OFFICIAL OCTOBER 2012 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE STATE OF ALASKA

CONNECT ALASKA®

October 1, 2012

Table of Contents

October 1, 2012

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

As the State Broadband Designated Entity, in partnership with the Alaska Department of Commerce, Community and Economic Development, please accept this submission from Connected Nation on behalf of the state of Alaska's State Broadband Initiative (SBI) Grant Program, known as Connect Alaska.

The Connect Alaska program and its collective stakeholder community continue to be faithful and energized contributors to the National Telecommunications and Information Administration's (NTIA) SBI program. Now more than ever, the significance of complete and validated data as compiled through the Federal Communications Commission's (FCC) National Broadband Map is instrumental in forging the innovation economy of the 21st century. As the Commission relies upon this unique resource to distribute monies under the Connect America Fund, through the Universal Service Fund reform, the Connect Alaska program equally values this data in informing meaningful program interventions relating to broadband access, adoption, and use initiatives. Truly, this coordination embodies the spirit of the SBI and demonstrates the joint effort of the NTIA, FCC, state governments, industry, and non-profits like Connected Nation as it continues to serve as a key tool for the American public and policymakers. We are proud of the role that Connect Alaska has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit broadband providers, consumers, and businesses nationwide.

The artifacts that comprise this submission should be found to be compliant with the October 1, 2012, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connect Alaska: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A: 4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)	n/a	Accuracy and Verification Report
n/a	DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a	n/a	List of Changes and Corrections to the Dataset
n/a	n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the April 2012 SBI data submission for the Connect Alaska program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on August 9, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance
New to the semi-annual submission for October 2012 is a more robust version of the ReadMe text file. As per the template released on the Grantee Workspace on May 18, 2012, this file contains a high-level summary of the items contained within the submission, including the exact file deliverables, a description of the errors and warnings from the Check

Submission report, and extraneous information of which the NTIA and other users of the dataset should be made aware.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the April 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That practice continues in this submission as technology and speed combinations are reviewed and scrutinized; any questionable information supplied by providers is reviewed more in depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

This October 2012 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for 100 percent of the Alaska provider community or 23 total providers. Among the 23 participating providers, 10 supplied an update to their network or coverage area(s), while 12 have reported no change. The remaining provider previously supplied data but was non-responsive in the October 2012 update effort; therefore, their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact record is contained herein.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connect Alaska principals that all commercially reasonable efforts were made to account for 100 percent of the known Alaska broadband provider community, pursuant to this semi-annual data update submission.

Connect Alaska has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Alaska conducts field validation efforts. To date, 19 (82.61 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connect Alaska website, (http://www.connectak.org), continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connect Alaska website encountered 2,585 unique visits during this reporting period (13,047 total to date for the life of the grant awarded on June 10, 2010). Additionally, this pronounced Web activity netted 2 broadband inquiries over this same reporting period (48 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connect Alaska website and the Connect Alaska interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connect Alaska mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Alaska to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connect Alaska has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

In conjunction with the Alaska Department of Commerce, Community and Economic Development outreach was conducted during this data update reporting period by Connect Alaska to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect Alaska website. During this reporting period Connect Alaska has developed a number of new relationships with statewide associations such as Alaska Fire Chiefs Association, Alaska Department of Fire Safety, and Alaska Association of School Boards to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. It became apparent that these relationships are beneficial to the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connect Alaska will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connect Alaska has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connect Alaska is also working hard to clarify CAI information associated with wireless broadband. NTIA has requested in-depth questioning of CAI listing a wireless broadband service as their sole form of connectivity. This follow-up allows us to better understand the reason for adopting the wireless broadband service.

From our work in Alaska, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connect Alaska efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connect Alaska program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Alaska, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,

Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

DATA ACQUISITION: ALASKA COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this sixth reporting period of the SBI, Connect Alaska, working in close coordination with the state of Alaska, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connect Alaska has continued to identify and process CAI data obtained through an ongoing statewide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connect Alaska through Esri ArcGIS software.

Connect Alaska continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connect Alaska website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the state as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the state client. Connect Alaska will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link:
http://www.surveymonkey.com/s/YD6MFC9

In addition to the survey, Connect Alaska has developed a number of new relationships with statewide associations such as Alaska Fire Chiefs Association, Alaska Department of Fire Safety, and Alaska Association of School Boards to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connect Alaska will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connect Alaska has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connect Alaska conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect Alaska continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect Alaska works with the Alaska Department of Commerce, Community and Economic Development to identify existing relationships that can support CAI outreach.

Connect Alaska has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Alaska project as well as self-awareness of their own CAI connectivity (specifically upload and download speeds). Connect Alaska will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, Alaska Department of Commerce, Community and Economic Development will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the state.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	712	712	712	425	290	278
Libraries	126	126	126	46	44	44
Healthcare	276	276	276	178	175	6
Public Safety	319	319	319	3	3	3
Higher Ed Institutions	20	20	20	8	8	8
Other Government	569	569	569	24	19	18
Other Non-Government	459	459	459	9	9	6
Total	2,481	2,481	2,481	693	548	363

During the coming months, CAI data collection will be supported by regular reporting to the Connect Alaska team. The CAI data is proving an invaluable resource to all components of the Connect Alaska effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on August 9, 2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.

Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the state of Alaska.

Inventory of Deliverables, Connect Alaska: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the state of Alaska have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Alaska as a polygon of the state boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development is underway at CN as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

Datasets for In-Kind Match

Connect Alaska received an Alaska Statewide Digital Mapping Initiative Orthoimagery dataset from the Alaska Department of Natural Resources as part of an in-kind match contribution to assist Connect Alaska with its mapping and planning goals - $177,933 in-kind match contribution.

The Department of Education and Early Childhood Development provided the Connect Alaska mapping initiative a school district speed test dataset as part of an in-kind match contribution to assist with its mapping and planning goals - $5,000 in-kind match contribution.

Alaska Field Validation Methodology

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets and Trips;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and
- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

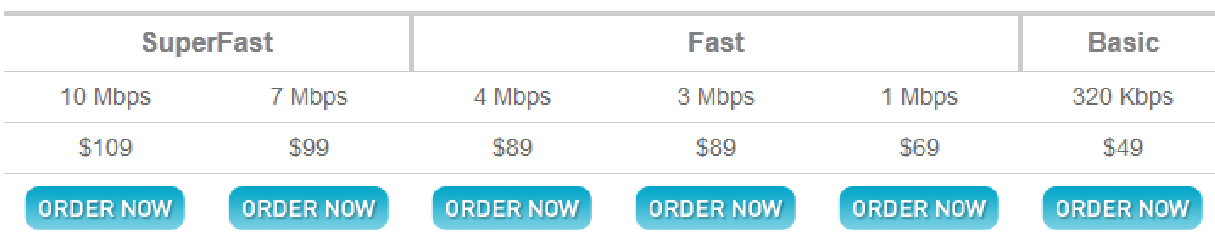
Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff conducted on-site validation tests in Alaska on the following providers: Ace Tekk Wireless Internet; AlasConnect, Inc.; Alaska Communications Systems Holdings, Inc. (d.b.a. ACS); Alaska Power and Telephone Company; American Broadband Communications (d.b.a. TelAlaska Long Distance Inc.), AT&T, Inc.; American Broadband Communications (also d.b.a. TelAlaska Long Distance Inc.); ATCONTACT COMMUNICATIONS; Borealis Broadband; Clearwire Corporation; Copper Valley Telephone Cooperative, Inc.; Cordova Telephone Cooperative, Inc.; Craig Cable, GCI Internet; Hughes.net, Ketchikan Public Utilities; Matanuska Telephone Association; SPITwSPOTS LLC; Verizon Wireless; and Yukon Telephone Company.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 19 companies (out of a universe of 23 viable providers) totaling 82.61 percent within the state of Alaska.

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on August 9, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

Alaska Communications Systems Holding, Inc. (ACS)
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.



SuperFast		Fast			Basic
10 Mbps	7 Mbps	4 Mbps	3 Mbps	1 Mbps	320 Kbps
$109	$99	$89	$89	$69	$49
ORDER NOW	ORDER NOW	ORDER NOW	ORDER NOW	ORDER NOW	ORDER NOW

Matanuska Telephone Association, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

MTA Matanuska Telephone Association

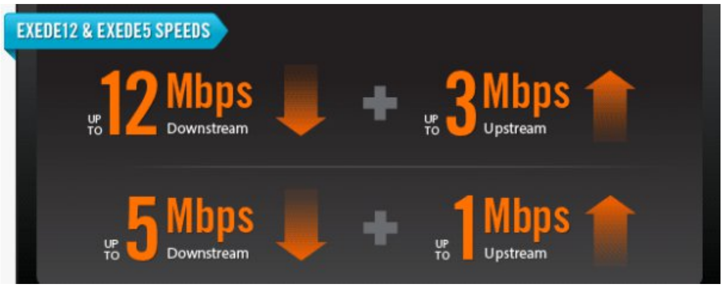
INTERNET PACKAGES | available when you also have **MTA PHONE** service

Download Speed	Usage				
	10GB	25GB	40GB	70GB	100GB
256K	$25				
768K	$40	$45	$55	$65	$95
2M		$50	$60	$70	$100
5M		$60	$70	$80	$110
10M		$70	$80	$90	$120
Additional GB	$5		$4	$3	$2

SPITwSPOTS LLC
Issue: Fixed wireless platform with maximum advertised download speed in tiers 7 and 8, as well as maximum advertised upload speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider website advertises 15, 20, and 25 Mbps download service; screenshot below.
Regarding upload speeds, provider could not be reached for confirmation prior to this submission; outreach will continue.

Extreme
15Mb Service..$154 monthly
20Mb Service..$205 monthly
25Mb Service..$250 monthly

ViaSat, Inc.
Issue: Satellite platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.



ACCURACY AND VERIFICATION: PROVIDER VALIDATION METHODOLOGY

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a statewide level, static maps of statewide and borough-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Estimates derived from provider-validated data indicate that approximately 8.25 percent of Alaska households do not have terrestrial fixed broadband service available, and approximately 6.31 percent of Alaska households have neither mobile nor fixed broadband service available.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 16.25 percent of rural Alaska households do not have terrestrial fixed broadband service available, and approximately 12.77 percent of rural Alaska households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard.
6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. omni-directional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).
15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).

18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).
23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hillshade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

BROADBAND INQUIRIES METHODOLOGY

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connect Alaska website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information requested by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at other such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,600 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connect Alaska project has received a total of 2 inquiries (48 grant inception to date). As more inquiries are submitted to Connect Alaska, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

My ConnectView Methodology

My ConnectView is an online, interactive mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connect Alaska project launched My ConnectView on April 2, 2012, and has received 643 visits this reporting period; to date the interactive mapping applications have received 2,000 visits.

Speed Test Methodology

The 262 speed tests that are represented in the Connect Alaska Speed Test Report during this reporting period (2,414 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Alaska speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for borough-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connect Alaska project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connect Alaska with the information on where broadband services are available. Second, unlike theoretical speed information which was received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the state of Alaska.

Providers Deemed Non-Viable

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the October 2012 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	650Net	http://www.650net.net	Offers dial-up only, except offers DSL as a reseller in California.
2	AAA Internet Service	http://aaainter.net/dsl	Dial-up service with nonfacilities-based DSL. Does not offer in Alaska on searches.
3	Access123.net	http://www.access123.net	Nonfacilities-based web engine reseller for multiple companies.
4	ACERX.NET	http://acerx.net	Nonfacilities-based reseller of 13 national companies with cable, DSL, and mobile wireless applications.

5	Airewaves Broadband, LLC	www.airewaves.com	Airewaves website is no longer a valid URL.
6	Alaska Wireless Cable	n/a	Provider is no longer in business; URL is inactive.
7	Alaska Wireless Systems	n/a	Provider is no longer in business; URL is inactive.
8	Angoon Cablevision	n/a	Provider is no longer in business; URL is inactive.
9	Arctic Slope Telephone Association Cooperative, Inc.	http://www.astac.net	Provider dos not meet the broadband speed requirements in download.
10	Bay Cablevision	www.bristolbay.com	Provider does not meet the broadband speed requirements in either upload or download.
11	Bristol Bay Telephone Cooperative, Inc.	http://www.bristolbay.com/	Provider does not meet the broadband speed requirements in either upload or download.
12	Broadband National	http://www.broadbandnational.com	Nonfacilities-based reseller of 30 national companies with cable and DSL applications.
13	Bush-Tell Inc.	n/a	Per CSR, they are local exchange services only; no website.
14	Camino-Net Internet Services	http://www.camino-net.com	No longer in business; phone and website are both inactive.
15	Circle Telephone Co.	n/a	Per CSR, they are local exchange services only; no website.
16	Communications Unlimited	http://www.cuicable.com/	Communications services company; does not provide broadband.
17	Core Communications	http://www.corecomm.us/	Printer and visual communications supplier.
18	deluxehost.com	http://deluxe-host.com	Company delivers web hosting services.
19	Denali Wireless Television	http://www.denalitelevision.com/	Nonfacilities-based web engine reseller for multiple companies.
20	DGUI	http://www.dgui.com/	No longer in business; phone and website are both inactive.
21	Dialer.net	http://international.dialer.net	England-based, international pay-as-you-go mobile wireless and hot spot reseller.

22	DTS-NET.COM	http://www.dts-net.com/	Non-facilities based reseller.
23	Echostar	http://www.echostar.com/	Does not provide service in Alaska.
24	Eyecom Cable	www.telalaska.com	Subsidiary company of Tel Alaska and Eyecom; does not provide broadband service.
25	Freedom Internet	http://freedominternet.net/	Dial-up services only.
26	Haines Cable TV	http://www.hainescable.tvheaven.com/	Company offers cable TV services only.
27	High Frequency Wireless	http://www.hfwireless.com/	Company is a reseller of GCI services and Clearwire and is an electronics repair depot.
28	Hoonah.Net	n/a	Information located on company is not viable; phone number inactive.
29	ICE Communications	http://www.ice-com.net	Information located on company is not viable; phone number inactive.
30	Imbris, Inc.	http://www.imbris.com	Nonfacilities-based web engine reseller for multiple companies.
31	IMGISP.NET	http://www.imgisp.net/	Nonfacilities-based web engine reseller for multiple companies.
32	Incredible Networks	n/a	Could not locate any information on company.
33	Interactiveinfo.com Inc.	http://interactiveinfoservice.com/	Performs internet search services.
34	iRadical	n/a	Could not locate any information on company.
35	ISPartner.net	n/a	Could not locate any information on company.
36	LCSisp.com	http://www.lcsisp.com/index.cfm	Dial-up services only.
37	Level 3 Communications, LLC	www.level3.com	Does not provide service in Alaska.
38	Lou's TV & Satellite Service, Inc.	http://www.lousatellite.biz/	Reseller of Wild Blue services.
39	MainBoard	http://www.mainboard.cc/internet.htm	Offer dial-up and a nonfacilities-based reseller of DSL, cable, and wireless.
40	Maine Cable and Wireless	http://www.mainecableandwireless.com	Could not locate any information on company.

41	Marcin Company	n/a	Could not locate any information on company.
42	MCI Communications Services, Inc.	http://www22.verizon.com/	Acquired by Verizon Communications, Inc. However no services available in Alaska.
43	Microcom	http://www.microcom.tv/	Reseller of Hughesnet, Starband, and Spacenet.
44	Millenicom Inc.	http://www.millenicom.com	Reseller of 3G and 4G mobile wireless services.
45	Mitkof.net	n/a	Information located on company is not viable; phone number inactive.
46	Nanomega.Com	www.nanomega.com	Information located on company is not viable; phone number and URL inactive.
47	NetAccess, Inc.	http://www.nas.net/	Canada business only provider with an array of services.
48	NetSpeed Online	http://www.netspeed-online.net	Could not locate any information on company.
49	Nook Net	n/a	Information located on company is not viable; phone number inactive.
50	Nushagak Electric & Telephone Cooperative Inc.	http://www.nushtel.com/	Provider dos not meet the broadband speed requirements in either upload or download.
51	Overarch Broadband	http://www.overarch.com	Provider does not offer service in Alaska; provides services in Treasure Valley, Idaho.
52	Pacific Internet Exchange	http://www.pie.us/	Provider is a web hosting company.
53	PremoWeb	http://www.premoweb.com/about_us/contact_us.html	Dial-up services only.
54	Qwest Communications Company, LLC	www.qwest.com/	Provider does not offer service in Alaska.
55	Sea Lion International, LLC	http://www.sealioncompanies.com	Provider funding was rescinded and there are no plans for project SABRE going forward.
56	Simply Dialup A Metrogeek Company	http://www.simplydialup.com	Dial-up services only.

57	Skagway Cable TV	www.hainescable.tvheaven.com	Cable TV services only.
58	SkyFrames	http://www.skyframes.com	Information located on company is not viable; phone number and URL inactive.
59	Smith Cable Systems	n/a	Company is a contractor for the installation of cable; no ISP operations.
60	Surferz.Net	http://www.surferz.net	Dial-up services only.
61	The Summit Telephone and Telegraph Company of Alaska, Inc.	n/a	Provider does not meet the broadband speed requirements in either upload or download.
62	Total Access Networks, Inc.	http://www.totalaccess.net	Supplies in-home solutions for multiple types of home networking and other types of services.
63	TransAria	http://www.transaria.net	Website points to backhaul provider, Cutthroat Communications; does not serve Alaska.
64	TSISP.NET	www.tsisp.net	Website search engine.
65	University Corporation for Advanced Internet Development	n/a	Nationwide GBit network for anchor institutions; network under testing and construction; no website found.
66	VPM Global Internet Services, Inc.	http://www.vpm.com	Reseller of HughesNet services.
67	Wireless Roanoke, Inc.	http://www.wirelessroanoke.com	Information located on company is not viable; phone number and URL inactive.
68	wisbin	http://www.wisbin.com	Reseller of DSL Internet service in Wisconsin; does not serve Alaska.
69	www.AmericanAngel.us	http://www.americanangel.us	Information located on company is not viable; website is a social website.
70	YEYZOO.NET	http://t1.vedy.net	Provider is a nonfacilities-based reseller of backhaul.
71	YLISP (Your Local ISP)	http://www.itsyournet.com	Nonfacilities-based reseller for local ISP companies.

APPENDIX A: BROADBAND PROVIDER LOG

CONNECT ALASKA

Broadband Provider Log

Complete	35
Non-Responsive/Refused	0
In Progress	0
Count of Datasets by Status	**35**
Total Unique Providers Represented	**23**

Provider Name	Platform	Status	NDA Execution Date	Notes
Ace Tekk Wireless Internet	Fixed Wireless	Data Added to Statewide Inventory		[AUG-08-12 Brian Dudek] Change: Provider added an additional transmission point to provide additional coverage to the NE around Olnes and Chatanika.
Adak Eagle Enterprises, LLC	Mobile Wireless	Data Added to Statewide Inventory	12/22/2009	[AUG-21-12 Brian Dudek] Change: New provider for October 2012 submission that previously did not reach broadband speeds.
Adak Eagle Enterprises, LLC	DSL	Data Added to Statewide Inventory	12/22/2009	[AUG-21-12 Brian Dudek] Correction: Provider altered Provider Name and Provider DBA.
AT&T Corp, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[AUG-21-12 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission. Clear expansion noted in Kodiak and Prudhoe Bay regions. Also increased speeds to tier 5 in HSPA+ areas.
GCI Internet	Fixed Wireless	Data Added to Statewide Inventory	2/25/2010	[AUG-09-12 Brian Dudek] Change: New provider platform that previously did not meet broadband requirements. Provider upgraded infrastructure in 14 locations.
Ketchikan Public Utilities	Fixed Wireless	Data Added to Statewide Inventory	1/8/2010	[AUG-23-12 Brian Dudek] Change: New provider platform for the October 2012 submission.
Ketchikan Public Utilities	Fiber	Data Added to Statewide Inventory	1/8/2010	[JUL-19-12 Brian Dudek] Change: Provider expanded fiber territory.
Ketchikan Public Utilities	DSL	Data Added to Statewide Inventory	1/8/2010	[AUG-22-12 Brian Dudek] Change/Correction: Provider expanded DSL territory onto island off the coast. Reduced the extent of other DSL coverage as provider indicated during validation trip.
Spacenet Inc.	Satellite	Data Added to Statewide Inventory		[SEP-04-12 Brian Dudek] Correction: Initial submission of provider's coverage, but they were in service previously.
SPITwSPOTS LLC	Fixed Wireless	Data Added to Statewide Inventory		[AUG-31-12 Brian Dudek] Change: Provider added additional transmission points for traffic layers and slightly increasing coverage on both sides of Kachemak Bay.
ViaSat, Inc.	Satellite	Data Added to Statewide Inventory	1/8/2010	[AUG-14-12 Brian Dudek] Change: New provider offering high speed service (Exede) for the October 2012 submission.
ATCONTACT COMMUNICATIONS	Backhaul	Backhaul Provider Only Processing Complete		
GCI Internet	Cable	Speed Only Update; Data Processing Complete	2/25/2010	[AUG-09-12 Brian Dudek] Change: Provider upgraded cable modem capabilities in Bethel to max advertised download tier 6 and upload tier 4.
Matanuska Telephone Association, Inc.	DSL	Speed Only Update; Data Processing Complete	6/15/2010	[JUN-14-12 Brian Dudek] Correction: Provider decreased speed tier from 7 to 3 in 1.5 sq.mi. area.
AlasConnect, Inc.	Fixed Wireless	No Update to Provide		
Alaska Communications Systems Holding, Inc.	Backhaul	No Update to Provide	6/2/2011	
Alaska Communications Systems Holding, Inc.	DSL	No Update to Provide	6/2/2011	
Alaska Communications Systems Holding, Inc.	Mobile Wireless	No Update to Provide	6/2/2011	
Alaska Power & Telephone, Inc.	DSL	No Update to Provide	2/26/2010	
Alaska Power & Telephone, Inc.	Fixed Wireless	No Update to Provide	2/26/2010	
American Broadband Communications	DSL	No Update to Provide	6/7/2010	
Borealis Broadband Inc.	Backhaul	No Update to Provide	2/1/2010	
Borealis Broadband Inc.	Fixed Wireless	No Update to Provide	2/1/2010	
Clearwire Corporation	Fixed Wireless	No Update to Provide	3/3/2010	
Copper Valley Telephone Cooperative, Inc.	DSL	No Update to Provide	1/11/2010	
Copper Valley Telephone Cooperative, Inc.	Mobile Wireless	No Update to Provide	1/11/2010	
Craig Cable TV, Inc.	Cable	No Update to Provide	7/27/2010	
GCI Internet	Backhaul	No Update to Provide	2/25/2010	
GCI Internet	Mobile Wireless	No Update to Provide	2/25/2010	
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
Kodiak Kenai Cable Company	Backhaul	No Update to Provide	2/7/2011	
OTZ Telephone Cooperative, Inc.	DSL	No Update to Provide		
Yukon Tech Inc	Cable	No Update to Provide	6/23/2010	
Yukon Tech Inc	Fixed Wireless	No Update to Provide	6/23/2010	
Cordova Telephone Cooperative, Inc.	DSL	No Update Provided - Use Last Submission Data		

State Broadband Initiative Mapping Methodology

For the State of Alabama

Revised September 30, 2012

CostQuest Associates

LinkAMERICA Alliance

Contents

Overview

This document provides an overview of how the sixth required data set was collected and processed for the State Broadband Initiative (SBI) in the state of Alabama.

This submission builds upon prior efforts to increase in state broadband mapping and planning capacity. Although each state has taken a slightly different path to building in house capacity, this cross-state partnership helps the LinkAMERICA team focus on comparable outcomes across the four states, where appropriate and support each state based upon the State's elected transition path. Our intent is not to make the states look and be the same, rather it is to leverage economies of scope and scale among the business processes while at the same time pursuing the longer term goal of transitioning sustainable program leadership to the respective states.

As our team completes the third year of the SBI program, more work has shifted to in state partners. Much of this work focuses upon the capacity building, planning and technical assistance components of the program. One immediate result of this is that in some of our states in-State partners have taken direct responsibility for the survey, validation and development of Community Anchor Institution information. The methods by which CAI data were developed are included as Appendix One. During this third program year we also anticipate at least one in State partner taking over the state web presence, both in terms of content and hosting. We also have States hiring in dedicated resources to support the program.

As expected, this document rests heavily on the prior drafts but has also been updated and expanded.

Significant changes include additions covering:

1. Trends in provider inputs
2. Modification to internal provider tracking
3. Increases in the amount of WISP coverage using propagation estimates
4. Requested changes based upon NTIA guidance
    a. Review of submitted speed with respect to NTIA supplied frequency table
    b. Review of NTIA speed guidelines and provider documentation
    c. Inclusion of Provider Universe Table (Appendix 4)
    d. Expansion of verification methods summary table
5. Transition planning with respect to capacity building within the State for Broadband map development (even while the technical data development components of the program continue to rest with CostQuest and the LinkAMERICA Alliance).

Treatment of the following subjects has been expanded:

1. Verification and validation
2. Data production methods

3. Provider advertised speed and coverage validation

As anticipated, the SBI program continues to mature and evolve. Technical leadership and strong program office guidance has been appreciated. We continue to focus resources on establishing stable business processes to track submissions, verify received and processed data, test for temporal stability and provide reporting deliverables consistent with NTIA expectations.

In our view, the mapping deliverable reflects (1) a good faith effort, which results in a reasoned response to the NOFA, Technical Appendix A, as well as supplementary program office guidance and modifications offered in phone calls, emails, and webinars, (2) a stable foundation for improvement and prioritization of both NTIA and state needs and interests , (3) a valid data processing model to support online mapping, consumer feedback, provider verification and reporting, and finally, (4) a valid use of the evolving data transfer model and its intrinsic validation methods. More importantly, the resulting data and online coverage maps that follow from this work are providing good input and context for the Broadband planning teams working across the states we have the pleasure to serve.

We also note that the mapping deliverable is increasingly important to state policy makers as each of the states we work with continues to assess the policy ecosystem that supports the advancement of broadband access and adoption.

We close this methodology document with 4 appendices. Appendix 1 refers to efforts related to Community Anchor Institutions. Appendix 2 describes data collection challenges. This section describes some of the open issues, challenges and questions we are exploring. Our hope is to receive clarification and counsel from NTIA in how best to confront some of these issues, which are likely common across states. Appendix 3 describes the confidentiality framework explained by NTIA. Appendix 4 details the provider universe, those providers found to be non-NOFA compliant and those providing data.

Purpose of This Manual

This technical document was developed to provide transparency in our data production process.

Our goal is to illustrate a thoughtful process designed to meet the intent of the submission. Our hope is that we have developed a process that is reasonable, with respect to the data it deals with, as well as flexible enough to change with evolving NTIA requirements and lessons learned from the Broadband mapping community.

Data Sources

Developing the Provider List

Broadband provider lists for all states were developed from the following sources:

- Prior comparable mapping/research efforts
- State lists of regulated telecommunications, cable and wireless service providers
- State and national industry organizations (i.e. cable associations, wireless service provider organizations, telecommunications associations)
- FCC Form 477 respondents
- Third party data sources such as Warren Media, Media Prints, American Roamer Coverage Right, GeoResults Wirecenter Boundaries.
- Independent web searches
- Interviews with key state staff members and important community influencers

As one would expect in a dynamic marketplace, provider identification is an ongoing and important component of our work. Mergers and acquisitions, the use of multiple regional DBAs, the lack of any universal identity management attribute, and the generally complex parent-subsidiary structure of many telecommunications companies, make provider identification and tracking very challenging. Because of this dynamic environment, the Provider list is reviewed on an on-going basis and changes are made as necessary to ensure that the list remains current.

At the start of each round, email and telephone contact is made to all known providers. This time consuming, but necessary, process ensures that the list of contact persons remains current, and that providers are aware of data request changes and deadlines associated with each round. Where necessary, we execute new NDAs with providers. We maintain this communication with providers throughout the Data Collection period, providing multiple paths and opportunities for participation in the program. Providers that respond too late to be included in the final dataset are flagged for inclusion in the next submission. Unresolved data concerns are also flagged and tracked so that we can begin working on a plan for resolution prior to the next data collection round.

As contact is made in each round, we qualify each provider by asking a series of questions regarding the type of service and speeds offered. If the provider does not meet the minimum specifications for a

Broadband provider (as defined in the NOFA) we make a note of the change in status.[1] Providers remain on our list and are included in program communications so that in the event that their service is upgraded or expanded their status can be updated accordingly.

Provider Outreach

To meet the program's aggressive deadlines and participation goals, LinkAMERICA believes it is critical to maintain rapport with providers. To do this we reach out to providers with regular project communications, including a program newsletter and links to the various State mapping websites. In several states we have participated in trade association and policy summits.

As described above, individual e-mails and/or telephone calls are made to all providers explaining the status of the program and requesting their continued support. In some instances we've also had the opportunity to support providers in their BTOP / BIP applications. Through these collective outreach initiatives, and our engagement with various industry associations, we continue to enjoy a healthy and appropriate relationship with Broadband service providers.

NDA

To provide protection for all parties involved, LinkAMERICA continues to honor the terms of our NDA. If providers did not execute the NDA in previous rounds they were offered the opportunity to do so in this collection round. New providers were of course also supplied with a copy of the NDA.

To facilitate the execution of NDA's, LinkAMERICA continues to use the DocuSign online document management solution. This system allows providers to review and digitally sign the NDA in a legally binding manner, and has been instrumental in achieving rapid approval and execution of NDAs with the majority of providers. In some cases, NDA's were individually negotiated to address specific provider concerns. In all cases, minimum standards established by the NOFA are honored. In other cases, providers chose to submit data without executing an NDA.

Provider Survey

Since five prior rounds of data collection have been completed, the LinkAMERICA team has a solid base of coverage and speed information with which to begin Round 6. This allowed us to provide flexible response options to participating providers. One option allowed them to review check maps of their coverage and speed data – submitting only corrections and additions to the existing dataset. (For provider convenience the check maps were created in both PDF and Google Earth (.KMZ) formats.) The second option was to allow submittal of completely new datasets, either in tabular form or in multiple other digital formats. For those without CAD or GIS systems, we continued to allow the submittal of printed/scanned maps and other written materials.

[1] As with other Grantees, we struggle with appropriate and consistent classification for service providers who opportunistically provision Broadband services. In this submission we continue to bring them into the analysis as a provider type "other". As the inclusion of this category isn't our primary goal, we are working to process data as we can. We are similarly categorizing and retaining reseller information. Appendix 4 illustrates the categorization of non Broadband providers within our provider tracking and verification systems.

Survey Methods

Once again, we used a secure digital survey process (via our provider portal websites) to collect and display information for providers. The Round 6 survey process was designed to accommodate both new and returning providers, and the different types of information they would be submitting. The following is a summary of the process encountered by each group:

New providers: New providers were routed directly to our standard survey where they were provided with templates for uploading data in tabular NTIA-compliant formats. As in previous rounds, if providers could not supply information in the requested format, alternatives were offered. These alternatives included uploading service-area boundary maps, exchange area maps, CAD drawings or customer address lists. From that information, the LinkAMERICA team developed a geographic representation of coverage and was able to build coverage features for each provider.

Returning providers: For Round 6 we continued to work with participating providers to improve their datasets. Check maps continue to be a useful tool to show providers how their area would be displayed on the resulting interactive state map and to get constructive feedback regarding corrections and changes that need to be made to their coverage and speed data. Generating these customized documents in each round is an extremely time consuming verification process, but it allows us to close many of the gaps that might have otherwise persisted.

Follow Up

After the release of the Round 6 survey in early July 2012, LinkAMERICA launched an extensive effort to encourage responses. Every known provider was contacted at least twice during the months of July and August. The initial data submission deadline was set for mid-August, but we continued to accept "straggler" submissions into September.

No Response Policy

As mentioned above, every effort was made to contact each provider who appeared on our initial list. However, if no current information could be found on the company (i.e. no website, no valid phone number, and no contact person identified) they were removed from the list of "known providers". We believe the vast majority of those we were unable to reach were providers who have simply ceased to exist[2]. If we verify that a company is a broadband provider still doing business and are not able to get a response to our request for data, we make note of that in our datapackag.xls, and continue to reach out to encourage participation.

Summary

In summary, an intensive 45-60 day provider outreach and data collection process is initiated at the beginning of each round. In Round 6, given the data vintage of June 30, 2012, we began this process in June and the last submissions were accepted in September, 2012.

While we continue to successfully engage the majority of providers in each round, the amount of manpower required to solicit complete and timely responses should not be underestimated. This process is one of the most costly and complex within the entire SBI program.

[2] The list of known providers and important submission statistics are contained in the datapackage.xls file.

Third Party Data Used

We acquired the following commercial/restricted use data products:

- American Roamer, Coverage Right Advanced Services (tabular). This data served two purposes. The first was to verify the provider list and help find Broadband service providers not on other lists. The second was to verify the reasonableness of the Broadband service provider's submission.
- GeoResults Wirecenter Boundaries. This data was used in the verification of 'telephone' Broadband provider data. Where a public domain exchange boundary wasn't available, the boundary was used for coverage containment tests.
- Media Prints Cable boundaries. This data was used in the verification of Cable/HFC Broadband provider data. It was used to research valid providers and discover if that provider was offering Internet service. FCC 477 restricted use data were analyzed to find valid providers within a given area.
- Proprietary Provider Serving Areas. Since the first survey, a number of providers have supplied their engineering, serving area and/or franchise boundaries. We have maintained and enhanced these proprietary data sources.

We have included third party data sources which touch on each of the three major technologies analyzed within the SBI program. Each of these data sources tie back to a public domain data source, which provides a cross-verification mechanism for the commercial data product.

Although there are a large number of third party licensed data sources available, we remain conservative in our acquisition plans. From our limited analysis we are concerned about the ability to cross-verify additional third party licensed sources against public domain data. Further, we are unsure of how we may be able to integrate another data provider's view of valid Broadband providers within the definitions used by the NOFA (e.g. Are they using an FRN/DBA identity view or a marketing view? Can the provider supply in a 7-10 day window? Are they facilities based or not?). This leads us back to a statement we made in a 'lessons learned' Webinar (April 2010) about exploring a consortia to lower the cost of data acquisition and allow multiple entities to peer review the quality and methodologies behind licensed data products.[3]

Beyond these commercial data sources, we used a number of public domain sources. These included:

Geographic Data Files

- US Census TIGER data[4]

Sources that helped isolate providers, identity management or provider service areas

- NECA Tariff 4
- State produced exchange boundaries
- Carrier produced wirecenter boundaries (sometimes proprietary to provider)

---

[3] We also suggested forming a technical standards committee and a consistent system for confidence reporting.
[4] Census data were derived from < http://www.census.gov/cgi-bin/geo/shapefiles2010/main>, Census 2010 files. Roads were derived from the county faces and edges file downloaded at the same location and tiled for a full state.

- FCC Coals reports (321/325)
- FCC FRN API lookup tool
- FCC/FAA Antenna Registration System
- FCC FRN Lookup Tool (plain text search)
- USAC High Cost FCC Filing Appendices

Sources that helped isolate anchor institutions

- USAC Grant lookup tool
- USAC High-Cost FCC Filing Appendices
- HRSA data warehouse
- NCES data lookup
- State managed lists of schools (K-12), post-secondary institutions and libraries
- List of museums, conventions, and visitors bureaus from www.onlineatlas.us
- In state relationships to key stake holders.

Finally, challenges exist when dealing with the inevitable conflicts between provider-submitted data and third party sources (public or commercial). There is no guarantee third party sources are more accurate or timely than the providers' own reports. Indeed, some third party sources are based upon different standards than those specified in the NOFA, perhaps making them less reliable than information collected directly from providers. At the very minimum, provider data has a lineage and temporal status that we can identify. A concern we have with increasing use of third party data is that we have no way to verify its quality or development methodology. Particularly in rural areas we are concerned about what third party data may reflect based upon what we assume to be a small sample of information.

In other words, we may hit a wall in which we can't determine how the commercial source derived its coverage conclusion. To us this means that third party data sources are beneficial, but represent a supplementary view, not an authoritative one, of the NOFA defined Broadband market.

In short, we have chosen to use provider data as the baseline. We will challenge provider reports when third party data shows major anomalies, when submitted data conflict with prior submissions or when a consistent volume of consumer feedback points to a potential error.

Confidentiality and the Use of Licensed Materials

As a mapping vendor, we are reliant upon the cooperation of Broadband service providers. In large part, what underlies this cooperation is trust that we will not violate the proprietary and confidential nature of the data provided to us.

We are thankful for the confidentiality clarification that NTIA shared with us (included as Appendix 3). We use this as a guiding document to help us communicate with providers about what information NTIA considers to be confidential. Our suggestion is that NTIA publish this, or something comparable, to ensure a consistent interpretation of the NOFA and how it guides NDAs.

As some providers are non-responsive to requests for information, or lack resources necessary to put data into NTIA compliant formats, we have fallen back to the use of commercial data sources in several places.

For incumbent telephone providers we have used commercial wirecenter boundary products to filter Census Blocks and segments that are clearly out of their exchange areas. For cable providers we will use an estimate based upon Census Designated Places within MediaPrints named areas.

Public Engagement: Crowd Sourcing, Surveys and Social Media

Crowd sourcing (i.e., an intentional and carefully designed effort to tap into the collective intelligence of the public at large to expand our knowledge base) continues to be an important element of our data collection and validation process. An expanding use of social media is also an important strategy in our efforts to promote the state programs overall and engage more citizens in the work at hand. In addition to the various opportunities the public has to provide input via the online service coverage maps and the related 'Broadband story' process, our crowd sourcing efforts are grounded in a time tested telephone survey approach focused on the consumer market. In addition, we continue to advance our process to include certain initiatives centered in two social media outlets – Facebook and Twitter. These initiatives are discussed below.

Consumer Surveys

Working under contract for the state of Alabama in 2009, our initial consumer survey was performed before the NTIA SBI grant was in place. Subsequent consumer surveys funded by the SBI grant were hosted in 2010 for the states of Idaho, Wisconsin and Wyoming and then again in 2011 for Alabama (as noted below). These surveys will be repeated after two years to establish and evaluate trends. These primarily telephone based surveys include two distinct and carefully scripted tracks: one for Internet users and one for non-users. The telephone survey approach allows us to reach the non-Internet user group as well as the current Internet user. A secondary online approach is also used to augment input from current Internet users. In the most recent Alabama survey we added a third tier to our approach as we equipped local field survey teams with an iPad-based survey tool and targeted their time to reaching the younger market. For non-users, the surveys help determine why they don't have or don't use Broadband. For current Broadband users, the survey helps determine the nature of their Broadband access and how they use that connectivity in their daily lives. In addition to our state-specific surveys a nation-wide survey was also hosted to provide a broader view of consumer views for comparison purposes. State-specific surveys are, where possible, framed to match the state's regional Broadband planning structure (e.g., the updated consumer survey in Alabama was designed to produce results relevant to the state's twelve Broadband planning regions).

The resulting data is helpful on a number of fronts in the SBI's mission to advance the access and adoption to Broadband. Survey data provides an important, albeit broad, gauge for assessing coverage information obtained by providers. For example, areas with widely available coverage (according to provider information), but lower consumer subscription levels (according to survey results), or perhaps where survey results suggest Broadband is not available, can be examined in more detail. Survey results

are also very important to the broadband planning (and capacity building) components of the SBI program in that they help inform and formulate Broadband advancement priorities. Survey results also help inform Broadband policy discussions on both the local and state levels. Finally, survey results provide important information to the service provider community regarding market demand and specific Internet use in specific communities (i.e., regions).

Our ongoing consumer survey process adheres to a consistent process. For example, consistent with prior practice the 2011 Alabama survey was launched in June 2011 with a test number of survey calls to confirm (and adjust as needed) the structure of the survey and the underlying survey process. Our surveys typically run for three to four months. All telephone surveys are completely random beginning with the acquisition of a list of state-specific, randomly selected landline telephone numbers. Mobile phones are not typically included in the surveys. Upon evaluation of the survey statistics, auxiliary surveys are executed to ensure appropriate representation is achieved on both demographic and geographic fronts. For example and as noted above, the recent Alabama survey was augmented with a field effort to ensure the younger demographic (i.e., age 18 – 25) was adequately represented. This secondary step is required because of the continued migration (by younger markets) to non-landline based communications. This younger market is also surveyed by reaching out through social media outlets (primarily Facebook and Twitter) to encourage their participation in an online survey process.

As noted above, our telephone survey process is augmented by providing online access to the survey. Participation in the online survey is promoted on all of our state-specific public web sites and selected social media.

As a final relevant point with respect to the consumer survey process the length of the survey is noteworthy. By survey standards, these tend to be long surveys. The surveys typically average just over fifteen minutes. While this clearly contributes to the number of survey call attempts that were required to reach the level of statistical validity, it is not insurmountable.

Social Media

The phenomenon of social media is widely documented and yet still emerging as an effective access point for public engagement. We continue to explore appropriate ways to use a variety of social media venues in our SBI efforts. All of our efforts are informed by and consistent with relevant state statues and guidelines. Different states have different perspectives on if and how the state will participate in the use of social media. Some state requirements are well defined and some are still being formed. Where appropriate, we use LinkedIn, Facebook and Twitter to support our work. A central focus is on promoting awareness of the program and seeking to expand engagement. In some situations we find that sub-program initiatives (e.g., regional planning teams) are making very effective use of Facebook to help inform and engage citizens impacted by the SBI program. As noted above, we are able to promote additional input on the consumer surveys through a social media outreach program aimed at our younger market segments.

In addition, we continue to evaluate how Facebook and Twitter can be used to drive public input on two important crowd sourced issues: online speed tests and input on map accuracy. Based on data obtained

through our web site traffic monitoring process and readily available social media tracking processes, results are promising.

Capacity Building and Transitioning to State Partners

A fundamental goal of LinkAMERICA has always been to transfer knowledge and capacity to our in-State partners.

Within each State, transition planning and responsibility for specific activities is on a slightly different timeline. Much of this is driven by resource availability and partner identification within the State. For example we began transitioning the responsibility for Community Anchor Institution data to the State of Alabama in Round 3, starting with the use of interns to validate Community Anchor Institution data. In Round 4 the state's responsibility expanded to include collection of all CAI data, and in Round 5 the effort culminated with Alabama assuming responsibility for the CAI submission. LinkAMERICA supported this process with detailed transition documents and technical support.

Alabama plans to continue the transition process though the end of year 3 assuming more responsibility for the interactive State maps and website. In Idaho the SBI Framework Coordinator took on the responsibility of reaching out to CAIs in round 5. In round six the outreach became more relationship based and face to face. Other States are looking more towards program year 4 and/or the in-State hire of a Broadband Coordinator as the initiation point to support their transition efforts. Broadband Coordinators were brought on board in both Idaho and Wyoming in year three. An open position was recently filled in Wisconsin. Alabama has had a broadband coordinator in place for nearly two years.

Data Sharing With Other States

Where possible, LinkAMERICA works to share data with other state mapping entities. This data exchange tends to take two routes.

First for wireless providers if we find a fair amount of coverage that crossess into an adjacent state, we will ask the provider's permission to convey this information to the neighboring states. If the permission is received, we send the data to the mapping agency.

Second, in circumstances where we receive a speed that is outside of the technology speed 'norms' and this provider offers service in another state we try to check with other covered states to find out if the service is comparably marketed.

Trends in Submitted Data

Overall we note several important trends in this data submission. The list below represents general trends and not a scientific survey.

We note the following trends:

The coverage of advertised speeds is increasingly important. More and more providers are specifically concerned about where the submitted NTIA footprint shows available of 4 x 1 Mbps or 6 x 1 Mbps service.

Large national providers are beginning to submit block level speed information. In round 6 AT&T submitted block level coverage and speed. Other national Wireline providers, such as Frontier improved their submission based upon the completion of system conversion of acquired properties.

xDSL speeds are increasing. More and more xDSL is likely ADSL 2+, VDSL, shortened loops, pair bonded or some combination of these. As we talk to providers who trigger speed/technology tripwires, we receive more and more feedback about the presence of these new technologies to enable speeds comparable with DOCSIS systems.

DOCSIS 3 is becoming the norm. Most cable systems are becoming DOCSIS 3.0. Over time we are seeing the DOCSIS 2.0 areas diminish. In some DOCSIS 3 areas there tend to be pockets of non DOCSIS 3 in predominant DOCSIS 3.0 markets.

There seems to be an increase in acquisitions among fixed wireless providers. A large consolidation with respect to T6/Digis/Skybeam/JAB has changed the provider landscape in several of our states. As much of the system consolidation has not yet taken place our coverage remains largely in tact but we anticipate changes in the next submission.

Fixed wireless providers are offering broadband services approaching 1 Gbps. This is occurring both in terms of licensed and unlicensed spectrum. Part of this is driven by where a provider has fiber or high capacity wireless backhaul but we are receiving more and more information from providers and radio manufacturers specific to very high speed wireless services. Although the service can be deployed within the 7-10 day NOFA window, these higher speed services tend to be purchased by high capacity customers. It may be worth reconsidering the speed norms in this category as well as adding a field in the datatable to indicate when a speed value is geared toward a specific end-user class.

There is less and less of a distinction between fixed wireless and mobile wireless. As firms market LTE and/or WiMax as home DSL alternatives we are a bit unsure how these two classes are to be established-what is the operating distinction between Transtech 80 (mobile licensed) and Transtech 71 (fixed licensed) when both are used as in in-home Broadband service?

Satellite providers are advertising broadband services exceeding the speed ranges in the data model. Further the spectrum used isn't available in the NTIA data model.

We continue to see a number of national Broadband providers who do not show broadband coverage within pockets of otherwise covered areas. In the figure below, the orange represents Census blocks which are NOFA broadband covered. The transparent areas have no NOFA broadband coverage from the same provider.

Figure 1--Uncovered pockets within urban, covered areas

This coverage drop-out appears to be happening in urban Census blocks typically with schools, shopping malls, universities and large businesses. We don't know what his is happening, but it could be an impact of the NOFA restriction on 7-10 provisioning. This is a noticeable artifact in the data and does challenge the notion of some who see NOFA compliant Broadband coverage as a uniform surface across an area.

Data Production Process

To support our objective of transitioning the data development process to our State partners, we continue to model, refine and document our data production process. We find this to be a very beneficial step for two purposes.

First, it helps us understand why (and if) a task is being done, and if it is being done efficiently. Much of this program started so quickly that it was difficult to plan logical integration and hand off points among the various workgroups. Further, we are currently in the process of consolidating much of the process data (check-ins, check-outs, metadata) and we can use this process model to efficiently plan cohesive information architecture.

Second, our process documentation and modeling helps explain why resources are being consumed in a particular way. This helps our State partners plan for in-sourcing specific tasks as their time and

budgetary constraints allow. It also helps our LinkAMERICA team better plan and cross-train members to deal with the work surge that occurs 30-45 days prior to submission.

Finally, documenting and modeling our process helps us to take advantage of increasing specialization and proficiency with certain types of data and management responsibilities. In submission 3, we had identified data “czars” responsible for check-in and check-out of data. That data czar helped to bridge the gap among receipt functions, provider feedback, production and DBA. In round 5 the data czar was also tasked with alerting on speed/technology tripwires. This individual was responsible for taking the initial review of each submission and determining if an NTIA speed/technology warning would be triggered.

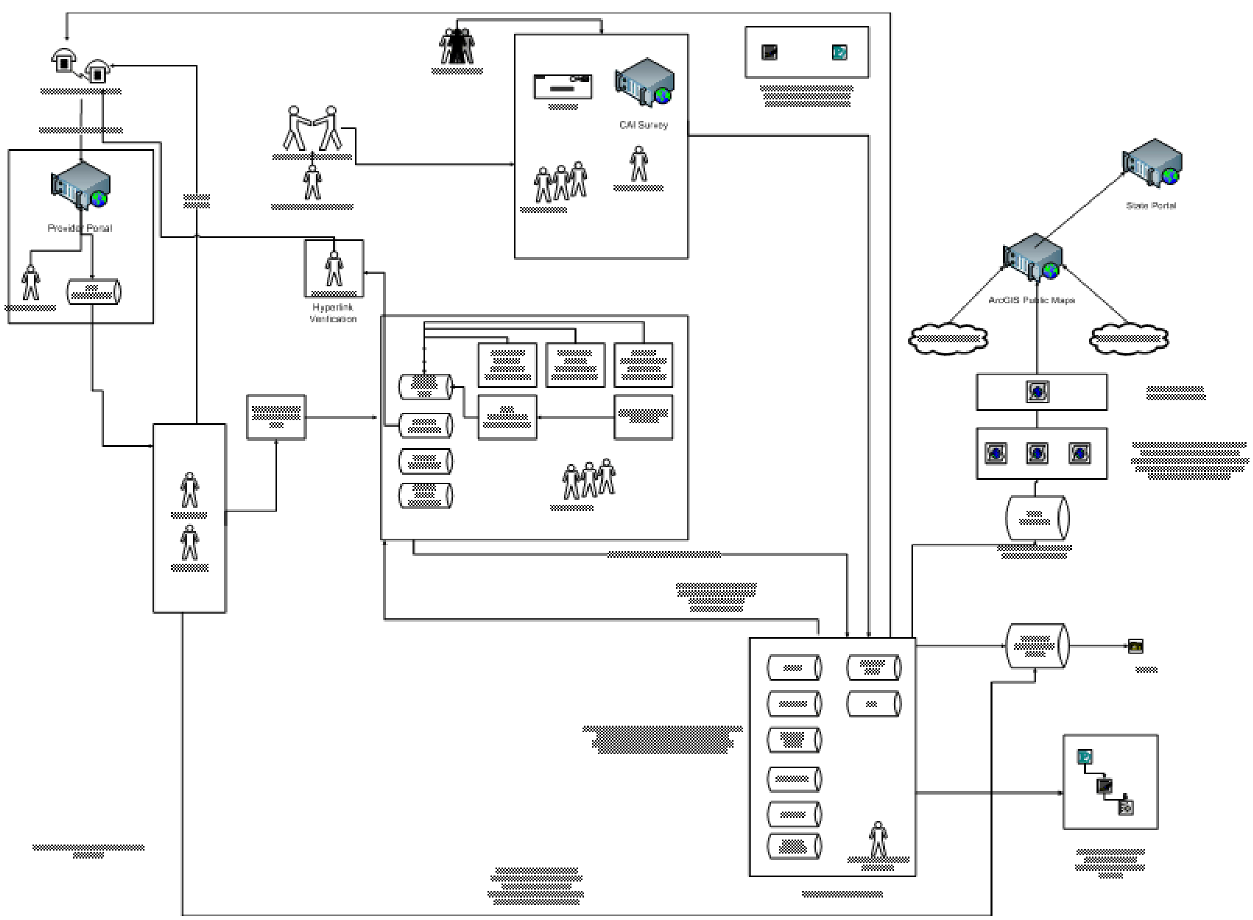


Figure 2—SBI Data Development Business Process Diagram

Provider Tracking In the Cloud

Prior to initiating the Round 5 survey, LinkAMERICA transitioned in house provider tracking systems to a Cloud based application, TrackVia.

The movement away from desktop solutions was based upon several factors. First, the architecture these systems were designed under no longer met the program realities. For example, deliverables like

Datapackage.xls were not contemplated when the original provider tracking system was developed. Second, the ability to share data across multiple geographic areas and organizations was becoming increasingly important as the program evolves and responsibility moves to in-State partners. Third, portions of this data need to securely transition back to State resources who may or may not be able to support a specific IT infrastructure. These factors combined to make the Cloud applications a valuable alternative.

As with any IT transition, the process has not been without challenges. Nonetheless the investment in time and resources has proven to be effective and worthwhile. We anticipate further movement away from desktop oriented architecture to a more open, Cloud type solution.

Data Production Methods

As raw data were received from the provider community, attention turned to normalizing the disparate submission formats[5]. The team considered each submission with respect to the following criteria. These criteria are important because they perform the basis for our verification and quality assurance process. In other words, we have to appropriately scale our data verification efforts to match the scale or ambiguity of the following:

- Locational certainty
- Speed certainty
- Temporal certainty
- Provider and network ownership certainty

The team's goal was NOT to quantify a particular degree of precision with respect to any of these criteria. Rather, we are working to attribute the above "certainty attributes" to each submission, and will continue to implement quality assurance and verification mechanisms that are resource-appropriate for each.

Deriving Broadband Coverage Information

Broadband Coverage[6] was normalized into four formats:

1. Coverage in Census Blocks (2010) of 2.00 or less square miles
2. Covered Street Segments (2010) in Census Blocks greater than 2 square miles[7]
3. Address Level Coverage (point data)
4. Wireless Service Areas (SHP file format)

---

[5] In line with NTIA Best Practices we continue to request and receive a large number of data input formats. This ranges from tabular Block lists to hand drawn maps.

[6] Speed, Anchor institutions and Middle Mile facilities are discussed in later sections.

[7] To help clarify issues relating to Census block area and vintages in use, our team published a technical paper to the Grantee workspace. Because we were unsure if this standard should be implemented uniformly, this document was never distributed to the provider community.

With each submission, the team went through a series of steps to normalize and categorize the data. Since data arrived in many different formats, and at many levels of granularity, the following normalization procedures were used:

- Determining the nature of service being provisioned (who is providing service and what technologies are in use)
- Planning an attack strategy for the submission –understanding the data and assigning team members to various tasks
- Alert provider relations staff if the received data trigger an NTIA speed/coverage tripwire.
- Geo-referencing the data; QA the geo-referenced data
- Geoprocessing the geo-referenced response
- Segregating the submission into the correct NOFA-compliant submission formats.
- Apply appropriate source metadata[8]

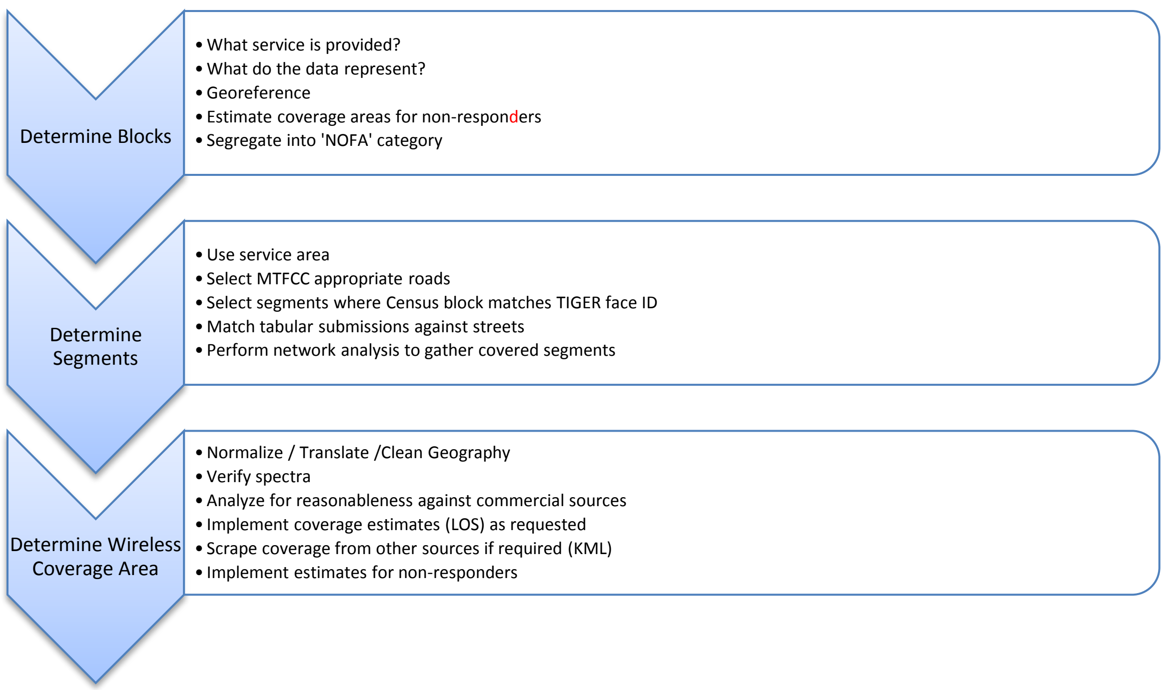


Figure 3-Components of Broadband Coverage Process

Impact of Program Change

There were several important program changes that impacted how Broadband coverage was developed and submitted to NTIA in Round 6.

[8] When our team logs a submission into the staging database we record at least two attributes. One records the method used to derive the coverage, the other records the method by which speed was attributed to that object. Other attributes carried to NTIA carry source meta values as well.

Speed Examination

Given recent concerns about the depiction of speed and what that mapped speed represents, LinkAMERICA invests considerable time requesting detailed information on speed which appeared to be beyond normal speeds for a given Technology of Transmission given the NTIA supplied frequency tables.

Based upon these conversations we learned

A) For incumbent telephone providers; the speeds beyond the normal xDSL range represent significantly shortened copper loops, as well as upgrading DSLAMs and modems to support ADSL2+ or VDSL.

B) For cable providers the intermixing of DOCSIS 3.0 and non 3.0 systems in a market area is typical and sometimes reflects a circumstance where segments of plant cannot be upgraded to DOCSIS 3.0. This variance can be at a level below the Census block. In these cases the maximum advertised speeds remain to represent the market area but the plant variance is typical. We also have one 'cable' provider who is delivering DOCSIS 2.0 over fiber plant.

C)There exists a fundamental disconnect between some providers reporting a service qualified speed--the maximum speed available at a structure versus other providers submitting their maximum speed at the market (MSA/RSA level). Both submission paths are available to providers but the likelihood of providing a speed incompatible with a technology is much greater for providers submitting market level speed.

D)Fixed wireless provides are using new radio technology to quickly deploy services which rival and sometimes exceed those of wireline service providers. These speeds are being advertised, sometimes on public facing websites as well as using direct field sales staff to target specific high demand customers. These services are actively marketed but they challenge the data model in that the speed is marketed and available within 7-10 days of request but the nature of the fixed wireless submission forces attribution of this speed within a potentially large geographic area.

E) There exists a minority of providers who submit a theoretical speed that is unmatched by their web advertising. In these cases we request clarification from the provider on the inconsistency. Our experience has been that providers will modify the speed to be consistent with their marketing and advertising.

F) The maximum advertised speed offered is not always clear. Sometimes the speed is described in advertisements in terms of a combination of video and data. Other times it is data not video. Some providers allow a customer to select how much bandwidth they want to allocate to their data stream versus video stream. In other words the bandwidth available to a household is constant but how it gets allocated among the data versus video becomes a customer or service directed choice. This makes getting Maximum Advertised Downstream speed very difficult because it is not just a product of the broadband network which we are mapping but also the customer's selected service package.

Provider Definitions

Within our provider verification process we work to derive a state level provider match against third party data sources. As discussed in the early pages of this manual, there is no guarantee that a third

party data source is any more accurate than submitted data, nor does it necessarily reflect the provider ecosystem specified in the NOFA, Technical Appendix A. We devote significant resources to matching our submitted data against outside data sources. In many cases this becomes a judgment call trying to match provider names across systems. It is a difficult and somewhat arbitrary process. Nonetheless we do believe it has value because it forces a re-examination of who we believe is an appropriate provider within a non-NOFA context[9].

The use of a provider match system, as well as the webinar comments (3/17/11)[10] directing grantees to estimate, wherever possible, non-participating providers have made us back away from one of our fundamental assumptions in data collection. As discussed in prior versions of this manual, we had developed a certain "hold-out" class of data when a provider's data wasn't of sufficient quality to verify, or we were unable to put it into the data model (e.g. address points submitted for fixed wireless). In submission four, much of this hold-out data was included[11]. In some cases this involved using simple polygons to capture a wireless ISPs serving area. Other times, if we are confident in the coverage, but can get little clarification on the submitted speeds or frequencies, we release the coverage and note in our internal metadata the source issues with the other attributes.

In the weeks leading to submission 5 we received a request from NTIA to clarify the presence of unusual shaped wireless polygons. Our interpretation of this was a request for information relating to the source of these data which do not appear as propagated coverage. Although the 'unusual shapes request' represents a very small portion of the submitted data, it begs an important question about the expectations with respect to wireless coverage patterns. We look forward to working with NTIA to address these issues in a fair way across States and providers. We would not want to create a coverage dichotomy where advertised coverage was disallowed from the NTIA submission because of an expectation about how advertised coverage should appear. One concern we have when we develop a coverage estimate which differs from a providers advertised coverage pattern, which should we submit?

Finally, we use the provider type classification of 'other' to bring specific aspects of certain provider's data into our submission. There still seems to be confusion on how to handle provider types where a provider offers multiple paths to provision Broadband for typically business customers. Rather than waiting for certainty on the answer, we bring the provider in and list them as provider Type "other". Our sense is provider Type "other" will continue to expand in subsequent submissions.

Clearly one challenge is the data, but an equally significant challenge is appropriate messaging around this "other" provider type category. We do not want to leave consumers with the impression that they

---

[9] We have requested from NTIA information on how provider matching is done within their QA process; beyond the relatively short whitepaper posted with the national map <http://www.broadbandmap.gov/blog/wp-content/uploads/2011/02/DataComparison_Methodology2.pdf>, we have not received any more detailed information on how providers are cross verified between submitted and third party sources at the national level. Our understanding is licensing concerns are holding the release of this information.

[10] Clarifying comments from Akins Lawl indicate the Program Office does not want Satellite providers estimated if the provider is non-responsive to data requests (email 9/12/12).

[11] We continue to process older submission data looking for information and methods by which we can estimate coverage information. This will be an ongoing process.

can get a high capacity fiber or microwave link despite the fact that the hospital next to them or in a nearby Census block can get this service.

After the April 2011 Grantee conference, LinkAMERICA submitted a paper describing our provider classification system[12]. It is our feeling that understanding the type of provider is essential to appropriate verification methods.

Coverage Geoprocessing Methods

The next section discusses how data were georeferenced and geoprocessed given a particular submission format. We have yet to find a particular method that works across all submissions. Rather we tend to tailor our geoprocessing to meet the specifics of the service provider and data submitted.

In most cases, in Round 6 we were not provided with street segment geographic objects for Blocks greater than two square miles (large Blocks). This necessitated subsidiary geoprocessing. As stated before, our first goal was to derive block level coverage. Then, for Blocks greater than 2.00 square miles, we moved to a segment gathering processing. The segment process will be described in the last section.[13]

Block Level Coverage Derivation Using Service Point Data

A number of providers submitted point level customer data.

In some cases the submissions themselves were not internally consistent. For example, in the image below, unprojected points are shown, while the Census block polygon to which the points are supposed to "belong" is highlighted. In this case, one of the following scenarios has occurred: block attribution is wrong, the points are not in the location to which they are attributed, or different block shapes were used than what is assumed.

[12] https://sbdd-granteeworkspace.pbworks.com/w/file/42309493/provider%20ClassificationFINAL.docx

[13] As has been discussed previously, we note inconsistency in how providers are supplying information at the block and segment level. Beyond the temporal differences, we see that providers are computing area differently, as well as including or excluding water areas. This provides an inconsistent measure across providers for the 2.00 sq mile cut off. Our preference would be to provide guidance to service providers within our states, but our concern is that we will inconsistently message this with grantees in other states. We would appreciate consistent guidance from FCC/NTIA on this topic.

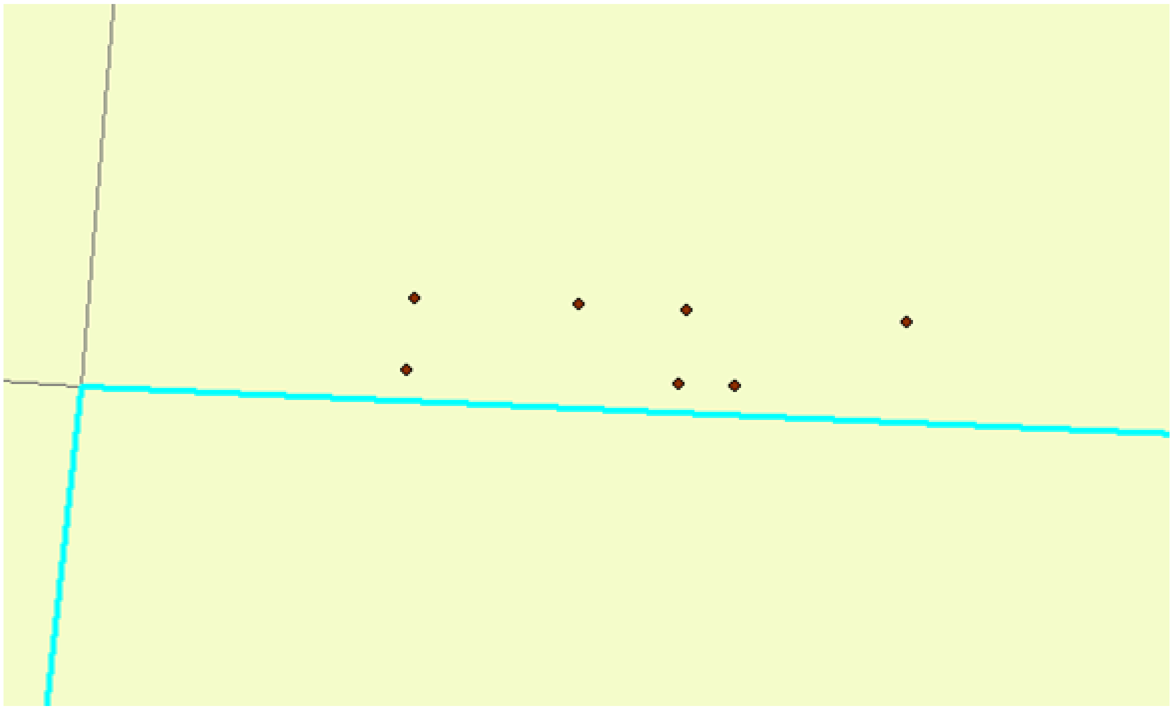


Figure 4-Internal inconsistency in submitted data

In other circumstances, we found that inconsistent geocoding standards may produce misleading results. The next image shows point level data, and the Blocks are colored based upon the counts of points intersecting Blocks. The challenge this presents is that if geocoding was performed on a different dataset than the block boundaries (the road traces are not coincident with block boundaries) and/or geocoding was done without an offset, it becomes problematic to assign coverage to a Census block based upon only the point locations.

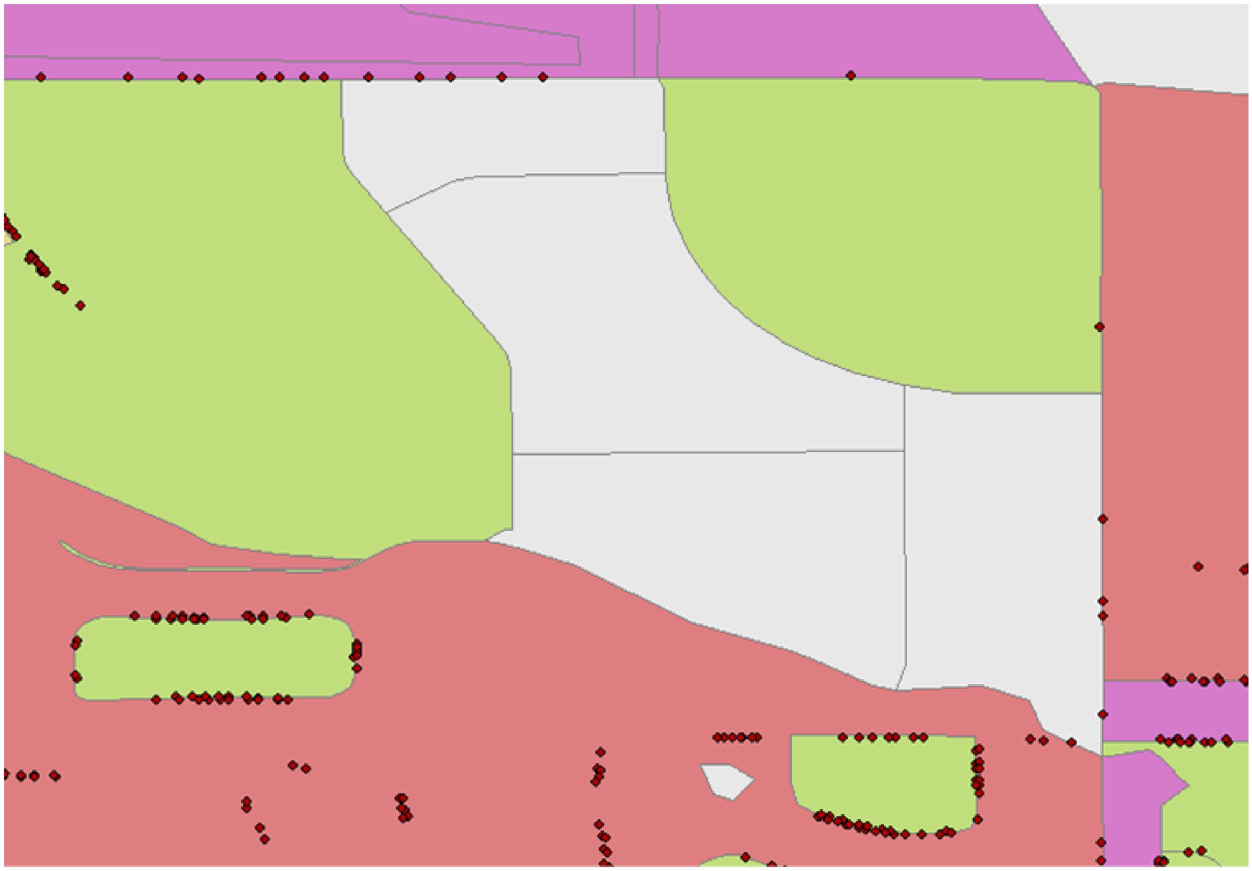


Figure 5-Block Coverage

For this reason, where we were provided address point data and asked to generate covered Census blocks, we elected to use a 200-foot buffer to select Census Blocks that intersect our points.

We also see a number of providers submit customer data and facility data. Their intent is to allow us to have two primary sources from which to derive the most accurate coverage. In these cases we tend to look for clusters of customers in areas where we see no facility based coverage.

With respect to deriving Block level speed from sub-Block data, we have instituted a business rule where the predominant speed in a Block is the speed we attribute to the Block.

Block Level Coverage Derivation Using Customer Facing Plant Level Point Data

In other circumstances, providers submitted point level plant data. From what we could gather, these points tended to be customer-dedicated terminals. Typically, these providers were high speed Broadband producers—which may somewhat strain the definition of Broadband as other providers supplying comparable services specifically disclaimed the ability to provide high-capacity Broadband services in the required 7-10 day interval. In these plant point data submissions, we had similar concerns to the point level customer data, but two factors tended to make us use a more conservative intersection buffer. First, we tended to have far fewer points to work from, so our concern was grabbing too many covered Blocks as the Blocks tended to be much smaller in these urban areas.

Second, these plant points tended to be dedicated to distinct customers, but it was difficult to know which element of the customer's campus to attach coverage to.

In the case of the image below, given a small shift to the left, it would be easily possible to gather 1 to 3 Census Blocks from this point. Although orthoimagery is helpful in a circumstance such as this, it is still indeterminate.

Thus, in the circumstance of plant level point data, we used a 100-foot intersection buffer.

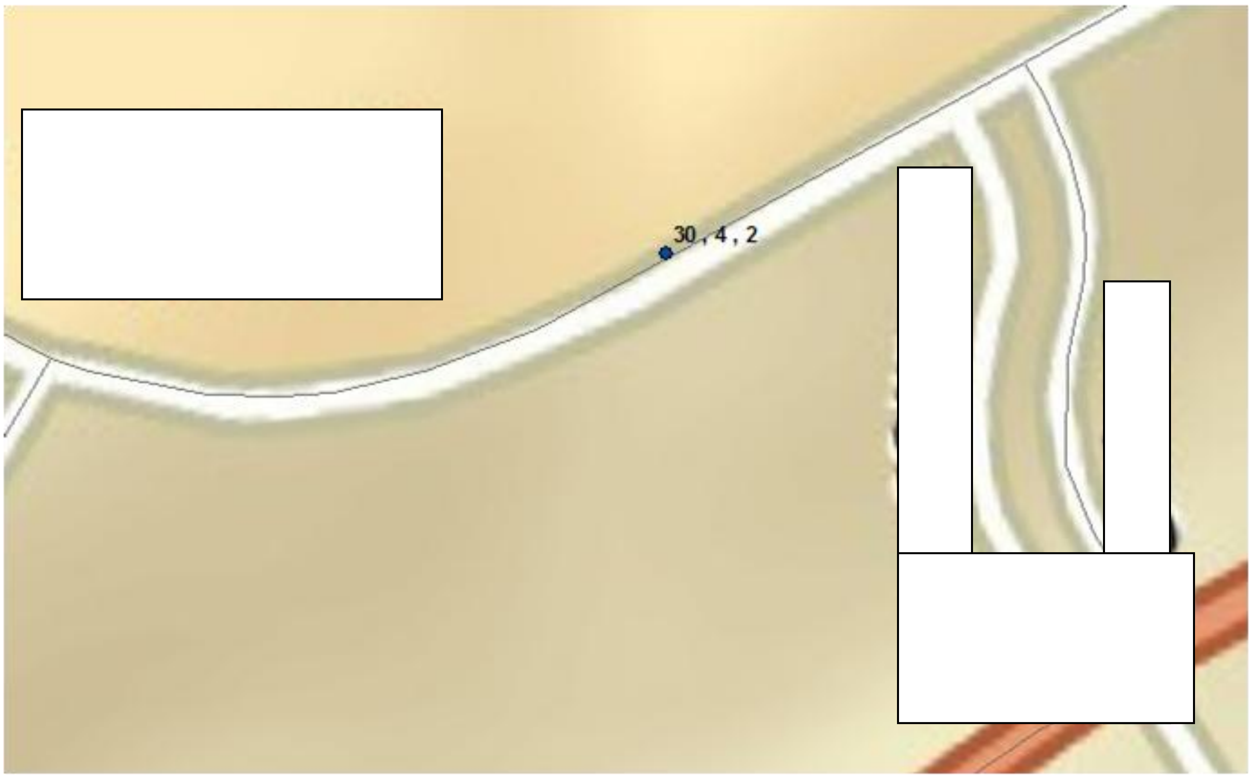


Figure 6-Plant Point level data

Coverage Derivation Using Linear Facilities Data

A number of providers submitted facilities data. We handled this data in different ways depending upon what we believed the facility data represented.

Most telecommunications networks are divided into two components. Feeder - supplies higher capacity nodes (eg. DSLAMs, Fiber Nodes). Distribution - usually supplies customer premises (NIDs, Pedestals, Taps, ONTs). Where we could discern what facilities we were provided, we used different methods.

The next image demonstrates a geo-referenced CAD image as given to us by a service provider. Note the light and dark green shading. We would infer that the lighter segments represent distribution and the dark green represents the feeder network.

In the case of a combined strand map, we used a relatively tight buffer of 200 feet to gather covered Census Blocks. Our intersection tolerance is based upon an assumption that our data likely represent a

situation comparable to customer point level submission in that we have most of the network footprint captured.

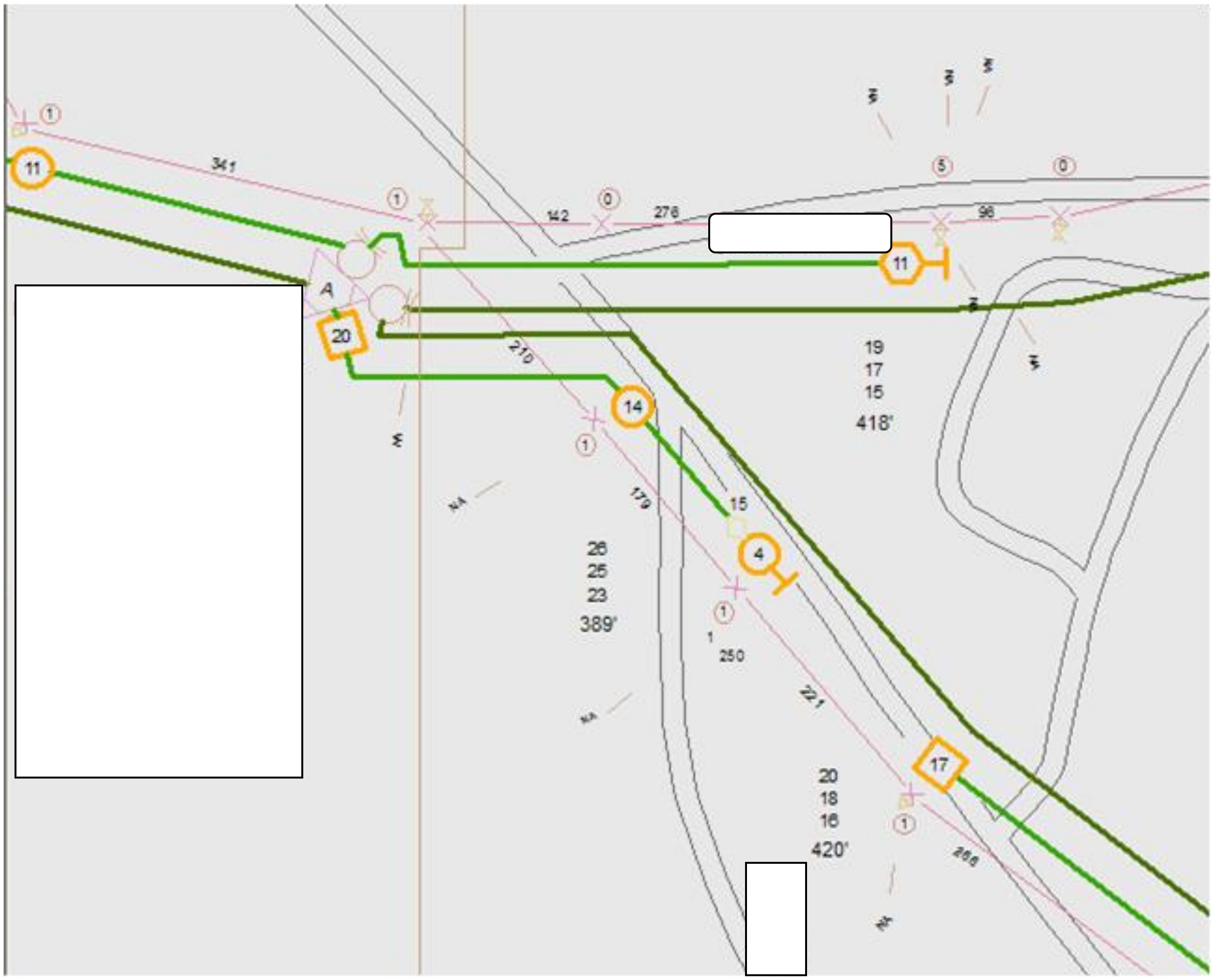


Figure 7-Georeferenced CAD information supplied by Broadband provider

In other circumstances, we were provided engineering information that we inferred to be feeder only. This inference was typically based upon the presence of fiber optic equipment only. In these cases, we used a more generous 2,000 meter Census block intersection. The 2,000 meter criteria was based upon an informal survey of population in proximity to the geo-referenced strand data, but it could be varied based upon a more complete survey.

Coverage Derivation Using Covered Street Segment Data

In some cases we were provided with covered street segment data. Covered segments tended to come from two sources.

In some circumstances, providers gave us CAD data, which was not drawn in a projected manner. This is relatively common for older engineering data derived from hand drawn records. This meant that our

team geo-registered the image into an approximate position. In this case, the boundary streets were selected, and an enclosing polygon was derived. The intersection of this polygon and the Blocks within became the geoprocessing method to derive Blocks.

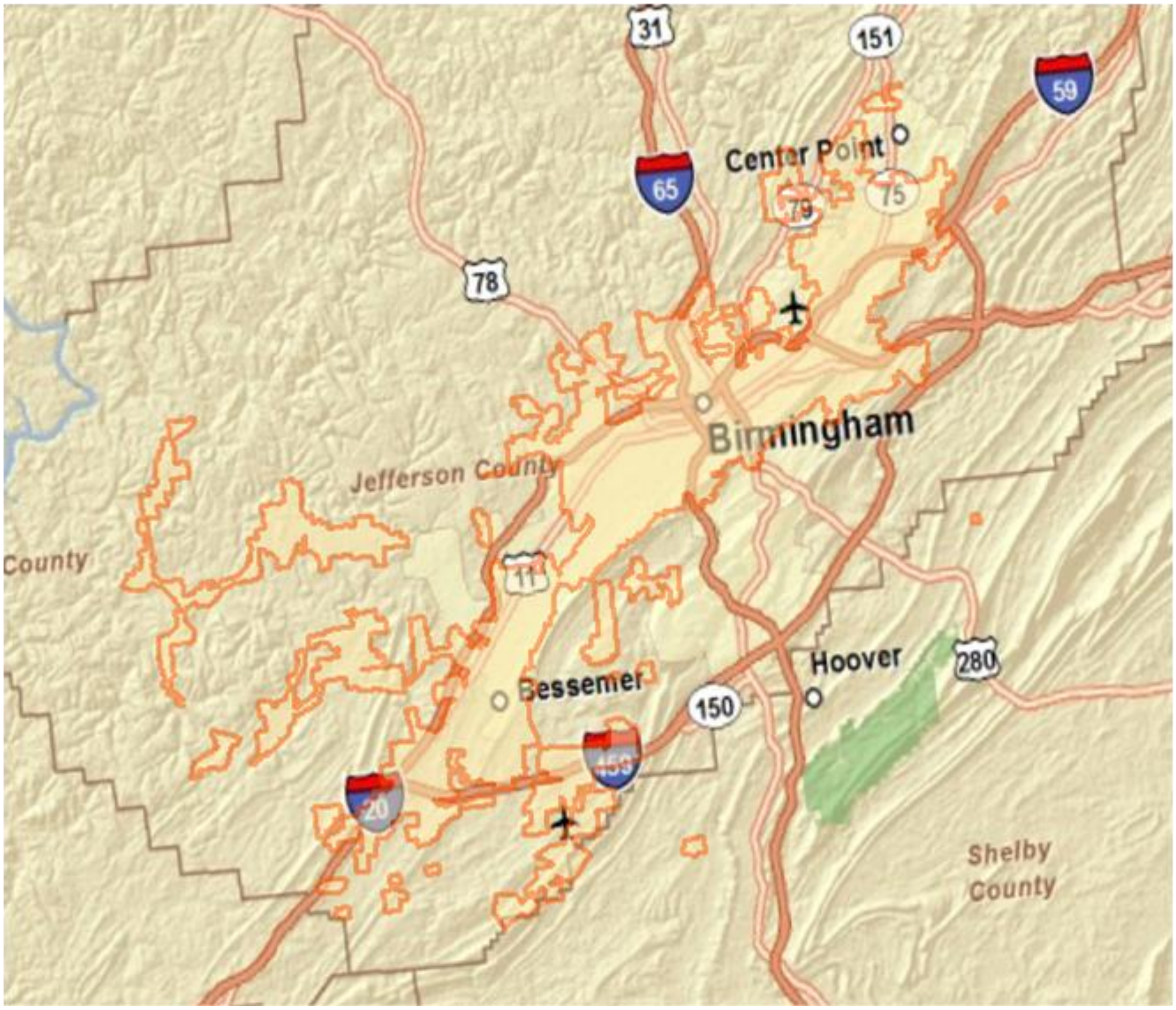


Figure 8-Coverage derived from street segments

In a second circumstance, street segment data was developed during coverage estimation. Handling the estimated data is discussed below.

Coverage Derivation Using Serving Area Point Submission Data

In other cases we worked with providers to derive service areas based upon point plant data. In these cases we were given a serving node and an appropriate road length service boundary. There is an important distinction from the plant data discussed above. In this specific case, the data submitted was a node that served many locations--such as a Central Office or DSLAM. This is contrasted with the earlier example in which the point represents a node serving only a few customers.

When trying to derive coverage from Central Office or DSLAM nodes, the team used ESRI Network Analyst to derive covered road segments honoring these road engineering parameters.

The figure below shows street level coverage derived from Central Office and remote DSLAM point data.

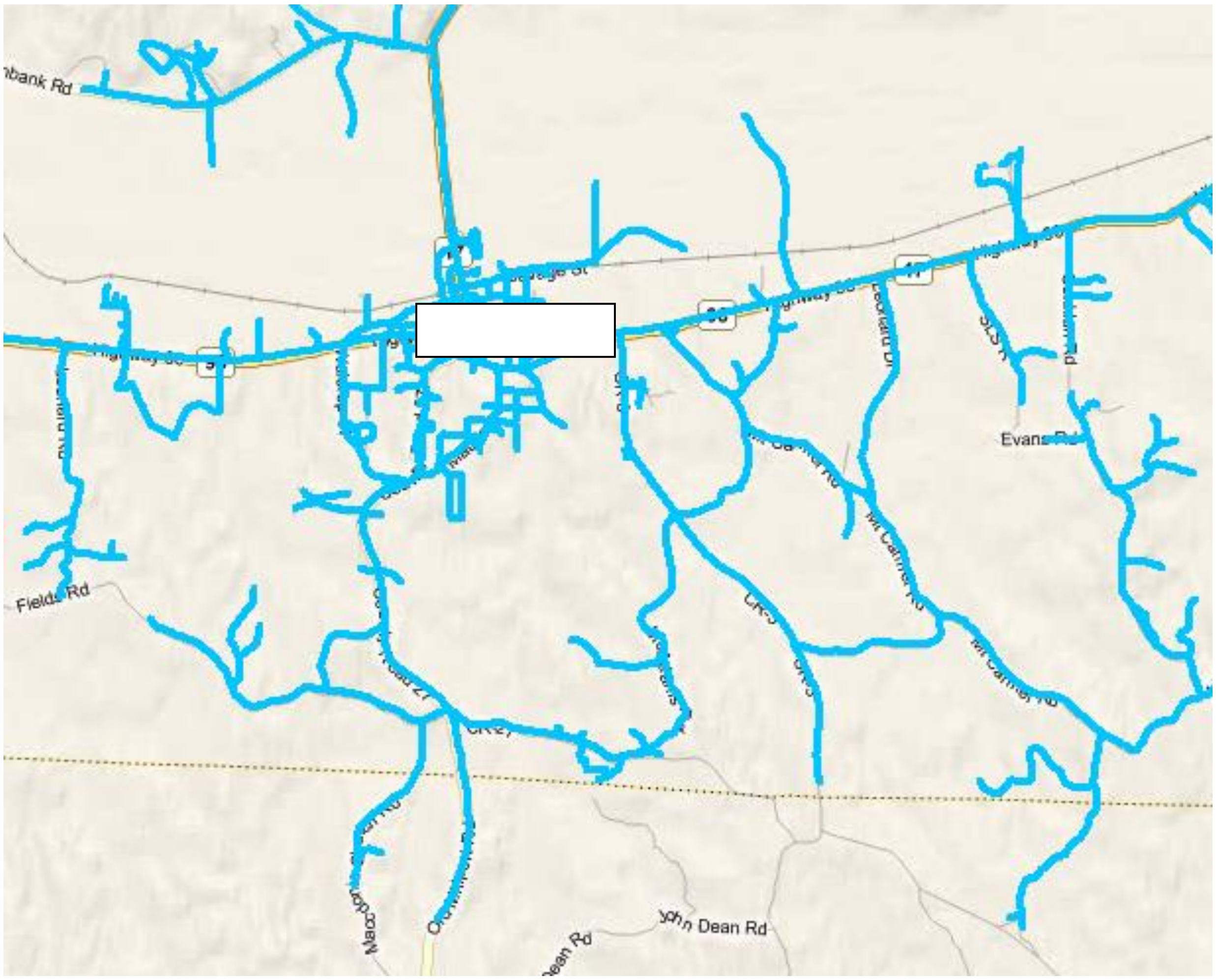


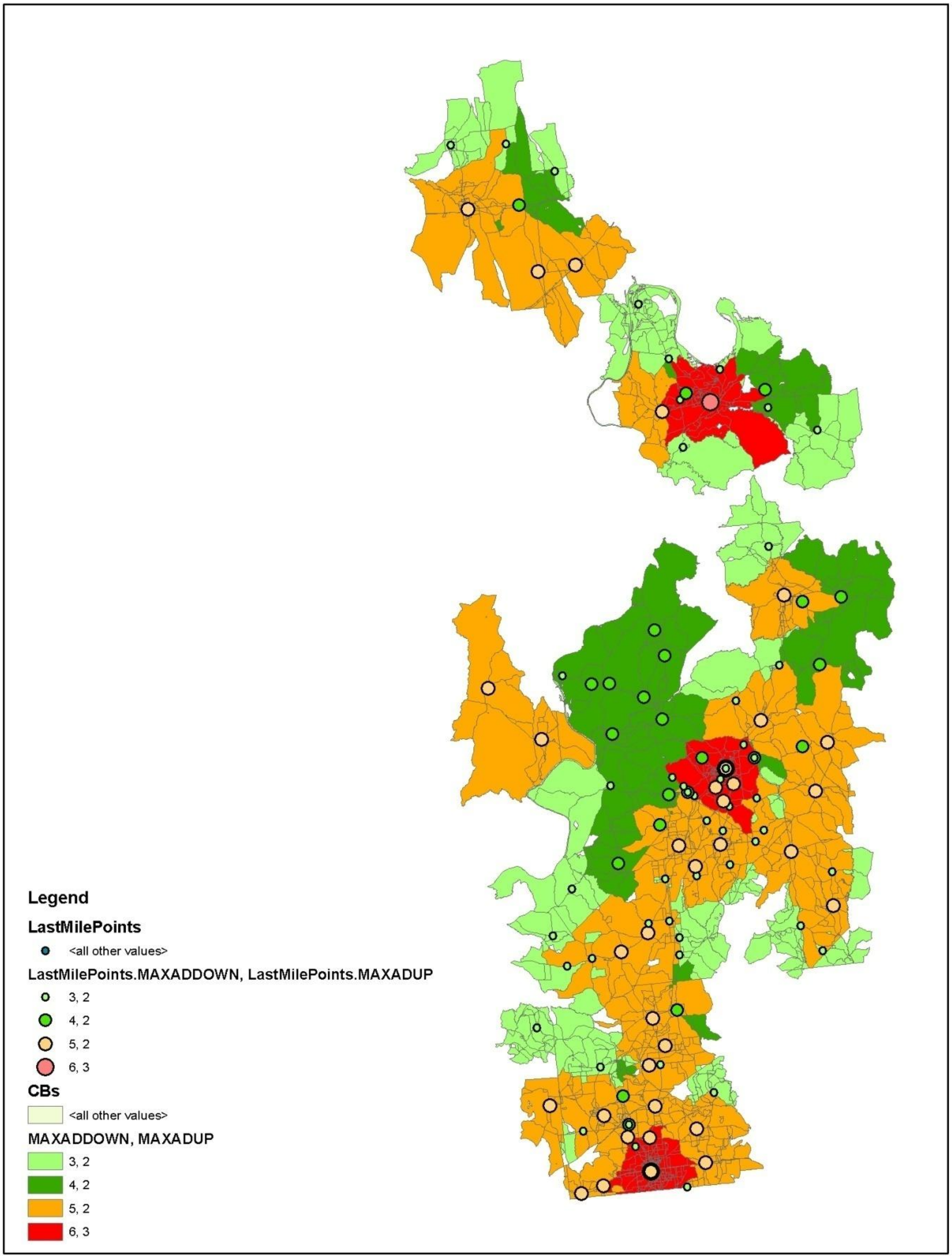
Figure 9-Coverage derived through road paths

In response to Provider feedback we revised this process to include a larger variety of TIGER road types. In Round 1, unimproved roads were not used. In the current submission -- particularly to improve estimates in areas bordering parks and public lands -- a wider class of TIGER roads was used.[14]

The segment level coverage is easily extendable to derivations of Census block level speed. The figure below shows the attributions of block level speed based upon the Maximum Advertised Speed available from a DSLAM. Although the methodology isn't perfect, it does provide insight into the value of granular infrastructure data.

[14]Only TIGER features of MTFCC type S1100 and S1200 were excluded from use.

Over time we have seen an increase in the number of providers submitting this type of data for our use. Our sense is some providers find plant level data easier to generate and are satisfied with the results of derived coverage.


Legend
LastMilePoints
<all other values>
LastMilePoints.MAXADDOWN, LastMilePoints.MAXADUP
3, 2
4, 2
5, 2
6, 3
CBs
<all other values>
MAXADDOWN, MAXADUP
3, 2
4, 2
5, 2
6, 3

Coverage Derivation Using Polygon/Polyline Serving Areas

Broadband service providers sometimes submitted coverage in terms of served areas. This was either in direct geospatial formats, CAD files, or paper maps. The image below reflects a carrier's service area. Within that service area, there are variations in technology of transmission and served speeds. When polygons with speed data and technology of transmission were available, we used a spatial intersection to gather covered Census Blocks. In many cases, using covered Census Blocks resulted in a loss of the speed variation (sometimes the speed variation was at a level smaller than a Block and did not get picked up within a spatial query).

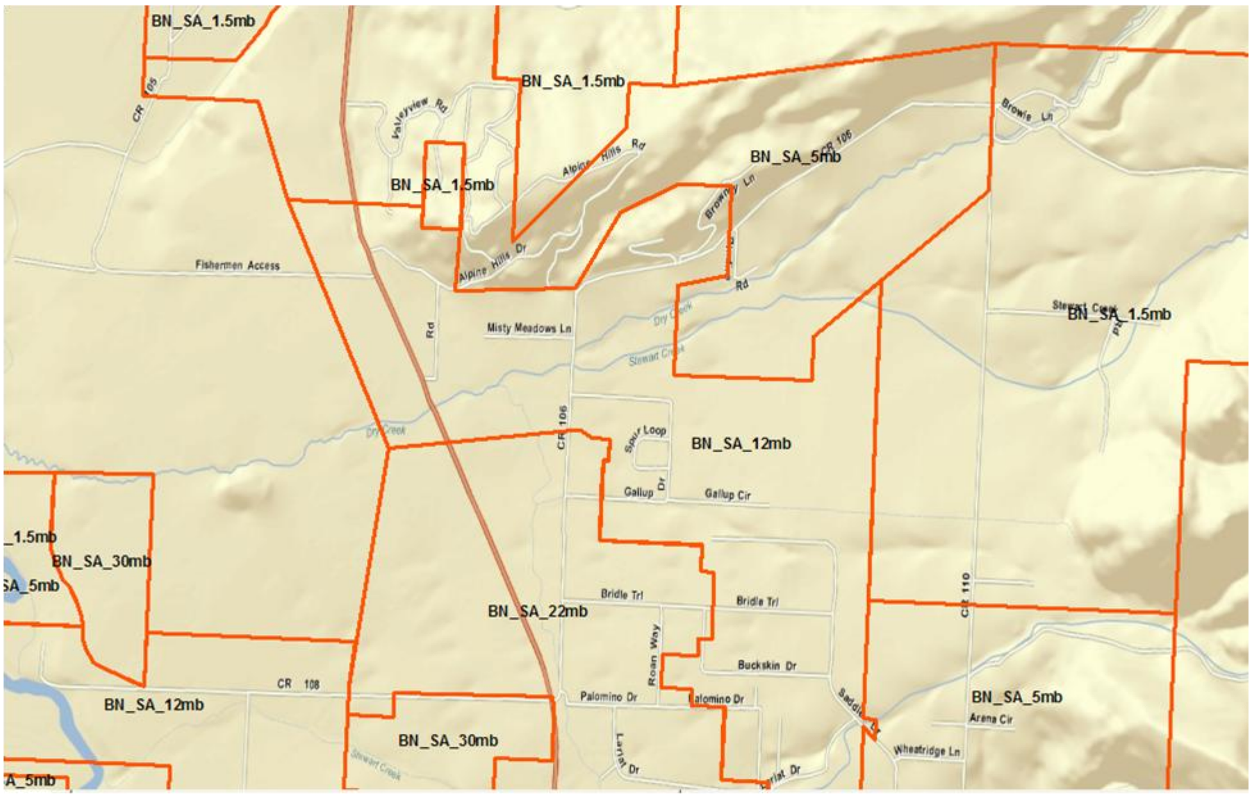


Figure 10-Coverage derived through serving area polygons

Although we cannot directly solve the loss of speed granularity due to Block shapes, we honor a business rule wherein we always select Blocks from the highest speed areas first, and then allow the lower speeds to select from the remaining Blocks. This is an arbitrary rule, but our feeling was that it should be a consistent selection, rather than an unordered selection.

Street Segment Derivation, Large Blocks

For those calculated Blocks greater than 2.00 square miles (large Blocks), we provided coverage in terms of covered street segments and corresponding geography.

With respect to segments we had four sources of data:

1. Covered large Blocks
2. Tabular street segments and address ranges for large Blocks

3. Geographic segments either with street attributes or without
4. Service area boundaries

A few providers only provided a list of covered large Blocks without corresponding segment information beneath the block. This provided the choice of either selecting all segments in the block, or none. Because we had little information from which to make the selection, we elected to be conservative and did NOT pass any covered segments to NTIA from this submission format.

Some Broadband providers submitted covered street names and street ranges. In these cases we performed a manual analysis trying to link to specific segment names and address ranges within covered Blocks. Sometimes this was a simple process because a provider used a TIGER derived street database. In other cases we could not determine the source of the provider's street data. Street and Address matching tended to yield a relatively good result (typically between 30% and 100% of possible segments in the Block), but was very time consuming. Where yield rates were low, our result was a shredded

segment coverage pattern, like the image shown below.[15]

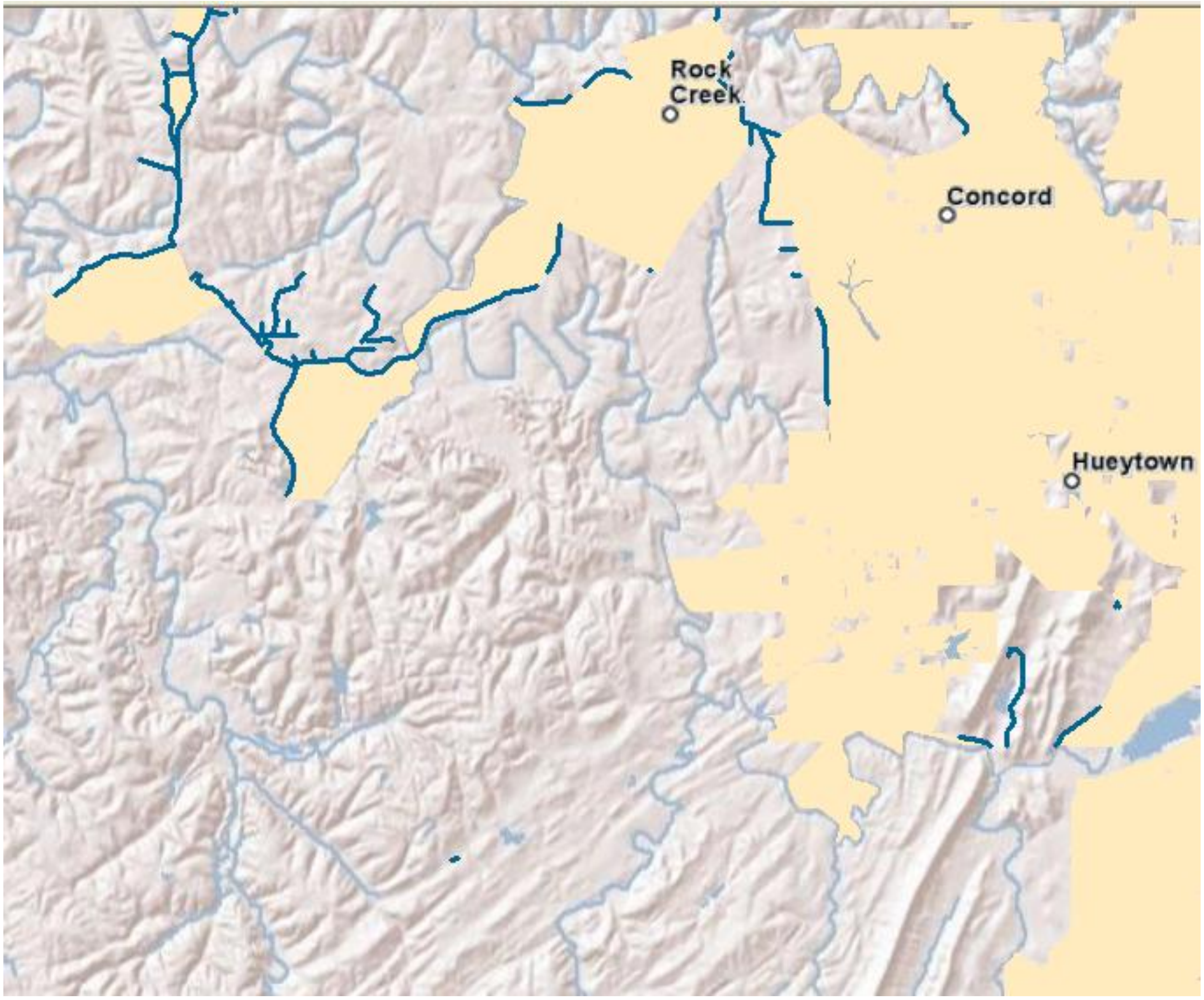


Figure 11-Blue road segments adjacent to peach covered small Blocks

A number of providers submitted geographic objects. In this case, our manual process was directed toward a conflation of data sources. The goal was to take provider submitted segments and put these segments in terms of our TIGER 2010 basemap. Although there is a trade-off in the accuracy using non-provider submitted segments, we felt it was more important to have a license-free road set that would edgematch our Block features, the TIGER state boundary and remain consistent with the block size standards we used for other providers. This is important for the appearance of the online maps, as well as potential verification work where we are attempting to judge a feature based upon its attachment to a covered small Census block. The figure below shows street segment input data.

[15] We continue to hear providers expressing concern that our request for either a geographic object or TIGER Line ID is beyond the scope of the NOFA clarification. Therefore, they cannot supply additional information to us.

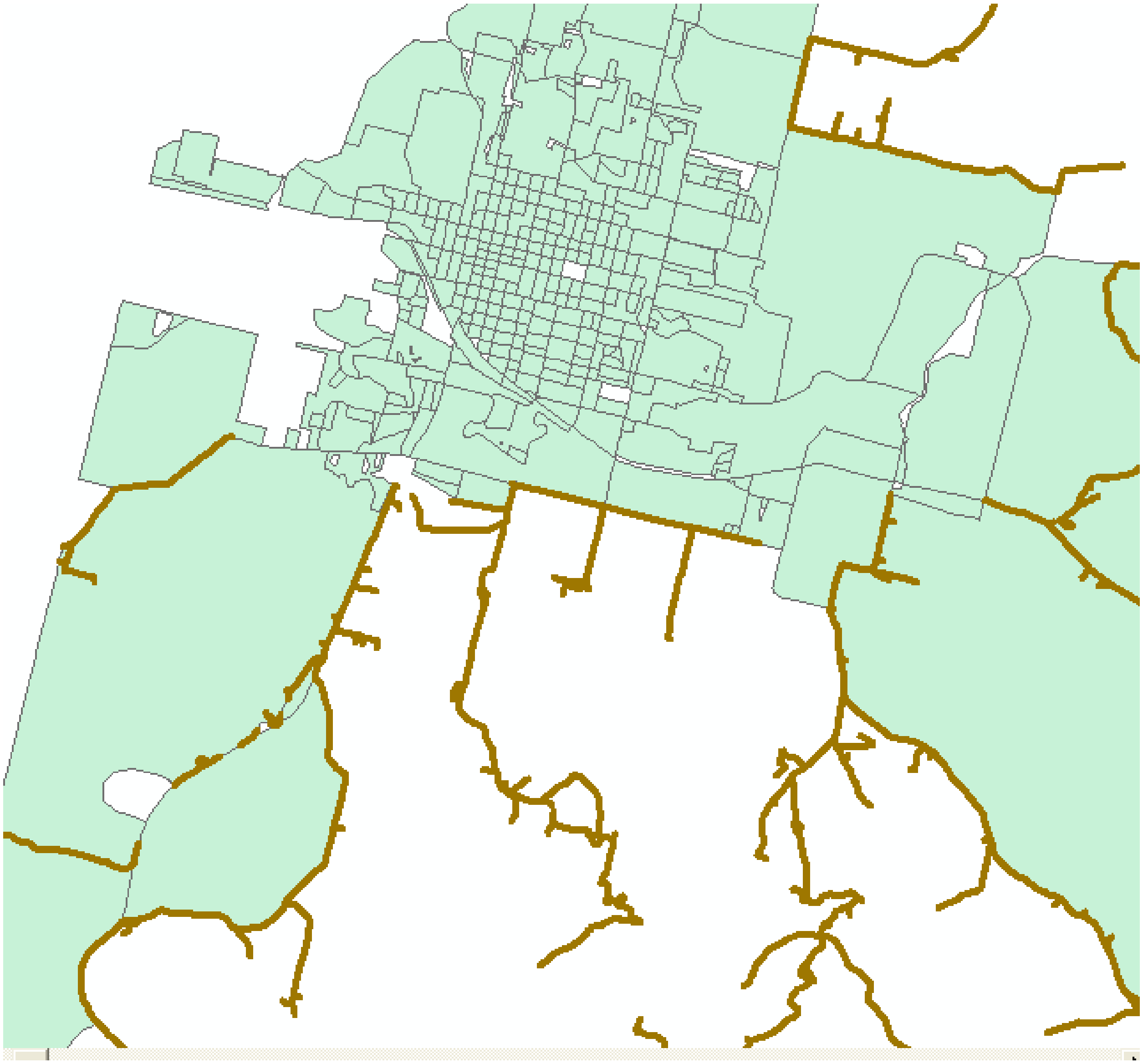


Figure 12-provider Submitted Street Segment Objects. The segments don't edge match the Blocks nor are they continuous.

The figure following demonstrates the same area after the conflation process. Blue segments are the conflated TIGER roads which will be passed to NTIA.

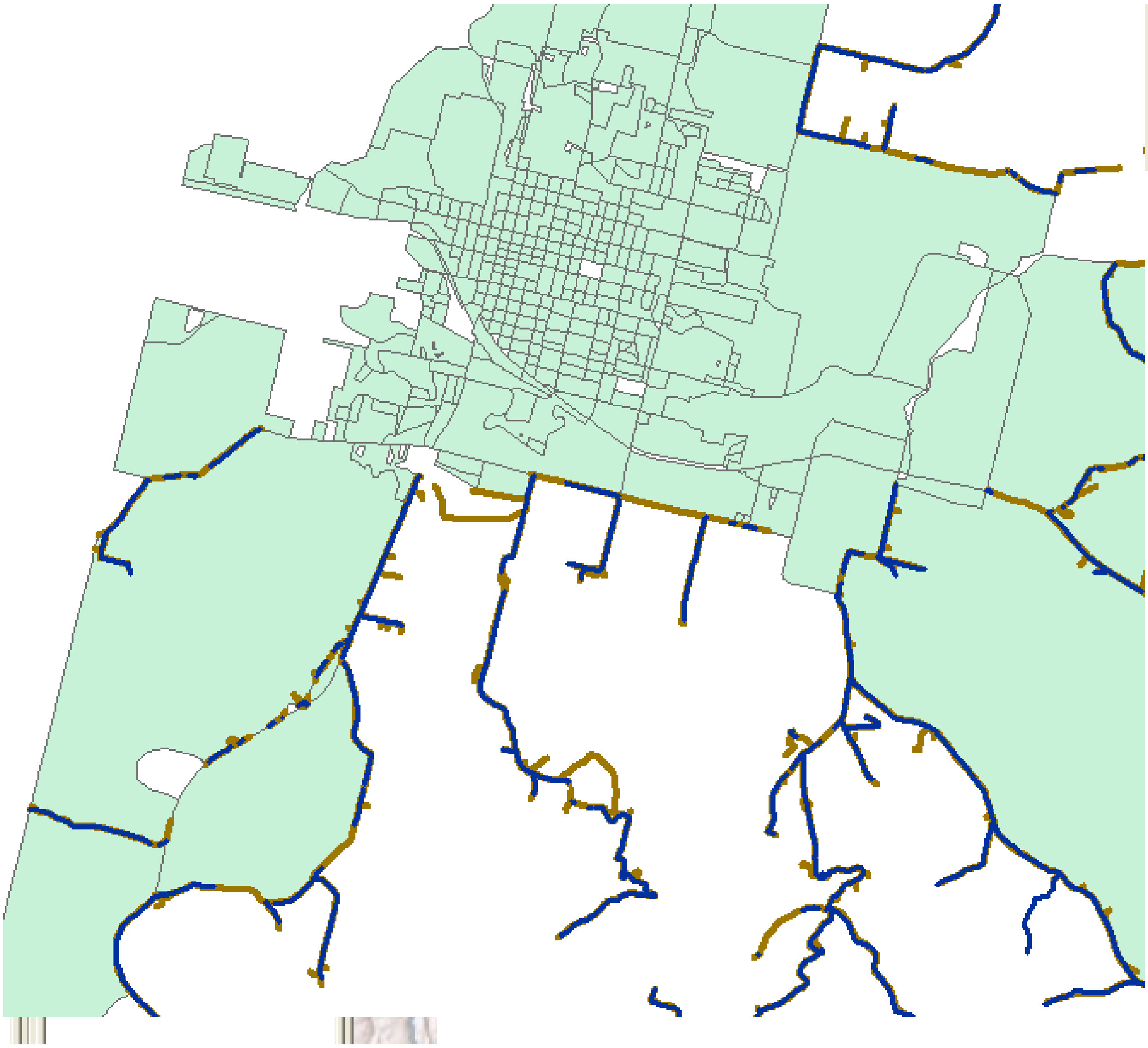


Figure 13-provider submitted segments in gold, selected TIGER in blue—Conflation result; in many cases what was a continuous segment is made discontinuous because even with a distance buffer the TIGER segment doesn't always intersect the provider segment

The final segment process was used when we were supplied with a Broadband covered area polygon. In this case, we found the segments within covered areas and eliminated those segments inside of Blocks less than or equal to 2.00 square miles.

Because there was more control over the format of the inputs (we knew we had a boundary and were working with TIGER segments), this was an automated process that followed this general format:

- Select large covered Blocks by provider ID (from updated Large Block table)
- Select TIGER 2010 road segments (MTFCC like 'S%') that face (CB = CBLeft2010 or CB = CBRight2010) covered large Blocks for provider

- Select segments as distinct records, max speed with corresponding technology, join in feature names, export selected records to temporary DBMS table
- Join TIGER roads feature class to temporary table on TLID
- Select covered segments (Python script)
- Select service area polygons for provider
- Clip selected facing segments with selected service area
- Export clipped segments to staging feature class, keyed by providerID

In this figure, orange represents covered small Blocks; black lines are covered segments in large Census Blocks (light blue). The service area boundary is shown in grey. Based upon feedback from providers, we have elected to clip segments at the end of a coverage boundary.[16]

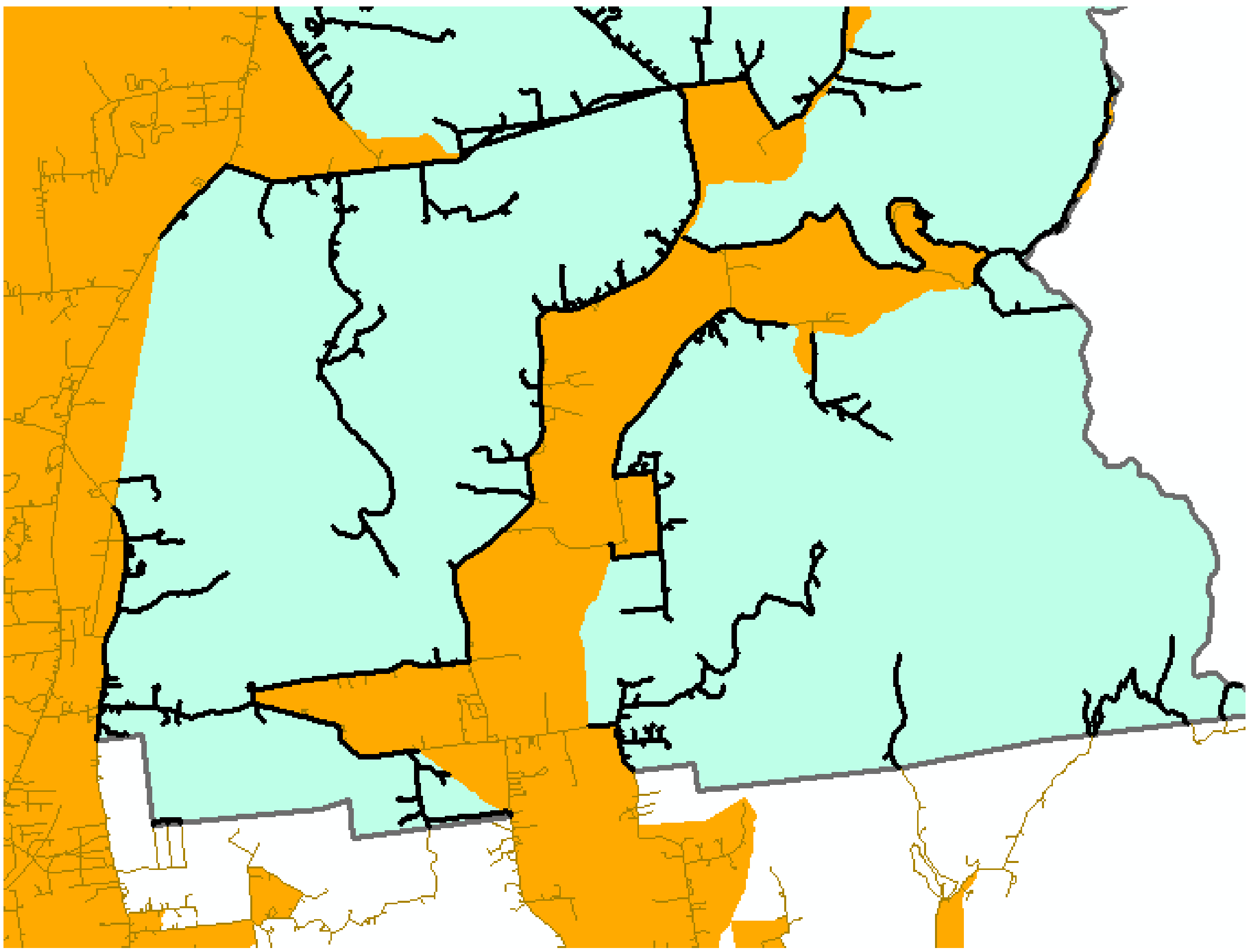


Figure 14-Output of the Segment Process

Wireless Coverage Process

In general, most providers of mobile Broadband submitted coverage information in a NOFA-compliant format. Other than attributions for spectrum and speed, little was done to this coverage.[17]

[16] An outcome not discussed here is how to handle address ranges on segments. As NTIA has asked for a Min and Max on the segment, deriving theses values for clipped segments is very problematic. Also the prevalence of alphabetic characters in addresses makes the min/max selections very arbitrary. We are grateful that addresses are nullable data elements.

Per Program Office direction, LinkAMERICA followed up with wireless providers where we determined that submitted data did not edgematch TIGER 2010 state boundaries. For the most part providers were unable to submit coverage data that edgedmatched as requested. In this case, we left the submitted data alone and did not perform any adjustments.

LinkAMERICA continues to make aggressive efforts to bring additional WISP coverage into the NTIA dataset. For the most part, our outreach was with providers who were unable to supply sufficiently granular data in the past or those that could only submit wireless address points which is no longer a valid submission format.

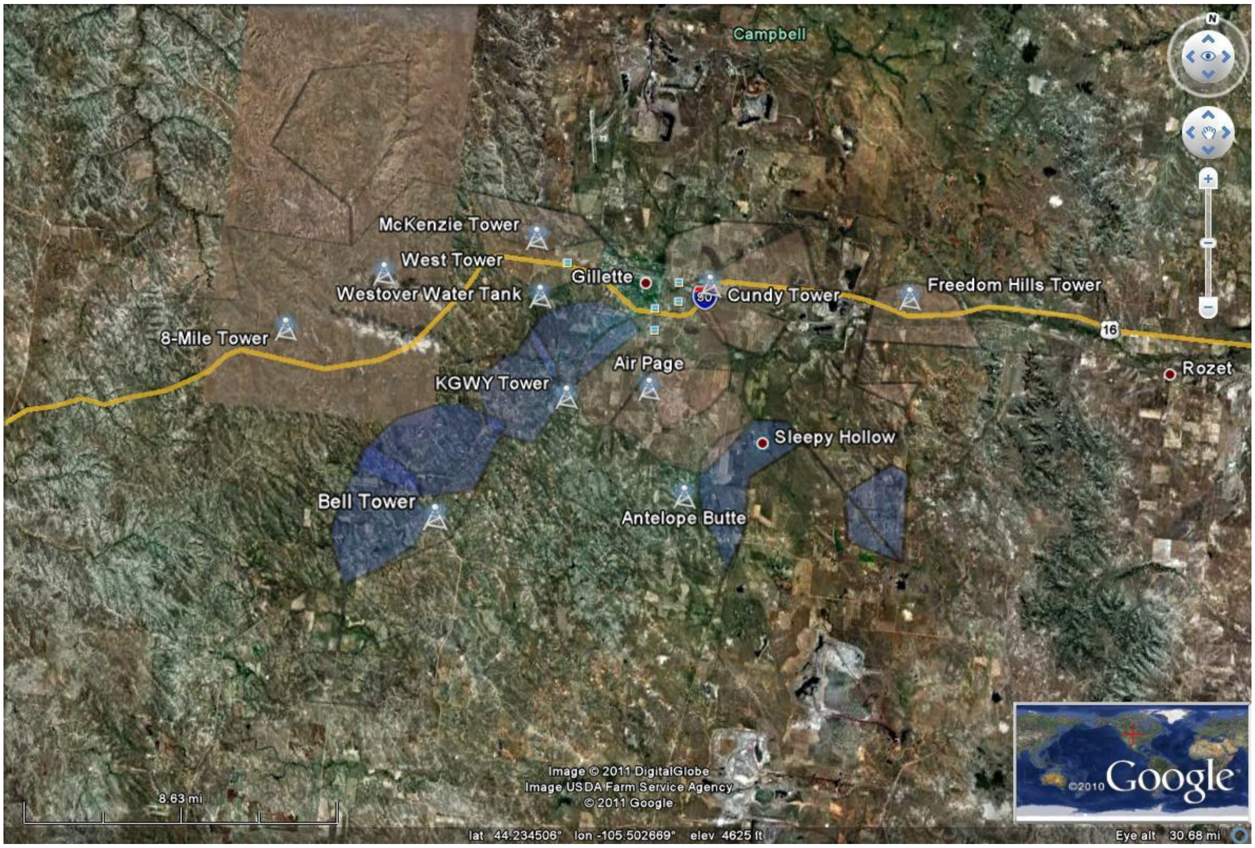
In Round 6 fixed wireless providers generally either supplied coverage information or infrastructure from which coverage estimates could be derived. Many allowed us to use their tower locations, antenna heights and direction/spread of coverage to derive a line of sight coverage estimate. In our experience, this is a conservative and reasonable derivation of coverage.

Some wireless providers submitted RF propagation studies. When this was done, there was a request that the signal strength be removed from coverage data. The request was honored. We note that some providers are very careful in that their coverage is an estimate of the probability of receiving an upstream link to their network. It is not intended as a depiction of any particular speed availability.

Other fixed providers were able to supply us with hand drawn maps or polygons/polylines drawn in Google Earth format. In these cases we did our best to georeference and verify the coverage areas with the WISP.

When we received coverage information in KML format, like the image below, we accepted the data as it was presented to us as the submitted coverage patterns were used in the provider advertising.

[17] Some polygon data did exceed the node count threshold. In these cases, data was rasterized to 100m cells and then converted back to polygons. The polygons were dissolved to multi-part geometry. This addressed the node count concern.



As the image above shows, in some cases we were provided hand-drawn coverage, as well as infrastructure. Instead of estimating their coverage using a line of sight or RF study, we elected to stick with the provider's supplied information. Our decision was guided by two primary factors:

If the provider is advertising using this coverage they must have specific confidence in its accuracy.
If the provider can supply coverage, as well as infrastructure that reasonably supports the coverage, there is a very high likelihood in the accuracy of the information.

The downside, of course, is the polygon shown on the map may not represent our notion of how wireless coverage should appear.

In general we note several interesting trends in the wireless data. First, we can be successful in increasing the amount of WISP coverage when we aggressively pursue WISPs. This means we have to be willing to accept data on their terms and convey it into SBI formats. Some of our WISP submissions have taken over 12 hours to normalize into SBI formats. Second, we have to accept that some WISPs will not be able to supply FRNs. Third, there appears to be some variation on how the NOFA coverage definition is met. In other words, there seems to be a disparity on the necessary link budget necessary (e.g. -80 dB, -98 db, -120 dB, etc) to provide the appropriate quality of service for data services to be provided at a location/inside a location.. Fourth it was very difficult getting providers to identify spectra used for

Broadband data services[18]. We are unsure if this is a competitive concern, or if the same coverage pattern is yielded for multiple frequencies. Typically, the spectra returned were those that a provider was licensed for. At this point, we have no reliable way to locally determine what set of frequencies are used to provide Broadband data services in a local area at a specific point in time.

Service Address Point Process

A handful of providers have requested that customer level, service address point data be submitted to NTIA. In these circumstances we have done minimal processing to preserve the provider's intent with this deliverable and not bias downstream NTIA use.

Our verification included checks against commercial or Public Utility/Public Service Commission exchange boundary maps. Points not contained within three miles of a boundary are not submitted to NTIA. The percentage of excluded data varies cross providers, but it tends to be under 1% of the total submission.

We retain from the provider the provided latitude and longitude, as well as Census block. For some coverage data, if a provider is unable to supply a longitude, latitude or Census block, we fill in these attributes. In those circumstances where we do not have a Census block, but we do have a longitude and latitude, we accept the given longitude and latitude and use that as the basis for our Census block assignment.

With point data we have tested for comparable geocoding success rates but do not overwrite provider information.[19] From this type of analysis we note the amount (usually little more than 10%) of addresses that seem to locate with less than street segment certainty. Deriving a thematic representation of the points on speed also illustrates some of the locational certainty issues in this point level data.

Coverage Estimation Process

Although the derivation of Broadband coverage into Census Blocks, street segments, or wireless coverage files is, in itself, a bit of an estimation process, there was an explicit estimation process required in cases where a Broadband provider either refused to participate in our survey, or provided such a threadbare submission that no carrier-based coverage information could be gleaned[20].

We typically resorted to three possible estimation paths.

---

[18] One provider responded by email, "This mapping program is to provide the coverage area for Broadband provided by a company. Not to keep a detailed account of every aspect of a companies (sic) network."

[19] We will make a second geocoding pass on locations with no longitude or latitude from provider. We typically pick up ~5% from our second geocoding pass. Typically the issue is address quality but also difficulties in geocoding in very rural areas.

[20] We report estimated submissions to NTIA as a non-responsive provider but we have data in the submission for them. This is the reason for datapackage.xls entries which are non responsive but contain submitted data.

For Cable (HFC) providers who did not provide any coverage information, we fell back to Media Prints data. Rather than using the entire Census Block Group gathered by Media Prints, we used only those Census Designated Places carrying the same or similar names to the Media Prints p_com field. Our reasoning was that Cable systems tend to be franchised on a municipal or at least administrative basis so the coverage will likely follow a governmental boundary. As a general rule, cable infrastructure is not available in the public domain[21] and what could be found was poor in quality and difficult to ascertain for validity.

For DSL providers who did not provide any coverage information, we estimated road-based coverage from their Central Offices[22]. We only used Central Offices that showed evidence of DSL or fiber-based services in the NECA 4 tariff. Road-based engineering areas were derived via ESRI Network Analyst to 18kft. These segments/boundaries were clipped to commercial wirecenter boundary edges.

For fixed wireless providers who provided no coverage information, we relied on their public websites to derive coverage maps. When these maps were available, we georeferenced them and tried to use the outer polygon boundary to represent their serving area. In other cases, when only a tower could be provided, we used a view shed analysis and estimated line of sight coverage at 10mi per tower[23]. Because much wireless propagation is driven far below the Census Block and much engineering information isn't known (frequency in use, polarization of the signal, coverage pattern of antenna(s), local terrain/land cover) this was the most complicated group to estimate.

Speed

Speed attributes are reported both at the block (typical) and higher levels (maximum advertised and subscriber weighted). We note that in many cases, providers did not supply typical or subscriber-weighted speeds. In some cases, it appears--although we cannot verify--that their maximum advertised speeds were used to populate typical speed columns.

We do have limited testing data on reported speeds, but we have been careful to not use our typical reported values with carrier-provided information. If we do not have a speed value from a provider, we report an empty value.

Several service providers claim they do not have data on typical speeds available, but estimate a 20% overhead factor between the advertised speed and what may be experienced by an end user.

We continue to request advertised speed at the block level. Nevertheless we appear to be getting speeds that do not vary over a large geographic area – leading us to believe that providers may still be submitting the maximum speed advertised in local media for the entire market. For the most part, we

[21] The team tried to use data from the FCC Coals system and 321/325 fillings but this seemed to be a bit non-uniform in quality.

[22] Central Office location was derived from GeoResults. Wirecenter boundaries also came from this commercial product.

[23] In some cases we had an approximate radius of coverage but no height. In this case we used a 50' height estimate and then clipped the coverage to the provided coverage range. We also clipped wireless coverage to honor state boundaries but did not look for providers serving coverage with out of study state facilities.

have been unsuccessful in messaging that advertised speed should not correspond to a market area, but instead, the maximum speed, which can be provided to a household—what some may describe as a 'qualified speed.'[24]

As a general rule, in circumstances where a provider supplies a range of speed attributes, we assign NTIA categories based upon the midpoint of the range. We follow this rule unless we can determine other grantees are handling the same submitted information differently.

To support NTIA program office requests, we have also modified the structure of the Service Overview table. Even if Maximum Advertised Speed is supplied at the market or county level, we push that speed down to the contained Blocks. The only records that remain in this table, will be those wireline records with either a non NULL nominal weighted speed or ARPU value.

Middle Mile

Middle Mile information was collected directly from providers via survey or interview. Middle Mile is a "chicken or egg" type of challenge in that it is possible to verify that the infrastructure exists, but extremely difficult to know what the site is doing without engineering level assistance. Although most providers submitted "something," there was a significant variance in what that "something" represented.

The purpose of this section is to record some of the comments and questions we have received about Middle Mile. We hope this provides better context for our data submission.

Within the NOFA, Middle Mile was defined as (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. (Collectively, (a) and (b) are "middle-mile and backbone interconnection points.")[25]

Given the existence of the "or" in this definition, providers submitted a variety of information. Based upon the NOFA example, several fixed wireless providers interpreted Middle Mile in terms of the connection points from their towers to their own serving backhaul location. The topology was commonly Microwave from their distribution towers to their NOC. The NOC and towers were listed as the Middle Mile points. This seems to be consistent with the first definition clause (a).

Telephone, Mobile Wireless, and Cable providers tended to remain either silent on the question, or would provide a single location in which Internet peering occurred (clause b). A number of participants explained that the NOFA was quite ambiguous with data traffic moving back and forth over both TDM

[24] As an example of a response to our request for Block level advertised speeds, we received the following comment from one anonymous provider, "This is and of itself does not require anything new of us – just states the NTIA supports efforts focused on getting that information on the CB level." It would be helpful to have broader messaging so that providers understand this new direction.

[25] From http://broadbandusa.gov/files/BroadbandMappingNOFA(FederalRegisterVersion).pdf at 54, visited March 28, 2010

and IP networks--it was unclear where the distinction should be drawn. As a general rule it seemed like many providers listed a single location where Internet Peering occurred.

A number of providers refused to answer the question on grounds of confidentiality[26]. Others would not disclose as their Middle Mile points are not owned--another company provides the physical and electronic connection to their network. In other words, the entity providing Broadband is not the entity providing Middle Mile.

Additionally, based upon the new Provider Type classification of “other,” we have started to integrate points provided by Broadband service providers not meeting the NOFA definition. This includes POP locations and aggregation points for public / private networks.[27] Within a given submission there were two final attributes that tended to concern respondents. First, speed should be measured in terms of only data capacity and what exactly is “data” (e.g., can/should you segregate out voice or video), and is the relevant capacity of the physical connection, channelized to a specific virtual circuit on their network.

Finally, a number of other providers were unsure of the height above grade measure (is this their floor, the street outside, etc). We seem to have a combination of height above or below grade, as well as heights above mean sea level (AMSL).

To the extent possible in our timeframe, we verified the location of a sample of Middle Mile points. Where we could see infrastructure that appeared to be consistent in location with other provider infrastructure, we felt that the location was accurate. In some cases, the point provided seems sensible (is on a road, near other equipment), but using imagery, we couldn’t find a place where this type of connection could occur. This wouldn’t be unforeseen, in that Middle Mile connectivity likely takes place in a protected environment much smaller than a standard Central Office installation.

Mobile Wireless Coverage

We have received mobile wireless coverage from most mobile Broadband providers in each state. At this point we have cleaned the geometry of the data and attributed it with spectra, NTIA speed categories and FRN as required.

Where possible, provider derived coverage has been reviewed for consistency against the commercial licensed product.. To a limited extent we also use licensing locations and tower infrastructure to spot-check supplied coverage. This mode of verification remains complex, given the lack of facility-based information with mobile wireless.

[26] As received in email 9/30/10, “Due to security concerns and the risk of public disclosure of highly sensitive data, whether inadvertent or otherwise, ***REDACT***response to the Middle Mile and backbone interconnection request is limited to publicly available information available on {remainder not included}”

[27] As discussed in our readme.txt file, a number of middle mile points were lost in validation due to their location in adjacent state. This will cause a decrease in some providers relative to prior submission.

Finally with respect to mobile Broadband services, we note several trends.

First LinkAMERICA used the NTIA supplied frequency tables to report speeds consistent with other grantees. In circumstances where a provider supplied a range of experienced speeds, we used the portion of the range consistent with the most frequently reported Grantee value.

Second where a provider reports multiple frequency bands in use but doesn't distinguish these bands by submitted SHP file, we submit identical geometries but attribute one geometry to each submitted spectrum value.

Third we are seeing a trend toward increasing Broadband speed. As of this writing, there is not consistency across providers in how they attribute the advertised 4G speed values. In other words, for some providers 4G means advertised speed categories increase. For other providers the speed value did not change.

Fourth, we have requested providers submit SHP files that are consistent with the TIGER 2010 boundaries. For the most part, providers have not done this. As the request came late in the round six submissions our hope is this request will be honored for round 7. We have not modified the submitted data to impose the TIGER 2010 state boundary.

Verification

Data verification is an ongoing and evolving process. Clearly, with each new data submission there will be a validation process at hand and at the same time, our team continues to expand and improve the efficiency and effectiveness of our data verification routines. Consistent with the movement toward an fGDB export database and use of a data receipt script, much of our validation effort is spent in supporting the ETL processes into the required formats. In future data submissions we will continue our work to stabilize and improve the business process that normalizes provider submissions into NOFA formats and expands in more depth on the confidence analysis within the data.

Verification Methods Summary

Our overall verification standard is focused on the level at which we supply processed data to NTIA. This means that the vast majority of our verification process and resources will be focused on verifying provider identity, coverage, advertised speed and appropriate metadata for Census block's less than or equal to 2 square miles.

We believe three broad verification themes are important to consider

a) The first step of broadband service verification is a consistently applied market definition—we call this provider identity verification.

b) There is probably not a single dispositive method of verification. Rather, a number of verification approaches are needed to appropriately classify confidence in data submitted to NTIA.

c) Verification approaches tend to meld together. As an example a web survey is complimented by a phone survey but expert review and external data may be necessary to reach a final informed judgment.

The table below demonstrates the various methods used across each feature class submitted to NTIA.

	Data Types			
Verification Method	**Census Block, Road segment or, address specific service availability**	**Mobile wireless service availability**	**Middle mile infrastructure locations**	**Community anchor institutions**
Provide/Subscriber Identity Verification	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Internal data consistency check	METHOD USED	METHOD USED	METHOD USED	METHOD USED
External data consistency checks	METHOD USED	METHOD USED		
Carrier confirmation	METHOD USED	METHOD USED	METHOD USED	
Public review	METHOD USED	METHOD USED		METHOD USED
Anchor institution review				METHOD USED
Expert review	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Telephone sampling	METHOD USED			METHOD USED
Purchased Datasets	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Developed Datasets	METHOD USED			
Web-based surveys	METHOD USED	METHOD USED		METHOD USED
Field Surveys	METHOD USED	METHOD USED		METHOD USED

The following table defines each of these methods and provides a summary of why this method is used, and the value we gain from it.

	Definition	Methodology	Purpose	Benefit
Provider Verification	Provider verification is the process of assembling a broadband provider database, determining which providers are properly classified into SBI eligible providers and developing contact information.	Provider verification involves combining multiple data sources, interviewing providers and classifying the broadband provider type.	Without a consistent understanding of the provider 'market' it is impossible to appropriately classify the coverage data. It is also impossible to explain to consumers of the data why a given provider is or isn't available in the submitted data.	The main benefit of this verification process is understanding who is providing broadband services, are the broadband services NTIA compliant and how do you 'contact' this provider (Name, DBA, FRN, Holding Company)
Internal data consistency check	An internal data consistency check is a validation measure across at least two dimensions. First is the provider data consistent with prior submissions. This would be an examination of this submission relative to a prior submission. Second is this submission	Most of this validation is performed using our spatial databases and running queries that compare submissions. We also use a similar set of queries to isolate transmission of technology outliers. These would be data sets which offer speed technology combinations	The purpose of this type of validation is to understand how things change over time and why. It also helps inform us for circumstances where we have data points which appear to be outside of the norm. If these outliers are	The main value is understanding why something changes and providing an opportunity to engage with the provider to understand why there has been a change.

	consistent with the technical specifications of the service offered.	which are unusual relative to other data received across all states.	detected, they can be pursued directly with the provider.	
External data consistency checks	An external data consistency check is a measure of the provider data against external sources (not from the Provider). The distinction between internal and external isn't pure, but our typical experience has been that External checks involve the acquisition of additional data sets and a comparison across multiple sets.	External validation can be performed by verifying supplied coverage against third party data sources. An example would be to test provider claimed DSL Census blocks against a commercial source of exchange boundaries. Wireless coverage is also compared to tower locations.	We don't believe a single, exhaustive third party data set is available for validation. We do believe a combination of external datasets can be used to inform and help filter out the false positive cases from provider data. We also note that the external data appears to diminish in accuracy as the area of analysis becomes less urban.	External validation provides an external measure of data quality assessment not influenced by internal data sources. It can be one of the more effective means of isolating false positives in submitted data.
Carrier confirmation	Carrier confirmation is the process of sending processed data back to the service provider	We use two techniques to accomplish this. First a provider's data is summarized in a tabular format. This lets the	One of the more critical steps in broadband mapping is translating carrier	Carrier confirmation gives the provider information on how their data will look when submitted to NTIA. It also helps short circuit complex problems like

	to ensure that translation into NTIA formats is fair and appropriately accurate.	provider quickly verify firm information (FRNs, DBAs, counties served). We also develop two sets of check maps. One is a PDF version and the second is a Google Earth (KMZ) version. Both versions display the NTIA reported coverage and speed. A different map is developed for each technology of transmission	supplied data into NTIA formats. Providing verification deliverables to the service provider (carrier) isan important external feedback process. Several providers also ask us to repeat this process before data are submitted to NTIA so they can see what will be submitted to NTIA.	online map display problems—which tend to come from FRN issues or incorrect data entry. This process also helps to strengthen the sense of ownership and participation with providers.
Public review	Public review is the process of collecting structured feedback from the general public in a manner which can be analyzed and used to improve/validate the submitted data.	Currently we use an online map 'layer' which provides consumers the ability to feedback about the coverage and provide in depth information about their concerns. The maps are also discussed within the context of planning teams within each state. We receive	As with other crowd-source approaches the intent is to allow the general public to feedback and improve the displayed and submitted data.	The benefit is to provide feedback and also display real time the comments of the general public. As a mechanism for validation the key is to develop feedback data which is structured in way that informs the mapping process.

		feedback from these meetings.		
Anchor institution review	Anchor institution review is targeted surveys intended to better understand the Anchor Institution broadband market.	We have used three methods to verify anchor institution data. The first is a targeted series of telephone calls. The second is specifically targeted mailers. The third is direct interviews with stakeholders. Schools for example, may have someone at the state level who maintains information about broadband connectivity.	As Anchor Institutions represent a different class of coverage information as well as a very different type of end user, a focused stakeholder management, data acquisition and data review process is advantageous.	Because CAIs represent a very distinct stakeholder community, building identifiable connections between the SBI program and the anchor institution community is important. Tailoring a specific data acquisition/ data review process helps Anchor Institutions establish a reliable set of infrastructure benchmarks which they can use to fulfill their mission.
Expert review	Expert review is the process of using subject matter experts to review submitted or processed provider data.	The method of subject matter review will be dependent upon the type of data in question. In the past this has taken the form of conversing with a wireless engineer to ensure that the coverage pattern appears plausible for a given technology. It may also involve a cross check on data from a second source—	The purpose of expert review is to get a second opinion regarding some aspect of submitted or processed data. Given the large number of submission formats and innovative ways to supply broadband, it is always	The most significant benefit is to have a secondary source for back checks and verification. For the most part expert review is from an engineering or deployment resource. Expert review also helps support process transparency so there isn't a closed GIS driven process making all the decisions.

		can this type of middle mile infrastructure support the maximum advertised speeds in this area? SME validation is also helpful trying to understand ambiguous information in submissions.	helpful to have multiple sets of eyes available to reduce errors from misunderstanding.	
Telephone sampling	Telephone sampling is the process of using targeted phone calls to verify aspects of submitted or processed data.	Telephone methodology tends to be consistent across the type of data being verified. A subject location or individual is identified. The phone number for that location is identified and a call is placed. The person performing the survey asks a scripted set of questions and records the responses in a database. For example, our team produces a survey to develop and monitor access and use trends at a regional level.	The purpose of a telephone survey is to gather in depth information from a targeted respondent. We would likely use telephone survey for targeted purposes--either clarifying anchor institution data or randomly polling consumers to better understand attitudes.	The primary benefits are to develop in depth information as well as surveying a large number of respondents regarding opinions or behavior. Phone surveys tend to be more helpful to survey attitudes or to find out location specific information. Telephone sampling is used in our consumer surveys.

Purchased Datasets	See external data consistency checks.			Also note that not all external data checks must be purchased. For example Census data could be used for an external consistency check but it is freely available for download.
Web-based surveys	Web based surveys can involve three dimensions. First a web survey (a form available to be filled out on the Internet) can be used to supplement and better understand consumers. A web survey could be a compliment or a substitute for a telephone survey to target a specific demographic (a web survey can also be part of a social media campaign). Further web surveys can be used to verify provider information.	In the case where a web survey is a compliment to phone or in person, a survey,instrument is developed and then respondents are invited to complete the form. In the case where a survey is a mechanism to gather additional information from provider web sites, this could take the form of manual queries (looking for address listed in a Census block) or automated scraping where information is pulled from a website via a specific web application. We currently use both approaches depending on our goal.	The purpose in all cases is to gather additional information via the Web.	The benefits of web survey are its relatively low cost as well as the ability to gather specific information into a form that can be easily used by downstream work processes.

Field Surveys	A field survey is sending a team of skilled participants into the field to verify submitted data or sample some aspect of the environment in a given area.	Field survey methods involve assigning a field team, equipping them with data acquisition hardware, ensuring they have a consistent skill basis and recording observations. To date most of our field survey work has been in engaging CAIs into the process. We have performed limited wireless testing and infrastructure verification.	Although expensive, field surveys are sometimes the best way to verify information such as provider equipment presence or the strength of a wireless broadband signal.	The benefits to field work are significant. They can help us better understand the exact phenomenon in a particular area.

Verification Standard

Verification is a broad term, but in our definition it boils down to determining if broadband coverage is in the right place. For a given provider, the question is whether the coverage is assigned to appropriate Census Blocks, road segments or area features. Coverage verification can be further broken out into two distinct classes:

- Technology verification, which is determining if the provider is listed with a technology consistent with their marketing information.
- Speed verification, which is determining if the speed supplied for that block, road segment, point area file or market area is consistent with the technology and the marketing information received.

The final verification dimension is consumer feedback and crowd-source verification. This is a dynamic set of steps we are beginning to implement. One side of this is responding to consumer concerns. The second is using the crowd sourced data to validate provider claims and, if appropriate, update the map and the underlying data.

At this stage, our working hypothesis (confirmed by our experience) is that there will not be a single measure to indicate broadband coverage availability in a Census block or along a segment. From prior work, and examining our current provider submissions, we believe that there is too much variation below the submitted record to make a single binary yes/no indication. Rather, there will be a series of measures that combine to provide qualitative confidence (a classification scheme) in our indication of Broadband availability at the block, segment, or wireless polygon level. We believe such a qualitative classification scheme is both relevant to and supportive of NTIA interests, as well as the interests of our end-user community – that is, the states and citizens we serve through this program.

The intent of this section is to illustrate why our team is moving toward a particular verification methodology. Our team is learning as we go along, and will adjust and improve this thinking. But given our experience to date, this is our path. As stated above:

- First, coverage verification is at the level of data submitted to NTIA.
- Second, coverage verification is enhanced when there is a secondary measure of availability (such as infrastructure presence or serving area boundaries)
- Third, given the limited resources of this effort, the most important coverage verification process to implement is the erroneous dispersion of coverage. These are the "islands" of coverage isolated by significant distance from other covered areas. In other words, Broadband Internet likely doesn't exist far away from other areas with Broadband Internet access supplied by the same provider.
- Next we present several examples which illustrate the complexity of coverage verification.

The first example is taken from a gentleman who requested a map change in Alabama. His home is near the yellow dot. The darker grey Blocks are covered Census Blocks. The black lines are covered road segments. He cannot receive DSL from his incumbent provider, although his neighbors can. The incumbent carrier does have at least one structure in that block from which Broadband services can be provided; unfortunately his home is not served.

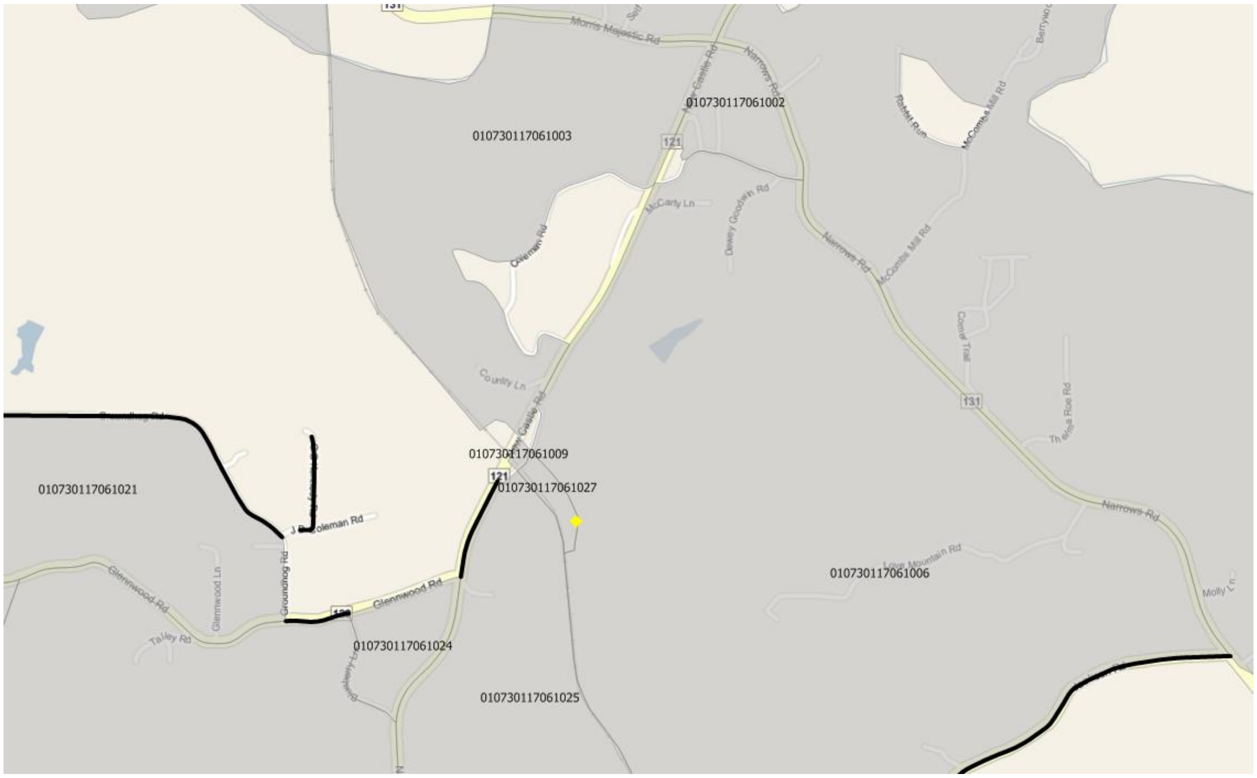


Figure 15--Sub block variation

Because the SBI program requires the depiction of coverage at the block level, the above map has been correctly generated. However, from the customer's point of view, the map is inaccurate. This requires us to explain that the maps are not intended to be a structure-level qualification, at which point some consumers question the value of the maps when seeking service information.

Beyond this type of one-off structure-level qualification, sometimes, as shown below, we have even larger gaps in provided coverage. The image here shows an "outlier" block that could be an error, or it could indicate missing Blocks along a major road that should have been filled in. In this figure, the outlier block is highlighted in turquoise.

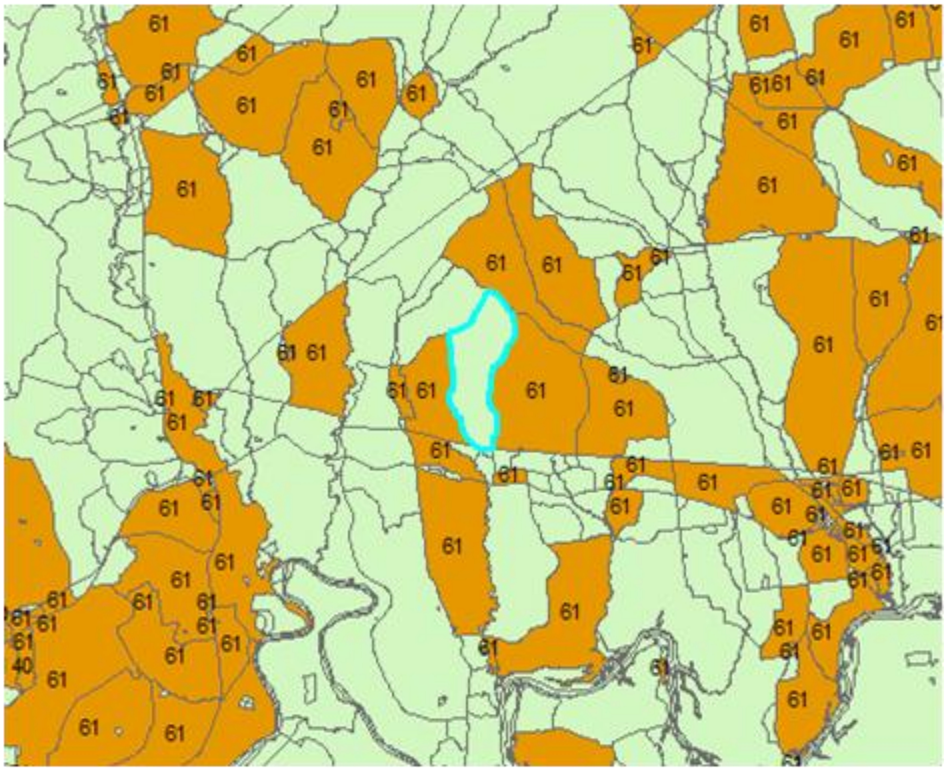


Figure 16--Dispersion in Submitted Data

In this particular case, we are faced with a different verification question. Based upon the properties of the neighbors, we believe this block should likely be covered (coverage interpolation,) but supplied data from the incumbent says otherwise. Although we don't have information to know how much of the data submitted to us is generated, our sense is that geocoded customers or plant are used. In this case the block dispersion could be the result of a side of the street assignment rather than an availability assignment. In other words the data may speak to where is working plant rather than where could service be provided in 7 to 10 days.

The next example shows where an interpolation process could require some adjustment. The figure below shows a town level view. There are some smaller Blocks that are likely covered by interpolation logic, but we also do not want to extend coverage beyond a franchise boundary as in the areas shown in a box on the bottom of the map.

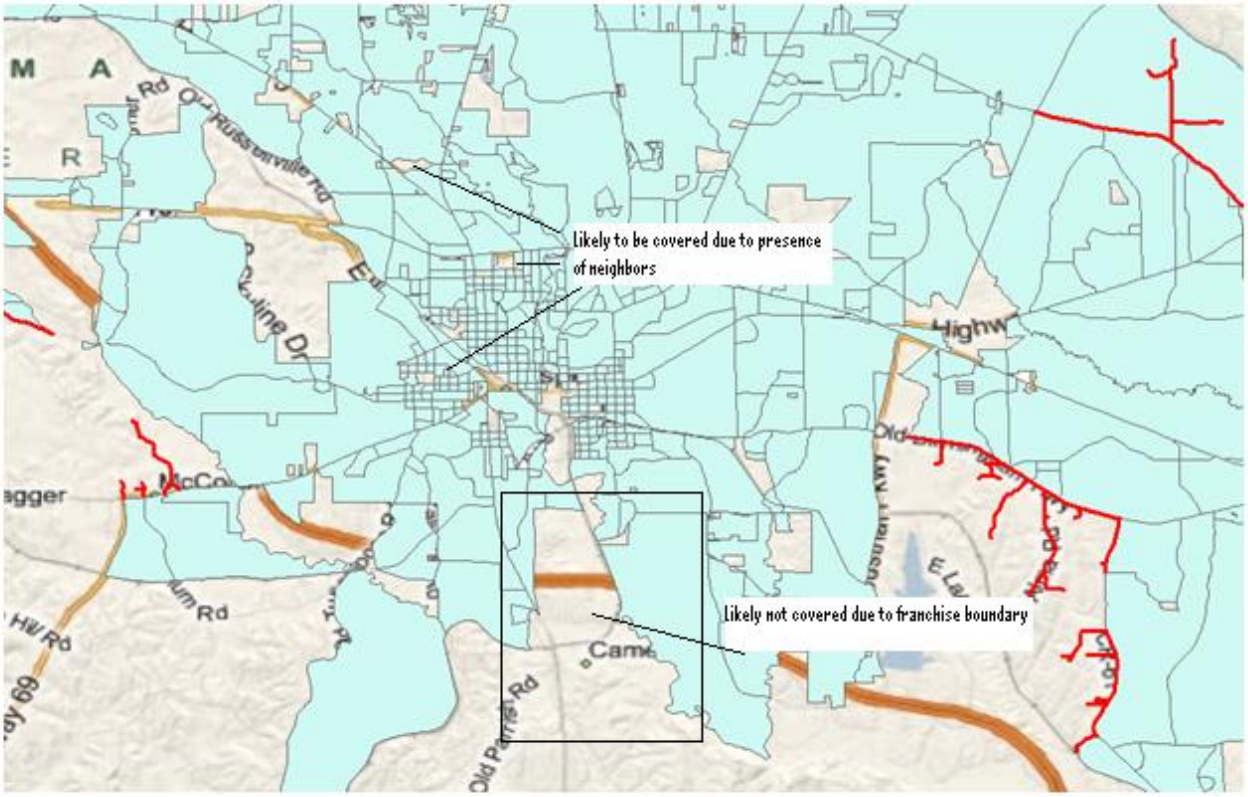


Figure 17-Where do you stop interpolating?

From what we can gather from some providers, the submitted data—data with consistently high degrees of dispersion or coverage holes—tends to come from geocoded billing records. In this paradigm, this means where there are no billing address points; service is not identified on a map. The interpolation verification question then takes on three dimensions.

First, if a provider has no customers in an area, how can we know if they would be able to provide service in a 7-10 day interval?

Second, if we use the properties of neighboring Blocks to interpolate coverage, when should we stop (e.g., at a franchise boundary, at a certain distance, etc.)?

Third, if we are comparing to a data source that examines coverage at a higher level (such as 477 Tract) do we use the Tract information to assign information block level coverage or do we use the tract coverage to filter out dispersions in coverage.

We continue to work with providers to get additional information to help us better understand and contend with this type of circumstance. However, we have not been entirely successful at getting franchise/service area boundaries that would address much of the issue.

The final map shows this dispersion problem, but to an even larger degree. This solitary large block is likely the result of a bad geocode, but we don't know, given the data that has been submitted by the provider and the "single customer in a block standard" set by the NOFA clarification.

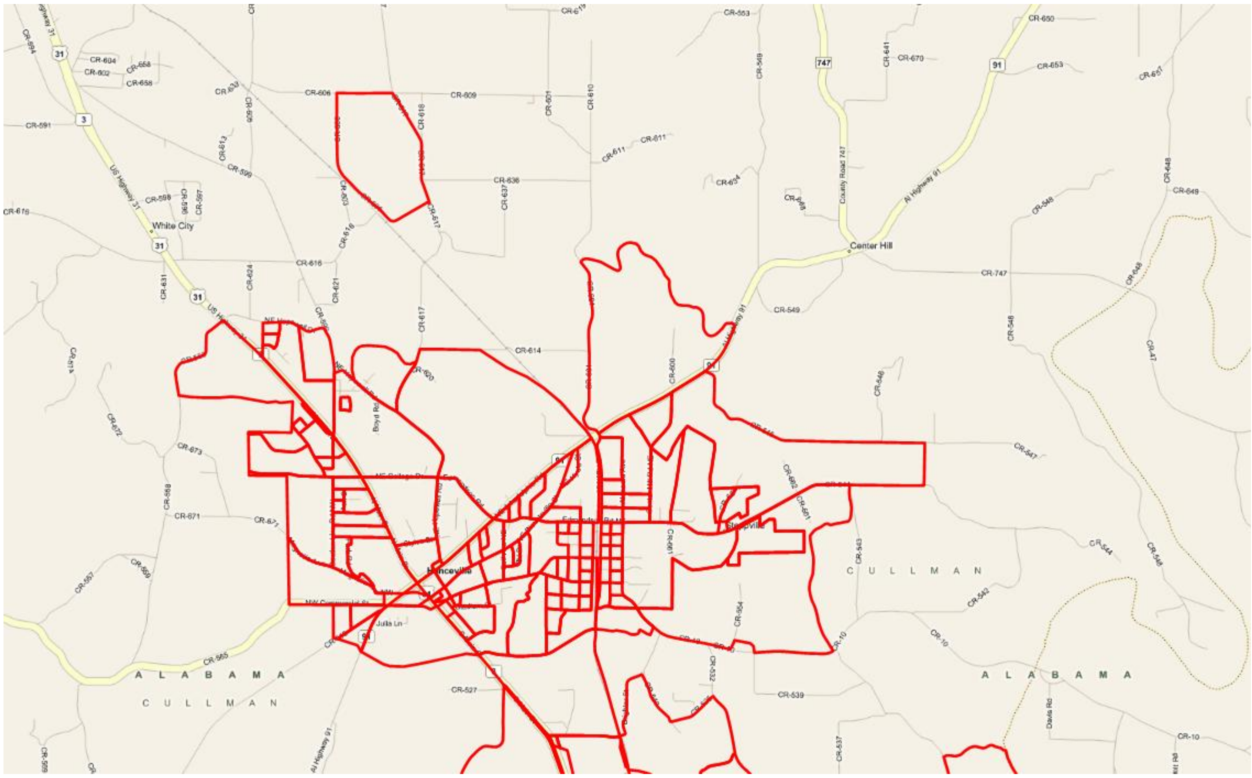


Figure 18-Dispersion in covered Blocks

Due to the fact that this situation is quite obvious in display, this type of problem is one that we are more aggressively trying to resolve. Where a single block has no neighbor offering comparable coverage and is a specified distance beyond an exchange boundary, our approach has been to filter these Blocks out. As of now, this filter is limited to incumbent xDSL providers because we have a good source of exchange boundaries.

The exchange boundary dispersion verification method breaks down when examining providers who are more likely to CLEC into neighboring territory. In the figure below, the black line represents the exchange boundary, while the continuity in the DSLAMs likely points to coverage extending along a road into another provider’s territory.

Figure 19--DSL Coverage outside of exchange boundary

In sum, the variability in our source data continues to suggest that our dynamic verification process is relevant, appropriate and evolving in a manner consistent with the overall program. And, as noted above, we believe the more meaningful outcome of our verification processes will likely be a series of qualitative indicators or expressed confidence levels. Our concern, as with the development of any sort of classification process, is how rigid we should make this classification given the variation in our input data and the varied perceptions of service providers, map viewers and down-stream data consumers.

Verification Work Process

To support our dynamic multi-factor verification process, we have implemented the following steps.

Between submissions our provider relations team works to analyze our current broadband provider ecosystem and capture any changes such as acquisitions, mergers or cessation of operations. They also remain in touch with providers who have indicated when follow-up is necessary. The team confirms that the providers who submit data are NOFA compliant. Given these steps they begin a survey and awareness campaign to get data submitted for the program.

When data is received, an analyst reviews the submission and any immediate questions or concerns are sent back to the provider as quickly as possible. We have found this gatekeeping step very helpful in making sure we understand the intent of the submission.

For all providers who submitted data to us in the prior round, the provider received both a tabular data summary and mapped output[28]. Prior to releasing the “check maps” to providers, we inspected each provider’s coverage area. After this in-house review, we solicited a second level of feedback from providers and received a number of requested changes and corrections used in the development of the current dataset.

For those providers who submit only block or segment level coverage (i.e., in those cases where we have no infrastructure to test with) we test for coverage containment within known service boundaries. The intent of this validation step is to remove Blocks that are obviously erroneous.

We have also begun to perform a mechanical test against wireline providers. This is an examination to ensure that each feature submitted has some neighbor within 1 mile. We are testing this process to try to understand what the neighbor distance should be. This has proven to be a difficult process.

We also verify the submitted speeds against the typical speed ranges in the NTIA frequency tables. If we note a value outside of typical range, we ask the provider for clarification. These responses are recorded.

As mentioned in the sections above, we have implemented a check on dispersed Blocks, but we have implemented less with respect to coverage interpolation (holes in coverage). We continue to work on a

[28] For the verification of round 3 data, we submitted both PDF and KMZ (Google Earth) format check maps. Some providers prefer to work with the Google format as it supports easier modification. Others continue to submit marked up PDFs.

series of mechanical tools to assist with the inspection process but have run into challenges related to geographic basemap and timing.

As our submissions have moved online, we have also begun to benefit from crowd source feedback. In some cases this has helped us identify and fix errors in our underlying data. In other cases, as we have shared with NTIA, we have encountered some perceptual issues rooted in how the data are developed and modeled to comply with the NOFA. Depiction of uniform coverage in small Census Blocks continues to be a challenge. Despite our best efforts to explain the full block coverage requirement, we continue to receive complaints that the coverage shown on the map is not accurate for a particular location within that block.

Consumer and Provider Responses to Deliverables

Here, we segue from internal verification to external verification. We view responses to our work product as a form of validation and verification. On the one hand, this gives us the opportunity to fix mistakes and then generate QA steps to make sure that the problem does not reoccur. We also learn how to improve what we are doing or better explain what we are doing to a community not always familiar with the NOFA and program office framework. On the other hand, listening and learning from this feedback helps us better target our mapping deliverable to meet the needs of our external customers. In this second case, external feedback not only provides feedback on perceived qualities (or lack of quality) in the data, it helps us to learn if we are developing data that is truly helpful to downstream users across a wide range of usage and intent.

At this point, our external deliverables take three forms: State Broadband Maps, data transfer to NTIA used for the National Broadband Map, and text format data requested by outside parties.

Online Map Experiences

With our State maps online, we continue to harvest viewer feedback and comments. Because an online map allows someone to zoom in far below the scale of the data, a large number of comments reflect sub-Census block concerns. While important to the citizens reporting these issues and to our Broadband planning teams, this level of data is outside the scope of our core validation process, which as noted above, is focused on the level of data submitted to NTIA.

There are several other themes that our team believes are important to share. These comments are actually quite helpful because they also improve our data processes to better meet the needs of map viewers. For example, we have invested significant time in harvesting more segments from provider data. Because the appearance of segments is so important, we are putting time into ensuring a visually appropriate edge match between the roads we harvest and the Blocks/roads we will show online. On a technical level, we also believe that a good segment process will help us understand more about dispersion in the data, and what is valid versus what is not valid.

Online Display of Consumer Feedback

We have completed development of a consumer feedback layer for our online maps.

The intent of the new layer is to show viewers the feedback of other map viewers. This layer went live after the Round 4 data was posted.

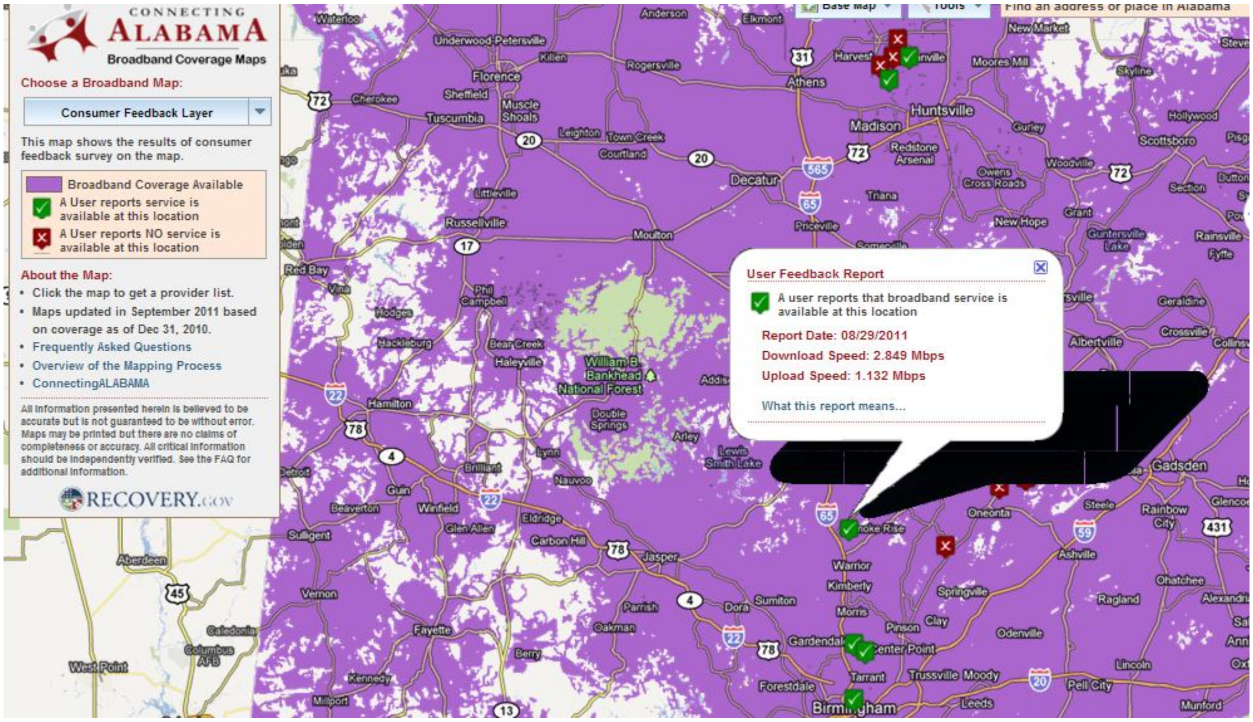
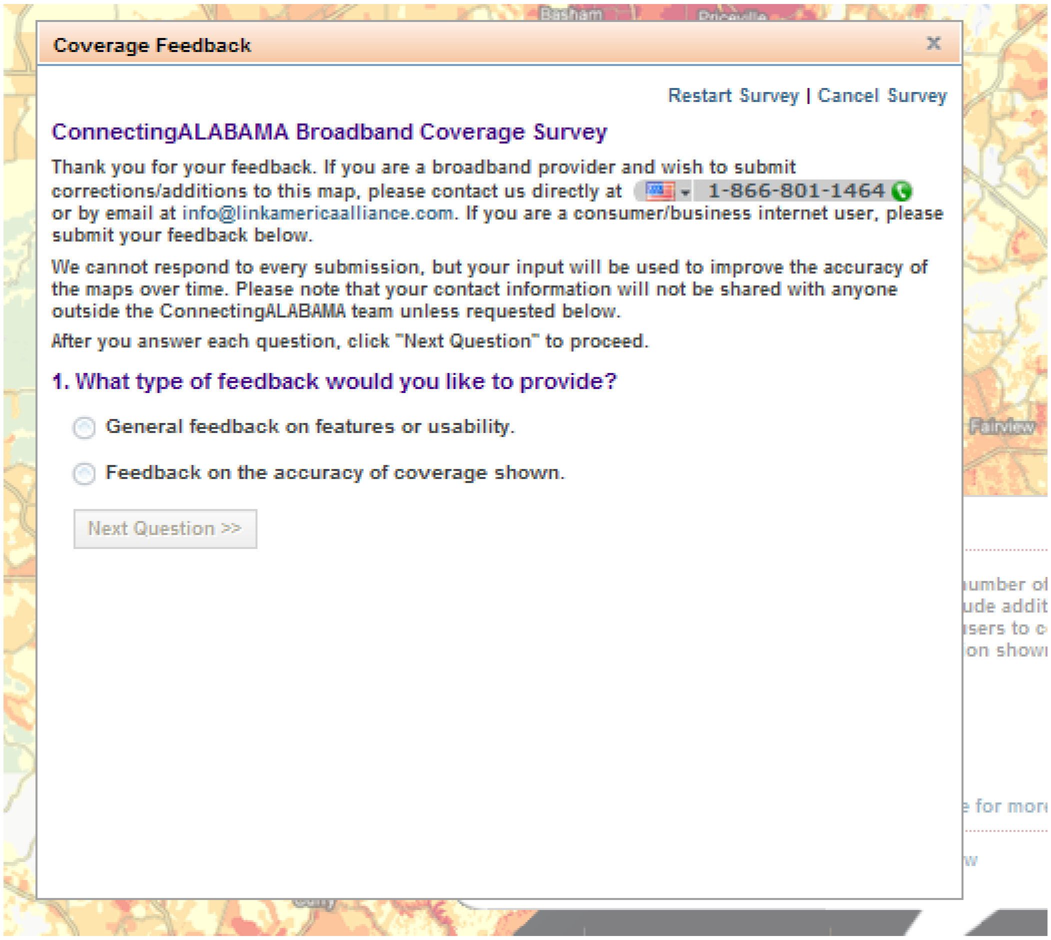


Figure 20--Consumer Feedback Layer

To gather feedback, we use a survey wizard which asks the end users to categorize their concerns. The survey went through several iterations of design and usability testing. Our experience has been unless we get a way to constrain the user feedback into manageable categories, it becomes very difficult to act upon.



As mentioned by other Grantees we struggle with how to use all of the feedback we receive. The qualified data points seem to fall below a volume in which we can infer significant modifications to the map data. Nevertheless, we believe it is important to gather structure and display the feedback to support project transparency.

Perception of Unfair Treatment Across Technologies

Several Broadband service providers have expressed strong concerns regarding how wireline services are displayed, as contrasted to how wireless coverage is displayed. This is an artifact of the SBI data model. As an example, consider the figure below.

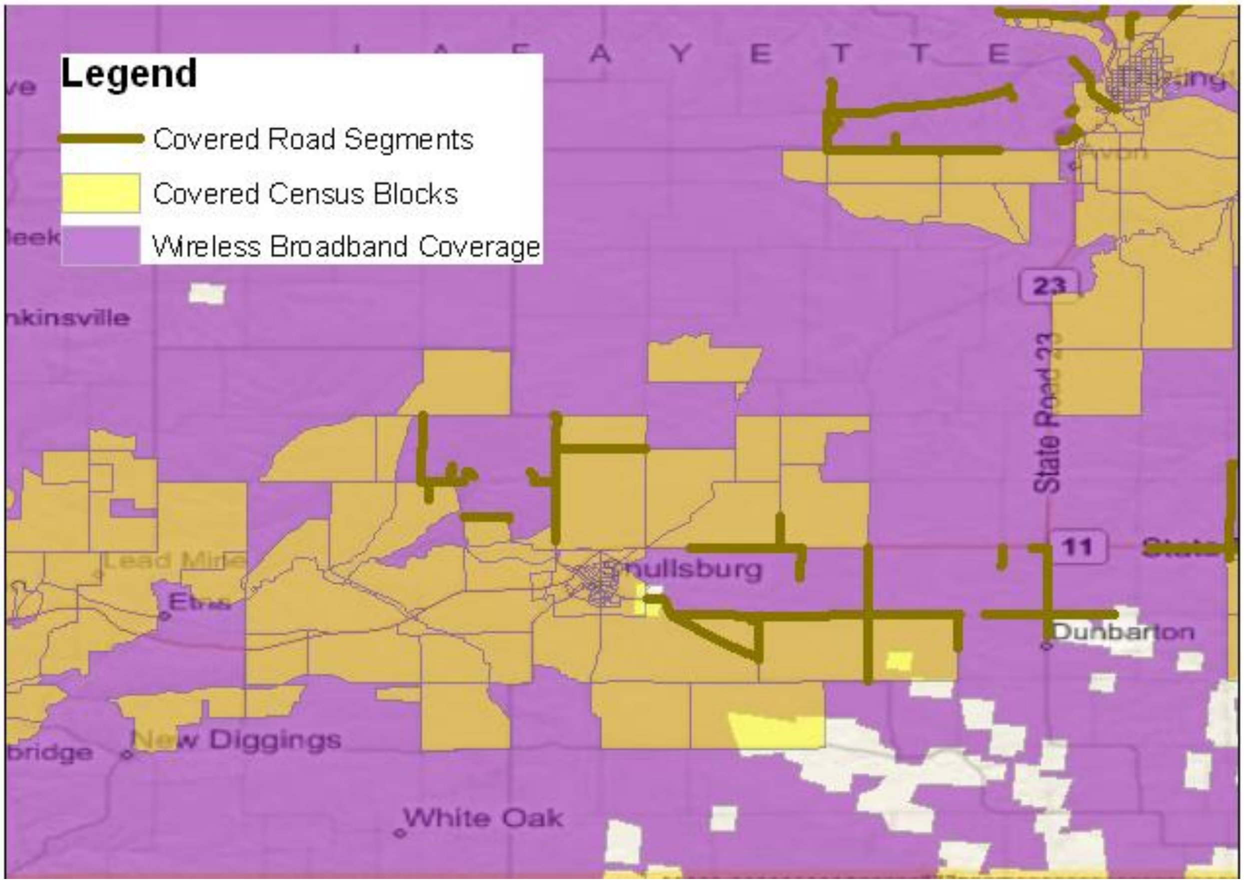


Figure 21--Multi Network Coverage portrayal

In this image, covered Census Blocks are light gold. Covered road segments are a darker gold and wireless coverage is purple. The concern seems to come down to how a wireline provider's coverage is shown in the large Census Blocks (greater than 2.0 sq mi). Some wireline providers have expressed dissatisfaction because their coverage is only tied to road geography, which leads to a visual "hole" in their coverage map. At the same time, they feel that it is unfair that the wireless provider's coverage is shown to be uniform in the same area. Put another way, if our maps show wireline in terms of Blocks and segments, why don't our maps show wireless the same way?

Loss of Geographic Granularity

Some providers particularly those who submitted facility level information are disappointed when we have to roll the derived data up to Census blocks or road segments as this changes the appearance of their service areas. This is especially important in rural areas where the larger blocks represent more of the service territory.

Perceptions of Carrier of Last Resort (COLR) Obligations

Some wireline providers have also expressed dissatisfaction because online maps limit the distance of coverage from a road segment. In our current online maps we buffer a wireline carrier's service 300' from road centerline. A number of providers have expressed that they are mandated to provide voice coverage (which Broadband will accompany) anywhere in the Exchange. There seems to be many

dimensions to this argument, but the basic concern comes down to not being able to accurately reflect the scope of their COLR obligation within the mixed block/segment view. Their ability (or lack thereof) to actually provision such services for new users within a 7-10 day period adds yet another level of complexity when attempting to fairly portray their coverage capabilities.

Intentions of Coverage Mapping

When a viewer of an online map clicks on the map (or zooms to an address), they are provided with a pop-up of service provider coverage in the area. The critical question is this: what is the area to which that pop-up window responds to? In the past, we reported back to the specific Census block, or buffered road segment intersected by the user click. As far as the map was concerned, once we move off of that road, or out of that segment, we have a new area to examine.

Our sense, given feedback received, is that our provider view should be a bit more tilted toward finding providers in a general area, rather than finding providers at a single-click location. If the goal of the map is to get someone to call a provider for service, our bias should be to include all of the potential providers in the general area, rather than giving potential customers a method to self-disqualify. That is, we want to cast a wider coverage net, rather than one too narrow. The problem with this approach is that it will create a number of false positive Broadband reports. As of this date we cannot determine if the claims of inaccurate coverage in online maps are due to the looser provider view standard or not. We keep this looser standard in place to minimize the likelihood of self-disqualifications.

Appendix One--Alabama

Community Anchor Institutions

LinkAMERICA began transitioning the Community Anchor Institution (CAI) data collection effort in the state of Alabama to ConnectingALABAMA in Round 3. For Round 4 ConnectingALABAMA assumed full responsibility for the CAI data collection effort in Alabama.

In the current submission ConnectingALABAMA worked to achieve two goals.

1. Obtain CAI data sets from the Homeland Security Information Network (HSIN).
2. Compare these data sets with previous and make necessary changes and additions to previous submissions.

ConnectingALABAMA was able to obtain GIS feature classes for the following CAI's from HSIN

Alabama Private Schools
Alabama Nursing Homes
Alabama Urgent Care Facilities
Alabama Health

Basic information included in the data sets is contact anchor name and contact information including physical addresses and phone numbers. The datasets also contain qualitative information regarding the generation of latitude and longitude values for each CAI.

ConnectingALABAMA's primary focus for this submission was to compare the April 2012, submission with data sets obtained from HSIN for private K-12 Schools, nursing homes, urgent care facilities and health departments. There is also an ongoing effort to replace PO Box locations with a Physical address when it is available.

The FULLFIPSID was populated using the GEOID10 ID from 2010 Census data. The focus of collection 7 will be the supplementation of missing data.

ConnectingALABAMA will utilize the following actions to locate connectivity data:
Alabama Broadband Advisory Board will be asked to participate in the identification of data. The board includes:

Alabama Commission on Higher Education
Alabama Department of Agriculture and Industries
Alabama Department of Children's Affairs
Alabama Department of Conservation and Natural Resources
Alabama Department of Economic and Community Affairs

Alabama Department of Education
Alabama Department of Homeland Security
Alabama Department of Postsecondary Education
Alabama Department of Public Health
Alabama Development Office
Alabama House of Representatives
Alabama House of Representatives
Alabama Rural Development Office
Alabama Senate
Alabama Supercomputer Authority
State of Alabama, Information Services Division

ConnectingALABAMA Regional Coordinators will work within the regional Broadband Action Teams to identify connectivity or appropriate contacts
ConnectingALABAMA will work in cooperation with Alabama SuperComputer Authority and local schools to identify true connectivity. We have identified that while all schools are connected through our Alabama SuperComputer Authority, these schools are also purchasing additional connectivity.

ConnectingALABAMA has begun the process of implementing regional broadband plans. Many of these plans include projects that will identify connectivity as well as connectivity needs. The use of the local individual already committed to assisting with Broadband will provide an alternative to published data that could have changed since last assessment.

Appendix Two

Data Collection Challenges

This section summarizes some of the challenges we have experienced with data collection and processing. The team believes it is important to categorize these challenges as they help inform the geoprocessing and verification methods used. It is also our hope that some of the more global issues can be discussed and decided within the Grantee community.

We begin with several global issues and then continue toward more granular challenges.

Global Data Collection Issues

Maximum Advertised Speed is Not Reported Consistently

As has been discussed in webinars and also within the context of NTIA data assessments, much reported speed information continues to be reported at the market level (MSA/RSA) and then uniformly pushed down to the Census blocks. This has a tendency to create a problem with NTIA speed tripwires since the technology is reported by block but the maximum advertised speed is reported at a regional level.

This challenge gets further amplified at a block level when comparing to a third party data provider. It can create a mismatch between third party data generated at an area larger than block level versus block level generated speed and vice versa. To minimize the potential confusion, it might be helpful to be able to provide a flag at the submitted record level which indicates the geographic basis by which the Maximum Advertised Speed is reported.

Census Block and Road Standards are not clear

There seem to be several methods by which providers are calculating the Census block area. So the distinction at 2.00 square miles can be uniform, it would be ideal to articulate an operational area calculation definition.

Providers Not Wishing for Block Level Aggregation of Their Data

For providers who submit address point data, we do minimal additional processing. Our main test is to ensure that points are contained within 1 mile of exchange boundaries; the only other processing was normalization into NTIA formats.

Broadband providers not Meeting the NOFA "provider" Definition

Comments on PBWorks appear to reflect a concern among a number of grantees about what a Broadband provider is--and how that definition impacts mapping.

If the 7-10 day provisioning rule is to be strictly enforced, it could seem to eliminate a number of prominent Broadband providers[31]. Further, the need for clarification around a facilities-based provider,

---

[31] By email ***REDACT*** informed us they could not provision in 7-10 days, but they also supply information on qualified locations to the address point level. Therefore, we draw a distinction between an incumbent provider owning the facility--which terminates at a customer premise--who cannot turn up service at a qualified location,

versus the reseller, has injected even more uncertainty. Right now we are unclear on how strictly to interpret either of these important distinctions, but we are concerned that we are beginning to create an NTIA exclusion criterion that is going to confuse downstream consumers of the data.

Given mergers and acquisitions in the CLEC space we are noticing a drop off in participation in this program by several national CLECs. We hope this is an artifact of the mergers and resource constraints rather than a long term trend.

Again, we do not want to exclude a service provider, but we believe there needs to be further clarification around the “7-10 day rule,” the definition of a “reseller,” and better interpretation of facility-based providers, versus equipping UNEs, SpA or leased lines.

We have used the provider Type of ”Other” to classify a number of providers who offer Broadband services, but we do not offer them in a manner consistent with Technical Appendix A definitions.

To What Extent Should We Begin “Classifying” the Data and Maps?

The question immediately preceding gets to the intent of a Broadband provider. This question gets to the intent of the Data and Maps.

Earlier in this document we discussed the question of what type of bias we should introduce to our online map messaging. In an online environment, do we want to more likely create an overstatement of coverage for a provider than an understatement? In other words, is the larger problem allowing a consumer to self-disqualify, versus calling a number of neighboring providers? There is a related issue to this. Clearly in our maps there is a lot of scatter in data that we believe should be more continuous. These are the islands of coverage from an incumbent provider[32]. There are a number of processes that could be put in place to deal with this type of scatter, but without more information from the service provider-- essentially the last mile facilities-- it will be difficult to perform this clean up in an informed manner. On the one hand, we can aesthetically clean the maps up and reduce the scatter, but we have little sub-block engineering information upon which to make this decision. Right now our preference is to put out a somewhat aesthetically messier deliverable and work with providers to get better information to clarify their submission. If that isn’t forthcoming, we are limited in what can be done given the lack of facility level information. In summary this yields two questions

In our online maps should we error on overstating coverage to prevent consumer self-disqualification? In our online maps should we work to clean up a lot of the scatter that we see without having facility-based evidence from which to remove it?

---

versus a provider not reporting any specific qualified locations in which they cannot turnup service in the 7-10 day window. In the first case we have a sense of where service can be offered and verified. In the second, we have no evidence that a service could exist there until a specific location becomes a customer.

[32] For a provider who sells opportunistically (not within a franchise area) it becomes even more problematic to classify their coverage because the points are more related to the type of consumer purchasing the service than a bounded offering. In a matter of speaking, the ProviderType is more determined by the technology and/or location than a type of business. The core intent of the NOFA and our grant application was centered around the 7-10 day providers but we believe maintaining information on provider Type “Other” and “Reseller” is important to assist in validation and market segment analysis as resources are available.

As we examine results from third party data assessments, it appears that this scatter is something that is also problematic with the assessment results. It also appears to be evident that different third party data sources treat water areas differently. When we are developing data based upon Wireline facilities, we exclude water blocks. We do not filter out water blocks from provider submitted data. We are unsure if there is or should be a standard in how water covered blocks are treated for Wireline broadband providers.

Community Anchor Institution Surveys

Over time the base of participation in CAI surveys has broadened. Our teams are interacting with more organizations interested in broadband planning. This is a benefit because it helps integrate the importance of Broadband mapping, planning and capacity building within their organizational framework. But it also begins to create challenges in data collection. There are two noticeable trends in this area.

First, CAIs are organizationally diverse. For a school, you expect to have a centralized entity that can answer and support questions about Broadband services. For a rural, volunteer fire department answering questions about broadband may go to the Chief. The way that he/she answers about Broadband is probably specific to her experience and context. The implication is two-fold. First saying that some percentage of CAIs in a state have access to broadband can be misleading because the formality of a school or government building is much different than the formality of a volunteer fire department. Second, that volunteer fire department may get broadband via a 3G mobile hotpsot when they need it…but the presence of *this* type of broadband is a very different thing than the presence of a responder who has mobile LTE broadband.

Second, technical knowledge of the survey respondent differs within each organization. This complicates our data collection. It is not uncommon for someone to say yes we have Broadband, I just don't know how we get it or how fast this is. So in response we report they are broadband served but unknown speed or technology. This doesn't mean they haven't been surveyed, it just means the response was unknown. As there are now a large number of people collecting this data, it would be helpful to have some consistent national business rules from which we can answer questions about the meaning of any particular data element. As an example, when should "no" be used versus when should "unknown "be used. In other words, what is the standard for the difference between never made contact with the CAI versus a respondent didn't know/couldn't answer. We have guidelines internally but are unsure if this is consistent across states.

Granular Data Collection Issues

Non-Uniform Submission Standards

It is clear among providers that there isn't a consistent method used to derive Broadband coverage. Some providers appear to be use a geocoding approach and then point in polygon or point on segment process. Others may be using GPS locations. In some cases, it is difficult to infer what reference data was used to georeference plant (is it the carrier's roadbase?). This leads to uncertainty regarding the input data scale or accuracy relative to other base layers. Although we may be trading off absolute accuracy, our standard has been to conflate submitted data to TIGER 2010 Blocks and TIGER 2010 roads. We perform our verification against this conflated data product.

Temporal

We are unsure of how well the data are temporally consistent. Some providers gave us their best effort to control to June 30, 2012. We note that some providers were clear that the submission was as of extract date without any way to move back in time. They have no means to control for time and cannot provide any audit support beyond when the data are released to us. Some data-especially loop qualification data-may change from day to day. It will be very difficult to clarify why something was changed from a given point in time.

Perceived Inaccuracy with Respect to Internal Standards

The NOFA is clear on submitting a list of Blocks in which a provider delivers Broadband service. This is a different objective than perfectly reflecting service territories. If a firm's accuracy standard is a reflection of their service area, then the data created under the NOFA will not meet their perception of accuracy. This leads to two other issues: First, using Census Blocks rather than serving area may overstate or understate a particular provider's Broadband serving area. This was a significant concern of ***REDACT*** who specifically required us to submit only address-level qualification data. The second issue this brings up is how or if, there should be some standard on how much of a Census Block needs to be covered to call it covered.

Confidentiality

Several providers have noted concerns with CPNI-related issues and have stated this as a reason for non-participation. We have also heard expressions of comparable concern regarding identifiable responses to Anchor Institution information.

Unclear on Definitions

As discussed earlier, several providers claimed confusion on several key terms involved in Middle Mile. We note a consistent stream of questions around the interpretation of Maximum Advertised Speed. Some providers understand this to be the most common speed package bought within the mass market, while others view this as a speed that can be purchased for an additional cost above a mass market offering (e.g. a Turbo option for an additional fee per month). Others interpret this as the fastest speed that is available for that particular location--in terms of xDSL, a structure qualified speed, for example.

Perception of Data Use

There seems to be some hesitancy releasing speed information because no one is sure of how the information will be used, or what the speed is intended to reflect. A number of providers have verbally indicated that typical speed will be about (on average) 80% of purchased speed due to overhead. But there are many other factors (such as a user's home network) that influence speeds measures. Providers are concerned about introducing statistics without a clear understanding of how those statistics are derived and will then be used. Also, as advertised speed is pushed down to a block level, we sense more trepidation to report speed values. This quickly begins to touch on parity across network types (why is wireline down at the block when wireless is half the state, etc.). Finally we note a

significant increase in speed values reported to us. This may be due to network upgrades or competitive concerns to match the theoretical network speed.

Location Uncertainty In Source Data

Within this document we have noted concerns about the impact of source data accuracy. Our geoprocessing methodology provided what we believe is a relatively conservative tolerance to account for the scale issue in the source data, but we are unsure of how this may impact downstream users. Clearly, it also impacts the verification process because we can't attempt to verify received data beyond a scale at which it was developed.

Covered Segment Process

Deriving Broadband covered segments in Census Blocks greater than 2 square miles has proved to be a challenge. Moving from a NOFA specified tabular deliverable to a requested geographic deliverable also increases the complexity of the effort.

Record Level Metadata

It would be helpful to have one or two additional fields in each feature class transmitted to NTIA. One User Defined field could be helpful as an expression of record level confidence. The second field could be used as a Key between the transfer geodatabase and our systems. Ideally, both fields could be large text fields (50 char) so the Grantee can use them to express a variety of attributes.

Miscellaneous Data Collection Notes

We note the following important observations regarding our data submission:

There are Middle Mile plant records for providers who are not present in the Census block, segment or wireless area feature classes. This is due to classification as non-NOFA Broadband providers.
In some cases, we have trimmed wireless coverage estimates to honor state boundaries.
We believe some providers are trimming their coverage to honor license area boundaries.
Where a provider submitted Middle Mile points out of state, we are no longer passing those points to NTIA as they fail the validation script.
In tables with mandatory Street and Zip5 attributes (Service Address), if the value is unavailable we fill the default value.
As before there remain some differences between the Data Model, Data Model Default Values and the Python Validation Script.
We have a significant amount of VDSL, ADSL 2 and ADSL 2+ coverage categorized into the xADSL category. This introduces large variance in speed availability as some providers are using VDSL, shortened loops and/or pair bonding to increase speed to levels nearly 30 Mbps.
We note a few providers who have speeds seemingly inconsistent with their technology of transmission. This is either very low speeds with optical fiber, or very high speeds with non DOCSIS 3.0 systems. We have verified on provider websites that the reported speeds are available in the area but these speeds will fall out of the NTIA frequency table analysis.
We have a small number of providers who serve an area with both a residential and business speed tier. In cases where we cannot distinguish which speed tier offering to use, we use the higher of the speed tiers.

Per NTIA request we have modified the manner in which we handle Wireless coverage polygons. If a Provider submits a single geometry but specifies multiple spectrum codes in use in that polygon, we duplicate the polygon for each spectrum code. In other words the geographic object is identical but the attribute data for the object is unique.

In point level data submissions (Service Address and CAI) we note points that are spatially coincident. With respect to Service Address points our thought is these represent multi-unit dwellings or businesses but we don’t have enough address detail to determine if these are multi-unit structures or duplicated customers. Because we cannot determine the reason for the duplication we leave spatially coincident records in our submission. We also leave in our CAI submission points which may be the same physical structure but have slight variations in addressing.

In point level middle mile data, we are finding a variance in the quality of the geocoded longitude and latitude returned. Given the data received we are unsure if this is an issue where the plant address is difficult to geocode or if the longitude and latitude provided to us is different than what would be returned in geocoding.

For Block and Segment level data which we produce based upon provider facility or service area boundaries, we remove Census blocks which are entirely water covered. This results in a drop of Census block counts for a number of providers.

Appendix Three

This appendix contains the confidentiality clarification supplied in a series of emails between CostQuest and NTIA.

Feature Class	*Metadata*	*NOFA Confidential?*	*Online Map*	*Public Disclosure*	*Exemption*
Last Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Middle Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Service Address	Constraints on accessing and using the data	No	No	Yes	
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
CAI	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential

	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Census Block	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Service Overview	Constraints on accessing and using the data	No	Yes	Yes	The only provider who may not show up on this table is a provider who has provided only confidential data (last mile, Middle Mile,

					address point with provider name)
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Road Segment	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None.				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Wireless	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				

	There are no restrictions on distribution of the data by users

Appendix Four-Alabama

This appendix details our analysis of the potential and actual broadband provider market.   We include both our internal tracking description document and then our categorization for each provider. As this extract was made prior to final submission, there may be differences between provider categorization and the attributes on the day of submission to NTIA.

Provider Categorization

Provider Type and Status Definitions

The Provider Type is based upon categories provided by NTIA, while the Provider Status is based upon categories developed internally for tracking purposes. It should be noted that the Provider Status discussed here relates to the provider's overall status within the program.

Provider Type Codes and Definitions:

NTIA code	Code	Name	Definition
1	P	Provider	This code applies to all confirmed providers of broadband service per the SBI program NOFA. A provider is given a "P" designation if we have determined that the company does indeed exist and appears to be providing broadband services.
2	R	Reseller	This code applies to all broadband entities that have been confirmed as pure resellers – meaning they do not own their own facility/equipment and simply resell services under their own brand name or the brand name of an actual Provider.
3	O	Other	The code applies to entities who were originally placed on the SBI provider list, but whose status is still in question or has been determined to be non-NOFA compliant.
	N/A	Not applicable	This code applies to entities who appeared on the original state provider list or a third party list (such as the FCC 477, American

4			Roamer, or Warren Media lists) but who have been confirmed as NOT providing broadband services.
	X	Inactive	This code applies to entities that may have appeared on an early provider list but whose identity and existence we subsequently have been unable to verify. This code may also apply to providers who have since been acquired or simple gone out of business and for which no FRN appears on the FCC list – These no longer need to be reported to NTIA. This is an INTERNAL category used to remove entities completely from the list of entities submitted to NTIA.

Once the proper Provider Type has been assigned to an entity, an overall Provider Status must be established. The Provider Status codes are specific to the Provider Types, and are not interchangeable. The following table lists the status codes associated with each Provider Type.

Provider Status Definitions

Provider Type Code	Provider Status Code	Name	Definition
P	D	Declined	A provider is given a Status of "D" if they have officially stated verbally or in writing that they will not participate in the SBI program.
	P	Participating	A provider is considered to be "Participating" if they have submitted USABLE data in at least one data submission round. The data does not need to be 100% complete for a provider to be assigned a "P" code – they simply have to have provided a level of data that is sufficient to submit to NTIA.
	NR	Non Responsive	A provider is considered "Non Responsive" if they have either failed to respond to any of our correspondence, or they have submitted insufficient data that makes inclusion of their data in the NTIA submission impossible.
	V	Submitted under other ID	A provider whose data is submitted under another Provider ID, but is operating under their own FRN.
	E	Estimated	A provider is marked as "Estimated" if they have not submitted usable data, and would otherwise be considered non-responsive, BUT for whom we are able to submit data by using estimation techniques and/or third party sources. This designation applies only to providers whose data is 100% estimated.
R	R	Reseller	"R" is the only status code for Resellers and it simply reconfirms their status as a reseller –data may not be submitted but name of provider is included in NTIA data package.
O	U	Unknown	The status of Unknown is assigned to an entity whose name has appeared on a list (or been submitted as a new possible provider) and is currently under investigation. It has not been determined yet if this entity is indeed offering broadband services or not.
	NC	Non-Compliant	This status is assigned to entities who appear to be in the broadband industry, but who do not meet the formal definition of a BB provider under NOFA requirements. Examples may be entities who cannot provision service within 7-10 days.

	P	Participating	These are providers who do not meet the formal definition of a BB provider under NOFA requirements, but are participating in the program and submitting data.
	NP	Not a Provider	This status applies to entities who may appear on a third partly list of valid providers, but who have been proven to either no longer exist, or simply no longer provides broadband services.
N/A			No status codes associated with this Provider Type
X			

Provider Disposition

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
100044	AL	A&E Design/IP-Networks	A&E Design/IP-Networks	n/a	X	
100069	AL	Access Spectrum	Access Spectrum	Access Spectrum	N/A	NP
73	AL	Advanced Broadband (Capshaw)	Advanced Broadband	n/a	P	V
69	AL	CyberBroadband	Advanced Broadband	n/a	P	P
68	AL	Advanced Computer Solutions, LLC	Advanced Broadband	n/a	P	P
70	AL	Aerowire, Inc.	Aerowire, Inc.	Aerowire, Inc.	P	NR

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
100057	AL	Airespring, Inc.	Airespring, Inc.	n/a	R	R
113	AL	AL Supercomputer	AL Supercomputer	n/a	O	NC
33	AL	Alabama Broadband, LLC	Alabama Broadband, LLC	Alabama Broadband	P	P
71	AL	Alanu Internet Solutions	Alanu Internet Solutions	n/a	N/A	NP
100001	AL	AlaWeb Internet Services	AlaWeb Internet Services	n/a	R	R
753	AL	AL-GA Wireless	AL-GA Wireless Broadband LLC	AL-GA Wireless Broadband, LLC	P	P
200	AL	Alliance Communication Network	Alliance Cable	Alliance Communications	N/A	NP
100070	AL	Allied Wireless	Allied Wireless	Allied Wireless	O	U
100079	AL	Almega Cable	Almega Cable	n/a	N/A	NP
100051	AL	American IP	American IP	n/a	O	NC

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
1	AL	Ardmore Telephone Company	Ardmore Telephone Company	Synergy Technology Partners, Inc.	P	P
61	AL	BellSouth Telecommunications, Inc.	AT&T Alabama	AT&T Inc.	P	P
708	AL	AT&T Corp., Inc.	AT&T Corp.	n/a	P	P
709	AL	AT&T Mobility LLC	AT&T Mobility LLC	AT&T Mobility	P	P
2	AL	AT&T Inc.	AT&T Mobility Services, Inc.	n/a	P	V
784	AL	Baldwin County International/DSSI Services, LLC	Baldwin County International/DSSI Services,	Baldwin County Internet / DSSI Services, LLC	R	R
100071	AL	Barat Wireless (USCC)	Barat Wireless (USCC)	Barat Wireless (USCC)	N/A	NP
796	AL	SmartResort Co. LLC	Beyond Communications	SmartResort Co. LLC	P	NR
786	AL	Birch Communications Inc	Birch Communications, Inc.	Birch Communications Inc.	R	R
100004	AL	Birch Communications Inc	Birch Telecom of the South, Inc.	n/a	X	

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
100005	AL	Blakely Cable TV Inc.	Blakely Cable TV Inc.	n/a	N/A	NP
100068	AL	Blount Broadband	Blount Broadband	n/a	P	NR
736	AL	Blount Wireless	Blount Wireless	n/a	P	P
707	AL	Otelco, Inc.	Blountsville Telephone	Otelco Inc.	P	P
74	AL	Boondocks Wireless	Boondocks Wireless	n/a	P	NR
75	AL	BoaGroup, LLC	Boonlink	n/a	N/A	NP
35	AL	Bright House Networks	Bright House Networks	Bright House Networks, LLC	P	P
706	AL	Otelco, Inc.	Brindlee Mountain Telephone	Otelco Inc.	P	P
4	AL	Otelco Inc.- AL	Brindlee Mountain Telephone Company duplicate	n/a	X	
100043	AL	Broadcore, Inc.	Broadcore, Inc.	n/a	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
787	AL	Broadstar, LLC	Broadstar, LLC	Broadstar, LLC	O	NC
788	AL	Broadview Networks Holdings, Inc.	Broadview Networks Holdings, Inc.	Broadview Networks Holdings, Inc.	P	D
100008	AL	BullsEye Telecom, Inc.	BullsEye Telecom, Inc.	n/a	R	R
31	AL	ITC^DeltaCom, Inc.	Business Telecom	ITC^DeltaCom, Inc.	O	NC
36	AL	Cable ONE	Cable ONE	Cable One, Inc.	P	P
100009	AL	Cable Options, Inc.	Cable Options	n/a	N/A	NP
37	AL	Ragland Telephone Company	Cable Star	n/a	P	D
47	AL	Lee Co Alabama (same Co. as Al_Co) - R. M. GREENE INC.	Cable TV of East Alabama	n/a	P	V
38	AL	R.M. Greene Inc.	Cable TV of East Alabama	R. M. Greene, Inc.	P	P
725	AL	Camellia Communications	Camellia Communications	Hayneville Holding Company, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
726	AL	Castleberry Telephone Company, Inc.	Castleberry Telephone Company, Inc.	Castleberry Communications	P	D
100036	AL	'Talk America Inc.	Cavalier Telephone	n/a	N/A	NP
100084	AL	Cavalier Wireless LLC	Cavalier Wireless LLC	Cavalier Wireless LLC	N/A	NP
100061	AL	Telapex, Inc	Cellular South	Cellular South, Inc	P	NR
100025	AL	Qwest Communications Company, LLC	CenturyLink	Qwest Communications International, Inc.	N/A	NP
9	AL	Gulf Tele	CenturyLink	n/a	P	V
5	AL	CenturyTel, Inc.	CenturyLink	CenturyTel, Inc.	P	P
100054	AL	CenturyTel, Inc.	CenturyTel Acquisition LLC	n/a	P	V
100078	AL	Centurytel Wireless Inc	Centurytel Wireless Inc	Centurytel Wireless Inc	N/A	NP
40	AL	Charter Communications	Charter Communications	Charter Communications	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
100066	AL	Cincinnati Bell Inc.	Cincinnati Bell Inc.	Cincinnati Bell Inc.	N/A	NP
100080	AL	City of Opelika Power Services	City of Opelika Power Services	n/a	O	NC
711	AL	Clearview Cable	Clearview Cable	n/a	N/A	NP
756	AL	Clearview Tower Company, LLC.	Clearview Tower Company, LLC.	n/a	N/A	NP
76	AL	C & G Computers	CnGWireless	n/a	P	P
100010	AL	Cobridge Communication	Cobridge Communication	Cobridge Communications	N/A	NP
100011	AL	Cogent Communications Group	Cogent Communications Group	n/a	O	NC
100012	AL	Collinsville TV Cable	Collinsville TV Cable	Collinsville TV Cable	N/A	NP
41	AL	Comcast of Alabama, Inc.	Comcast	Comcast Corporation	P	P
698	AL	Com-Link, Inc.	Com-Link, Inc.	Ropir Industries, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
100033	AL	South Al Communications	Conexus Communications	n/a	P	NR
100055	AL	Coosa Cable Co., Inc.	Coosa Cable Co., Inc.	n/a	P	V
42	AL	Coosa Cable Company Inc.	Coosa Cable Company Inc.	Coosa Cable Company/Cable Vision Services	P	P
65	AL	Corr Wireless Communications	Corr Wireless Communications	Corr Wireless Communications	N/A	NP
639	AL	DIECA Communications, Inc.	Covad Communications Company	Covad Communications Group, Inc.	O	P
760	AL	Leap Wireless International, Inc.	Cricket Communications, Inc.	Leap Wireless International, Inc.	P	P
77	AL	CTSWireless.NET	CTSWireless.NET	n/a	P	NR
78	AL	Cyber Broadband	CyberBroadband	n/a	P	P
112	AL	International Broadband Electric Communications, Inc.	CybrTyme	IBEC, Inc.	N/A	NP
44	AL	Demopolis CATV	Demopolis CATV	Demopolis CATV Co.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
100077	AL	Dish Network	Dish Network	Dish Network	R	R
79	AL	Dixie Land Internet Services	Dixie Land Internet Services	n/a	P	NR
100053	AL	DSL by Air	DSL by Air	n/a	P	NR
643	AL	DSLnet Communications, LLC	DSLnet Communications, LLC	Megapath, Inc.	N/A	NP
100067	AL	Eaglenet, Inc.	Eaglenet, Inc.	Eaglenet, Inc.	N/A	NP
45	AL	Edge's Cable Co., LLC	Edge's Cable Co., LLC	n/a	N/A	NP
100018	AL	Hickory Tech Corporation	Enventis Telecom Inc.	n/a	N/A	NP
100013	AL	Envision Media Inc.	Envision Media Inc.	Envision Media Inc.	N/A	NP
8	AL	GTC, Inc.	FairPoint Communications	FairPoint Communications, Inc.	P	P
6	AL	Farmers Telecommunications Cooperative, Inc	Farmers Telecommunications Cooperative, Inc	Farmers Telephone Cooperative, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
757	AL	Farmers Telecommunications Corporation	Farmers Telecommunications Corporation	Farmers Telephone Cooperative, Inc.	P	P
100014	AL	Florida Consolidated	Florida Multi-Media Services, INc	Florida Consolidated Multi-Media Services, Inc.	R	R
7	AL	Frontier Communications of Alabama, LLC	Frontier Communications of Alabama, LLC	Frontier Communications Corporation	P	P
734	AL	Frontier Communications of Lamar County, LLC	Frontier Communications of Lamar County, LLC	Frontier Communications Corporation	P	P
733	AL	Frontier Communications of the South, LLC	Frontier Communications of the South, LLC	Frontier Communications Corporation	P	P
833	AL	Farmers Cellular Telephone	FTC Wireless Internet	Farmers Cellular Telephone	P	P
717	AL	Galaxy Cable Inc.	Galaxy Cable Inc.	n/a	N/A	NP
100015	AL	Global Crossing North America, Inc.	GLOBAL CROSSING TELECOMMUNICATIONS, INC.	Global Crossing North America, Inc.	R	R
100016	AL	GORDON CABLE TV	GORDON CABLE TV	n/a	N/A	NP
80	AL	Gosuto Wireless	Gosuto Wireless	n/a	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
100017	AL	Gunby Communications	Gunby Communications	n/a	N/A	NP
10	AL	Harbor Communications	Harbor Communications, LLC	Harbor Communications	P	NR
11	AL	Hayneville Telephone Company	Hayneville Telephone Company	Hayneville Holding Company, Inc.	P	P
12	AL	HiWAAY Internet Services	HiWAAY Internet Services	n/a	N/A	NP
791	AL	Hughes Communications, Inc. / HNS	HNS License Sub, LLC	Hughes Communications, Inc.	P	P
52	AL	Otelco, Inc.	Hopper Telecommunications Co.	Otelco Inc.	P	P
82	AL	HorizonWisp.net	HorizonWisp.net	n/a	P	NR
97	AL	TriDigital Broadband	InLine	The Contact Network, Inc.	X	
84	AL	The Contact Network, Inc.	InLine	The Contact Network, Inc.	N/A	NP
100058	AL	InterGlobe Communications	Interglobe Comm	Interglobe Communications, Inc.	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
85	AL	Internet Technology Consultants	Internet Technology Consultants	n/a	X	
43	AL	CommuniComm Services	James Cable	CommuniComm Services	N/A	NP
86	AL	JMF Solutions, Inc	JMF Solutions, Inc	n/a	P	NR
703	AL	Knology of the Wiregrass	Knology	Knology, Inc.	P	P
702	AL	Valley Telephone	Knology	Knology, Inc.	P	P
701	AL	Knology of the Valley	Knology	Knology, Inc.	P	P
700	AL	Knology of Montgomery	Knology	Knology, Inc.	P	P
699	AL	Knology of Huntsville	Knology	Knology, Inc.	P	P
46	AL	Knology of Alabama	Knology	Knology, Inc.	P	P
15	AL	Knology Total Communications, Inc.	Knology	Knology, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
100056	AL	Level 3 Communications, LLC - AL	Level 3 Communications	n/a	P	V
658	AL	Level 3 Communications, LLC	Level 3 Communications, LLC	Level 3 Communications, LLC	P	P
100046	AL	LightEdge Solutions, Inc.	LightEdge Solutions, Inc.	n/a	N/A	NP
100020	AL	Media3	Media3	n/a	P	NR
48	AL	Mediacom Southeast, LLC	Mediacom	Mediacom Communications Corp.	P	P
644	AL	Megapath, Inc.	Megapath	Megapath, Inc.	N/A	NP
718	AL	MetroCast Communications of Mississippi, LLC	MetroCast Communications	Harron Communications LP	P	P
100021	AL	Metropolitan Telecommunications Holding Company	Metropolitan Telecommunications Holding Company	n/a	R	R
16	AL	Millry Telephone Company, Inc.	Millry Communications	Millry Corporation	P	P
793	AL	Mobile Internet Services	Mobile Internet Services	Mobile Internet Services	P	NR

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
17	AL	MonCre Telephone Cooperative Inc.	MonCre Telephone Cooperative Inc.	Mon-Cre Telephone Cooperative, Inc.	P	P
18	AL	Moundville Telephone Company	Moundville Telephone Company	Moundville Communications, Inc.	P	P
772	AL	Multi-Path Networks, Inc.	Multi-Path Networks, Inc.	Multi-Path Networks Inc	P	P
19	AL	Telephone Electronics Corporation	National Telephone of Alabama, Inc.	n/a	P	V
88	AL	professional2-wayradio.com/NetSpeedNow.com	NetSpeedNow.com	n/a	P	NR
89	AL	Network Solutions	Network Solutions	n/a	P	NR
673	AL	New Edge Network, Inc	New Edge Network, Inc.	New Edge Holding Company	O	NC
20	AL	New Hope Telephone Cooperative	New Hope Telephone Cooperative	New Hope Telephone Cooperative, Inc. (AL)	P	P
50	AL	Northland Cable Television	Northland Cable Television	Northland Communications Corp.	P	P
90	AL	Novo Communications	Novo Communications	n/a	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
689	AL	NuVox, Inc.	NuVox, Inc.	n/a	O	NC
91	AL	Omni Broadband	Omni Broadband	n/a	N/A	NP
100023	AL	Open Range	Open Range	n/a	X	
51	AL	Opp Cablevision	Opp Cablevision	Opp Cablevision	P	P
21	AL	Otelco, Inc.	Otelco Telephone LLC	Otelco Inc.	P	P
100047	AL	The Contact Network, Inc.	PAETEC Business Services	PaeTec Corporation	N/A	NP
100024	AL	pcAirLink Wireless	pcAirLink Wireless	n/a	P	NR
22	AL	Pine Belt Telephone Company, Inc.	Pine Belt Telephone Company, Inc.	Pine Belt Communications Co. Inc.	P	P
724	AL	Pine Belt Cellular, Inc.	Pine Belt Wireless	Pine Belt Communications Co. Inc.	P	P
100073	AL	Public Service Wireless	Public Service Wireless	Public Service Wireless	O	U

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
100074	AL	Qualcomm	Qualcomm	Qualcomm	N/A	NP
100026	AL	R. M. Greene, Inc.	R.M.GreeNe,Inc.	n/a	P	V
100027	AL	Rabbit Internet Services LLC	Rabbit Internet Services LLC	n/a	N/A	NP
23	AL	Ragland Telephone Company	Ragland Telephone Company	Ragland Telephone Company, Inc.	P	E
100028	AL	RAMCO BROADBAND SERVICES	RAMCO BROADBAND SERVICES	Ramco Broadband Services	N/A	NP
100019	AL	Mayfield Communications LLC	RANBURNE CABLE	n/a	N/A	NP
100029	AL	RAPID COMMUNICATIONS LLC	RAPID CABLE	n/a	X	
100060	AL	Residential Data Solutions	RDASOL	n/a	P	NR
53	AL	Riviera Utilities Cable	Riviera Utilities Cable	Riviera Utilities Cable TV	N/A	NP
100030	AL	S and V Wireless	S and V Wireless	n/a	P	NR

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
54	AL	Scottsboro Electric Power Board	Scottsboro Electric Power Board	Scottsboro Electric Power Board	P	P
92	AL	Shelby Telecom	Shelby Telecom	n/a	P	NR
100049	AL	Silver Star	Silver Star	n/a	N/A	NP
55	AL	Sky Cablevision	Sky Cablevision	Sky Cablevision	P	NR
837	AL	Skycasters, LLC	Skycasters, LLC	n/a	P	P
831	AL	Knetworx, LLC	Smith Lake Broadband	n/a	P	P
100075	AL	Southern Company	Southern Company	Southern Company	O	NC
684	AL	Southern Light	Southern Light	Southern Light, LLC	P	P
93	AL	Southnet	SouthNet; A Tombigbee Electric Company	n/a	P	P
100082	AL	Southstar Satellite	Southstar Satellite	n/a	R	R

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
100076	AL	SpectrumCo	SpectrumCo	SpectrumCo	N/A	NP
714	AL	Sprint Nextel Corporation	Sprint	Sprint Nextel Corporation	P	P
797	AL	StarBand Communications Inc.	StarBand Communications Inc.	StarBand Communications Inc.	P	P
94	AL	Starlite Computers	Starlite Computers	Starlite Consulting Inc.	P	P
798	AL	Stratos Global Corporation	Stratos Offshore Services Company	Stratos Global Corporation	O	S
694	AL	Peoples Telephone Company, Inc.	TDS	Telephone and Data Systems, Inc.	P	P
693	AL	Oakman Telephone Company, Inc.	TDS	Telephone and Data Systems, Inc.	P	P
692	AL	Butler Telephone Company, Inc.	TDS	Telephone and Data Systems, Inc.	P	P
640	AL	Cherokee Telephone Company	TEC/Cherokee Division	Telephone Electronics Corporation	P	P
24	AL	Roanoke Telephone Company	TEC/Roanoke Division	n/a	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
799	AL	Telovations, Inc.	Telovations, Inc.	Telovations, Inc.	N/A	NP
56	AL	Time Warner Cable LLC	Time Warner Cable	Time Warner Cable Inc.	P	P
63	AL	T-Mobile USA, Inc.	T-Mobile	Deutsche Telekom AG	P	P
96	AL	Traveller Multimedia Network	Traveller Multimedia Network	n/a	P	NR
98	AL	Trillion Digital Communications	Trillion Digital Communications	n/a	X	
57	AL	Troy Cablevision, Inc.	Troy Cablevision, Inc.	Troy Cable	P	P
58	AL	TV Cable Of Andalusia, Inc.	TV Cable Of Andalusia, Inc.	TV Cable Company of Andalusia, Inc.	P	P
761	AL	tw telecom of alabama llc	tw telecom	tw telecom inc.	P	P
27	AL	Union Springs Telephone Company	Union Springs Telephone Company	Ropir Industries, Inc.	P	P
99	AL	US Wireless ONline	US Wireless Online	n/a	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
677	AL	Utilities Board City of Sylacauga	Utilities Board City of Sylacauga	The Utilities Board of the City of Sylacauga	P	P
100038	AL	Utopian Wireless Corporation	Utopian Wireless Corporation	n/a	P	NR
101	AL	VeriQik	VeriQik	n/a	P	NR
100039	AL	Verizon Communications Inc. / Verizon Business	Verizon Business	n/a	O	NC
62	AL	Verizon Wireless	Verizon Wireless	Verizon Communications Inc.	P	P
665	AL	ViaSat, Inc.	ViaSat, Inc.	WildBlue Communications, Inc.	P	P
102	AL	VisionSix Internet	VisionSix Internet	n/a	X	
59	AL	West Alabama TV Cable Co., Inc	West Alabama TV Cable Co., Inc	West Alabama TV Cable Company Inc.	P	P
100048	AL	Level 3 CommuNications, LLC - AL	WilTel Communications	n/a	P	V
60	AL	Cobridge PNA Windjammer Communications LLC	Windjammer Communications LLC	Windjammer Communications LLC	X	

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
29	AL	Windstream Alabama, LLC.	Windstream	Windstream Corporation	P	P
103	AL	WP Media	WP Media	n/a	P	NR
801	AL	Zayo Group, LLC	Zayo Bandwidth, LLC	n/a	O	NC
100063	AL	Zito Media	Zito Media	Zito Media	N/A	NP
100081	AL	Zoom Media	Zoom Media	Zoom Media	N/A	NP

Technical Whitepaper
Arkansas Broadband Data Submitted for October 1, 2012 to NTIA

Submitted By Connect Arkansas

Connect Arkansas

Connect Arkansas, a private, non-profit, is implementing a community-based initiative to promote internet access and education. The Connect Arkansas Broadband Act was signed into law by Governor Beebe on March 28, 2007, to ensure the creation of a competitive broadband, or high speed internet, infrastructure that will not only improve personal lives, but also the economic capabilities and of all Arkansans.

To facilitate statewide broadband access, Connect Arkansas, a "delivery platform neutral" entity focuses on three major components: Determination of existing broadband infrastructure in Arkansas, Education, and Accessibility to computer devices. The first of these components, determining existing infrastructure, facilitates the requirements of the SBDD Program adequately.

Identification of Broadband Providers

As of September 1st, 2012, Connect Arkansas has identified by Holding Company name Eighty (80) Broadband Providers in the state of Arkansas. These providers are identified as having infrastructure in the state and are not identified as being resellers. Of these providers, Seventy-Two (72) submitted to Connect Arkansas at least partial data to map coverage. Of the remaining eight (8) Broadband Providers, six (6) have agreed to provide data in the future. HighTower Communications and Arkansas AirWaves are fixed wireless providers, along with SkyCasters Satellite broadband were discovered following the Fall 2012 Data Submission. CoBridge Communications sold infrastructure assets to Fidelity Communications, which has agreed to provide data at some point in the future (note: as per Fidelity coverage area has changed significantly from the data listed as CoBridge). WildBlue(Excede) is now a service of ViaSat, Inc. and provided data. Utopian Wireless was removed from list as it appears they are out of business.

Data Collection and Processing

For the Fall 2012 data set all providers were contacted first via mail, then email, and finally with telephone calls to the point of contact for each company. Twenty eight (28) companies updated coverage information as far as speed or coverage area. Twenty (20) participating Broadband providers chose to display data as unchanged from the Fall 2012 NTIA Data Submission. Twenty four (24) participating Broadband providers either were unable to update coverage information by deadline, or were unresponsive for this round of data collection.

The format of data collected has been in various formats as listed below:

ArcGIS Shape files
Tab delimited files of Address Ranges
Tab delimited files of Addresses
Physical maps of coverage
Tower information for propagation

Shape files were easily formatted to conform with standards in the SBDD Data Model.

All census blocks and tigerlines (used for address range and address points) are based on the 2010 U.S. Census.

All tab delimited address files were geocoded using the ESRI geocoding engine in ArcGIS. These geocoding passes were used against the standard ESRI database, as well as U.S. Census Tigerline data, and Arkansas Geographic Information Office's Street Centerline and Address Points. In the rural areas of Arkansas the accuracy of geocoding is much lower than in urban areas. To help remedy this, Connect Arkansas reviewed the geocoding results with each provider, giving each the opportunity to correct any issues. Note: any geocoding results that fell outside of a providers existing telephone exchange or know service areas were discarded. From these results, nearest road centerlines or census blocks (less than 2 square miles) containing the geocoded points, were selected to represent the Broadband Providers Coverage. Note: only two (2) Broadband Providers provided data at the address level.

Any physical maps of coverage (including those submitted in pdf format) were used as a basis to manually select line segments from existing road centerlines in the state (based on U.S. Census Tigerline data). From these results census blocks (less than 2 square miles) that contained the digitized road centerlines were selected along with the road centerlines in areas of larger census blocks, to represent the Broadband Providers Coverage.

In census blocks greater than 2 square miles, that also have had address points have been completed by Arkansas Geographic Information Office, Connect extracted and submitted the address points that corresponded to the adjacent street segments as produced based on the Broadband Provider's submitted data. Please note that at this time the Address Point base set for Arkansas is still under construction by Arkansas Geographic Information Office.

Fixed Wireless tower information (including Latitude, Longitude, Frequency, Power, Height) were gather and entered in to EDX Signal software to model signal propagation. This software also took into consideration terrain elevation as well as ground clutter to accurately model the Broadband signal, in most cases to a twenty (20) meter degree of accuracy. These raw propagation models were processed in ArcGIS into more organically smooth shapes to conform with standards in the SBDD Data Model.

The results of the processes above were loaded into the SBDD Data Model and the latest CheckSubmission script was run. All resulting failed processes were analyzed and addressed to result in No Fails in Census Blocks, Road Segments, Addresses, or Wireless Coverage data sets (exceptions explained below).

Middle Mile information that was received (most Broadband Providers view Middle Mile as proprietary information and elected not to submit) as tab delimited text files or as a spread sheet in Microsoft Excel. This information was brought into ArcGIS, processed, then formatted to conform with standards in the SBDD Data Model and uploaded.

Community Anchor Institution data is information received from 3rd party sources in regards to institutions as outlined in the NOFA. Most of the data collected is from phone surveys to each location. In some cases difficulties were presented in finding a suitable technical point of contact to collect information. Arkansas Department of Information Systems has agreed to help provide information for public schools as well as HITArkansas for Health Systems, in future submissions. Only Community Anchor Institutions that could be geolocated were included. Arkansas Department of Information Systems has also informed Connect Arkansas that every K-12 school in Arkansas is connected with at least a T1 ADSL connection. In cases where phone surveys found additional connections or higher speeds this was submitted. Connect Arkansas is also including commercial locations with publically available broadband (typically via WiFi).

Verification Processes

Connect is currently using several methods to verify data collected. The format of data collected has been in various formats as listed below:

Telephone surveys
FCC released Form 477 data
Telephone Exchange Boundaries
Data collected from feedback on interactive Broadband map at www.connect-arkansas.org
Data collected from speed tests on www.connect-arkansas.org
Speed test data released from Broadband.gov
Spot field validation of Wireless technology

General Notes

All Census Block data is 2010 vintage, and all Road Segments are based on Tigerline 2010.

Connect continues to identify small providers, in particular fixed wireless providers that do not advertise or have a web presence. It is possible that several more of these providers will be identified in future data submissions.

It should be noted that in some cases relating to Cable Companies in Arkansas several of these described their Broadband Coverage area as "all streets within XX city limits".

In the case of CoBridge Communications, Fidelity Communications acquired the company or at least CoBridge's service area in Arkansas. Contact was made with Fidelity and a NDA executed. The mapping contact observed that much of the coverage area had been changed as they were under extensive updating of infrastructure. As of this data submission Fidelity has not returned updated coverage, and Connect Arkansas is not comfortable with the accuracy of the old CoBridge data to submit as the coverage for Fidelity. Efforts will be made to obtain updated data from Fidelity in the next Data Round.

Several Cable companies in Arkansas currently report technology of DOCSIS 3.0, although the max speeds offered are well below the capabilities of the technology. This has been confirmed with the providers via in office visits, telephone conversation, email, or by letter. The reason for this is the lack of demand for higher speed tiers in their locations. The providers that fall in this category are Clinton Cable Inc., Comcast, Conway Corporation, Fusion Media, Ritter Communications, and Suddenlink.

In the past the Check Submission Tool also flagged Warnings for several DSL providers that offer speed tier 7 for DSL. These providers AT&T, PGTelco, Ritter Communications, TDS Telecom, & Yelcot Telephone all confirmed offering 10 Mbps or higher speed offerings via DSL. In some of these cases, for example AT&T Uverse (high speed variant of ADSL implementing Fiber to the Node

(FTTN)) speeds much higher than 10 Mbps are available. Also flagged for Warning was the T-Mobile's offering of speed tier 7, via HSPA+ 42 networks in limited areas. This technology is advertised to support speeds between 10Mbps to 27Mbps in some markets.

Warning flags have also been returned for Community Anchor locations that have Wireless technologies as the primary source of Broadband access. These results were from phone surveys conducted summer 2011, and have not been confirmed via survey due to budgetary concerns. This data will be verified in future surveys. However it is notable that in several communities in Arkansas it is not uncommon for an exchange of services in regards to Broadband access to take place. Fixed Wireless providers in some cases will provide service to municipal structures such as court houses and fire stations in return for access to infrastructure such as water towers, for placement of broadcast antennas.

Several Failed Flags were returned (One under Address Points, three under road segments) which were confirmed to be exceptions due to coding issues in the script by Michael Byrne (FCC) via email 3/27/2012.

The majority of Broadband Providers Submitted Maximum Advertised Speeds at the MSA/RSA level, or overall coverage areas which in some cases represent a large portion of land, in some cases several counties. At the direction of Andrew MacRae (Fall 2011) with NTIA, Connect Arkansas has pushed these speeds down to the census block and road segment level. Some inaccuracies can be seen in the data as actual Maximum Advertised Speeds in some cases vary from zipcode to zipcode in some cases. Also at the direction of Andrew MacRae (Fall 2011), in the case of large providers, Connect Arkansas attempted to obtain the max advertised speeds from the Broadband Providers' websites; the results of which follows:

CenturyLink
CenturyLink provide a system to check availability and speeds at address level. CenturyLink's system allows users to select city, street, and address in sequence via drop down lists. After making these selections the user is brought to page that display Max Available Download speeds for that address. Upload speeds are not mentioned. The download speed is then recorded in the spreadsheet that has been provided for this purpose.
This process captured roughly half the cells. The remaining cells were then checked to see if there were duplicates in the spreadsheet and then filled in by researching the city associated with the ZIP code and checking it against the list of cities CenturyLink provides and filled accordingly. This process still leaves some ZIP codes with the appearance of being unserved. The speeds for these remaining areas were then based on speeds submitted on the MSA/RSA level.

AT&T
AT&T has a way to enter your ZIP code on their website while looking at the services they offer. However, changing the ZIP code doesn't actually change the displayed services resulting in the premium U-Verse package being displayed for all areas including those that outside AT&T's wireline service. As such, any data extracted from AT&T's website is far less accurate than the speeds submitted on the MSA/RSA level. At the direction of Andrew MacRae, Connect also approached the mapping contact with ATT about more granular data, which the response was that all states received the same format of data and no additional data would be provided.

Windstream
Windstream’s method for changing geographic location while browsing service packages on their website is quite easy to use, but it doesn’t change any plan offerings. That is to say, the exact same 3, 6, and 12 Mbps packages are listed for every city chosen from their provided drop down menu. The data provided to Connect Arkansas by Windstream is considerably more accurate than that of the website. The speeds for these areas were then based on speeds submitted on the MSA/RSA level for Spring 2011, as Windstream declined to send new data at this time.

Cox
The location mechanism on the Cox website would not respond in any attempts to change it. That being said, the only download speed shown was done so in a general overview of all plans offered. No actual location dependant information was shared. The speeds for these areas were then based on speeds submitted on the MSA/RSA level.

Allegiance
Allegiance provides a list of all the cities they serve on their website, which then shows you the offered services for those areas. Download/Upload speeds were recorded for the areas that had internet services available.

American Samoa

Broadband Mapping Project:

Product Release White Paper

Contact Name Manager:	Andrew Berquist
Contact Phone Number:	684-633-3648
Contact E-mail:	**andrew.berquist@doc.as**
Submitted By:	Kristin Rousseau
Contact E-mail:	**kristin.rousseau@broadmap.com**
Product Specification:	Fall 2012 NTIA Data Model
Product/Process:	NTIA—October 1, 2012 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's October 1st, 2012 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Providers Included (DBA Name)
  - ASTCA
  - Bluesky Communications
    - Moana TV
- New Providers Since Last Data Submission
  - None
- Non-Responsive/Non-Cooperative Providers
  - None

COVERAGE AREA CHANGES

- Provider Expansion and Attribution Changes
  - Bluesky
    - Updated typical speeds for their TT-70
    - Ingested new georeferenced images for TT-80
    - Their TT-41 and TT-70 have both been validated by the provider
  - ASTCA
    - No updates for this round
- Coverage Footprint Reductions/Map Refinement -
  - None

DATA CORRECTIONS

- There were no data corrections required for this data submission

COMMUNITY ANCHOR INSTITUION (CAI) DETIALS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	CAIID Counts	Transmission Technology	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	49	27	0	0	0
Category 2 - Library	1	0	1	1	1
Category 3 - Medical/Healthcare	2	0	0	0	0
Category 4 - Public Safety	4	0	0	0	0
Category 5 - Universities/Colleges	1	1	1	1	1
Category 6 - Other: Government	26	0	7	7	7
Category 7 - Other: Non-Government	33	0	0	0	0
Total	**116**	**28**	**9**	**9**	**9**

CAI CHANGES

- The CAI's within the following categories were reviewed again against the below-mentioned databases to identify if any CAIID's need to be updated or added.

  - For K-12 institutions (CAI type 1) please add the NCES ID CCD ID value found here: **http://nces.ed.gov/ccd/bat/**

  - For Higher Education (CAI type 5) please add the NCES IPEDS ID value found here: **http://nces.ed.gov/ipeds/datacenter/**

  - For Libraries (CAI type 2) please. Combine (do not add) "FSCSKey" and "FSCs_SEQ" from the "puout08av2000" file and place them here: **http://harvester.census.gov/imls/data/pls/index.asp** (FYI the LIBID is your state's unique ID for libraries)

SUBMISSION RECEIPT

SUBMISSION RECEIPT RESULTS

- Attached are the results from the NTIA data submission receipt quality script.

AS_2012_9_17.txt

- Error Report

  The only item detected was for the wireless layer, TT-80, which was noted within the accompanying ReadMe file. The technology and speeds were validated by the provider and are within the ranges communicated in the NTIA data model.

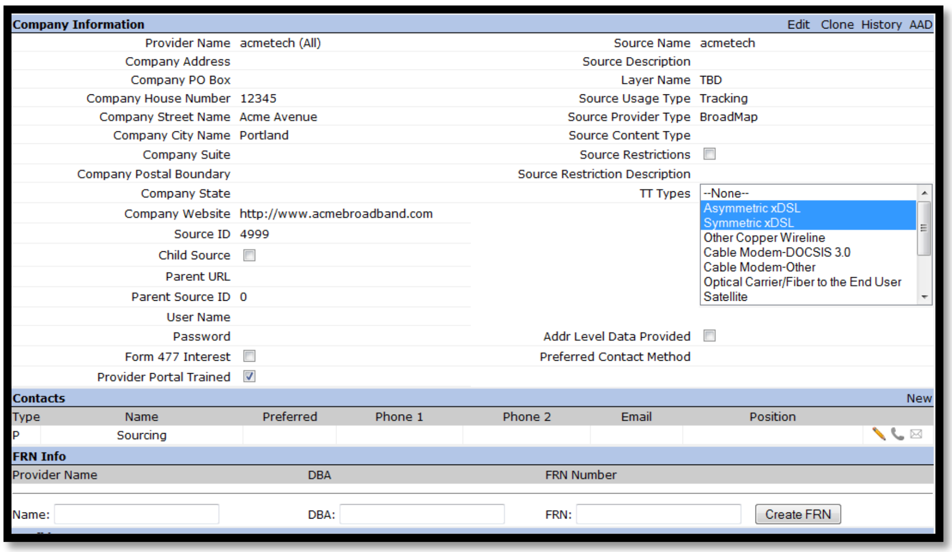
HIGH-LEVEL SUMMARY

DATA GATHERING

BROADBAND SERVICE AREAS, MIDDLE MILE AGGREGATION POINTS AND BROADBAND SERVICE OVERVIEW

The collection of Broadband Service Areas, Middle Mile Aggregation Points and Broadband Service Overview information is handled through the following Provider Outreach Process:

- Build and maintain an inventory of Broadband providers through research and State inputs.
- The inventory and everyday interaction with providers is tracked using our Provider Catalog (PCat). Below are some examples of the web application, which has a shared access between our team and mapping partner (BroadMap).



Company Information — Edit Clone History AAD

Provider Name: acmetech (All)
Company Address
Company PO Box
Company House Number: 12345
Company Street Name: Acme Avenue
Company City Name: Portland
Company Suite
Company Postal Boundary
Company State
Company Website: http://www.acmebroadband.com
Source ID: 4999
Child Source
Parent URL
Parent Source ID: 0
User Name
Password
Form 477 Interest
Provider Portal Trained
Source Name: acmetech
Source Description
Layer Name: TBD
Source Usage Type: Tracking
Source Provider Type: BroadMap
Source Content Type
Source Restrictions
Source Restriction Description
TT Types: --None-- / Asymmetric xDSL / Symmetric xDSL / Other Copper Wireline / Cable Modem-DOCSIS 3.0 / Cable Modem-Other / Optical Carrier/Fiber to the End User / Satellite
Addr Level Data Provided
Preferred Contact Method

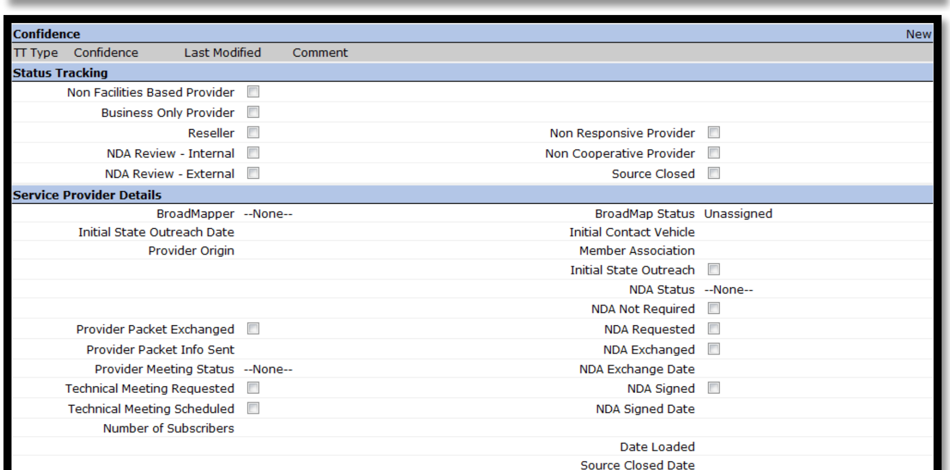
Contacts — New

Type	Name	Preferred	Phone 1	Phone 2	Email	Position
P	Sourcing					

FRN Info

Provider Name	DBA	FRN Number

Name: DBA: FRN: Create FRN



Confidence — New

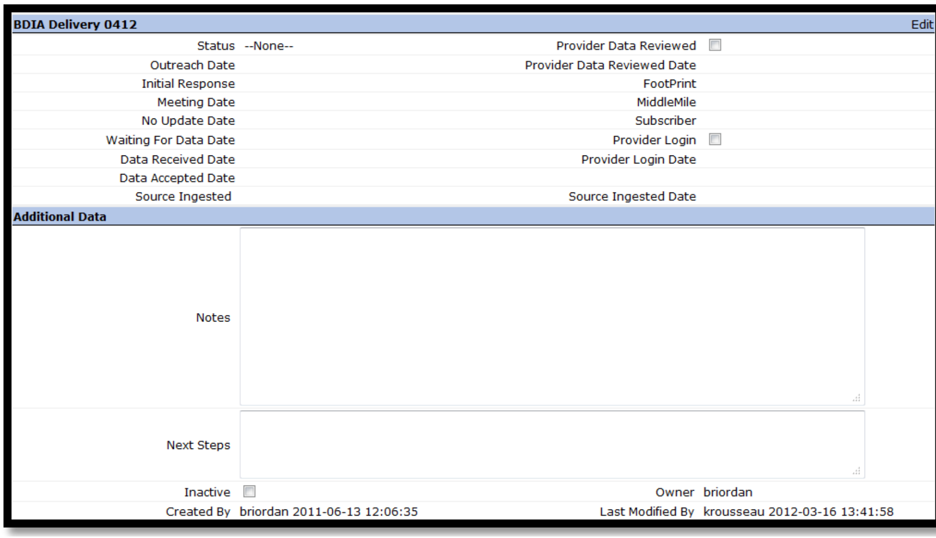
TT Type	Confidence	Last Modified	Comment

Status Tracking

Non Facilities Based Provider
Business Only Provider
Reseller
NDA Review - Internal
NDA Review - External
Non Responsive Provider
Non Cooperative Provider
Source Closed

Service Provider Details

BroadMapper: --None--
Initial State Outreach Date
Provider Origin
Provider Packet Exchanged
Provider Packet Info Sent
Provider Meeting Status: --None--
Technical Meeting Requested
Technical Meeting Scheduled
Number of Subscribers
BroadMap Status: Unassigned
Initial Contact Vehicle
Member Association
Initial State Outreach
NDA Status: --None--
NDA Not Required
NDA Requested
NDA Exchanged
NDA Exchange Date
NDA Signed
NDA Signed Date
Date Loaded
Source Closed Date



BDIA Delivery 0412			Edit
Status	--None--	Provider Data Reviewed	
Outreach Date		Provider Data Reviewed Date	
Initial Response		FootPrint	
Meeting Date		MiddleMile	
No Update Date		Subscriber	
Waiting For Data Date		Provider Login	
Data Received Date		Provider Login Date	
Data Accepted Date			
Source Ingested		Source Ingested Date	
Additional Data			
Notes			
Next Steps			
Inactive		Owner	briordan
Created By	briordan 2011-06-13 12:06:35	Last Modified By	krousseau 2012-03-16 13:41:58

- In order to encourage participation throughout the life of the program, we feel it's important to foster relationships with the providers and encourage a collaborative team effort between all parties for each data submission.

- Update provider material that describes the data requirements and logistics for data transfer.
- Update Non-Disclosure Agreement (NDA) for use in project, where applicable.
- Maintain multiple protocols for the provider to submit data, including Secure File Transfer Protocol (SFTP) technology when desired.
- Conduct one-on-one informational discussions with each provider to communicate the following:
  - Requirements of this project;
  - Broadband data required to support the product data model;
  - Submission protocols available;
  - Capability to validate how the supplied data is aggregated.
- Download/receive provider data.
- Establish a repeatable process with provider. Maintain provider communication, transaction and data handling records throughout the project (dates contacted, data received, etc.).

COMMUNITY ANCHOR INSTITUTION (CAI)

The collection of CAI information is handled through the following CAI Collection Process:

- Collect and maintain inventory of CAIs through data mining, research and State inputs.
- Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.
- Upload web-based data to Core Database for standardization.
- Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.
- Geocode CAI locations.
- Translate Core Database data to deliverable-ready format.
- Continue engagement with non-responsive institutions.

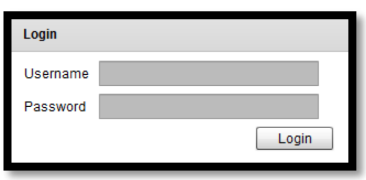
DATA INTEGRATION PROCESS

The data integration and processing mechanisms currently used allow for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

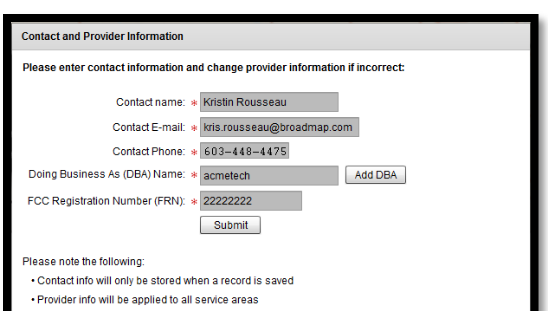
- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type category (addresses, block lists, paper maps, etc.).
- Standardize input based on data type within Staging Database.
- Create Compact Polygons (CP)—(internal methodology for generating area-based feature for coverage in Staging Database).
- Apply broadband attribution to CP; apply metadata to CP.
- Perform quality analysis of the CP against the source supplied to identify any completeness or accuracy issues.
- Request additional information from the provider if elements of coverage are missing or contain discrepancies. This is a second manual quality check to ensure data is complete.
    - o Process coverage area to build the required NTIA data model layers.

With the deployment of the Provider Portal this round, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it's allows them more visibility into how their data is being represented and gives them knowledge and ownership of their coverage representation. Below are some bullet points and supporting screen shots on how the portal is used.

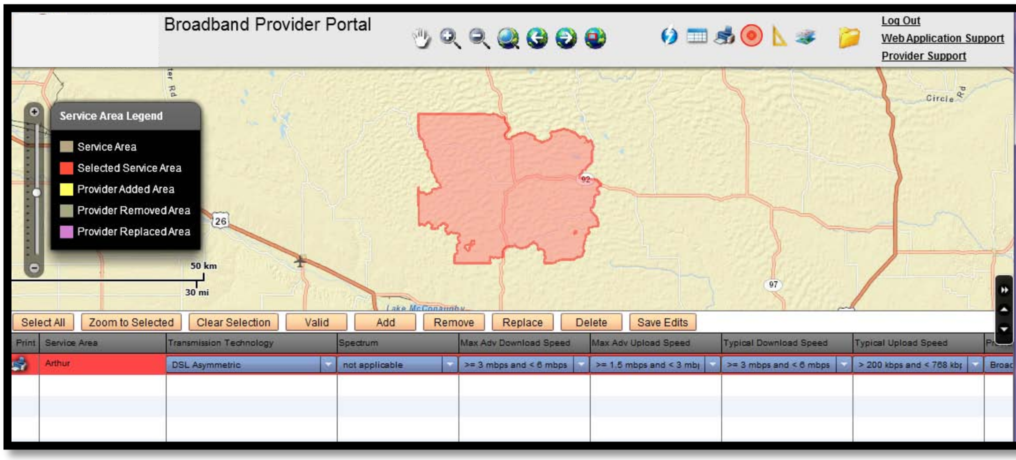
- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration



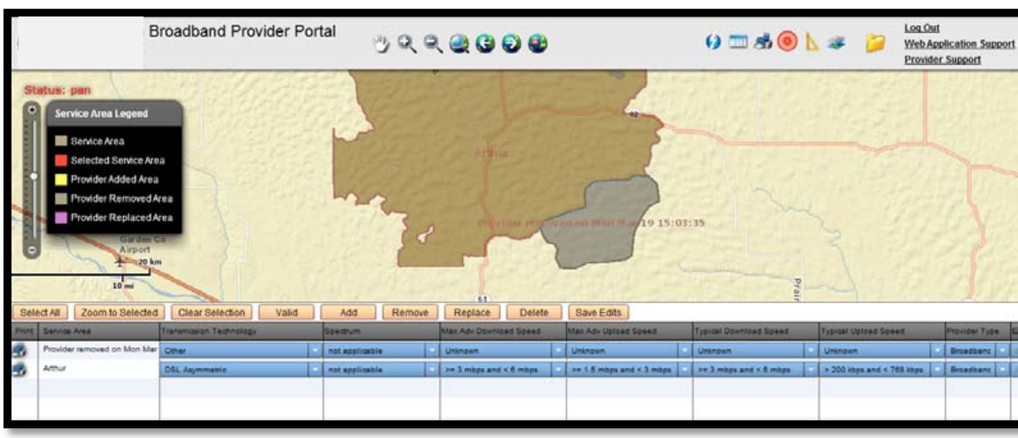
- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy



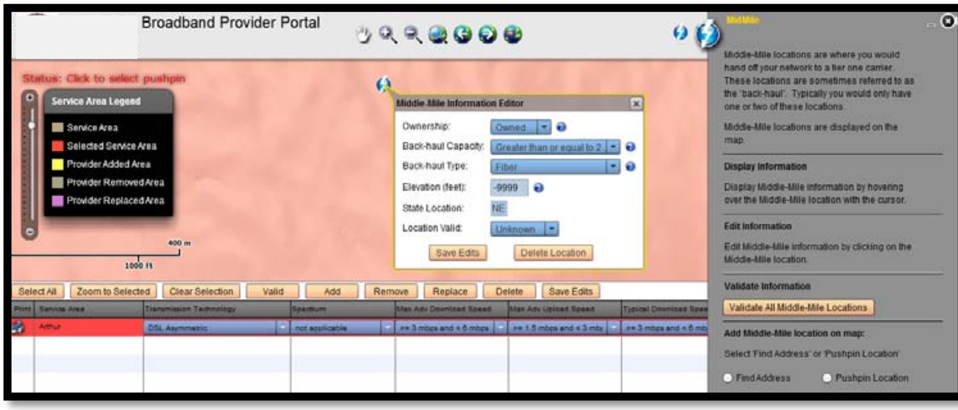
- Capability to review and request changes to the coverage footprint

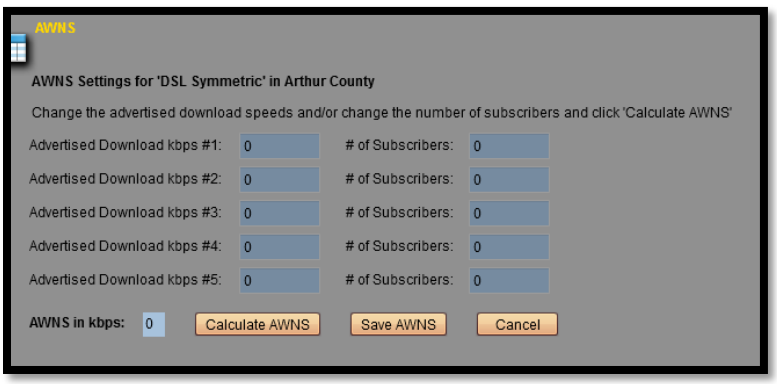


- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

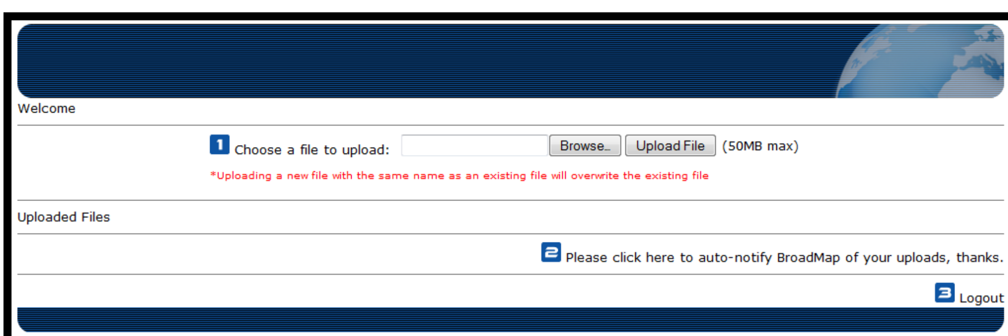


- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





- File upload functionality to support providers that would prefer a shapefile, spreadsheet, PDF, KMZ/KML file be used to reflect changes for the data round



- Once the provider has review completed changes to their coverage, middle mile and AWNS, then can validate them all signing off that everything is accurate.

DATA VALIDATION AND VERIFICATION

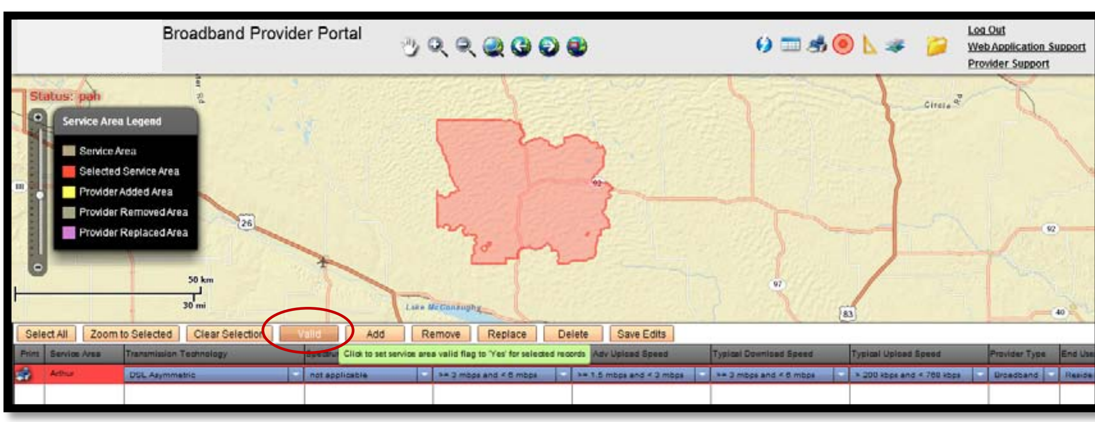
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage areas and serviceability claims, additional reviews are performed using the methods described in the subsections below in order of action (**Broadband Provider Validation**, **Third-Party Data Verification**, **Public Verification, and Confidence Values**).

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

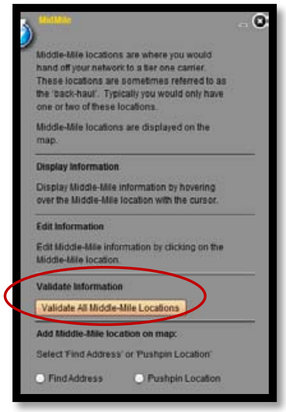
Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the **Data Integration Process** and are reviewed with the provider to complete validation.

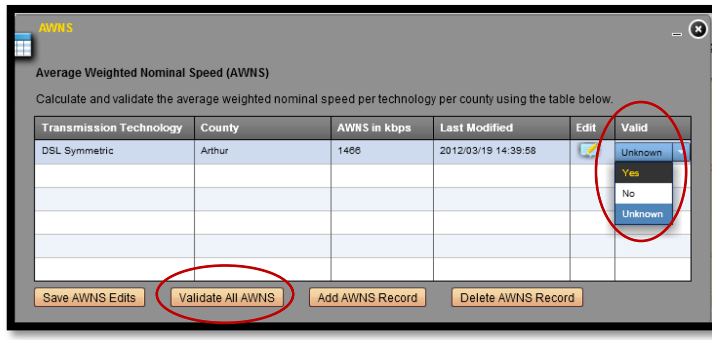
With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

- Coverage validation can be done on one record/footprint at a time or by selecting footprints and selecting the 'Valid' button. The provider could also print off their coverage for their own tracking purposes.



- Middle Mile & AWNS Validation





All validation results are tracked internally through our Validation Table, which also improves the overall **Confidence Value** as mentioned below.

THIRD-PARTY DATA VERIFICATION

For this submission, the NTIA 3rd Party Data summary was reviewed again to ensure any corrections required were represented in the final product and the supporting documentation. This includes additional feedback received directly from NTIA, prior to this data submission.

This submission was also compared to the previous data submission, April 2012, as a quality check to identify and resolve any potential erroneous discrepancies between the two products.

PUBLIC VERIFICATION

The broadband interactive map has been released to the public, which includes functionality to collect feedback on the provider's coverage areas, as well as running a speed test. The feedback and speed results are collected and reviewed with the providers prior to the next data submissions to identify if any map refinement is required.

The public website can be viewed at the following hyperlink:

http://asbb.broadmap.com/PublicMap/

CONFIDENCE VALUES

All verification, validation and manual quality review results are tracked by provider/technology type and stored and maintained within a **Validation table**. A confidence value is assigned, based on internal assessments of the collected information, to highlight the provider coverage areas and/or attributions that would benefit from further investigation and/or enhancements.

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will continue to be utilized further to identify specific areas in need of attention.

QUALITY CONTROL

Following collection, processing and analysis of the provider and CAI data, the product is checked manually and algorithmically against the NTIA data model. Some of the items included within these checks are:

- Format correctness;
- Table and field structure;
- Valid values, including default values, where applicable;
- Geographic extent and topology errors.

Prior to data submission, another quality control script supplied by NTIA is run. This script, SBDD_CheckSubmission.py, creates an output in text form that is required to be submitted along with the final deliverable. All errors must come up clean, unless otherwise specified by NTIA.

DETAILED PROCESS REVIEW

To review the detailed process, please review the attached object:

BMap_ProcessDetails
_2012_10_01.docx

Data Processing Methods

Provider Participation

In Round 6, the California Public Utilities Commission identified 225 potential broadband providers, 150 of whom did not submit data, and 82 who did. This represents an increase of 7 providers over the prior Round 5. Together, these 82 providers comprise over 99.9% of the total broadband connections in California, according to data contained in the latest FCC Form 477 to which the CPUC has access.

Data Collection

The California Public Utilities Commission (CPUC) sent out a Data Request to broadband providers to initiate the Round 6 data collection. Potential providers were strongly encouraged to submit broadband service availability data. Providers who previously submitted data were also sent maps displaying their Round 5 coverage and validation results to guide their 6th round submissions. Data submission instructions were posted online to assist providers along with template files, sample shape files and record formats on the CPUC Broadband Mapping Website at:

http://www.cpuc.ca.gov/PUC/Telco/Information+for+providing+service/BroadBand+Mapping.htm

The data submission instructions point each provider to the wireless and/or wireline datasets, which are separated into sections for those with GIS data (shape files or filegeodatabases) and those without GIS data (text or Excel files). For providers with GIS capabilities, statewide census block and TIGER/Line shape files were provided on the CPUC website. The square mileage of each block was calculated in advance in the sample census block shape file. Using the shape files, providers were able to determine which blocks in their footprint were less than two square miles and which were two square miles or greater and therefore needed to be represented using the road segment shape file. For providers without GIS capabilities, Excel spreadsheets were provided incorporating record field formats adhering to the NOFA data submission requirements.

Community Anchor Institutions (CAI)

CAI data came from two sources: (1) California Teleconnect Fund (CTF) program which provides 50% discounts on telecommunications bills for qualifying schools, libraries, government-owned and operated hospitals and health clinics, and other community based organizations, and (2) and, CENIC, which operates the K-12 High Speed Network (K12HSN) program which is funded by California Department of Education which enables educators, students and staff across the state to have access to reliable high speed network to deliver high quality online resources to support teaching and learning and promote academic achievement.

The following search engine websites were also utilized to look up and capture the corresponding CAI ID:

- For the libraries: https://harvester.census.gov/imls/data/pls/index.asp
- For K-12 institutions: http://nces.ed.gov/ccd/bat/
- For Higher Education: http://nces.ed.gov/ipeds/datacenter/

Technology of transmission and speeds data were included and identified through information from K12HSN (http://www.k12hsn.org/data/reporting/) and from those service providers who responded to our request for such information. The CAI addresses were geo-coded to point locations and geo-matched to Census Blocks 2010 to obtain the corresponding FULLFIPSID. Finally, the data is loaded into the filegeodatabase where the SBDD check submission tool has been run.

CPUC Initial Data Verification

Each data set submitted by broadband providers was reviewed against the GIS data model posted on the SBDD Network website, and checked if mandatory fields were filled in, and if each field contained the appropriate range of values. Where possible, we made certain that appropriate field headers were used and that each field contained the correct data type. When data was found to be missing or incorrect, the provider was contacted and the issue was documented in a separate provider spreadsheet.

Chico GIC Geo-processing

After the initial CPUC review, data was transferred to the Geographical Information Center (GIC) at CSU Chico for geo-coding, geo-matching, propagation of wireless service by antenna, and validation of geographic data. In those cases where the CPUC received street address level data from broadband providers, such addresses were assigned a point location, (geo-coded) and then geo-matched to census blocks and street segments.

Wireless providers who were unable to submit a shape file or geographic representation of their service area provided tabular system, tower, and antenna information. Wireless parameters were used to model the service area, and from that we created a shape file. The wireless propagation model is based on the Longley-Rice, Irregular Terrain propagation model. Individual unit specifications are used to measure performance based on frequency, transmit power, receiver sensitivity, antenna gain, and height. Signal coverage patterns are produced for each individual unit taking into account terrain and vegetation features that may hinder signal dispersion.

CPUC Final Data Verification

The resulting datasets were delivered from Chico to the CPUC in the SBDD transfer model geodatabase for final review and verification. Data sets were checked again and reviewed for unexpected changes resulting from the geo-coding /geo-matching process. Geo-processed data was visually reviewed using ArcGIS to verify service area footprints, and the SBDD check submission Python script was run on each dataset to identify unexpected values.

Deliverable Data

The final dataset is delivered to the NTIA/FCC in filegeodatabase format with the following feature classes:

- BB_ConnectionPoint_LastMile – not required per Clarification to the NOFA.
- BB_ConnectionPoint_MiddleMile – Point between the local "last mile" network and the middle mile network which goes on to connect to the internet backbone. This is a confidential dataset.
- BB_Service_Address – not included per the CPUC NDA.
- BB_Service_CAInstitutions – Community Anchor Institutions: points geo-coded from address lists
- BB_Service_CensusBlock – Broadband availability polygons for areas less than 2 square miles
- BB_Service_Overview – Service overview by County including Subscriber Weighted Nominal Speed
- BB_Service_RoadSegment – Broadband availability line segments for areas 2 square miles and greater
- BB_Service_Wireless – Wireless service area polygons.

Planned Validation Methods

The following validation methods will be conducted on Round 6 data. Detailed maps showing submitted service area footprints and areas that could not be validated will be distributed to each provider for feedback.

FCC Form 477

The FCC uses Form 477 to collect information from providers about broadband connections to end user locations, wired and wireless local telephone services, and interconnected Voice over Internet Protocol (VoIP) services, in individual states at the Census Tract level. A shape file was created for each provider reflecting the availability of broadband service at each census tract where the provider reported customers of their fixed broadband service. These layers were used to cross reference ISP data submissions to the CPUC. Customer locations from Form 477 for each provider were used to validate both areas where service is reported as being available, and maximum advertised speeds.

CPUC Mobile Broadband Test Results

The CPUC has developed a mobile broadband testing application for smartphones and data cards, and completed its first field test at 1,200 locations throughout the state in May of 2012, and is currently conducting the second field test as part of a project funded by the state's State Broadband Initiative Grant. The 1,200 locations were selected to represent both urban and rural areas and tribal lands, and involved traveling over 35,000 miles. The application records our testers' actual experience with mobile broadband service from AT&T Mobility, Sprint, T-Mobile and Verizon Wireless. These results are plotted and compared against each operator's coverage area and speed tier. Collected point data will be used to validate the speed/availability of each provider's mobile broadband service in the census block of the test location. In addition, we are using an interpolation model or 'Spline' to predict mobile service areas and speeds throughout the state, as well as to assist validating each mobile provider's speed and availability.

ID Insight, BroadBand Scout

BroadBand Scout is a third party, comprehensive and unbiased dataset specifically designed to show the carriers, connectivity, speed and usage details of the national broadband landscape. ID Insight's patent-pending process analyzes hundreds of millions of internet transactions that link a consumer's physical address to their internet carrier. BroadBand Scout data is provided as tabular point locations geo-matched to the census block level less the two square miles in area and to the street segment level where census blocks are greater than two square miles in area. A shape file was created for each provider reflecting the presumed availability of broadband service at each census block or street segment where Broadband Scout reported online customer transactions. These layers were used to cross reference ISP data submissions to the CPUC.

TeleAtlas Wire Center and Wire Center Region

The Wire Center Premium product is a comprehensive database for mapping and analyzing wire center service areas. It forms the backbone of the Tele Atlas® Telecommunication Products line. This product lists every Local Exchange Carrier (LEC) landline wire center in the United States. The term "wire center" refers to the location where the telephone company terminates the local lines; this is usually the same location as a central office, although a wire center might house one or more central offices. Buffers were created at 12,000 feet and 18,000 feet from provided Wire Center point datasets to cross reference ISP data submissions to the CPUC. The wire center boundary is a representation of the area served by all of the switching equipment housed at that physical location. Wire Center Region polygon GIS layers were provided and used for cross referencing ISP data submissions to the CPUC.

FCC Consumer Broadband Test (Non-Mobile App)

The FCC Online Consumer Broadband Test collects information regarding the location of the client, the engine used to provide the speed test, download speed, upload speed, latency, jitter, packet loss, minimum round trip time, maximum round trip time, and average round trip time at a specified point location. A shape file was created to represent each location at which speed tests were performed based on geo-coded address records. All point locations were then geo-matched to the census block level where less the two square miles in area and to street segment level where census blocks are greater than two square miles in area. These layers were used to cross reference ISP data submissions to the CPUC where sub-broadband speeds were reported and/or where there were no tests performed.

FCC Consumer Broadband Test (Mobile App)

The FCC Mobile Consumer Broadband Test collects information regarding the location of the client, the client's operating system, the engine used to provide the speed test (always OOKLA for mobile tests), download speed, upload speed, and latency, at a specified point location. A shape file was created to represent each location at which speed tests were performed based on latitude and longitude coordinate pairs. All point locations were then geo-processed to the census block level where less the two square miles in area and to street segment level where census blocks are greater than two square miles in area. These layers were used to cross reference ISP data submissions to the CPUC where sub-broadband speeds were reported and/or where there were no tests performed.

FCC Broadband Dead Zone Reporting Form

The FCC offers a Broadband Dead Zone Reporting Form for recording any address or city level queries done using the National Broadband Map that either failed to return any providers at the specified location, or is a location which a user knows has no service. The FCC Broadband Dead Zone Form collects information regarding the location of the client, whether the client has internet access at their home, what type of internet access the client has at their home, and whether or not the client would be interested in purchasing broadband internet if service options were available. A shape file was created to represent each location for which dead zone forms were filled out based on geo-coded address records. All point locations were then geo-matched to the census block level, where less than two square miles in area, and to street segment level, where census blocks are greater than two square miles in area. These layers were then used to cross reference ISP data submissions to the CPUC where dead zones and/or no services provided were reported.

California State Map Broadband Service Survey Feedback

The CPUC offers the Broadband Service Survey within its interactive map. The survey records user feedback based on address, city, or zip code level queries against the State’s Broadband Availability. It collects information regarding the location of the client, whether the client is accessing the internet from their home, place of business, or any other location, whether or not the client purchases broadband service, and if not, why they choose not to purchase broadband service. A shape file based on geo-coded address records was created to represent each location for which service surveys were submitted where the respondent indicated non-subscription because of no broadband availability. All recorded locations were then geo-matched to the census block level, where less than two square miles in area, and to the street segment level, where census blocks are greater than two square miles in area. These layers were then used to cross reference ISP data submissions to the CPUC

Chico GIC Data Validation Processes

Each individual provider’s data was validated independently using all applicable validation methods. The following fields were added to each individual provider’s data tables as follows to record validation results and to allow symbology of discrepancies based on validation methods for further interaction with each provider to refine their data submissions. These fields are not included in the data set the CPUC submits to the NTIA.

- FCC_477 (FCC Form 477)
- BBSCOUT (ID Insight BroadBand Scout)
- TA_WC_REG (TeleAtlas Wire Center Region)
- WC_VAL_12K (TeleAtlas Wire Center 12,000 foot buffer)

- WC_VAL_18K (TeleAtlas Wire Center 18,000 foot buffer)
- VAL12k_18k (TeleAtlas Wire Center 12,000 to 18,000 foot buffer ring)
- DEGRAD_FT (TeleAtlas Wire Center distance)
- FCC_TST (FCC Consumer Broadband Test Non-Mobile App)
- FCC_MOBL (FCC Consumer Broadband Test Mobile App)
- FCC_DZ (FCC Broadband Dead Zone Reporting Form), and
- CA_SRVY (State Map Broadband Service Survey Feedback)
- Mobile speed test point data
- Mobile speed test predicted areas ('Spline')

The final step was a summary statistics report of all validation results for all submitted providers. Summary statistics include validity counts and percentages for all validation methods, specific to provider and technology.

Wireline Census Block and Street Segment Validation

A spatial selection was performed on Census Block and Street Segment data, either submitted by the provider, or created from submitted address records through a geo-coding/spatial selection process, to derive only those blocks or street segments which intersect polygons in a given validation layer. Counts are recorded as number of unique blocks or unique segments which share geographic area with any given validation layer, compared to the total number of unique blocks submitted by, or created for, a given provider. Percentages are recorded as percentage of the total number of unique blocks or street segments which share geographic area with any given validation layer, compared to the total number of unique blocks submitted by, or created for, a given provider.

Wireless Validation

A spatial selection was performed on Wireless Availability data, either submitted by the provider, or created from tower and antenna location information, to select only those polygons which intersect a given validation layer. Results are recorded as a percentage of the total geographic area of wireless coverage sharing geographic area with any given validation layer compared to the total coverage area submitted by, or created for, a given provider.

Colorado Broadband Data & Development Program

October 1, 2012 Data Delivery Report

For details about the Colorado Broadband Data and Development Program (CBDDP), please see our web site at www.colorado.gov/oit/broadband or visit the National Broadband Map at www.broadbandmap.gov. The Colorado interactive broadband map is available at http://maps.co.gov/ColoradoBroadband.

Purpose of this Report

This report provides details about the data set delivered to the NTIA on October 1, 2012 to support the National Broadband Map and to meet the requirements of the State Broadband Data and Development Program grant to the Governor's Office of Information Technology (OIT). The report describes the various processes used to verify this data set and the results of those processes. It also describes, in general terms, how the CBDDP collects and validates information about broadband availability in the State of Colorado.

Status of Data Collection

The Colorado Broadband Data and Development Program data collection effort began with a third party contractor through a data collection contract signed on March 22, 2010. After the October 2011 data submission, the CBDDP data processing was brought in-house to the Governor's Office of Information Technology. For the October 2012 delivery, OIT attempted to contact all 125 known potential service providers to contribute data toward the CBDDP. Of the identified potential providers, 35 provided data updates, 9 new service providers were added to the dataset, and 30 providers declared "no data change" from the last data submission. 42 of the providers were non-responsive and 6 would not provide data to the CBDDP.

The following table categorizes all possible broadband service providers in Colorado known to the CBDDP, and indicates the status of their participation in the program. See the Data Delivery Report at the end of this document for more details on the data.

Service Providers	October 1, 2012
Potential Identified Providers	**129**
Data Sets Delivered to NTIA	74
Non Responsive Providers	42
Not a Broadband Provider	1
Will Not Provide Data	6
Out of Business	6

The following table describes service providers included in the current data delivery.

Service Provider Updates	October 1, 2012
New in Data Set	9
Updated Data	35
Responded "No Data Change"	30
Data Sets Delivered to NTIA	**74**

The CBDDP is very pleased with the progress that has been made in promoting speed tests among reporting CAIs. As shown below, 32% (or 1,663 of 5,226) of the data collected for CAIs is from speed tests. The CBDDP has not significantly expanded the number of CAIs submitting speed test information between April 2012 and this delivery. However, with the hiring of new GIS and planning staff within OIT, we expect to make a more concerted effort to collect additional CAI information or update the data collected last year. The following table shows the number of community anchor institutions that have been identified in the state.

Community Anchor Institutions	October 1, 2012		
	Identified	**Collected**	**Includes Speed Test**
Cat. 1 - School K -12	2109	2082	974
Cat. 2 - Library	252	251	14
Cat. 3 - Medical/Healthcare	709	693	143
Cat. 4 - Public Safety	1779	1591	305
Cat. 5 - University/College	55	55	42
Cat. 6 - Other Government	601	546	179
Cat. 7 - Other non-Government	10	8	6
TOTALS	**5515**	**5226**	**1663**

Addresses and names that appear to be duplicates are validated. The CBDDP chooses to report multiple CAIs at the same address as distinct entities. For example, a county sheriff's office and a 911 call center at the same address are reported as two distinct entities.

Validation and Verification Processes for the October 2012 Data Set

Techniques:

1. Automated Validation
2. Analysis of Changes
3. Visual Review
4. Third Party Data Validation
5. Feedback Loop
6. CAI Speed Test Analysis
7. Drive Testing Mobile Coverage Areas
8. FCC Speed Test Validation
9. Crowd Sourcing
10. Survey

1. Automated Validation

The CBDDP has been developing and improving automated validation scripts since its first data delivery in May 2010. The CBDDP runs both the scripts it has developed as well as the script provided by the NTIA on a monthly basis. The data delivery includes documentation demonstrating that the data has passed the NTIA validation script as required.

In addition to testing all of the issues covered by the NTIA script, the CBDDP's automated script:

- Verifies that the Geodatabase has metadata, is in the correct projection, and that the feature classes are properly named
- Verifies all columns are properly named and defined
- Verifies all table value domains are adhered to
- Captures the required information to accurately complete the Records Count and Provider Table tabs for the SBDD Data Package
- Cross references and creates statistical tables of technology type and valid speed combinations for both Service Provider and CAI data
- Compares FCC assigned Frequency Reference Numbers (FRNs) to provider names to ensure consistency across the data set
- Ensures consistency in provider names
- Identifies possible duplicates among CAIs
- Tests all feature classes to ensure they are within the State's boundaries
- Creates a statistical table for all features classes including records details, service provider information and attribution frequencies
- Ensures the data model, business rules and schema are in compliance

2. Analysis of Changes

There are three major types of data changes between the April 2012 delivery and the October 2012 delivery. First is the addition of new providers and deletion of old providers. The second type of data change refers to receiving new data from existing providers, and therefore, the coverage was updated to reflect changes in service by these providers. The third type of data change is from the improved processing techniques implemented by the OIT team. OIT analyzed and reprocessed all data provided by the former third party contractor, Critigen, to determine the accuracy of their data processing. OIT's more comprehensive processing techniques resulted in improved accuracy of coverage area. The following table shows the percent change of number of features from April 2012 to October 2012.

	Census Blocks		Road Segments		Wireless Service		Middle Mile		Address Pts	
	Number of Providers	% Features Changed	Number of Providers	% Features Changed	Number of Providers	% Features Changed	Number of Providers	% Features Changed	Number of Providers	% Features Changed
New Providers	2	100%	2	100%	7	100%	1	100%	1	100%
Deleted provider	1	-100%	1	-100%	3	-100%	2	-100%	0	0%
Received new data	21	5%	20	14%	20	13%	7	-1%	0	0%
Re-processed existing data	6	56%	6	14%	3	0%	8	-4%	0	0%
No Changes	18	0%	18	0%	18	0%	37	0%	2	0%

3. Visual Review

The CBDDP also routinely reviews the coverage areas for new service providers and those with changes to their coverage areas as part of preparing data for delivery. We found no unusual coverage areas.

4. Third Party Data Validation

OIT compares service provider coverage areas to the following third party data sets: American Roamer, ComSearch, Pitney Bowes, MediaPrints, and SpectrumView. 20 providers overlapped multiple third party data sets, so in these cases all of the relevant third party data sets were used to validate a single service provider/technology type combination. The CBDDP records comments about coverage area, geometry, and attribution provided for the technology type, and assigns a categorical assessment of the match between the CBDDP data and each third party dataset. This assessment is necessarily subjective as the third party data sets are sometimes very crude in their spatial resolution, making it difficult to make precise comparisons.

5. Feedback Loop

As a routine part of the work flow, the CBDDP gave all service providers the opportunity to review the final geospatial representation of their data in the form of mapbooks. In addition, the OIT team created validation assessments based on the tests described below and communicated results to providers for verification of speed accuracy within the provider coverage area.

6. CAI Speed Test Analysis

There are several issues to consider when comparing speed test data to service provider advertized maximum speeds. Many speed tests do not collect the name of the service provider being tested. In areas where more than one service provider offers varying maximum service speeds, it is not possible to know who is providing the service to the CAI. Also, if a speed test result is directly tied to a certain service provider, it is unknown if the customer has chosen to purchase the maximum available speed offered by the service provider.

The speed test information that the CBDDP collects from CAIs requests the name of the service provider, but of the 1,662 speed tests collected from CAIs, 1,048 of those tests specifically identified the service provider. The CBDDP uses all of the CAI speed tests, regardless of provider information because this gives a more comprehensive perspective of the comparison between the speeds at each institution and the potential advertised service in their area.

The following table compares the speed tier for the CAI speed test to the maximum advertized speed tier by any service provider for that particular census block. A similar test also compared the CAI tests to the minimum advertised speed by any providers that reported service in that area, and the table with these results is below as well.

CAI Speed Test Compared to Maximum Download speed by Census Block																
	Speed Test Slower								***Same Tier***	***Speed Test Faster***						***Total Tests***
Number of Speed Tiers Slower or Faster	***-8***	***-7***	***-6***	***-5***	***-4***	***-3***	***-2***	***-1***	***0***	***1***	***2***	***3***	***4***	***5***	***6***	***7***	
School K - 12	3	16	29	35	110	83	306	157	103	53	16	14	6	0	0	0	931
Library	0	1	1	1	0	2	4	3	1	1	0	0	0	0	0	0	14
Healthcare	0	4	6	15	24	23	26	30	6	6	0	2	0	0	0	0	142
Public Safety	0	1	14	42	33	68	59	41	26	11	2	1	0	0	0	0	298
University, college	0	0	0	4	2	3	5	6	8	7	4	2	0	0	1	0	42
Other Government	1	1	7	8	21	32	47	20	20	9	2	4	0	0	0	0	172
Other Non-Government	0	0	0	0	1	1	3	0	0	0	0	0	0	0	0	0	5
Totals	**4**	**23**	**57**	**105**	**191**	**212**	**450**	**257**	**164**	**87**	**24**	**23**	**6**	**0**	**1**	**0**	**1604**
Totals	**1299**								**164**	**141**							**1604**

CAI Speed Test Compared to Minimum Download speed by Census Block																	
	Speed Test Slower								Same Tier	Speed Test Faster							Total Tests
Number of Speed Tiers Slower or Faster	**-8**	**-7**	**-6**	**-5**	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	
School K - 12	0	0	0	4	18	38	78	117	122	134	215	129	58	11	6	1	931
Library	0	0	1	1	0	2	2	5	0	1	1	0	1	0	0	0	14
Healthcare	0	0	1	1	9	16	29	34	7	22	11	6	4	2	0	0	142
Public Safety	0	0	0	3	12	27	46	61	62	30	27	24	5	1	0	0	298
University, college	0	0	0	0	0	1	0	4	5	1	4	13	5	3	3	3	42
Other Government	0	0	1	1	11	17	21	29	41	18	13	12	4	4	0	0	172
Other Non-Government	0	0	0	0	1	1	2	0	1	0	0	0	0	0	0	0	5
Totals	**0**	**0**	**3**	**10**	**51**	**102**	**178**	**250**	**238**	**206**	**271**	**184**	**77**	**21**	**9**	**4**	**1604**
Totals	**594**								**238**	**772**							**1604**

7. Drive Testing Mobile Coverage Areas

The CBDDP tested the mobile wireless coverage areas reported by the service providers. The CBDDP has completed drive testing for over 5,000 miles of roads. This testing followed a test scheme that started with primary test points along major highways followed by secondary points from one half to one mile away from the primary point to confirm the result of the primary point. Tests continued until either four secondary points (beyond the primary points) were collected or until at least two of the secondary tests failed (with test speeds of less than 768 Kbps). The primary points were generally 10 to 15 miles apart, and the derived points were clustered around the primary points within 2 to 3 miles. All tests used commercially available wireless air cards, identical laptops, and the same FCC speed test site. The tests checked only the major national mobile providers and were all performed between March and May of 2011.

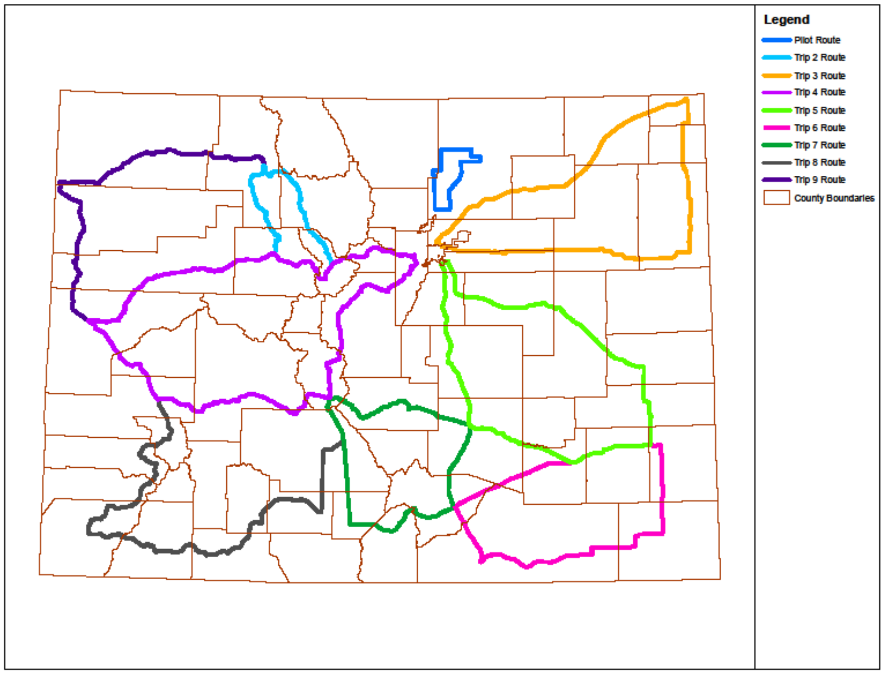


Figure 1: The following graphic is a general depiction of the routes used for the drive testing.

The following table presents the results of these drive tests. The number of test results shown for each provider reflects only the test points that fell within the coverage area submitted to the CBDDP by that service provider.

MOBILE WIRELESS COVERAGE TESTING									
All Points Tested Including Primary and Derived									
Combined Result for Three Providers Tested									
	Tiers Slower				Same Tier	Tiers Faster			Total Tests
Number of Speed Tiers Slower or Faster	< 768 Kbps	-3	-2	-1	0	1	2	3	
	0	1	90	475	390	164	1	0	1121
Totals	566				390	165			1121
ATT									
	Tiers Slower				Same Tier	Tiers Faster			Total
Number of Speed Tiers Slower or Faster	< 768 Kbps	-3	-2	-1	0	1	2	3	
	0	0	89	140	83	50	0	0	362
Totals	229				83	50			362
Sprint									
	Tiers Slower				Same Tier	Tiers Faster			Total

Number of Speed Tiers Slower or Faster	< 768 Kbps	-3	-2	-1	0	1	2	3	
	0	1	1	143	163	23	1	0	332
Totals	145				163	24			332
Verizon									
	Tiers Slower				Same Tier	Tiers Faster			Total
Number of Speed Tiers Slower or Faster	< 768 Kbps	-3	-2	-1	0	1	2	3	
	0	0	0	192	144	91	0	0	427
Totals	192				144	91			427

The CBDDP has had discussions with a private vendor of mobile speed testing services to obtain the data they've collected from their devices and application installed in vehicles of local agencies subscribing to their service. This will significantly increase the magnitude of mobile speed tests.

8. FCC Speed Test Validation

The FCC speed test information contains two separate data sets, both of which cover a date range from March 2010 to February 2012. The Consumer Broadband Test (CBT) Data includes speed tests from homes, businesses, community centers, and other landline or fixed wireless locations. The Mobile Data includes speed tests collected using the Mobile App on a mobile device (i.e. iPhone or Android). The first two tables below compare the speed tier of the FCC CBT speed tests to the maximum and minimum advertised speed tiers reported by any service providers for each location. The third table below compares the speed tier of the FCC Mobile speed test to individual mobile broadband providers in the CBDDP dataset.

FCC CBT Data Speed Tests Compared to Maximum Download Speed																		
	Speed Test Slower								**Same Tier**	**Speed Test Faster**								**Total Tests**
Number of Speed Tiers Slower or Faster	**-8**	**-7**	**-6**	**-5**	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
Maximum	6	101	1865	1436	3291	2987	6489	2147	869	366	81	28	2	0	0	0	0	0	19668
Totals	18322								869	477									19668

FCC CBT Data Speed Tests Compared to Minimum Download Speed																			
	Speed Test Slower								**Same Tier**	**Speed Test Faster**									**Total Tests**
Number of Speed Tiers Slower or Faster	**-8**	**-7**	**-6**	**-5**	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	
Minimum	0	6	16	123	321	741	1981	2634	2762	2812	4634	3264	1400	209	33	14	o	o	20950
Totals	5822								2762	12366									20950

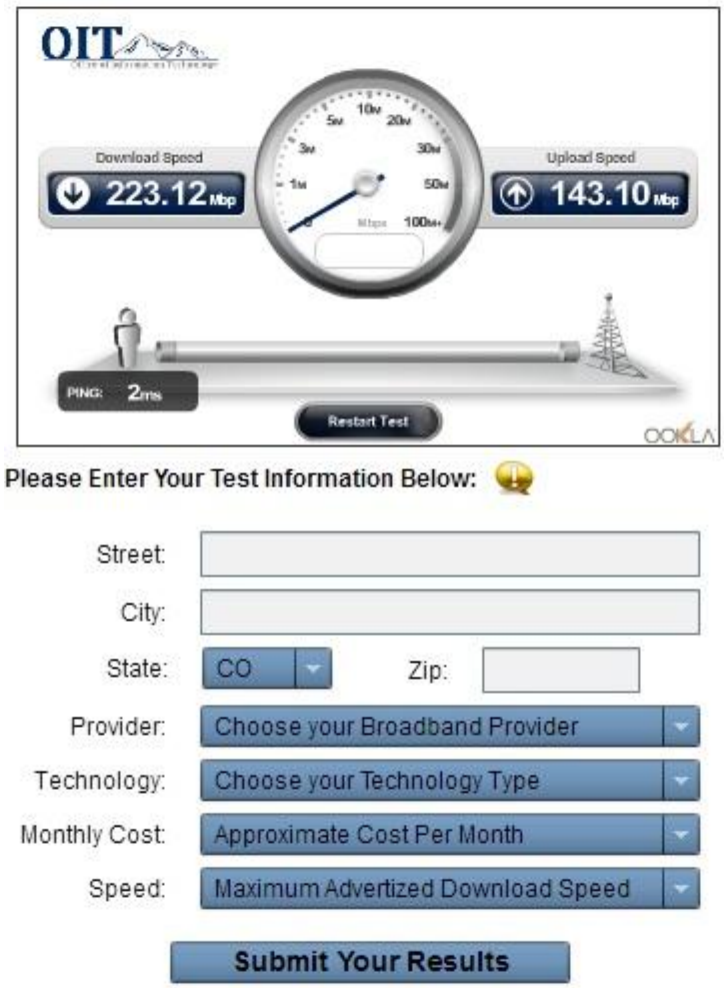
FCC Mobile Speed Tests compared to Mobile Services Providers															
	Speed Test Slower						Same Tier	Speed Test Faster							Total Tests
Number of Speed Tiers Slower or Faster	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	
Composite															
	11366	17953	33653	44697	79627	92094	94735	70227	76640	32446	41093	196	11	9	594747
Totals	279390						94735	220622							594747
AT&T Inc.															
	0	0	12436	19808	19484	20950	22144	12560	15546	124	2	2	2	0	123058
Totals	72678						22144	28236							123058
Leap Wireless International, Inc.															
	0	0	0	0	10956	17005	16424	18150	19468	10763	14110	54	2	2	106934
Totals	27961						16424	62549							106934
Nucla-Naturita Telephone Company															
	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2
Totals	1						O	1							2
Sprint Nextel Corporation															
	0	0	3830	5526	8497	11525	11750	7688	8377	2773	3642	20	1	1	63630
Totals	29378						11750	22502							63630
T-Mobile USA, Inc.															
	5819	9177	8958	9917	10711	6273	7811	585	209	273	7	0	0	0	59740
Totals	50855						7811	1074							59740
Verizon Wireless															
	5456	8646	8321	9414	29951	36335	36598	31243	33040	18513	23332	120	6	6	240981
Totals	98123						36598	106260							240981
Viaero Wireless															
	91	130	108	31	28	6	8	0	0	0	0	0	0	0	402
Totals	394						8	0							402

9. Crowd Sourcing

Colorado broadband speed tests are collected in two ways: first, with a public speed test application, and second with a provider-only speed test application. The public speed test is located in the CBDDP mapping application (http://maps.co.gov/ColoradoBroadband) and an image of the speed test is shown below. A direct link speed test application also exists that can be placed on any website, which will help increase availability of the speed test and collect more results than the CBDDP mapping application alone. Using this application, the general population can conduct speed tests from their home or office. The speed test is provided by an Ookla application and results are given for Download and Upload speeds in mbps. In addition to test results being collected, the User's location, Provider name, technology type, and monthly cost are also requested following the test results. The purpose is to collect reports of service from citizens and Community Anchor Institutes in order to compare against the provider data.

The provider-only speed test application allows providers to submit speed tests during service calls or installations, at which time they are able to test the unrestricted bandwidth.   These speed tests show actual available speed when not restricted by consumer speed packages.

The CBDDP is still working to collect a significant number of speed tests using the aforementioned methods, which will then be used to compare to provider data.



10. Surveys

The CBDDP prepared and distributed a survey for residences and businesses requesting information about their broadband availability, their use of broadband, actual speeds received, and transmission technology. Approximately 1100 surveys were collected from rural, underserved, and un-served communities across the state, and nearly 800 of those surveys included speed tests. Similar to the data verification shown above, the reports provide a sense of the actual speeds in use or available to residents and businesses across the state. The following table compares the speed tier reported in the survey speed test data to the maximum advertised speed tier by any service provider for that location.

SURVEY DATA																
Results from Residential and Business Locations																
	Tiers Slower							Same Tier	Tiers Faster							Total
Speed Tier	<-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	>7	
	6	15	39	100	72	255	139	49	10	12	7	1	5	3		713
Totals	626							49	38							713

Summary of Process

The CBDDP follows the data collection process outlined on the National Broadband Map website: http://www.broadbandmap.gov/about/technical-overview. A more detailed description of the data processing methods is provided in the Process Guide, which is included with the data submission (CO_Process_Guide_2012_10_01.pdf).

During the first two years of the program, the CBDDP contracted a third party business (Critigen) to perform data processing. Starting with the April 1, 2012 delivery, the CBDDP hired staff and brought this process in-house. The CBDDP will continue with in-house staff through the remainder of the program to October 31, 2014. In-sourcing has improved data quality and increased the number of providers reporting in comparison to previous deliveries. The CBDDP has implemented the following process, which may vary from other state programs.

Data Collection

1. The data gathering process begins by identifying and contacting potential broadband providers. Participation in the program is voluntary, but many providers choose to support this effort.
2. The CBDDP reaches out to providers who have not previously submitted data, in order to create a more comprehensive state dataset.
3. The CBDDP also contacts each currently participating provider to allow them to report data changes or confirm that existing data is still accurate.
4. The CBDDP works closely with providers to help find the best and most accurate way to submit data. We encourage a uniform data submission across all providers, but accept data in various formats dependent on the provider's software limitations.

Data Processing

1. Reference layers include the U.S. Census Bureau 2010 TIGER/Line Shapefile Census Blocks and Roads.
2. Landline data is divided into three separate categories: census blocks less than two square miles, census block greater than two square miles, and service address points
   - For census blocks less than two square miles, the entire census block is presumed to have coverage if a service provider reports broadband service within that census block.

- For census blocks greater than two square miles, the CBDDP reports service along road segments.
- Service addresses represent providers who provide service to specific business locations or CAIs, but do not advertise or provide service to residences.

The data submitted by the provider is used to collect census blocks and road segments from the reference layers (US Census Bureau TIGER/Line).
Data is often submitted as address or point specific information, in which case a 150 foot buffer is drawn around each point and the resulting coverage is used to select the appropriate census blocks and road segments. The CBDDP also implements a network analysis to transform DSLAM (digital subscriber line access multiplexer) locations into a service network area, which is then used to spatially select Census Blocks and Road Segments.

3. Wireless data submitted as a service coverage area is added directly to the provider coverage
4. Wireless data submitted as tower locations is processed using signal propagation software to create a coverage plot.
5. Middle mile locations are reported by the providers using either addresses or coordinates. Central office locations and wireless towers are included in the BB_ConnectionPoint_MiddleMile.
6. Representing typical speeds continues to be an issue, as only two thirds of the providers report typical speed information.
7. Based on clarifications from the NTIA, the CBDDP did not provide any features in the BB_Service_Overview feature class as more granular speed information was provided in the BB_Service_CensusBlock, BB_Service_RoadSegment and BB_Service_Address feature classes.
8. The CBDDP is not currently collecting pricing information.
9. Various validation methods are implemented to check the data accuracy, as described “Validation and Verification” section of this document.

Data Submission

1. Before submitting data to the NTIA, the CBDDP compiles the data from each provider into a single dataset using the data model specified by the NTIA.
2. The NTIA then integrates the CBDDP's dataset into the National Broadband Map dataset.

Data Summary and Feature Class Statistical Tables

File Summary	
File Type	**Number of Records**
Total Records in all Files	**612628**
Census Block < 2 sq. miles	**453218**
Street Segments	**151653**
Wireless Shape File	**66**
Service Address	**1025**
BB Service Overview	**0**
Community Anchor Institutions	**5515**
Middle Mile	**1151**
Metadata Provided for Geospatial Data	**Yes**

Provider Information	
	Number of Records
Number of ISPs Provided	**74**

Census Blocks ‹ 2 sq. miles

Data Type	Code	Data Element	Count	%
Records Details		Total Records	453218	
		Census Blocks < 2 sq. miles with Broadband	147651	
		Census Blocks < 2 sq. miles in State (with & without broadband)	192101	
		Census Blocks > 2 sq. miles in the State (with & without broadband)	8961	
		Total Census Blocks in the State (with & without broadband)	201062	
Services Provider Details		Number of Distinct Providers	42	
		Number of Distinct "Doing Business As"	40	
		Number of Distinct FRN	43	
Technology	10	Asymmetric xDSL	188595	41.6%
	20	Symmetric xDSL	64801	14.3%
	30	Other Copper Wireless	77705	17.1%
	40	Cable Modem-DOCSIS 3.0	54248	12.0%
	41	Cable Modem-Other	19230	4.2%
	50	Optical Carrier/Fiber	48639	10.7%
	60	Satellite	0	0.0%
	70	Terrestrial Fixed Wireless-Unlicensed	0	0.0%
	71	Terrestrial Fixed Wireless-Licensed	0	0.0%
	80	Terrestrial Mobile Wireless	0	0.0%
	90	Electrical Power Line	0	0.0%
	0	Other	0	0.0%
Max. Advertised Download Speed	3	> 768 kps, < 1.5 mbps.	9330	2.1%
	4	> 1.5 mbps, < 3 mbps.	56672	12.5%
	5	> 3 mbps, < 6 mbps.	112054	24.7%
	6	> 6 mbps, < 10 mbps.	75654	16.7%
	7	> 10 mbps, < 25 mbps.	104169	23.0%
	8	> 25 mbps, < 50 mbps.	31670	7.0%
	9	> 50 mbps, < 100 mbps.	61185	13.5%
	10	> 100 mbps, < 1 gbps.	2466	0.5%
	11	> 1 gbps.	18	0.0%
Provider Type	1	Provider	453218	100.0%
	2	Reseller	0	0.0%
End User Category	1	Residential	451118	99.5%
	2	Governmental	2100	0.5%

Data Type	Code	Data Element	Count	%
Typical Download Speed	3	>= 768 kbps. < 1.5 mbps.	16136	3.6%
	4	>= 1.5 mbps. < 3 mbps.	42506	9.4%
	5	>= 3 mbps. < 6 mbps.	102893	22.7%
	6	>= 6 mbps. < 10 mbps.	50656	11.2%
	7	>= 10 mbps. < 25 mbps.	81206	17.9%
	8	>= 25 mbps. < 50 mbps.	30541	6.7%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
	11	> 1 gbps.	0	0.0%
		ZZ "null"	129280	28.5%
Max. Advertised Upload Speed	2	>200 kps, < 768 kps.	27614	6.1%
	3	>= 768 kbps. < 1.5 mbps.	98290	21.7%
	4	> 1.5 mbps, < 3 mbps.	83223	18.4%
	5	> 3 mbps, < 6 mbps.	107209	23.7%
	6	> 6 mbps, < 10 mbps.	97531	21.5%
	7	> 10 mbps, < 25 mbps.	29104	6.4%
	8	> 25 mbps, < 50 mbps.	4079	0.9%
	9	> 50 mbps, < 100 mbps.	5943	1.3%
	10	> 100 mbps, < 1 gbps.	207	0.0%
	11	> 1 gbps.	18	0.0%
Typical Upload Speed	2	>200 kps, < 768 kps.	49451	10.9%
	3	> 768 kps, < 1.5 mbps.	59574	13.1%
	4	> 1.5 mbps, < 3 mbps.	65714	14.5%
	5	> 3 mbps, < 6 mbps.	83951	18.5%
	6	> 6 mbps, < 10 mbps.	40222	8.9%
	7	> 10 mbps, < 25 mbps.	22070	4.9%
	8	> 25 mbps, < 50 mbps.	2956	0.7%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
	11	> 1 gbps.	0	0.0%
		ZZ "null"	129280	28.5%

Street Segment

Data Type	Code	Data Element	Count	%
Record Details		Total Records	151653	
Services Provider Details		Number of Distinct Providers	40	
		Number of Distinct "Doing Business As"	39	
		Number of Distinct FRN	41	
Technology	10	Asymmetric xDSL	85155	56.2%
	20	Symmetric xDSL	15361	10.1%
	30	Other Copper Wireless	5298	3.5%
	40	Cable Modem-DOCSIS 3.0	10214	6.7%
	41	Cable Modem-Other	7541	5.0%
	50	Optical Carrier/Fiber	28084	18.5%
	60	Satellite	0	0.0%
	70	Terrestrial Fixed Wireless-Unlicensed	0	0.0%
	71	Terrestrial Fixed Wireless-Licensed	0	0.0%
	80	Terrestrial Mobile Wireless	0	0.0%
	90	Electrical Power Line	0	0.0%
	0	Other	0	0.0%
Max. Advertised Download Speed	3	> 768 kps, < 1.5 mbps.	4364	2.9%
	4	> 1.5 mbps, < 3 mbps.	43286	28.5%
	5	> 3 mbps, < 6 mbps.	18552	12.2%
	6	> 6 mbps, < 10 mbps.	29017	19.1%
	7	> 10 mbps, < 25 mbps.	41952	27.7%
	8	> 25 mbps, < 50 mbps.	3145	2.1%
	9	> 50 mbps, < 100 mbps.	11186	7.4%
	10	> 100 mbps, < 1 gbps.	151	0.1%
	11	> 1 gbps.	0	0.0%
Provider Type	1	Provider	151653	100.0%
	2	Reseller	0	0.0%
End User Name	1	Residential	151595	100.0%
	2	Governmental	58	0.0%

Data Type	Code	Data Element	Count	%
Typical Download Speed	3	> 768 kps, < 1.5 mbps.	5046	3.3%
	4	> 1.5 mbps, < 3 mbps.	26509	17.5%
	5	> 3 mbps, < 6 mbps.	11767	7.8%
	6	> 6 mbps, < 10 mbps.	18413	12.1%
	7	> 10 mbps, < 25 mbps.	29853	19.7%
	8	> 25 mbps, < 50 mbps.	3008	2.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
	11	> 1 gbps.	0	0.0%
		ZZ "null"	57057	37.6%
Max. Advertised Upload Speed	2	>200 kps, < 768 kps.	21825	14.4%
	3	> 768 kps, < 1.5 mbps.	32278	21.3%
	4	> 1.5 mbps, < 3 mbps.	43169	28.5%
	5	> 3 mbps, < 6 mbps.	18026	11.9%
	6	> 6 mbps, < 10 mbps.	32862	21.7%
	7	> 10 mbps, < 25 mbps.	3264	2.2%
	8	> 25 mbps, < 50 mbps.	131	0.1%
	9	> 50 mbps, < 100 mbps.	97	0.1%
	10	> 100 mbps, < 1 gbps.	1	0.0%
	11	> 1 gbps.	0	0.0%
Typical Upload Speed	2	>200 kps, < 768 kps.	22309	14.7%
	3	> 768 kps, < 1.5 mbps.	23353	15.4%
	4	> 1.5 mbps, < 3 mbps.	25599	16.9%
	5	> 3 mbps, < 6 mbps.	5991	4.0%
	6	> 6 mbps, < 10 mbps.	15200	10.0%
	7	> 10 mbps, < 25 mbps.	2144	1.4%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
	11	> 1 gbps.	0	0.0%
		ZZ "null"	57057	37.6%

Wireless

Data Type	Code	Data Element	Count	%
Record Details		Total Records	66	
Services Provider Details		Number of Distinct Providers	45	
		Number of Distinct "Doing Business As"	43	
		Number of Distinct FRN	42	
Technology	10	Asymmetric xDSL	0	0.0%
	20	Symmetric xDSL	0	0.0%
	30	Other Copper Wireless	0	0.0%
	40	Cable Modem-DOCSIS 3.0	0	0.0%
	41	Cable Modem-Other	0	0.0%
	50	Optical Carrier/Fiber	0	0.0%
	60	Satellite	5	7.6%
	70	Terrestrial Fixed Wireless-Unlicensed	27	40.9%
	71	Terrestrial Fixed Wireless-Licensed	17	25.8%
	80	Terrestrial Mobile Wireless	17	25.8%
	90	Electrical Power Line	0	0.0%
	0	Other	0	0.0%
Max. Advertised Download Speed	3	> 768 kps, < 1.5 mbps.	13	19.7%
	4	> 1.5 mbps, < 3 mbps.	8	12.1%
	5	> 3 mbps, < 6 mbps.	19	28.8%
	6	> 6 mbps, < 10 mbps.	18	27.3%
	7	> 10 mbps, < 25 mbps.	7	10.6%
	8	> 25 mbps, < 50 mbps.	1	1.5%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
	11	> 1 gbps.	0	0.0%
Spectrum	1	800 MHz Spectrum Used	3	4.5%
	2	700 MHz Spectrum Used	7	10.6%
	3	1900 MHz Spectrum Used	6	9.1%
	4	1700 MHz Spectrum Used	6	9.1%
	5	2500 MHz Spectrum Used	4	6.1%
	6	Unlicensed Spectrum Used	30	45.5%
	7	Specialist Mobile Radio Service	4	6.1%
	8	Wireless Communication Service	1	1.5%
	9	Satellite	5	7.6%

Data Type	Code	Data Element	Count	%
Typical Download Speed	2	>200 kps, < 768 kps.	0	0.0%
	3	> 768 kps, < 1.5 mbps.	16	24.2%
	4	> 1.5 mbps, < 3 mbps.	5	7.6%
	5	> 3 mbps, < 6 mbps.	12	18.2%
	6	> 6 mbps, < 10 mbps.	8	12.1%
	7	> 10 mbps, < 25 mbps.	0	0.0%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
		ZZ "null"	25	37.9%
Max. Advertised Upload Speed	2	>200 kps, < 768 kps.	16	24.2%
	3	> 768 kps, < 1.5 mbps.	22	33.3%
	4	> 1.5 mbps, < 3 mbps.	6	9.1%
	5	> 3 mbps, < 6 mbps.	12	18.2%
	6	> 6 mbps, < 10 mbps.	8	12.1%
	7	> 10 mbps, < 25 mbps.	2	3.0%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
	11	> 1 gbps.	0	0.0%
Typical Upload Speed	2	>200 kps, < 768 kps.	15	22.7%
	3	> 768 kps, < 1.5 mbps.	19	28.8%
	4	> 1.5 mbps, < 3 mbps.	3	4.5%
	5	> 3 mbps, < 6 mbps.	4	6.1%
	6	> 6 mbps, < 10 mbps.	0	0.0%
	7	> 10 mbps, < 25 mbps.	0	0.0%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
		ZZ "null"	25	37.9%

Service Addresses

Data Type	Code	Data Element	Count	%
Record Details		Total Records	1025	
Services Provider Details		Number of Distinct Providers	3	
		Number of Distinct "Doing Business As"	3	
		Number of Distinct FRN	3	
Technology	10	Asymmetric xDSL	0	0.0%
	20	Symmetric xDSL	0	0.0%
	30	Other Copper Wireless	0	0.0%
	40	Cable Modem-DOCSIS 3.0	0	0.0%
	41	Cable Modem-Other	0	0.0%
	50	Optical Carrier/Fiber	1025	100.0%
	60	Satellite	0	0.0%
	70	Terrestrial Fixed Wireless-Unlicensed	0	0.0%
	71	Terrestrial Fixed Wireless-Licensed	0	0.0%
	80	Terrestrial Mobile Wireless	0	0.0%
	90	Electrical Power Line	0	0.0%
	0	Other	0	0.0%
Max. Advertised Download Speed	3	> 768 kps, < 1.5 mbps.	0	0.0%
	4	> 1.5 mbps, < 3 mbps.	0	0.0%
	5	> 3 mbps, < 6 mbps.	0	0.0%
	6	> 6 mbps, < 10 mbps.	0	0.0%
	7	> 10 mbps, < 25 mbps.	0	0.0%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	0	0.0%
	11	> 1 gbps.	1025	100.0%
Provider Type	1	Provider	466	45.5%
	2	Reseller	559	54.5%
End User Name	1	Residential	43	4.2%
	2	Governmental	516	50.3%
	4	Unknown	466	45.5%

Data Type	Code	Data Element	Count	%
Typical Download Speed	3	> 768 kps, < 1.5 mbps.	0	0.0%
	4	> 1.5 mbps, < 3 mbps.	0	0.0%
	5	> 3 mbps, < 6 mbps.	0	0.0%
	6	> 6 mbps, < 10 mbps.	0	0.0%
	7	> 10 mbps, < 25 mbps.	0	0.0%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	516	50.3%
	11	> 1 gbps.	466	45.5%
		ZZ "null"	43	4.2%
Max. Advertised Upload Speed	2	>200 kps, < 768 kps.	0	0.0%
	3	> 768 kps, < 1.5 mbps.	0	0.0%
	4	> 1.5 mbps, < 3 mbps.	0	0.0%
	5	> 3 mbps, < 6 mbps.	0	0.0%
	6	> 6 mbps, < 10 mbps.	0	0.0%
	7	> 10 mbps, < 25 mbps.	0	0.0%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	35	3.4%
	11	> 1 gbps.	990	96.6%
Typical Upload Speed	2	>200 kps, < 768 kps.	0	0.0%
	3	> 768 kps, < 1.5 mbps.	0	0.0%
	4	> 1.5 mbps, < 3 mbps.	0	0.0%
	5	> 3 mbps, < 6 mbps.	0	0.0%
	6	> 6 mbps, < 10 mbps.	0	0.0%
	7	> 10 mbps, < 25 mbps.	0	0.0%
	8	> 25 mbps, < 50 mbps.	0	0.0%
	9	> 50 mbps, < 100 mbps.	0	0.0%
	10	> 100 mbps, < 1 gbps.	516	50.3%
	11	> 1 gbps.	466	45.5%
		ZZ "null"	43	4.2%

Community Anchor Institution

Data Type	Code	Data Element	Count	%
Record Details		Total Records	5515	
Anchor Category	1	School-K through 12	2109	38.2%
	2	Library	252	4.6%
	3	Medical/healthcare	709	12.9%
	4	Public safety	1779	32.3%
	5	University, college, other post-secondary	55	1.0%
	6	Other community support/gov't	601	10.9%
	7	Other community support/non-gov't	10	0.2%
Technology	10	Asymmetric xDSL	1216	22.0%
	20	Symmetric xDSL	20	0.4%
	30	Other Copper Wireless	1934	35.1%
	40	Cable Modem-DOCSIS 3.0	5	0.1%
	41	Cable Modem-Other	146	2.6%
	50	Optical Carrier/Fiber	1787	32.4%
	60	Satellite	14	0.3%
	70	Terrestrial Fixed Wireless-Unlicensed	27	0.5%
	71	Terrestrial Fixed Wireless-Licensed	77	1.4%
	80	Terrestrial Mobile Wireless	0	0.0%
	90	Electrical Power Line	0	0.0%
	0	Other	0	0.0%
		ZZ "null"	289	5.2%
Max. Advertised Download Speed	1	< 200 kps.	0	0.0%
	2	>200 kps, < 768 kps.	0	0.0%
	3	> 768 kps, < 1.5 mbps.	231	4.2%
	4	> 1.5 mbps, < 3 mbps.	1707	31.0%
	5	> 3 mbps, < 6 mbps.	992	18.0%
	6	> 6 mbps, < 10 mbps.	433	7.9%
	7	> 10 mbps, < 25 mbps.	1430	25.9%
	8	> 25 mbps, < 50 mbps.	213	3.9%
	9	> 50 mbps, < 100 mbps.	67	1.2%
	10	> 100 mbps, < 1 gbps.	81	1.5%
	11	> 1 gbps.	72	1.3%
		ZZ "null"	289	5.2%

Data Type	Code	Data Element	Count	%
Max. Advertised Upload Speed	1	< 200 kps.	0	0.0%
	2	>200 kps, < 768 kps.	214	3.9%
	3	> 768 kps, < 1.5 mbps.	666	12.1%
	4	> 1.5 mbps, < 3 mbps.	1806	32.7%
	5	> 3 mbps, < 6 mbps.	1029	18.7%
	6	> 6 mbps, < 10 mbps.	446	8.1%
	7	> 10 mbps, < 25 mbps.	782	14.2%
	8	> 25 mbps, < 50 mbps.	97	1.8%
	9	> 50 mbps, < 100 mbps.	53	1.0%
	10	> 100 mbps, < 1 gbps.	61	1.1%
	11	> 1 gbps.	72	1.3%
		ZZ "null"	289	5.2%
Y/N Broadband Service	Y	Yes-Subscribers to Service	5226	94.8%
	N	No-Does Not Subscribers to Service	289	5.2%
	U	Unknown	0	0.0%
Lat/Long Accuracy	1	Lat/Long falls within the State	5515	100%
	2	Total Lat/Long	5515	100%
Anchor Names		Total Count Anchors Names	5515	
		Distinct Count of Anchor Names	5368	

Data Type	Code	Data Element	Count	BB Info
Community Anchor Institution Category Count with Broadband Information	1	School-K through 12	2109	2082
	2	Library	252	251
	3	Medical/healthcare	709	693
	4	Public safety	1779	1591
	5	University, college, other post-secondary	55	55
	6	Other community support/gov't	601	546
	7	Other community support/non-gov't	10	8
		Totals	5515	5226
Public WI-FI	1	Y	0	
	2	N	5515	

Middle Mile

Data Type	Code	Data Element	Count	%
Record Details		Total Records	1151	
Services Provider Details		Number of Distinct Providers	43	
		Number of Distinct "Doing Business As"	41	
		Number of Distinct FRN	41	
Ownership	0	Owned	327	28.4%
	1	Leased	824	71.6%
Facility Capacity	1	Multiple T1's and less than 40 mbps.	571	49.6%
	2	Greater than 40 mbps and less than 150 mbps.	113	9.8%
	3	Greater than 150 mbps. and less than 600 mbps.	52	4.5%
	4	Greater than 600 mbps. and less than 2.4 gbps.	42	3.6%
	5	Greater than 2.4 gbps. and less than 10 gbps.	0	0.0%
	6	Greater than 10 gbps	373	32.4%

Data Type	Code	Data Element	Count	%
Facility Type	1	Fiber	548	47.6%
	2	Copper	4	0.3%
	3	Hybrid Fiber Coax (HFC)	1	0.1%
	4	Wireless	598	52.0%
		N/A "null"		0.0%
Lat / Long		# of Lat/Long in State	1151	100%
		Total Lat/Long	1151	
Elevation		Number of Data Points	586	
		Lowest Elevation	0	
		Highest Elevation	300	

	Services Providers			Census	Roads	Wireless	Mid Mile
	Broadband Services Providers Submitted						
	FRN	Company Name	Doing Business As				
1	0004311627	Agate Mutual Telephone Cooperative Association	Prairie Networks, LLC	28	214		10
2	0003777927	Antilles Wireless, LLC	USA Communications	232		1	
3	0004496774	AT&T Inc.	AT&T Corp, Inc.			4	1
4	0014860522	Baja Broadband Holding Company	Baja Broadband Operating Company, LLC	3201	280		
5	0003728292	Beulahland Communications, Inc.,	Beulahland Communications, Inc.,			2	1
6	0003754652	Bijou Telephone Co-op Association, Inc.	Bijou Telephone Cooperative Association, Inc.	424	840	1	3
7	0003766201	Blanca Telephone Company	Blanca Telephone Company	2922	3252		
8	0017108747	Brainstorm Internet	Brainstorm Internet			1	14
9	0014778781	BySky, Inc.	BySky, Inc.			1	
10	0019746445	CAP Cable	USA Communications	628	5	1	
11	0018626853	CenturyTel, Inc.	CenturyTel, Inc.	98786	56867		
12	0001621127	City of Glenwood Springs	City of Glenwood Springs, Community Broadband Network	673	46	1	
13	9999	Colorado Mobile Inet, LLC	Colorado Mobile Inet, LLC			1	14
14	0002147098	Columbine Telecom Company	FairPoint Communications	251	667	1	10
15	0004441663	Comcast Cable Communications, LLC	Comcast	54704	10375		
16	0007001977	CSC Holdings, LLC	Bresnan Communications	15116	6354		
17	0001617281	Delta County Tele-comm, Inc.	TDS Telecom	829	821		1
18	0003753753	DIECA Communications, Inc.	Covad Communications Company	134364	4718		3
19	0001629781	Dubois Telephone Exchange, Inc.,	DTE	53	130	1	4
20	0013339973	Eagle Communications, Inc.	Eagle Cable TV And Internet	237	29		1
21	0004317731	Eastern Slope Rural Telephone Association, Inc.	Eastern Slope Rural Telephone Association, Inc.	2220	7449		12
22	0003767852	Eschelon Telecom of Colorado, Inc.	Integra Telecom	81750	20735		
23	0004338489	Farmers Telephone Company	Farmers Telephone Company	180	921		12
24	0005059092	Farmers Telecommunications	Farmers Telecommunications	682	111	2	1
25	0015575285	Front Range Internet, Inc.	Front Range Internet, Inc.	5794	97		1
26	0016084683	Grand County Internet Services, Inc.	Grand County Internet Services, Inc.			1	30
27	0000824224	Grand Valley Telecommunications, Inc.	Grand Valley Telecommunications, Inc.	1171	10	1	7
28	0001616200	Haxtun Telephone	Haxtun	1023	1327		
29	0019794643	HighSpeed4U	HighSpeed4U			1	24
30	0018483073	Hughes Network Systems, LLC	HughesNet			1	
31	0015866460	Internet Colorado	Internet Colorado	364	54	1	10
32	0018706002	Inventive Wireless of Nebraska, LLC	Vistabeam			1	
33	0007651219	iLOKA Inc	Microtech-tel	36794	21382		
34	0014175673	JAB Broadband	Skybeam, Inc.			1	399
35	0003766623	Jade Communications, LLC	Jade Communications, LLC			1	7

36	0002748044	James Cable LLC	CommuniComm Services	692	3		1
37	0003728284	J.e.d. Enterprises, Inc.	J.e.d. Enterprises, Inc.	203	1355		16
38	0005030200	Live Wire Networks, Inc.	Live Wire Networks, Inc.	293		1	
39	0003723822	Level 3 Communications, LLC	Level 3 Communications, LLC				365
40	0002963528	Leap Wireless International, Inc.	Cricket Communications, Inc.,			2	
41	0018769547	Magnolia Road Internet Coop	MRIC			2	20
42	9999	Mountain Broadband, LLC	Mountain Broadband			1	18
43	9999	Nedernet, Inc.	Nedernet, Inc.			1	15
44	0004312187	Nucla-Naturita Telephone Company	Nucla-Naturita Telephone Company	297	332	2	
45	0004311809	Nunn Telephone Company	Nunn Communications, LLC	199	679		1
46	9999	OurayNet	OurayNet			1	13
47	0014699953	Peetz Communications, LLC	Peetz Cooperative Telephone Company	94	176	1	
48	0004314316	Phillips County Telephone Company	PCTelecom	214	757	2	3
49	0001615889	Plains Cooperative Telephone Association, Inc.	Plains Cooperative Telephone Association, Inc.	1113	3475	1	52
50	0005059092	Rico Telephone Company	Rico Telephone Company	78	93		3
51	0014705602	Roggen Telephone Cooperative Company	Roggen Telephone Enterprises, Inc.			1	1
52	0001615665	Rye Telephone Company, Inc.	ghValley.net	894	2641	1	2
53	0005061775	San Isabel Telecom, Inc.	San Isabel Telecom, Inc.	1360	634	1	5
54	0004310769	S&T Telephone Coop Association. Inc.	S&T Telephone Coop Assoc Inc	24	29		
55	0016136327	SECOM	SECOM			2	27
56	0018756155	Skycasters, LLC	Skycasters			1	
57	0017163304	Slopeside Internet, LLC	Slopeside Internet, LLC			3	
58	0005070933	South Park Telephone Company, LLC	ghValley.net			2	1
59	0003774593	Sprint Nextel Corporation	Sprint			2	1
60	0005087457	StarBand Communications Inc.	StarBand Communications Inc.			1	
61	0001616390	Strasburg Telephone Company	TDS Telecom	111	176		1
62	0003723236	Sunflower Telephone Company	FairPoint Communications	179	359		12
63	0006945950	T-Mobile USA, Inc.	T-Mobile			3	7
64	0013430244	Time Warner Cable	Time Warner Cable	925	859		
65	0004351086	tw telecom inc.	tw telecom inc.	1261	5		2
66	0005200067	Uintah Basin Electronic Telecommunications	Strata Networks	1358	467	1	
67	0003290673	Verizon Wireless	Verizon Wireless			4	
68	0015360456	Viaero Wireless	Viaero Wireless			1	
69	0007843766	ViaSat	ViaSat Communications			2	
70	0001616192	Wiggins Telephone Association	Wiggins Telephone	658	2876		1
71	0006275945	XO Communications, LLC	XO Communications Services, Inc. (Affiliated Entity)	839	53		
72	0012579652	Zirkel Wireless, LLC	Zirkel Wireless, LLC			2	19
73	0014817357	Unite Private Networks, LLC	Unite Private Networks	516 Service Address			
74	0019898303	Cogent Communications, Inc.	Cogent Communications, Inc.	43 Service Address			
	0003723822	Level 3 Communications, LLC	Level 3 Communications, LLC	466 Service Address			

Distinct Speed Tiers Provided

Technology Codes		Allowable Down	Allowable Up		Speed Tier Codes
10	Asymmetric xDSL	3 to 10	2 to 9	1	< 200 kps.
20	Symmetric xDSL	3 to 9	2 to 9	2	>200 kps, < 768 kps.
30	Other Copper Wireless	3 to 11	2 to 11	3	> 768 kps, < 1.5 mbps.
40	Cable Modem-DOCSIS 3.0	3 to 10	2 to 7	4	> 1.5 mbps, < 3 mbps.
41	Cable Modem-Other	3 to 7	2 to 7	5	> 3 mbps, < 6 mbps.
50	Optical Carrier/Fiber to End User	3 to 11	2 to 11	6	> 6 mbps, < 10 mbps.
60	Satellite	3 to 5	2 to 4	7	> 10 mbps, < 25 mbps.
70	Terrestrial Fixed Wireless-Unlicensed	3 to 7	2 to 7	8	> 25 mbps, < 50 mbps.
71	Terrestrial Fixed Wireless-Licensed	3 to 7	2 to 7	9	> 50 mbps, < 100 mbps.
80	Terrestrial Mobile Wireless	3 to 7	2 to 7	10	> 100 mbps, < 1 gbps.
90	Electric Power Lines	3 to 5	2 to 5	11	> 1 gbps.
0	All Other	3 to 11	2 to 11		

Distinct Speed Tiers Provided

Maximum Advertised Speed				Typical Speed			
Technology	Download	Upload	Freq.	Technology	Download	Upload	Freq.
10	3	2	3581	10	3	2	11549
10	3	3	5022	10	3	3	4588
10	4	2	27513	10	4	2	29258
10	4	3	25166	10	4	3	23636
10	5	2	14032	10	5	2	22780
10	5	3	13098	10	5	3	13342
10	5	4	134	10	6	2	2753
10	6	2	2753	10	6	3	10953
10	6	3	29716	10	7	3	29086
10	6	4	1327	10	7	4	72232
10	6	5	4303	10	7	5	887
10	6	6	9669	10	8	5	10687
10	7	3	29211	10	8	7	21005
10	7	4	73529	10	ZZ	ZZ	21007
10	7	5	887	20	3	2	4441
10	7	7	1825	20	3	3	601
10	8	5	10699	20	4	4	13431
10	8	7	21005	20	5	5	1970
10	8	8	293	20	6	6	55327
20	3	3	4813	20	7	7	1940
20	4	4	6768	20	8	8	1799

Maximum Advertised Speed				Typical Speed			
Technology	Download	Upload	Freq.	Technology	Download	Upload	Freq.
20	5	3	2	20	ZZ	ZZ	653
20	5	5	8949	30	3	3	3
20	6	6	54408	30	4	2	37
20	7	7	2859	30	4	4	2653
20	8	8	2363	30	5	5	76379
30	3	3	251	30	6	6	36
30	4	4	2908	30	7	7	451
30	5	5	76585	30	7	8	1099
30	6	4	37	30	8	8	54
30	6	6	102	30	ZZ	ZZ	2292
30	7	7	1954	40	ZZ	ZZ	64462
30	7	8	1099	41	5	2	93
30	8	8	68	41	7	2	772
40	9	6	64462	41	7	5	266
41	4	2	695	41	ZZ	ZZ	25640
41	5	2	93	50	5	2	77
41	6	5	617	50	5	5	19
41	7	2	772	50	7	3	1089
41	7	3	22544	50	7	4	2731
41	7	4	2050	50	7	6	59
50	3	3	27	50	7	7	818
50	4	4	36913	50	8	8	4
50	5	5	18016	50	10	10	516
50	6	6	1752	50	11	11	466
50	7	3	1089	50	ZZ	ZZ	727714
50	7	4	2731	60	3	2	2
50	7	5	3611	60	4	2	1
50	7	7	2319	60	ZZ	ZZ	2
50	8	8	466	70	3	2	1
50	9	5	1871	70	3	3	3
50	9	9	6038	70	4	3	3
50	10	7	2407	70	5	2	3
50	10	9	2	70	5	3	3
50	10	10	208	70	5	5	1
50	11	10	35	70	6	4	2
50	11	11	1008	70	6	5	2
60	4	2	2	70	ZZ	ZZ	9
60	5	3	2	71	3	2	1
60	7	5	1	71	3	3	4
70	3	2	1	71	4	2	1
70	3	3	2	71	5	2	1

Maximum Advertised Speed			
Technology	Download	Upload	Freq.
70	4	3	1
70	5	2	2
70	5	3	3
70	5	4	1
70	5	5	2
70	6	2	1
70	6	3	2
70	6	4	1
70	6	5	3
70	6	6	4
70	7	4	1
70	7	6	1
70	7	7	1
70	8	7	1
71	3	2	1
71	3	3	4
71	4	2	1
71	5	2	1
71	5	3	3
71	5	5	1
71	6	3	1
71	6	5	2
71	6	6	3
80	3	2	6
80	4	2	1
80	4	3	2
80	5	3	1
80	5	4	1
80	5	5	2
80	6	4	1
80	7	3	1
80	7	4	1
80	7	5	1

Typical Speed			
Technology	Download	Upload	Freq.
71	5	3	2
71	6	3	1
71	6	4	1
71	ZZ	ZZ	6
80	3	2	5
80	5	3	2
80	6	3	1
80	6	5	1
80	ZZ	ZZ	8

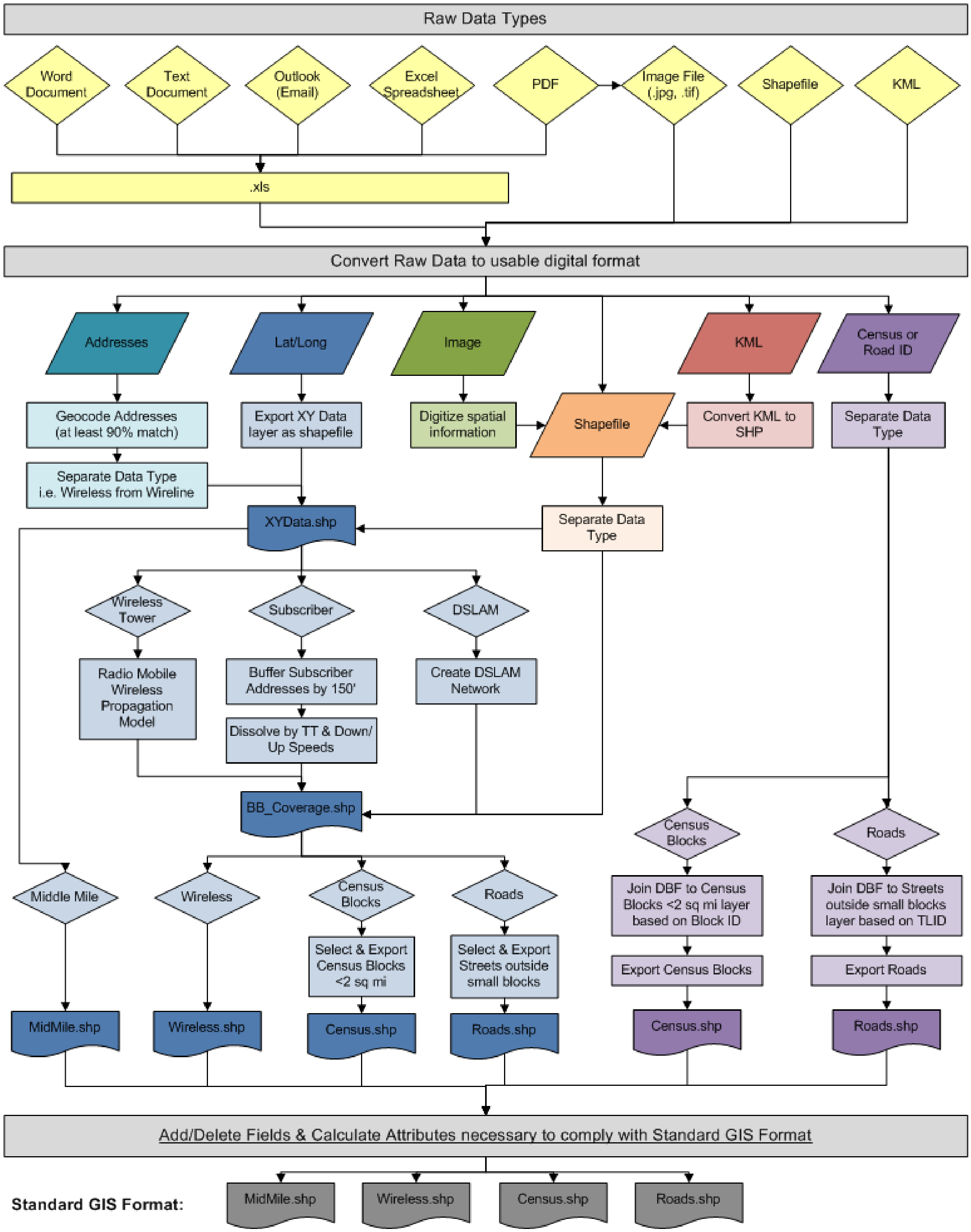
Colorado Broadband
Data and Development Program

Broadband Geoprocessing Guide

Document Owners	
Prepared by	GIS Analyst: Larry Norden GIS Analyst: Megan Chadwick GIS Analyst: Windy Fischer
Department	Governor's Office of Information Technology
Document Status	
Project Number	001
Date Created	January 27, 2012
Filename	P:\SBDDGP-ARRA Project\BroadbandProductionArea\Documents\Team Documents\Data_Processing_Guide.docx
Status	Working Document
Last change author	ChadwicM on 9/24/2012 11:40:38 AM
Last change date	September 24, 2012
Last change description	Update processes for compatibility with ArcGIS 10; add Radio Mobile Documentation

Table of Contents

1. Overview


Raw Data Types
Word Document
Text Document
Outlook (Email)
Excel Spreadsheet
PDF
Image File (.jpg, .tif)
Shapefile
KML
.xls
Convert Raw Data to usable digital format
Addresses
Lat/Long
Image
KML
Census or Road ID
Geocode Addresses (at least 90% match)
Export XY Data layer as shapefile
Digitize spatial information
Shapefile
Convert KML to SHP
Separate Data Type
Separate Data Type i.e. Wireless from Wireline
XYData.shp
Separate Data Type
Wireless Tower
Subscriber
DSLAM
Radio Mobile Wireless Propagation Model
Buffer Subscriber Addresses by 150'
Dissolve by TT & Down/ Up Speeds
Create DSLAM Network
BB_Coverage.shp
Census Blocks
Roads
Middle Mile
Wireless
Census Blocks
Roads
Join DBF to Census Blocks <2 sq mi layer based on Block ID
Join DBF to Streets outside small blocks layer based on TLID
Select & Export Census Blocks <2 sq mi
Select & Export Streets outside small blocks
Export Census Blocks
Export Roads
MidMile.shp
Wireless.shp
Census.shp
Roads.shp
Census.shp
Roads.shp
Add/Delete Fields & Calculate Attributes necessary to comply with Standard GIS Format
Standard GIS Format:
MidMile.shp
Wireless.shp
Census.shp
Roads.shp

2. General Information

2.1. Base Data

Base Data is located in:

…\BroadbandProductionArea\Workspaces\BaseData

2.1.1. Census

base_data.gdb\Blocks_2010_WGS84

Census Block Shapefile is an extract of selected geographic and cartographic information from the U.S. Census Bureau's MAF/TIGER and Referencing MTDB Database. The Shapefile is used to distinguish broadband coverage between Providers, in addition to Road networks. All Census Blocks in Colorado exist within the Shapefile and .dbf. Unnecessary Fields have been eliminated for ease in processing and to comply with NTIA requirements.

base_data.gdb\Blocks_2010_WGS84_LT2SqMi

This is a subset of the *Blocks_2010_WGS84.shp* that consists Census Blocks with areas less than 2 square miles.

2.1.2. Roads

base_data.gdb\Roads_2010_WGS84

The TIGER/Line Files are shapefiles and related database files that are an extract of selected geographic and cartographic information from the U.S. Census Bureau's MAF/TIGER and Referencing MTDB Database. The TIGER shapefile consists of the Colorado road network and is used in conjunction with Census Blocks to build a broadband coverage for the state of Colorado. Unnecessary Fields have been eliminated and attributes have been modified to comply with NTIA formatting requirements. The following fields were added and calculated using the following tools:

- ADDMIN & ADDMAX were added and calculated using *CalcMaxMinAddr*
- STREETNAME was added and calculated using C*alcStreetName*
- **TOOL TO BE DEVELOPED 1: Delete duplicate TLID from Roads_2010_WGS84**

base_data.gdb\Roads_2010_WGS84_Outside

This is a subset of the *Roads_2010_WGS84* feature class that consists of the Colorado road network outside of Census Blocks less than 2 sq. mi. The file is used in conjunction with Census Blocks to build a broadband coverage for the state of Colorado.

2.1.3. Address Locators

2.1.3.1. ESRI ArcGIS 10 Address Locator

(1) ArcGIS Online World Geocoding is a set of standard, no cost services for internal and commercial use. The Software service allows for batch geocoding with 9.3.1 and ArcGIS 10. Description of services can be found: http://www.esri.com/software/arcgis/arcgisonline/world-geocoding.html

(2) The ArcGIS 10 style North American Address Locator (**TA_Address_NA_10**) enables you to geocode street addresses in North America. The locator is a composite geocoder that supports multiple levels of geocoding. The following levels of geocoding are supported in the USA: street address point, street address, street name, ZIP Code, ZIP+4, and city/state. More information regarding Address Locator can be found: http://www.arcgis.com/home/item.html?id=919dd045918c42458f30d2c85d566d68

2.2. Source Data

2.2.1. TIGER 2010

The TIGER/Line Files are shapefiles and related database files that are an extract of selected geographic and cartographic information from the U.S. Census Bureau's MAF/TIGER and Referencing MTDB Database.

2.3. Resource Documents

2.3.1. BB_WKBK_Working.xlsx

…\BroadbandProductionArea\Documents\Team Documents\BB_WKBK.xlsx

A Spreadsheet document that lists all forms of Raw Data available from Providers. Raw Data is divided between Census/Roads, Wireless, and Midmile between providers. Descriptions, location, speeds, etc are outlined and categorized. The document is updated with every delivery to ensure new Raw Data is effectively enhanced.

2.3.2. Providers and Stats for October 2011 Delivery.xlsx

P:\SBDDGP-ARRA Project\BroadbandProductionArea\Documents\QualityAssurance

Consists of five separate documents.

(1) **Colorado Service Providers** disclosing the list of current broadband Providers in Colorado, FRN, Company Name, DBA, Census, Roads, Wireless, and Midmile.

(2) **Colorado Street Segment** outlines Data Types, Code, Data Element, Count, and % for Technology, Speeds, Provider Type, and End User Name available in Colorado.

(3) **Colorado Middle Mile** outlines Data Types, Code, Data Element, Count, %, for Ownership, Facility Capacity, Facility Type, Lat/Long, and Elevation available in Colorado.

(4) **Colorado Census Blocks < 2 sq. miles** outlines Data Types, Code, Data Element, Count, and % for Technology, Speeds, Provider Type, and End User Name available in Colorado.

(5) **Colorado Wireless** outlines Data Types, Code, Data Element, Count, and % for Technology, Speeds, and Spectrum.

2.3.3. SBDD_TRANSFER_JUNE_2011.pdf

P:\SBDDGP-ARRA Project\BroadbandProductionArea\Documents\NTIA_ReportsMaterials

Object model diagram outlining the Geodatabase Design for Colorado Broadband Coverage using the NTIA Standard. Document consists of Feature Class Descriptions, Subtype Descriptions, Domains, CODES, Default Values, and Field Names for Census Blocks/Roads, Middle Mile, and Wireless.

2.3.4. Standard GIS Format Document

…\BroadbandProductionArea\Documents\Team Documents\Standard GIS Format Doc.xlsx

Document created to achieve a Standard GIS Format for Geoprocessing and a Post-processing format to meet NTIA Standards.

2.4. Workspace

2.4.1. Broadband Production Area

Broadband Production Areas is located at:

P:\SBDDGP-ARRA Project\BroadbandProductionArea

2.4.2. Personal Workspace

The raw data, base data and supporting documents can be found at the locations listed above, but for processing purposes the data must be copied to your personal workspace, which is located at:

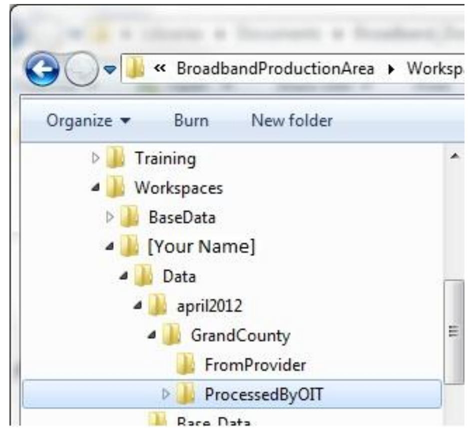
*…\BroadbandProductionArea\Workspaces\[**Your Name**]*

(This will be referred to as "…Your_Workspace")

To set up "…Your_Workspace":

(1) Create a folder for each provider: …Your_Workspace\Data\[Provider_Name] and two sub-folders: "FromProvider" & "ProcessedbyOIT". Copy raw data from Provider into the "FromProvider" folder

(2) Create an empty File Geodatabase in the "ProcessedbyOIT" folder that you will use to process all of your data
- Open ArcCatalog and navigate to Workspace
- Right Click>New>File Geodatabase. Name the file gdb: "*working.gdb*"



(3) Create a copy of the NTIA Staging template in the "ProcessedbyOIT" folder. You will use this ***after*** your data is processed to the GIS Standard Format.
- Rename it "[provalias].gdb" (this should be the provider alias from the look-up table, and should be all lowercase).
- Template location:

…\BroadbandProductionArea\Workspaces\BaseData\StagingTemplate.gdb

2.4.3. NTIA Staging and Final Format Workspaces

Once you have processed your data to the Standard GIS Format product, you will transfer the data to the Broadband Production Area for NTIA Staging and Final Product. These processes are described in sections 7 and 8.

The NTIA Staging area is located at:

…\BroadbandProductionArea\Workspaces\2012October_StagingArea

The NTIA Final Product area is located at:

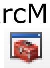
…\BroadbandProductionArea\Workspaces\2012October_FinalProduct

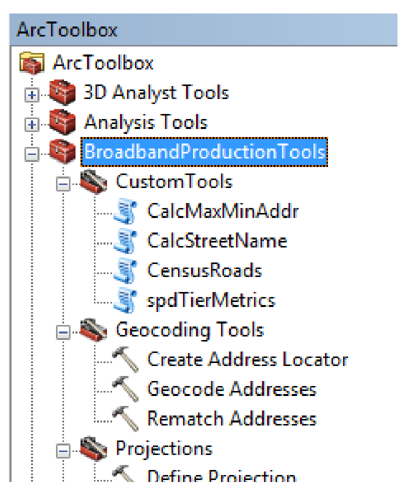
2.5. Tools

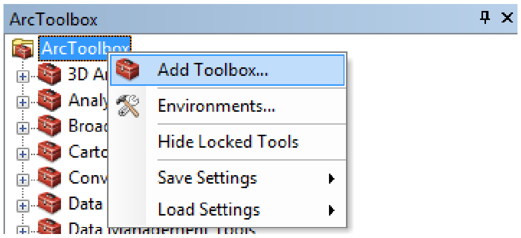
The custom toolbox (*BroadbandProductionTools.tbx*) is located at:

…\BroadbandProductionArea\Workspaces\Tools

This toolbox contains the ArcGIS tools that are used during data processing, as well as custom tools specifically built by the Colorado Broadband Production team. To add the toolbox:

- Open ArcMap or ArcCatalog and click the ArcToolbox button 
- Right click on the ArcToolbox folder and choose Add Toolbox…





- Navigate to the custom toolbox location. Add the *BroadbandProductionTools.tbx* – it should appear as shown to the right

The tools contained in the toolbox will be referenced throughout this document as needed. The following table contains descriptions of each tool. See Tool Development section at the end of this document for more detail about the Custom Tools

Name	Function
Clip	Cuts out a piece of one feature class using another feature class. (Used in DSLAM process)
Spatial Join	Transfers the attributes from one feature class to another feature class based on the spatial relationship
Buffer	Creates buffer polygons around input features to a specified distance
Frequency	Creates a new table containing unique field values and the number of occurrences of each unique field value
Summary Statistics	Calculates summary statistics for field(s) in a table.
KML To Layer	Converts a KML or KMZ file into a feature class along with a layer file derived from the source renderer information inside the KML/KMZ.
Copy Features	Copies features from the input feature class or layer to a new feature class
Append	Appends multiple input datasets into an existing target dataset
Merge	Combines multiple input datasets of the same data type into a single, new output dataset
Dissolve	Aggregates features based on specified attributes.
Add Join	Joins a table view to a layer (or a table view to a table view) based on a common field
Make XY Event Layer	Create Feature class from XY data
Define Projection	This tool overwrites the coordinate system information (map projection and datum) stored with a dataset. The only use for this tool is for datasets that have an unknown or incorrect coordinate system defined
Project	Creates a new dataset or feature class with the coordinate system specified
Create Address Locator	Creates an address locator
Geocode Addresses	Matches the addresses against the address locator and saves the result for each input record in a new point feature class
Rematch Addresses	Rematches addresses in a geocoded feature class
XYCode.py	Create Feature class from XY or address data - Developed by Windy
CalcMaxMinAddr	Calculate AddMin & AddMax for Roads_2010_WGS84 - Developed by Larry
CalcStreetName	Calculate STREETNAME for Roads_2010_WGS84 - Developed by Larry
CensusRoads	Select Census Blocks and Roads from coverage feature class (only point right now) - Developed by Megan

spdTierMetrics	Combine vendor data speeds. Each censusblock will show the Max Advertised Download speeds that come from the roads, census & wireless feature classes for the NTIA delivery - Developed by Larry
Staging Format Tool	Check fields & attribute data of provider supplied Shapefile and put in Standard GIS Format (add & calculate fields). Populate provider information from lookup table
Final Format Tool	Load data from Provider gdbs into the Final gdb.
Tool to be developed	Delete duplicate TLID from Roads_2010_WGS84
Tool 3 (Larry)	One or More tools will run error checks (Check Valid Data Types, Check Topology)

3. Raw Data

Raw Data refers to the files or correspondence relating to a Provider's Broadband coverage. The Raw Data is sent routinely by Providers bi-annually, whether or not broadband coverage has changed.

Providers can provide raw data in numerous file forms. In order to extract pertinent data, the raw file type needs to be evaluated and, in many cases, converted to a usable file type for geoprocessing. Other Raw Data file types need to be georeferenced for data extraction.

3.1. Raw Data File Types

3.1.1. Microsoft Word Document (.doc/.docx)

Microsoft Word Documents contain data like addresses, XY coordinates, typical speeds, and advertised Speeds. The information presented needs to be converted into a table in Excel spreadsheet for geoprocessing.

3.1.2. Text (.txt)

Text refers to tab delimited text documents created in programs like Wordpad and Notepad. An example can be found in Delta/Strasburg raw data. The document contained information like addresses, latitude/longitude, speeds, techtype, etc. The data can easily be copy/paste into an Excel spreadsheet for geoprocessing.

3.1.3. CAD (Computer Aided Drafting)

CAD files consist of several files: Annotation, MultiPatch, CAD Drawing, Point Feature Class, Line Feature Class, and Polygon Feature Class. Metadata associated with the CAD files may be provided and imported into the GIS File Geodatabase. Although the images can be viewed in ArcGIS, they cannot be edited. All files must be converted to GIS Feature Classes.

3.1.4. KML/KMZ

KML or KMZ (Keyhole Markup Language) is a file format used to display geographic data in an earth browser, such as Google Earth. This can contain Point, Line, and Polygon data. KML files are not compatible with ESRI software, but the layers can be converted into shapefiles.

3.1.5. Outlook Item

Correspondence through Outlook email can contain important provider data. The information is used to fill in attribute data and can contain location information as well. Please read all correspondence with the raw data and extract any necessary information.

3.1.6. Excel Spreadsheet (.xls/.xlsx)

Excel files are the easiest file type to translate into ArcMap and ArcCatalog. All raw data file types need to be converted to this format in order to create dBASE tables for processing. In order to have a working excel table, the data within the table needs to be clean. A clean table refers to not having any special characteristics about the data: bold font, merged columns or rows, special characters, etc.

3.1.7. Shapefile (.shp)

Although data is rarely given by Providers in a Shapefile format, little processing needs to occur because the data is already in GIS Format. If the shapefile consists of point data, then most processing steps still need to occur, with the exception of midmile. If the provider sends census block or road segment data in the form of a shapefile then little processing needs to occur prior to Standard GIS Format. The shapefile data needs to be evaluated with scrutiny to ensure all the necessary fields exist and the data is accurate.

******Staging Format Tool: Used to check fields, attribute data, put in Standard GIS Format***

3.1.8. PDF

Portable Document Format File used by Adobe or Acrobat plug-in. The file displays as an image. If the PDF has an image demarcating the boundary of the Provider's broadband coverage, then the image needs to be extracted and treated as an image. If the PDF contains tabular data, the data can be extracted and imported into an Excel spreadsheet.

3.1.9. Image File (.jpg, .tif, .gif…etc)

Joint Photographic Expert Group format is indicative of an IMAGE file. The JPEG typically delineates the boundary of a Provider's broadband coverage; however, the image could also contain speeds and technology transmission types. The image may need to be georeferenced for future processing.

4. Digital Raw Data

The raw data needs to be converted to Digital format that can then be used for geoprocessing in ArcGIS. Conversion methods are file format dependent. All File Formats should finish as a dBASE table, except where noted.

4.1. Data Cleanup

4.1.1. Latitude/Longitude Coordinates

To Convert Degrees-Minutes-Seconds to Decimal Degrees, use the following formula:

$$Decimal\ Degrees = DD + \left(\frac{MM}{60}\right) + \left(\frac{SS.SSS}{3600}\right)$$

Note: Do not forget the conversion formula does not account for the Longitude value being (-). After the Conversion is complete, multiply ONLY the Longitude by (-1). The adjustment needs to be documented in the Excel table. Also, if the raw data indicates the Latitudes and Longitudes are already in DMS, verify the minutes-Seconds are correctly broken into fractional parts

4.1.1.1. Raw Data Formats

A. Text file (Tab Delimited)

(1) Open Excel and import the .txt file
(2) Choose Delimited or Fixed Width and follow the prompts to determine the data format
(3) Make sure that the table meets the requirements listed under Final Format

B. Other formats (Word Docs, Emails, etc)

(1) Open new Excel file and add necessary fields
(2) Manually input data from raw data source
(3) Make sure that the table meets the requirements listed under Final Format

C. Excel

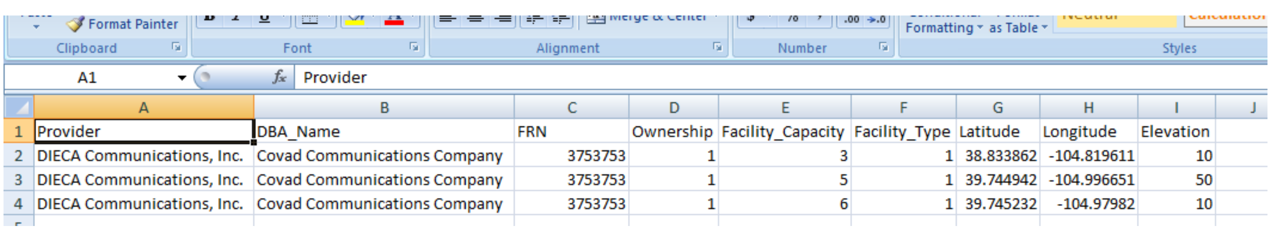
(1) Verify that table meets Final Format requirements

4.1.1.2. Final Format

Requirements:

(1) Clean .xlsx format – no special formatting
(2) Must meet the Data Specification Requirements listed below (Section 4.3)
(3) Latitude/Longitude listed in Decimal Degrees
(4) Include any other record-specific data listed in the raw data (i.e. Facility Capacity (Midmile) or Transmission Technology (Wireless/Terrestrial))
(5) Have no spaces in field names

The following is an example of how a Midmile Lat/Long table should look:



Provider	DBA_Name	FRN	Ownership	Facility_Capacity	Facility_Type	Latitude	Longitude	Elevation
DIECA Communications, Inc.	Covad Communications Company	3753753	1	3	1	38.833862	-104.819611	10
DIECA Communications, Inc.	Covad Communications Company	3753753	1	5	1	39.744942	-104.996651	50
DIECA Communications, Inc.	Covad Communications Company	3753753	1	6	1	39.745232	-104.97982	10

4.1.2. Addresses

4.1.2.1. Raw Data Formats

A. Text file (Tab Delimited)

(1) Open Excel and import the .txt file
(2) Choose Delimited or Fixed Width and follow the prompts to determine the data format
(3) Make sure that the table meets the requirements listed under Final Format

B. Other formats (Word Docs, Emails, etc)

(1) Open new Excel file and add necessary fields
(2) Manually input data from raw data source
(3) Make sure that the table meets the requirements listed under Final Format

C. Excel

(1) Verify that the table meets the requirements listed under Final Format
(2) Address fields may need to be concatenated or parsed out in order to be contained in the four allowable address fields

4.1.2.2. Final Format

Requirements:

(1) Clean .xlsx format – no special formatting
(2) Must meet the Data Specification Requirements listed below (Section 4.3)
(3) Include any other record-specific data listed in the raw data (i.e. Facility Capacity (Midmile) or Transmission Technology (Wireless/Terrestrial))
(4) Address information must be contained in the following fields (no more/no less):
   a. Address (Number & Street Name)
   b. City
   c. State
   d. ZIP
(5) Have no spaces in field names

The following example shows Subscriber Addresses for both Wireless and Terrestrial service:

******Note**: Wireless and Terrestrial must be separated at this point*
See Data Specifications for allowable Download/Upload Speeds- delete records that do not meet the standards.
- *If your data does not comply with these standards, contact your provider to clarify the speed capabilities*

	A	B	C	D	E	F	G	H	I	J	K	L
1	PROVIDER	DBA_NAME	FRN	ADDRESS	CITY	STATE	ZIP_CODE	TRANS_TE	AD_DOWI	ADD_UP	TYP_DOW	TYP_UP
2	City of Glen	City of Glenw	1621127	3650 Hwy 82	GLENWOOD SPRINGS	CO	81601	70	4	3	4	3
3	City of Glen	City of Glenw	1621127	447 JODY ROAD	BASALT	CO	81621	10	6	3	4	3
4	City of Glen	City of Glenw	1621127	77 LEWIS LANE	BASALT	CO	81621	10	6	3	4	3
5	City of Glen	City of Glenw	1621127	633 W MAIN STREET	ASPEN	CO	81611	10	6	3	6	3
6	City of Glen	City of Glenw	1621127	38 OLD MIDLAND DRIVE	GLENWOOD SPRINGS	CO	81601	10	6	3	4	3
7	City of Glen	City of Glenw	1621127	1113 RED MOUNTAIN DRIVE	GLENWOOD SPRINGS	CO	81601	10	6	3	4	3
8	City of Glen	City of Glenw	1621127	40 SUNSET DRIVE	BASALT	CO	81621	10	6	3	4	3
9	City of Glen	City of Glenw	1621127	310 10th STREET	GLENWOOD SPRINGS	CO	81601	70	4	3	4	3
10	City of Glen	City of Glenw	1621127	315 E 10TH STREET	RIFLE	CO	81650	10	6	3	4	3
11	City of Glen	City of Glenw	1621127	703 10th STREET	GLENWOOD SPRINGS	CO	81601	70	4	3	4	3
12	City of Glen	City of Glenw	1621127	717 10th STREET	GLENWOOD SPRINGS	CO	81601	70	4	3	4	3
13	City of Glen	City of Glenw	1621127	412 11th STREET	GLENWOOD SPRINGS	CO	81601	70	4	3	4	3
14	City of Glen	City of Glenw	1621127	611 11th STREET	GLENWOOD SPRINGS	CO	81601	70	4	3	4	3
15	City of Glen	City of Glenw	1621127	1145 W 12TH STREET	GLENWOOD SPRINGS	CO	81601	10	6	3	4	3
16	City of Glen	City of Glenw	1621127	125 E 12TH STREET	RIFLE	CO	81650	10	6	3	4	3
17	City of Glen	City of Glenw	1621127	1538 E 12TH STREET	RIFLE	CO	81650	10	6	3	4	3
18	City of Glen	City of Glenw	1621127	310 W 12TH STREET	RIFLE	CO	81650	10	6	3	6	3
19	City of Glen	City of Glenw	1621127	426 E 12TH STREET	RIFLE	CO	81650	10	2	2	2	2
20	City of Glen	City of Glenw	1621127	602 W 12th STREET								
21	City of Glen	City of Glenw	1621127	611 W 12th STREET								
22	City of Glen	City of Glenw	1621127	517 W 13th STREET								

This record must be deleted – does not have a valid TransTech/ Speed combination. See Data Specifications for details

Same table, separated between Wireless and Terrestrial:

	A	B	C	D	E	F	G	H	I	J	K	L
1	PROVIDER	DBA_NAME	FRN	ADDRESS	CITY	STATE	ZIP_CODE	TRANS_TE	AD_DOWI	ADD_UP	TYP_DOW	TYP_UP
2	City of Glen	City of Glenw	1621127	447 JODY ROAD	BASALT	CO	81621	10	6	3	4	3
3	City of Glen	City of Glenw	1621127	77 LEWIS LANE	BASALT	CO	81621	10	6	3	4	3
4	City of Glen	City of Glenw	1621127	633 W MAIN STREET	ASPEN	CO	81611	10	6	3	6	3
5	City of Glen	City of Glenw	1621127	38 OLD MIDLAND DRIVE	GLENWOOD SPRINGS	CO	81601	10	6	3	4	3
6	City of Glen	City of Glenw	1621127	1113 RED MOUNTAIN DRIVE	GLENWOOD SPRINGS	CO	81601	10	6	3	4	3
7	City of Glen	City of Glenw	1621127	40 SUNSET DRIVE	BASALT	CO	81621	10	6	3	4	3
8	City of Glen	City of Glenw	1621127	315 E 10TH STREET	RIFLE	CO	81650	10	6	3	4	3
9	City of Glen	City of Glenw	1621127	1145 W 12TH STREET	GLENWOOD SPRINGS	CO	81601	10	6	3	4	3
10	City of Glen	City of Glenw	1621127	125 E 12TH STREET	RIFLE	CO	81650	10	6	3	4	3
11	City of Glen	City of Glenw	1621127	1538 E 12TH STREET	RIFLE	CO	81650	10	6	3	4	3
12	City of Glen	City of Glenw	1621127	310 W 12TH STREET	RIFLE	CO	81650	10	6	3	6	3
13	City of Glen	City of Glenw	1621127	1114 N 1ST STREET	GRAND JUNCTION	CO	81501	10	6	3	5	3
14	City of Glen	City of Glenw	1621127	1114 N 1ST STREET	GRAND JUNCTION	CO	81501	10	6	3	5	3
15	City of Glen	City of Glenw	1621127	642 N 1ST STREET	NEW CASTLE	CO	81647	10	6	3	4	3
16	City of Glen	City of Glenw	1621127	200 W 20TH STREET	RIFLE	CO	81650	10	6	3	4	3
17	City of Glen	City of Glenw	1621127	200 W 20TH STREET	RIFLE	CO	81650	10	6	3	4	3
18	City of Glen	City of Glenw	1621127	401 23rd Street	Glenwood Springs	CO	81601	50	10	10	ZZ	ZZ
19	City of Glen	City of Glenw	1621127	401 23rd Street	Glenwood Springs	CO	81601	50	10	10	5	5
20	City of Glen	City of Glenw	1621127	401 23rd Street	Glenwood Springs	CO	81601	50	10	10	7	6

	A	B	C	D	E	F	G	H	I	J	K	L
1	PROVIDER	DBA_NAME	FRN	ADDRESS	CITY	STATE	ZIP_CODE	TRANS_TE	AD_DOWI	ADD_UP	TYP_DOW	TYP_UP
2	City of Glen	City of Glenw	1621127	3650 Hwy 82	GLENWOOD SPRINGS	CO	81601	70	4	3	4	3
3	City of Glen	City of Glenw	1621127	310 10th STREET	GLENWOOD SPRINGS	CO	81601	70	4	3	4	3
4	City of Glen	City of Glenw	1621127	703 10th STREET	GLENWOOD SPRINGS	CO	81601	70	4	3	4	3
5	City of Glen	City of Glenw	1621127	717 10th STREET	GLENWOOD SPRINGS	CO	81601	70	4	3	4	3
6	City of Glen	City of Glenw	1621127	412 11th STREET	GLENWOOD SPRINGS	CO	81601	70	4	3	4	3
7	City of Glen	City of Glenw	1621127	611 11th STREET	GLENWOOD SPRINGS	CO	81601	70	4	3	4	3
8	City of Glen	City of Glenw	1621127	602 W 12th STREET	GLENWOOD SPRINGS	CO	81601	70	4	3	4	3
9	City of Glen	City of Glenw	1621127	611 W 12th STREET	GLENWOOD SPRINGS	CO	81601	70	4	3	4	3
10	City of Glen	City of Glenw	1621127	517 W 13th STREET	GLENWOOD SPRINGS	CO	81601	70	4	3	4	3
11	City of Glen	City of Glenw	1621127	412 13th STREET	GLENWOOD SPRINGS	CO	81601	70	4	3	4	3
12	City of Glen	City of Glenw	1621127	405 22nd Apt B1 LANE	GLENWOOD SPRINGS	CO	81601	70	4	3	4	3

4.1.3. Address Ranges

If address data is provided as address ranges instead of individual address numbers that does not match the TIGER Streets data, then geocoding will not be successful. **Solution:** grab the highest high and lowest low of each address range and then geocode as individual addresses

4.1.4. Census BlockID

4.1.4.1. Input Formats

A. Text file (Tab Delimited)

(1) Open Excel and import the .txt file
(2) Choose Delimited or Fixed Width and follow the prompts to determine the data format
(3) Make sure that the table meets the requirements listed under Final Format

B. Other formats (Word Docs, Emails, etc)

(1) Open new Excel file and add necessary fields
(2) Manually input data from raw data source
(3) Make sure that the table meets the requirements listed under Final Format

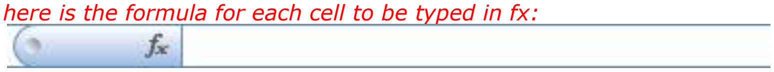
C. Excel

(1) Evaluate Data Layout in Excel table. If Census Block ID's consist of 15 numbers (no letters), then the Census Blocks table just needs to meet Final Format Requirements. If, however, the Census Blocks are divided by State, County, Tract, and Block; then the fields will need to be concatenated in a new field named "FULLFIPSID"
In order to concatenate the fields, the numerical values need proper preceding "0"s and must be in a 'text' format.

	A	B	C	D
1	State	County	Tract	Block
2	08	001	008308	1000
3	08	001	008308	1001
4	08	001	008308	1002

Concatenate by typing formula in new Column:
=CONCATENATE(A2,B2,C2,D2)
Once calculation is made, drag the 'paste' box down to automate formula for all Census Blocks

****NOTE**: If cell values lose preceding '0's with concatenation, try this method instead:*
- *Insert 6 new columns with names: State2, County2, Track2, Block2, Concatenate, and FULLFIPSID*
- *In State2 Column, first cell, type:=TEXT(value, format_text); whereas value, in this case is equal to A2, and format _text is equal to "00". Paste formula through column by selecting value cell and dragging down the right bottom corner. Using the table above as an example, here is the formula for each cell to be typed in fx:*

  State2: =TEXT(A2, "00")
  County2: =TEXT(B2, "000")
  Tract2: =TEXT(C2, "000000")
  Block2: =TEXT(D2, "0000")
  Concatenate: =CONCATENATE(A2,B2,C2,D2)
  FULLFIPSID: Copy value>Paste Special>Select Paste Values
- *Eliminate unnecessary fields now that you have a concatenated FULLFIPSID*

(2) If Speeds are listed in kbps or mbps values, change to proper code value for speed range by referring to the "**Providers and Stats for October 2011 Delivery.xlsx.**
(3) Verify TransTech codes are correct and have proper Speed Combinations by referring to the Speeds Combination Table listed below.

4.1.4.2. Final Format

Requirements:

(1) Clean *.xlsx* format – no special formatting
(2) Include any other record-specific data listed in the raw data (i.e. Transmission Technology and Download/Upload Speeds)
(3) Have no spaces in field names

4.1.5. Road TLID

4.1.5.1. Input Formats

A. Text file (Tab Delimited)

(4) Open Excel and import the *.txt* file
(5) Choose Delimited or Fixed Width and follow the prompts to determine the data format
(6) Make sure that the table meets the requirements listed under Final Format

B. Other formats (Word Docs, Emails, etc)

(4) Open new Excel file and add necessary fields
(5) Manually input data from raw data source
(6) Make sure that the table meets the requirements listed under Final Format

C. Excel

(4) Verify that the table meets the requirements listed under Final Format

4.1.5.2. Final Format

Requirements:

(1) Clean *.xlsx* format – no special formatting
(2) Must meet the Data Specification Requirements listed below (Section 4.3)
(3) Include any other record-specific data listed in the raw data (i.e. Transmission Technology and Download/Upload Speeds)
(4) Have no spaces in field names

4.1.6. Shapefile

Shapefiles from provider can be imported directly in the *working.gdb.* Some shapefiles may be ready for NTIA Final Format, and others will need further processing.

- Identify the coverage type of the shapefile (wired, wireless, or middle mile)
- Verify the data has all necessary fields for processing and final NTIA Fields

- Verify that the data meets the Data Specification Requirements listed below (Section 4.3)

When the data format is verified and imported into *working.gdb*, proceed to processing steps listed in **Section 6: Processing to Standard GIS Format**. Refer to table below for specific pre-processing instructions.

Coverage Type	Shapefile	Pre - Processing Instructions	Final Format
ALL	**ALL**	**Verify attribute information and import to working.gdb**	
Middle Mile	Point	No pre-processing necessary - Refer to Section 6.2.1	Point
Wireless	Point	No pre-processing necessary - Refer to Section 6.2.3	Polygon
Wireless	Polygon	No pre-processing necessary - Refer to Section 6.2.3	Polygon
Wired	Point	No pre-processing necessary - Refer to Section 6.2.4 & 6.2.5	Roads/Census Blocks
Wired	Polyline - Roads	Verify that roads format matches NTIA data structure exactly. For example, road layers from providers may have the address information listed in 5 fields instead of 4. Often the simplest solution is a spatial join or an attribute join (based on TLID) to the base data roads. You must also verify that the provider roads are outside Census blocks < 2 sq mi. Any road data located within census blocks < 2 sq mi, must be extracted and used to select Census Block coverage	Roads/Census Blocks
Wired	Polyline - Coverage	No pre-processing necessary - Refer to Section 6.2.4 & 6.2.5	Roads/Census Blocks
Wired	Polygon - Census Blocks	Verify that census blocks format matches NTIA data structure exactly. For example, census block layers from providers may contain census block > 2 sq mi. These must be extracted and used to to create the roads layer. If data is inconsistent, a spatial join or an attribute join (based on Full FIPS ID) to the census block base data can be performed.	Roads/Census Blocks
Wired	Polygon - Coverage	No pre-processing necessary - Refer to Section 6.2.4 & 6.2.5	Roads/Census Blocks

4.2. File Geodatabase

4.2.1. Import Base Data to *working.gdb*

Right Click on working.gdb, Select Import>Feature Class(Multiple)> Navigate to

…\BroadbandProductionArea\Workspaces\BaseData\base_data.gdb

and select the Road and Census block layers

4.2.2. Import Provider Data to *working.gdb*

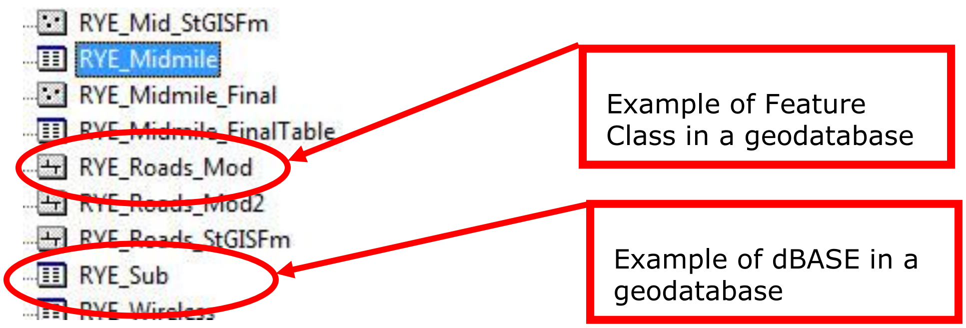
Import all provider data into *working.gdb.* All data should be pre-processed and ready to load as either a feature class or a dBase table

4.2.2.1. Load Shapefiles as Feature Class

a) Right Click on File Geodatabase>Select Import>Feature Class(Single)
b) Navigate to the desired shapefile
c) Ensure Output Location path is into new geodatabase and name Output Feature Class
d) Edit fields in Field Map to meet Standard GIS Format Requirements

4.2.2.2. Load.xlsx tables as dBASE Tables

a) Right Click on File Geodatabase>Select Import>Table(Single)
b) In 'Input Rows' field, Navigate to clean *.xlsx* table
c) Ensure Output Location path is into new geodatabase and name Output Table>OK



4.3. Data Specifications

4.3.1. Identifying Data Type

Terrestrial, Wireless, and Midmile must be separated into individual tables.

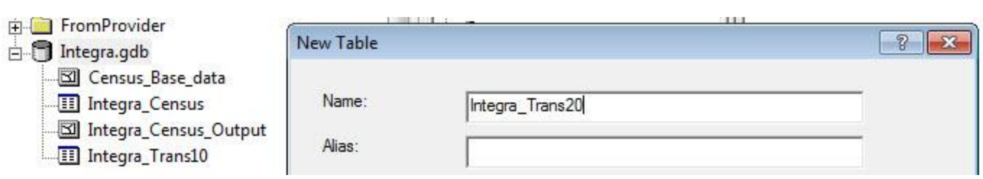
You can identify Terrestrial and Wireless based on TransTech values:

- Terrestrial TransTech = 10, 20, 30, 40, 41, 50
- Wireless TransTech = 70, 71, 80

Midmile is usually listed as a separate dataset, but can be mixed in with Wireless towers. Ensure that none of the wireless towers are reference to by provider as "backhaul" (Backhaul is another term for Midmile), check check that any Midmile with wireless capabilities is included in the Wireless towers data table.

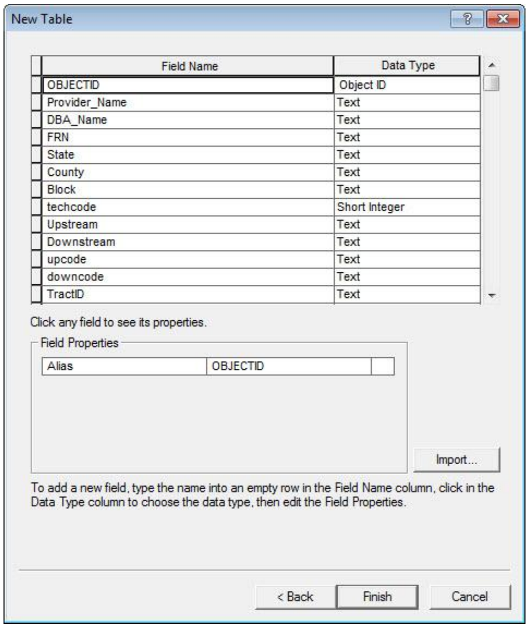
Dividing Tables in ArcCatalog

(1) Navigate to File Geodatabase for Provider>Right Click>New>Table
(2) A Window Application Form prompts you to Select a Table Name and Table Alias Name



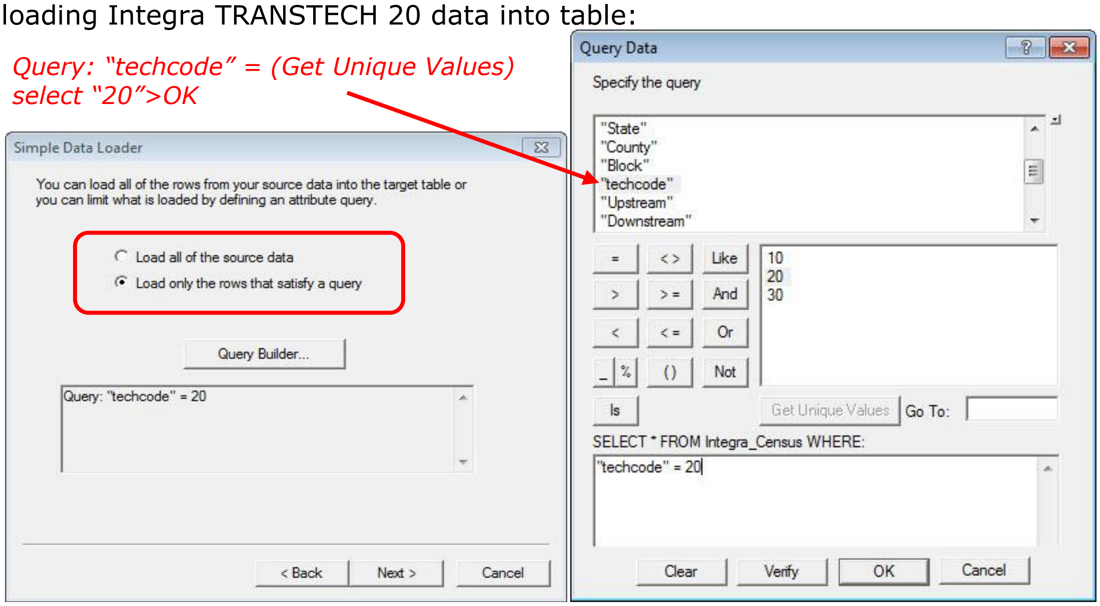
(3) Name Table> Next>Keep Default Values for Storage Configuration>Next>

(4) Here you have the opportunity to 'IMPORT' fields from a table. Select 'Import'>Navigate to primary dBASE>Save>OK. Verify the fields match final output> Finish.



(5) The New Table can be viewed in the *.gdb* (May need to refresh)

(6) Now, the new table is empty and must be loaded with data. Right Click>Load>Load Data>Navigate to primary dBASE table>Add>Next>Next>Select the **Load only the rows that satisfy a query**>Build a query in Query Builder. See example below for loading Integra TRANSTECH 20 data into table:



(7) Repeat Procedures for separating ALL TRANSTECH Codes.

4.3.2. Max Download/Upload Speeds

Maximum Download/Upload speeds must be listed by Speed Tier Codes – if your data is listed in mbps, it needs to be converted to Speed Tier Codes using the table below.

techcode	Upstream	Downstream	upcode	downcode
10	2Mbps	25Mbps	4	7
10	2Mbps	25Mbps	4	7
10	2Mbps	25Mbps	4	7
10	2Mbps	25Mbps	4	7
10	2Mbps	25Mbps	4	7
10	2Mbps	25Mbps	4	7
10	2Mbps	25Mbps	4	7
10	2Mbps	25Mbps	4	7

Upstream and Downstream refer to the MAXADUP and MAXADDOWN data fields. Here is an example of data given in Mbps standard instead of Speed Tier Code. Data Needs to be converted

	Speed Tier Codes
1	<= 200 kps
2	>200 kps, < 768 kps
3	>= 768 kps, < 1.5 mbps
4	>= 1.5 mbps, < 3 mbps
5	>= 3 mbps, < 6 mbps
6	>= 6 mbps, < 10 mbps
7	>= 10 mbps, < 25 mbps
8	>= 25 mbps, < 50 mbps
9	>= 50 mbps, < 100 mbps
10	>= 100 mbps, < 1 gbps
11	>= 1 gbps

TRANSTECH and Speed Combos

The Transmission Technology / Speed combinations must also fall within the allowable ranges (listed in table below). If your data does not comply with these standards, contact your provider to clarify the speed capabilities.

	Technology Codes	Down	Up
10	**Asymmetric xDSL**	3 to 10	2 to 9
20	**Symmetric xDSL**	3 to 9	3 to 9
30	**Other Copper Wireline**	3 to 11	2 to 11
40	**Cable Modem-DOCSIS 3.0**	3 to 10	2 to 7
41	**Cable Modem-Other**	3 to 7	2 to 7
50	**Optical Carrier/Fiber to End User**	3 to 11	2 to 11
60	**Satellite**	3 to 5	2 to 4
70	**Terrestrial Fixed Wireless-Unlicensed**	3 to 7	2 to 7
71	**Terrestrial Fixed Wireless-Licensed**	3 to 7	2 to 7
80	**Terrestrial Mobile Wireless**	3 to 7	2 to 6
90	**Electric Power Lines**	3 to 5	2 to 5
0	**All Other**	3 to 11	2 to 11

5. GIS Format

Convert Digital Raw Data (tabular data, images, non-compatible spatial data) into GIS Format (ArcGIS compatible spatial data):

5.1. Coordinates

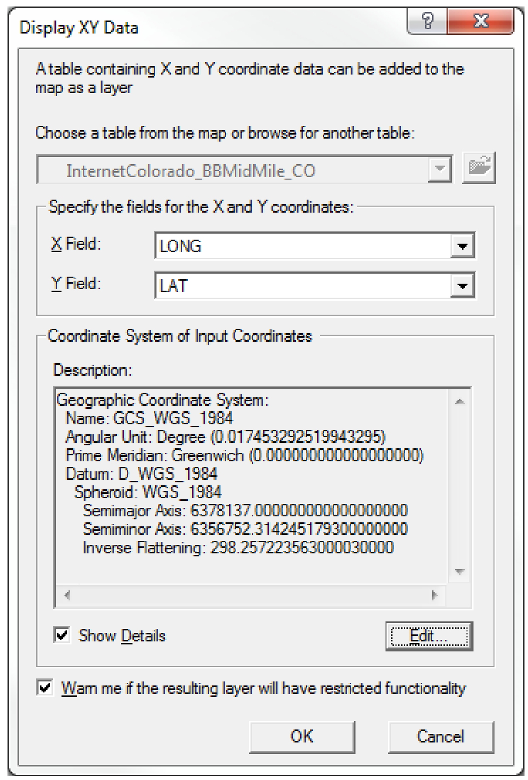
Creating A Feature Class (Option 1):

(1) Open ArcMap and select a coordinate system

- Right click on "Layers" in the Table of Contents and choose "Properties…"
- Select GCS_WGS_1984 (Predefined>Geographic Coordinate Systems>World>WGS 1984)

(2) Add your dBASE table to ArcMap. Right click and choose Display XY Data.

- Select the correct X and Y fields. ****NOTE: Do not confuse X Field and Y Field as your data will not be projected properly.*
- Select GCS_WGS_1984 (Geographic Coordinate Systems>World>WGS 1984)
- Click OK
- This creates an XY Event Layer that will need to be exported as a feature class



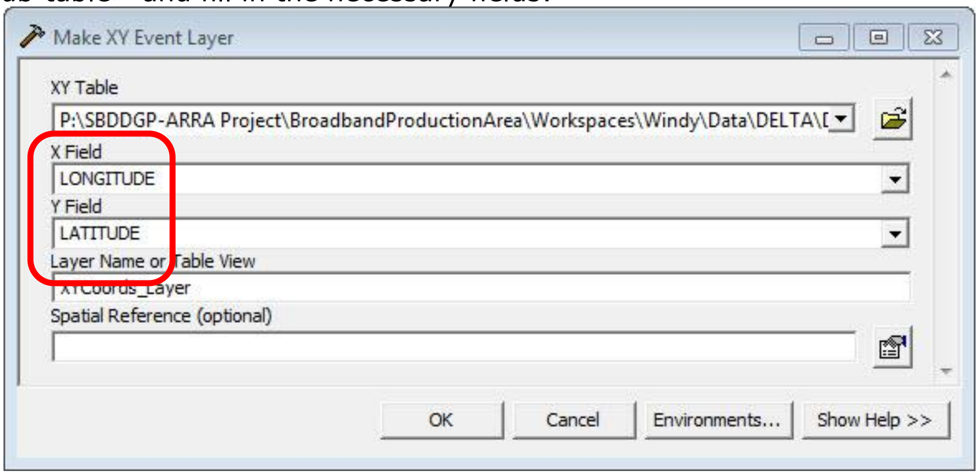
(3) Right click on the Event Layer, choose Data > Export Data…

(4) Click the Browse Folder button and navigate to your *working.gdb.* Choose the Save as type: *File and Personal Geodatabase feature classes* and name your file.

Creating A Feature Class (Option 2):

(1) Once the dBASE table is created, the next few steps can be completed in either ArcCatalog or ArcMap by way of individual Analysis tools or Modelbuilder. The process is essentially the same. In order to avoid multiple **.lyr*'s and **.shp*'s from

being created, Modelbuilder is preferred. In Tools>Make XY Event Layer> Select *.gdb* table> and fill in the necessary fields:



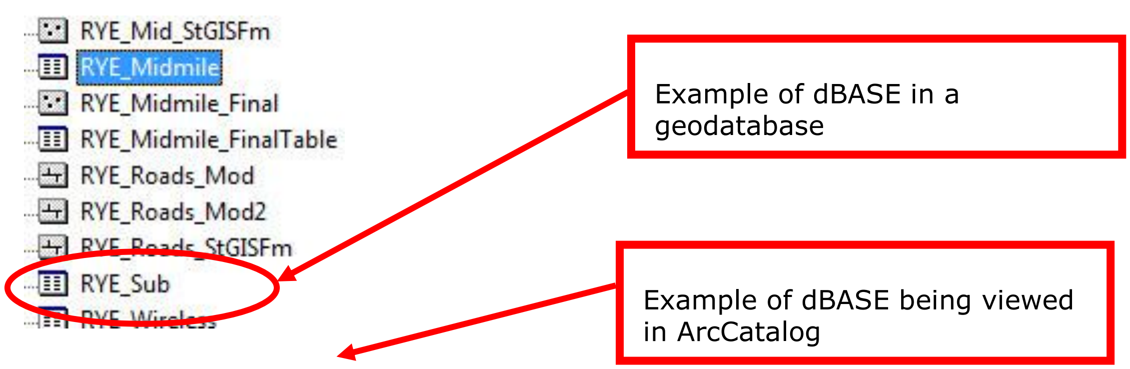
****NOTE: Do not confuse X Field and Y Field as your data will not be projected properly.*

(2) This merely creates an event layer, not a true shapefile layer, which is needed. In order to create a **.shp*, use the Copy Features tool in the Tool Box of ArcCatalog or ArcMap. Alternatively, 'Export' the data from the drop-down menu and export to the File geodatabase. Verify the data is accurately projected and review anomalies. *****TOOL - Windy: A tool is being built to Automate Process**

5.2. Addresses

If the Broadband Provider issues subscribers address data, the following actions need to occur:

(1) Ensure data is saved in geodatabase as dBASE table as described in 5.1.2.

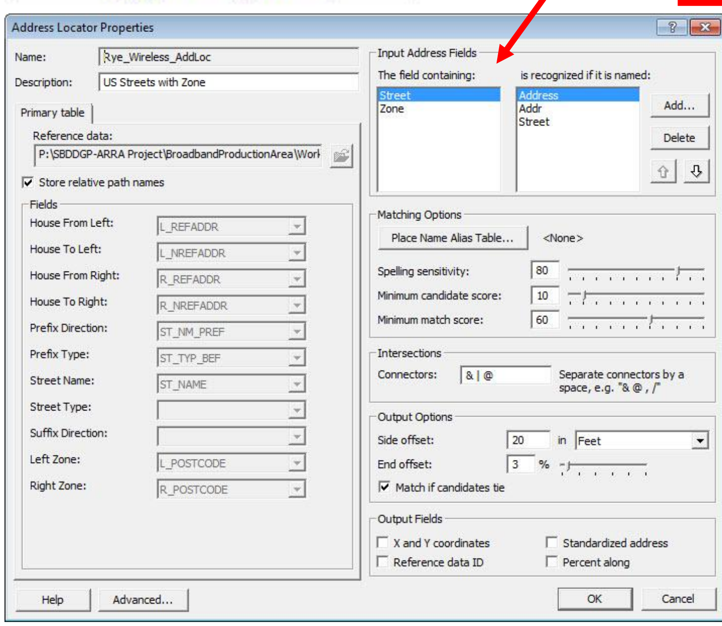


PROVNAME	FRN	HOUSE_NUMB	STREET_N	NM_SU	CITY	STAT	ZIP_CODE	TRANTECH
Rye Telephone	1615665	10701	BARTLETT	TRAIL	RYE	CO	81069	50
Rye Telephone	1615665	10704	BARTLETT	TRAIL	RYE	CO	81069	50
Rye Telephone	1615665	10724	BARTLETT	TRAIL	RYE	CO	81069	50
Rye Telephone	1615665	10729	BARTLETT	TRAIL	RYE	CO	81069	50
Rye Telephone	1615665	10754	BARTLETT	TRAIL	RYE	CO	81069	50
Rye Telephone	1615665	10755	BARTLETT	TRAIL	RYE	CO	81069	50
Rye Telephone	1615665	10775	BARTLETT	TRAIL	RYE	CO	81069	50
Rye Telephone	1615665	10792	BARTLETT	TRAIL	RYE	CO	81069	50
Rye Telephone	1615665	10793	BARTLETT	TRAIL	RYE	CO	81069	50
Rye Telephone	1615665	10795	BARTLETT	TRAIL	RYE	CO	81069	50

(2) Select an Address Locator as described in **Section 2.1.3**. If the Address Locators in the Base Data cannot geocode the dBASE due to insufficient or different Provider information than prescribed, a new Address Locator is created by 'right clicking' in the *.gdb*, selecting 'New', and then select Address Locator.

(LT): Address Locator Icon

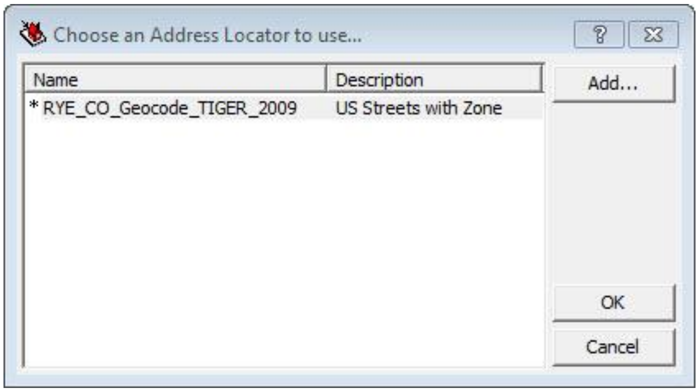
(BC): Creating Address Locator using US Streets with Zone



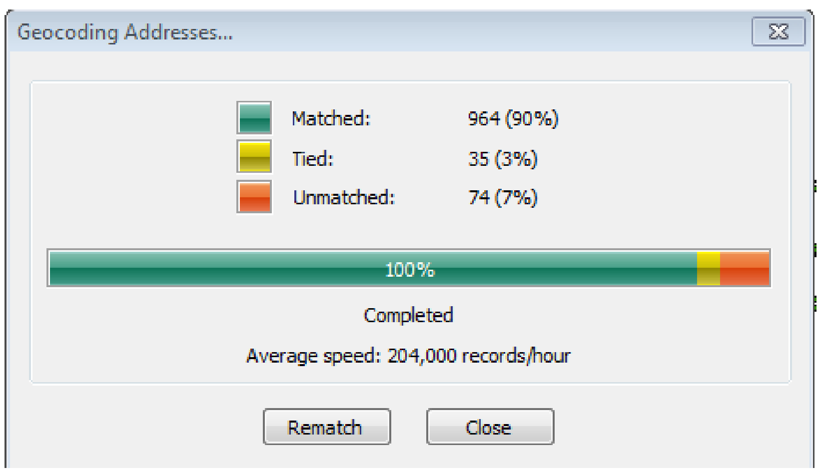
It is possible multiple Address Locators will have to be used in order to handle the variety or provider addresses.

(3) An Address Locator is actively used in ArcMap. Open ArcMap and add the dBASE table, (Note: The Table of Content view will automatically switch from 'Display' to

'Source'. Now, 'Right Click' on the dBASE Table, select 'Geocode Addresses'. A window will prompt to select the 'New' Address Locator created in the *.gdb*. Select 'Add', navigate to the preferred Address Locator' in the *.gdb* and select 'OK'. The Address Locator will be added.



(4) Run the Geocode for the addresses. A window will show the progress of the data divided into three categories: Matched, Unmatched, and Tied. Every geocode process needs to have a match of 90% or more in order to have the most accurate sample available for Broadband coverage. Review Unmatched and Tied addresses to make corrections until at least 90% Matched is acquired.



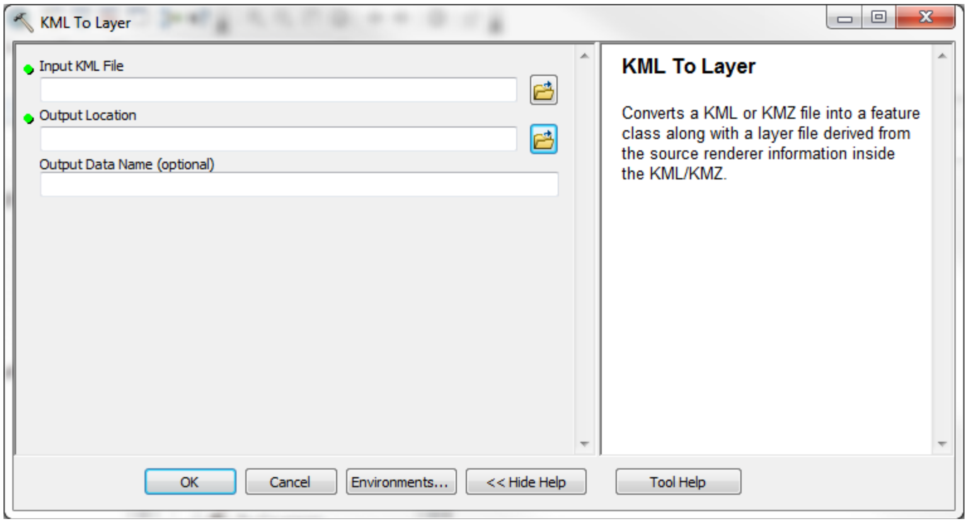
(5) The point data will automatically be displayed spatially in ArcMap once the geocoding is complete. Review the Point data for anomalies and spatial accuracy. Once complete, the data is now ready to be processed into Standard GIS Format according to **Section 6.2**.

5.3. KML/KMZ

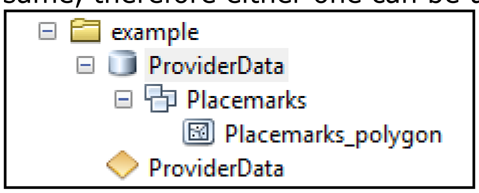
In order to use this data with ESRI software, the KML must be converted to Shapefile using the process described below:

- Open the KML/KMZ in Google Earth to analyze the data. Familiarize yourself with the location and attribute information so that you can verify that all data is converted into the new format.

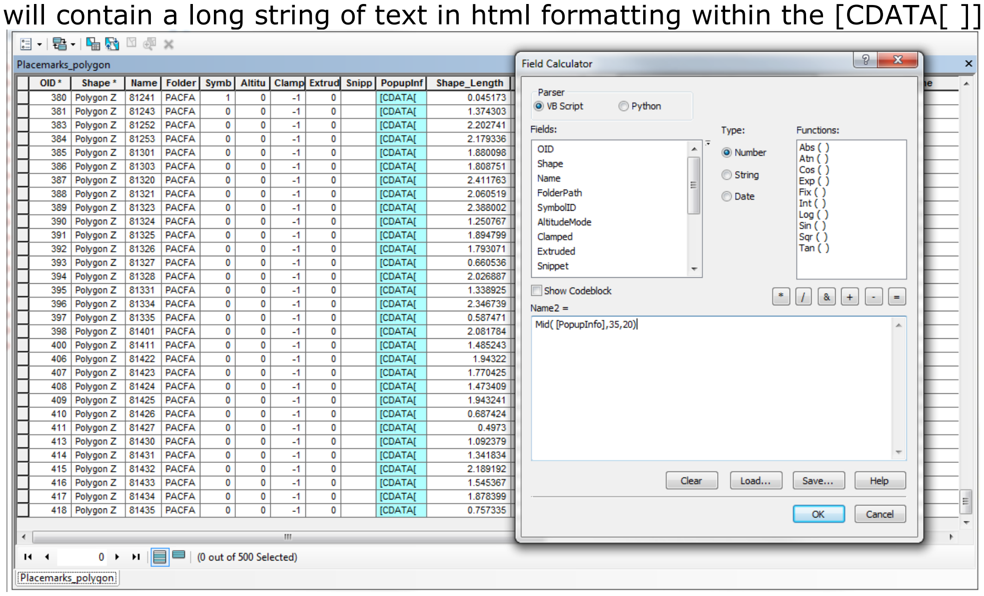
- Open the KML To Layer tool, input the KML/KMZ file and choose output information.



- The output will include a Layer file as well as a file geodatabase with a feature dataset and feature classes. The feature class and the layer file should be exactly the same, therefore either one can be used for processing.



- All of the attribute information from the KML will be contained in the "PopupInfo" field of the converted file. You will need to extract attributes from this field as necessary.
  - To do so, create a new text field (Open attribute table and choose "Add Field")
  - Calculate the field using sections of the PopupInfo field. The PopupInfo field will contain a long string of text in html formatting within the [CDATA[ ]] tag.



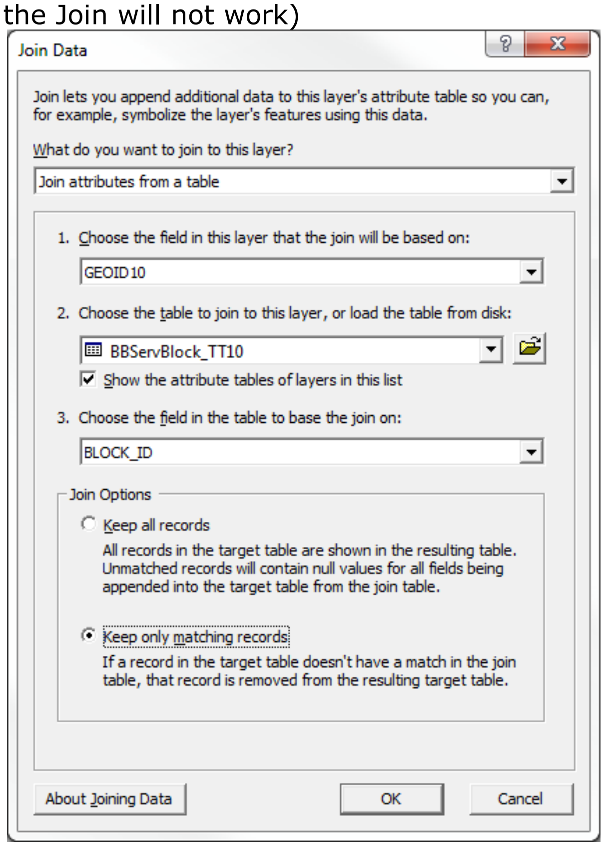
i.e. Mid([PopupInfo],35,20) (this will extract 20 characters of text, starting at the 35th character of the field).

5.4. Census BlockID

Create separate tables for each Transmission Technology (some Census Blocks may have multiple types or Transmission Technology available)

For each TransTech table:

(1) Join Subscriber DBF table to **2010_Blocks_WGS84** based on the 15 digit Census Block ID (Note: if the Census Block ID field of the DBF table is the wrong format, the Join will not work)



(2) The Census Blocks layer should now only include matching records. If so, export Census Blocks as a new feature class in the *.gdb*: "TransTech##_Census"

(3) Merge all TransTech##_Census layers together

(4) The Census layer may have Blocks greater than 2 square miles, if so, you will need to:

a. Select the Blocks less than 2 square miles and export them as *census.shp*

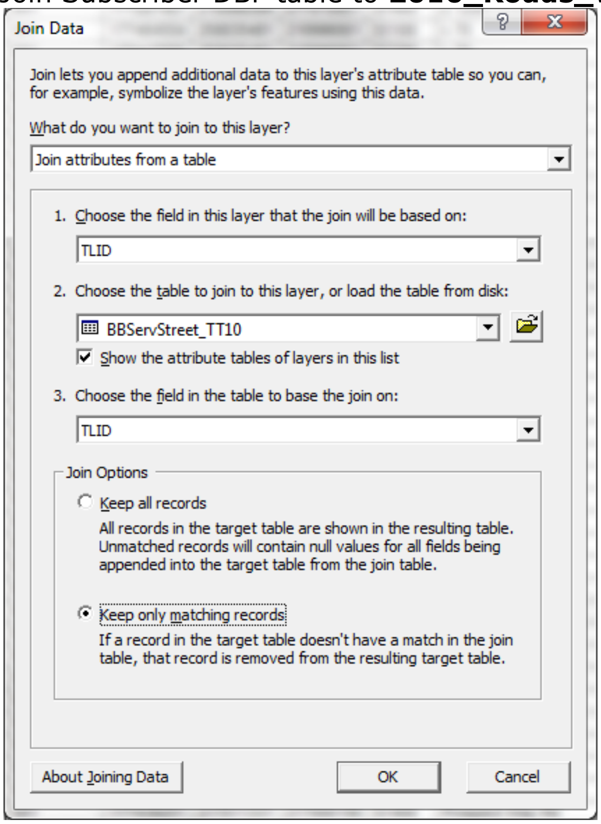
b. Then select and export the Blocks greater than 2 square miles and use that layer to select the Roads if you do not have a separate roads dataset from the provider

5.5. Road TLID

Create separate tables for each Transmission Technology (some Roads may have multiple types or Transmission Technology available)

For each TransTech table:

(1) Join Subscriber DBF table to **2010_Roads_WGS84_Outside** based on the TLID



(2) The Roads layer should now only include matching records. If so, export the Roads as a new feature class in the *.gdb*: "TransTech##_Roads"

(3) Merge all TransTech##_Roads layers together

5.6. Image File

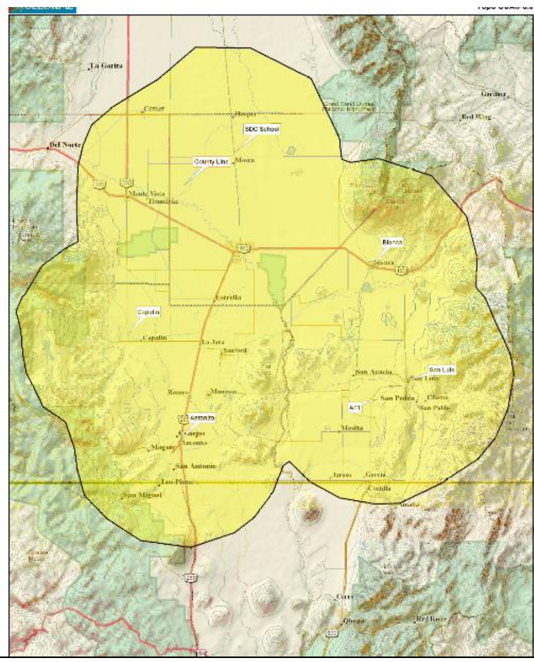
5.6.1. Georeferencing

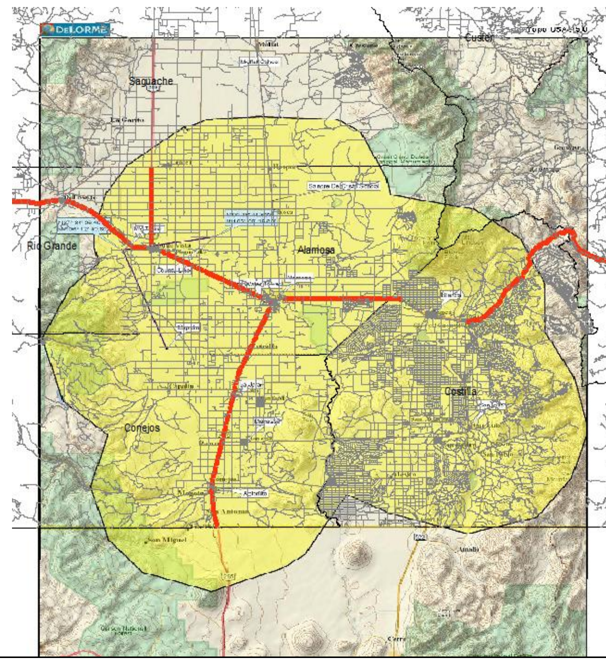
If you receive an Image File (*.*jpg*, *.*tif*, or image embedded in a *.*pdf*), the spatial information must be digitized.

(1) If the file is a PDF, open in Acrobat and Save As… *.*tif*
(2) Open ArcMap and Add basemap data that will be used as a reference for georeferencing
- If your image has County boundaries, then add the County boundary layer to use as reference point. Or if your image has roads, then you can use the TIGER roads layer as reference points.

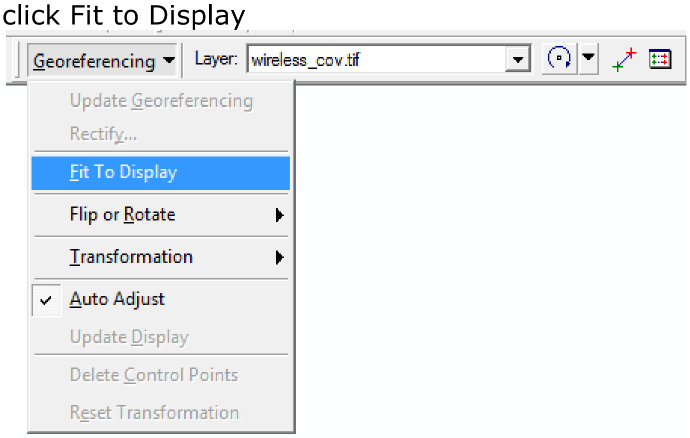
Example below shows image from provider and a suitable reference layer to be used for georeferencing.

The major road locations can be found on the image, and then matched to the same intersection on the roads layer

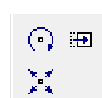




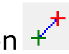
(3) Add your image
(4) Zoom to the approximate area of your image (this way when you 'Fit to Display' in the next step, your image is in the general area that it should be).
(5) In the Georeferencing toolbar (if this isn't showing, go to View>Toolbars>Georeferencing) select the *.*tif* file from the dropdown list, and then click Fit to Display



(6) You can use the Rotate, Scale and Shift buttons to move your image around before you start adding control points



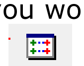
(7) You can use the Rotate, Scale and Shift buttons to move your image around before you start adding control points
(8) To add control points

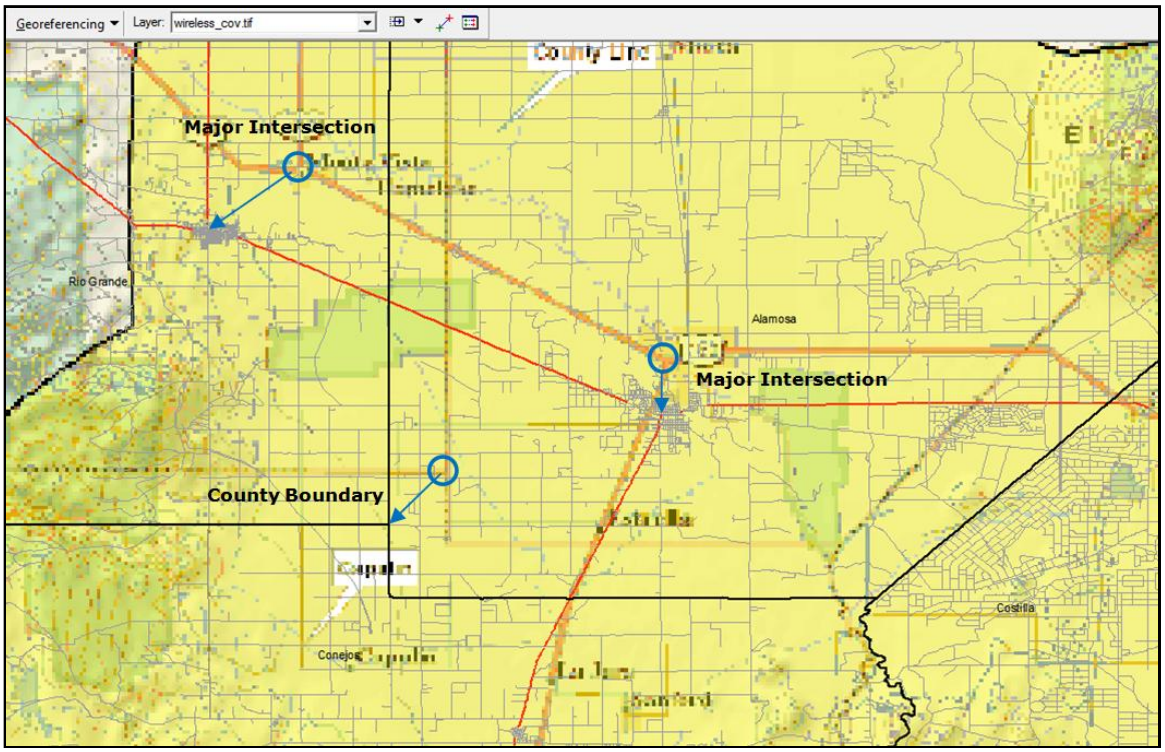
- Click the "Add Control Points" button 
- Click on the location on the image first (blue circles in image below)
- Then click on the corresponding location on the base data (end of blue arrow in image below)

  Notes:

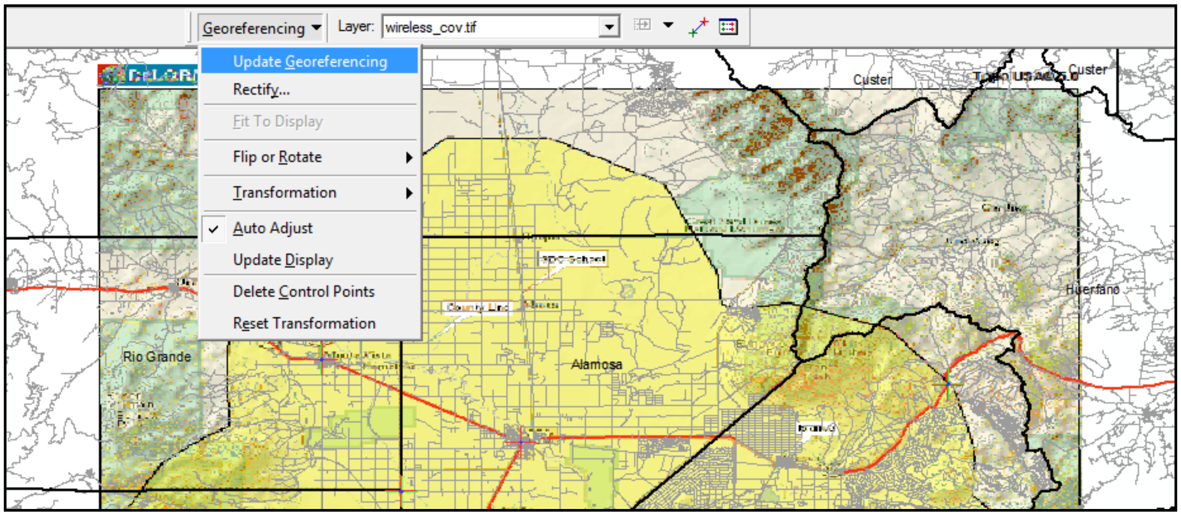
  The control points should be spread out over the extent of the image – if the points are too close together, the outer edges of the image may warp.

  You should use NO LESS THAN 3 control points, but as many as you need to achieve accurate georeferencing. Be careful though, if you add too many points, the image can warp!

  If you would like to delete a control point, click the "View Link Table" button , select the control point that you would like to delete, and click the X in the top right corner.



(9) Once you are satisfied with the placement of the image, click "Update Georeferencing". This will create a "world" file in the same directory as the image file (*.*tfwx* or *.*jgw*)



5.6.2. Digitizing

Now that you have a georeferenced image, you can use it to map your coverage area. If your image shows a polygon of the coverage area, follow the instructions below. If the image contains other information

(1) In ArcCatalog, Right Click on *working.gdb*>New> Feature Class. Name the feature class and choose the type according to the data you are digitizing
   Example: if you are drawing a polygon of the wireless coverage area, name the file "Wireless" and choose "Polygon Features"

(2) Add the newly created feature class to ArcMap and Start Editing. Click the Sketch tool, select Create New Feature, and set your new feature class as the Target.

(3) Draw each point or polygon (separate polygons for every TRANSTECH and speeds combo) as shown in your image file and add attributes manually.

5.7. CAD (*.DWG and *.WLD)

CAD Files can vary with data and file types. Files typically provided: a *.dwg*, annotation, polygon, polyline, and point. The Import to CAD tool does not always convert CAD data cleanly into a geodatabase. The following Steps are provided when the conversion tool fails to keep important attributes and field required to derive broadband coverage data. CAD drawings can be immediately displayed in ArcGIS. This step does not create GIS data, it only displays CAD data in the GIS data view.

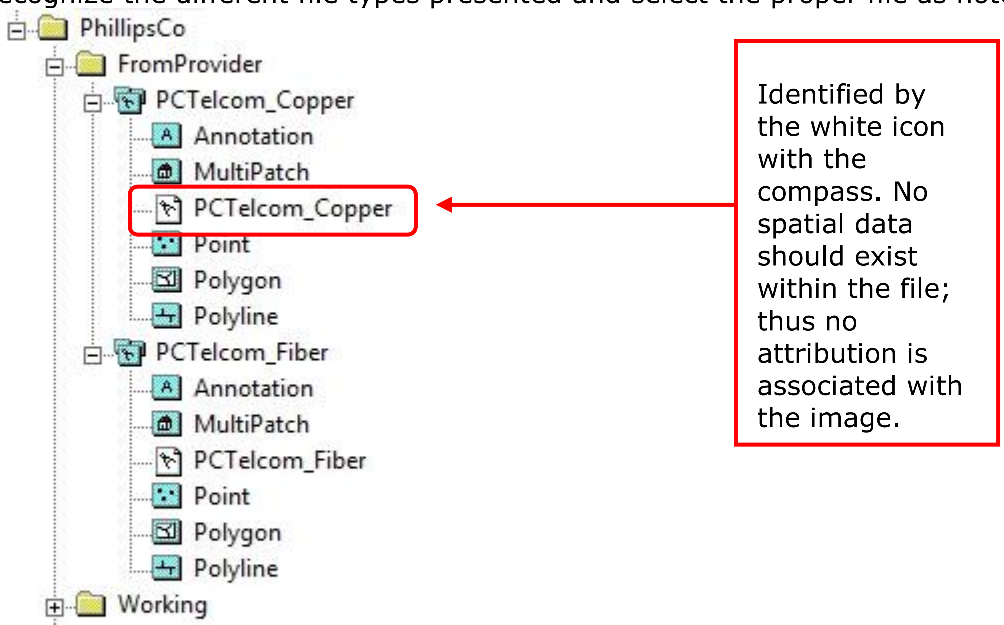
5.7.1. Coordinate System

Many CAD drawings, especially survey drawings, are drawn to a real-world coordinate system that GIS will recognize. When a CAD drawing is drawn to a standard coordinate system (State Plane, for instance), it can be reprojected in GIS for proper alignment with other GIS data. If the drawing has no standard coordinate system, it must be spatially adjusted in GIS to align with other data. Spatial adjustment is usually less accurate than reprojecting. The CAD file's coordinate system may be noted on the drawing itself, in the title bock, in the drawing notes, or on a layer showing a GPS point of origin. If there is no information on the coordinate system and datum from the drawing or the creators, compare drawing coordinates in CAD with GIS coordinates of the same area using a georeferenced orthophoto or other dataset. You will need this information to correctly align the data within GIS.

***NOTE*: *The methods described below are also addressed in different parts of the processing document (i.e.: georeferencing and creating a file geodatabase. In order to create working Digital Raw Data and convert to GIS Format, these steps are represented here because they differ slightly from the aforementioned.*

5.7.2. Georeference

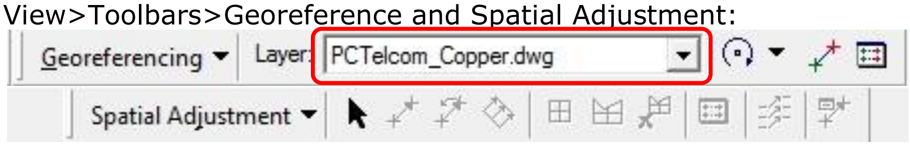
(1) Add the *.*dwg* to ArcMap for georeference. Only an image can be georeferenced, so recognize the different file types presented and select the proper file as noted below:



Notice the units associated with the image at the bottom right of the screen as pictured below, these units are what will be collected in the two corners in order to create a WLD (WORLD) doc for georeferencing:

(2) Add the Base Data Layer needed for georeferencing. Notice, they may not be in the same window. In order to view both files in the same window: View>Zoom Data>Full Extent.

(3) Add Georeference Toolbar and Spatial Adjustment Toolbar: View>Toolbars>Georeference and Spatial Adjustment:

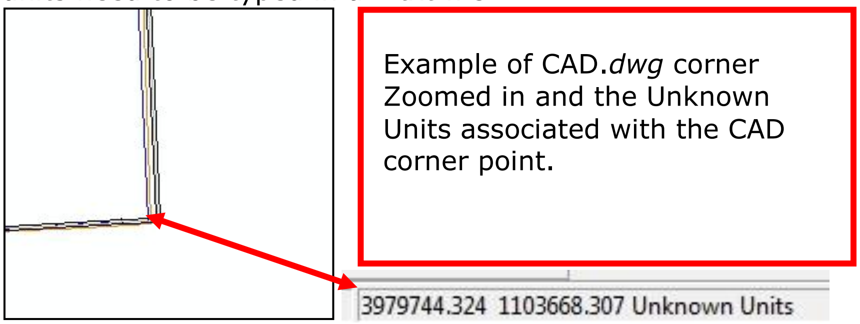


(4) Make sure the *.dwg* file is the highlighted layer in the georeferencing Layer window.

(5) Now, two procedures exist in order to georeference. The steps will highlight both but go in depth with only one. If the *.dwg* CAD file has a coordinate system but still

needs to be georeferenced because reprojection did not work, then the 'Add Control Points' tool can be used as described in the georeferencing steps described in Digital Raw Data. However, if not, follow the steps below.

(6) Zoom in to a corner or identifiable point location and collect unknown units. The units need to be typed in a *.*txt* file.



(7) Zoom to the corresponding corners in the base data layer and collect measurement units (Decimal Degrees most likely). Add unit information to *.*txt*. Save .*txt* with the exact same name as the .*dwg* file and in the same file as pictured below:

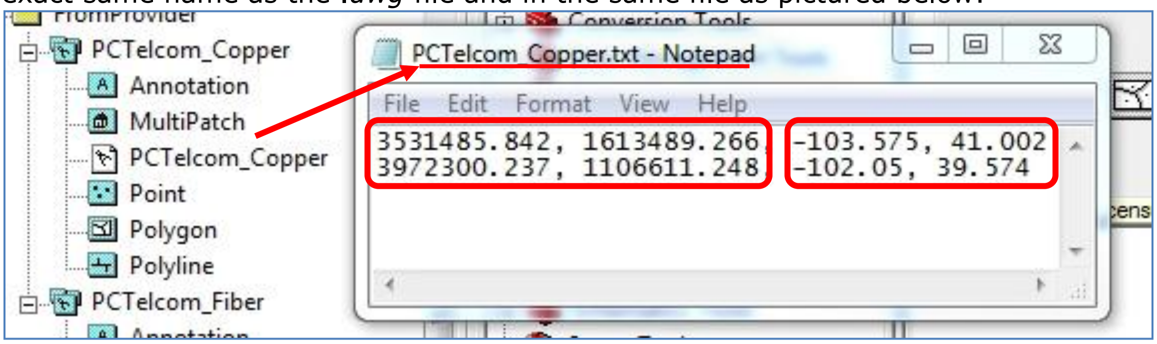
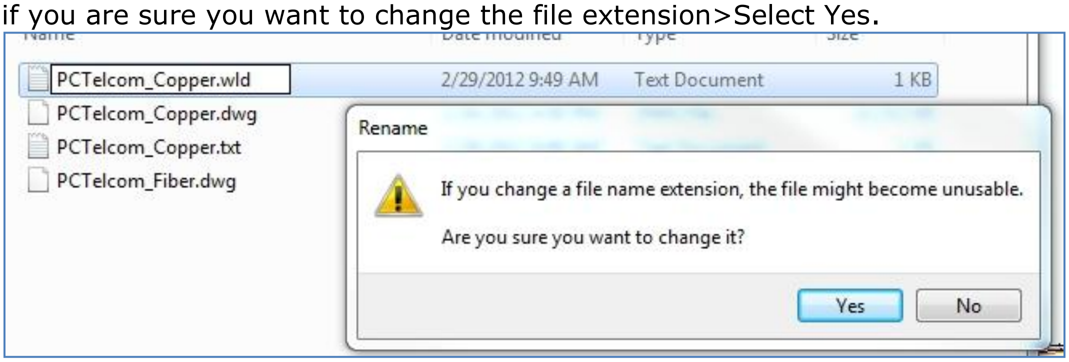


Figure 1: Notice Unknown Units across from corresponding Decimal Degree Coordinates.

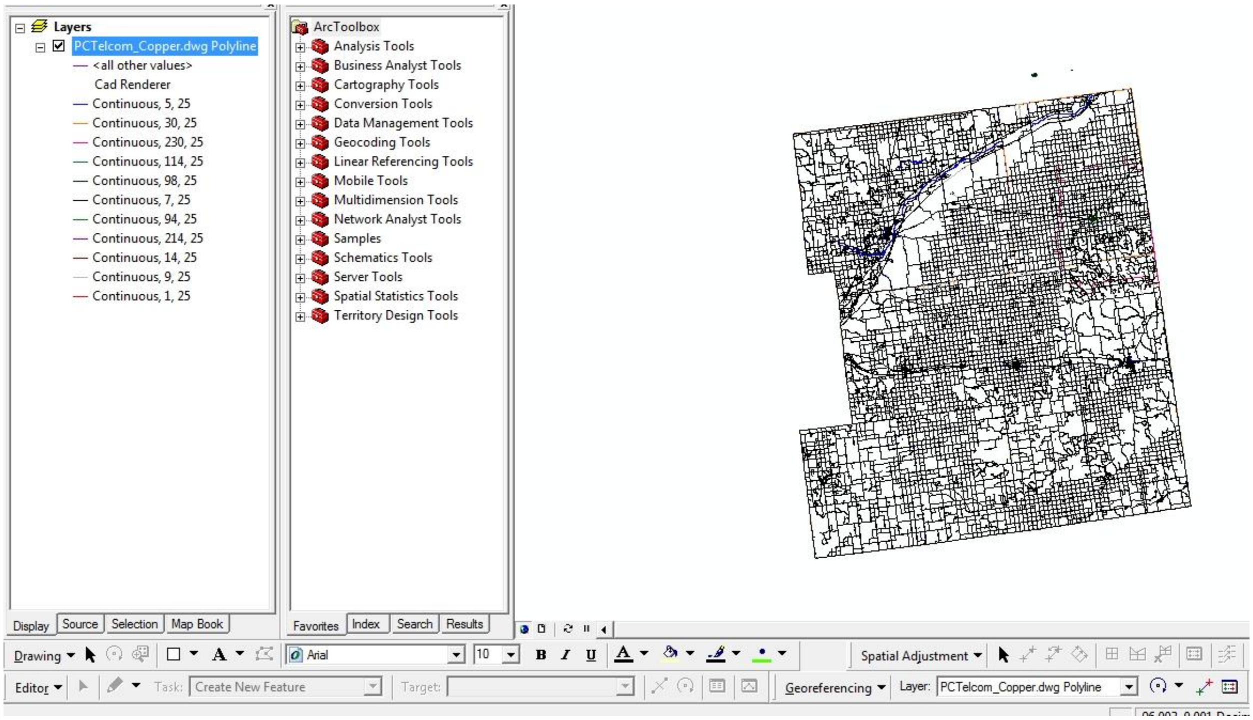
(8) Copy/Paste *.*txt* file and rename extension with *.*wld*. A Rename "Warning" will ask if you are sure you want to change the file extension>Select Yes.



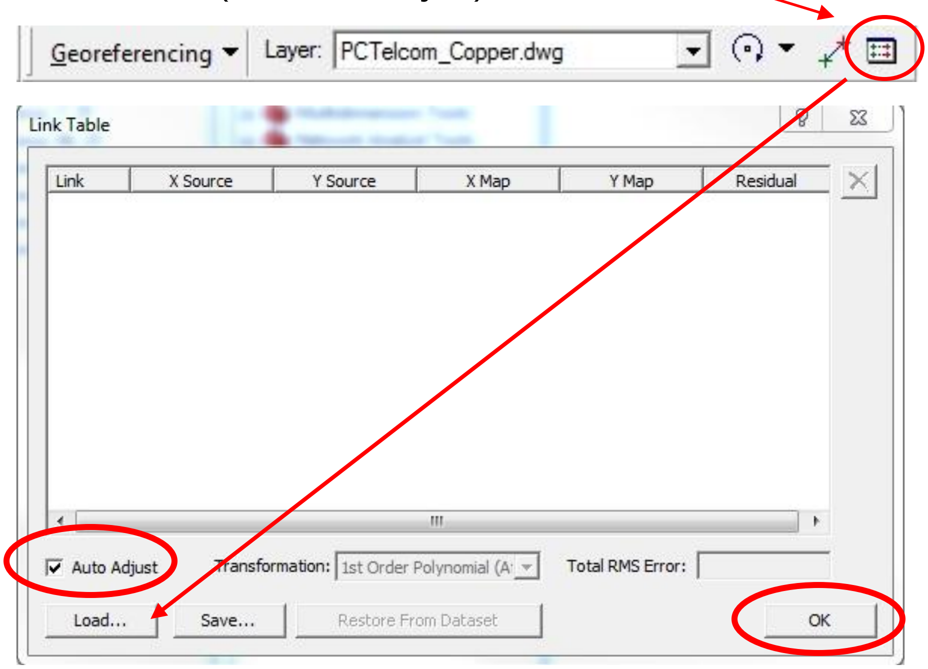
***NOTE**: If you do not see file extensions at the end of your documents, follow these steps:*

(Windows 7)
Start>Control Panel>Appearance and Personalization>Folder Options>View tab> Advanced Settings>clear the 'Hide extensions for known file types' check box>OK.

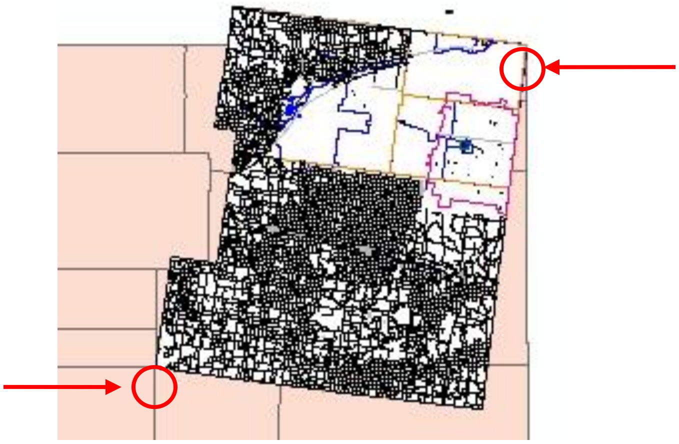
(9) Start new ArcMap Session>Add Point, Polyline, or Polygon file. Georeference>Fit to Display



(10)On the Georeference Toolbar>Select 'View Link Table' Tool>Load>Navigate to *.*wld* file>Load>OK. (check Auto Adjust).



(11)Close ArcMap. Open a new ArcMap Session. Add Georeferenced CAD file and then Base Data Layer. The two georeferenced corner should now be adjusted.

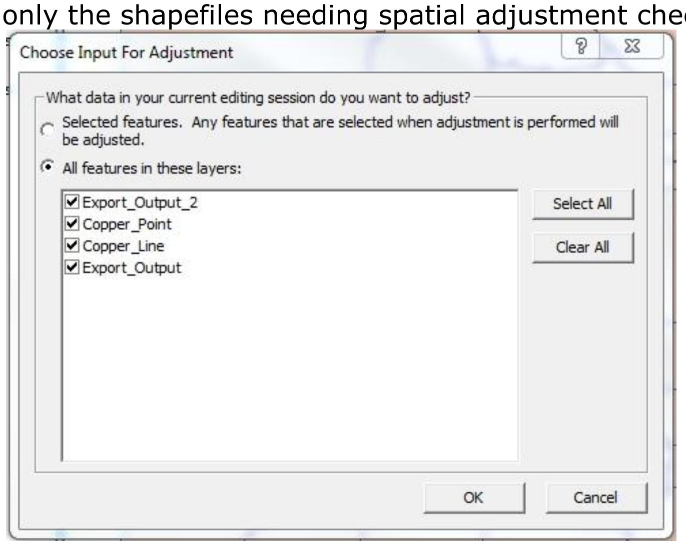


******NOTE:***
***IF NOT**: Original CAD file could have been corrupted. Delete file and copy/paste new file. Redo steps (8-11).*
OR
***IF NOT**: Make sure no special ArcMap extensions are in operation causing reprojection to be skewed (i.e. Business Analyst)*

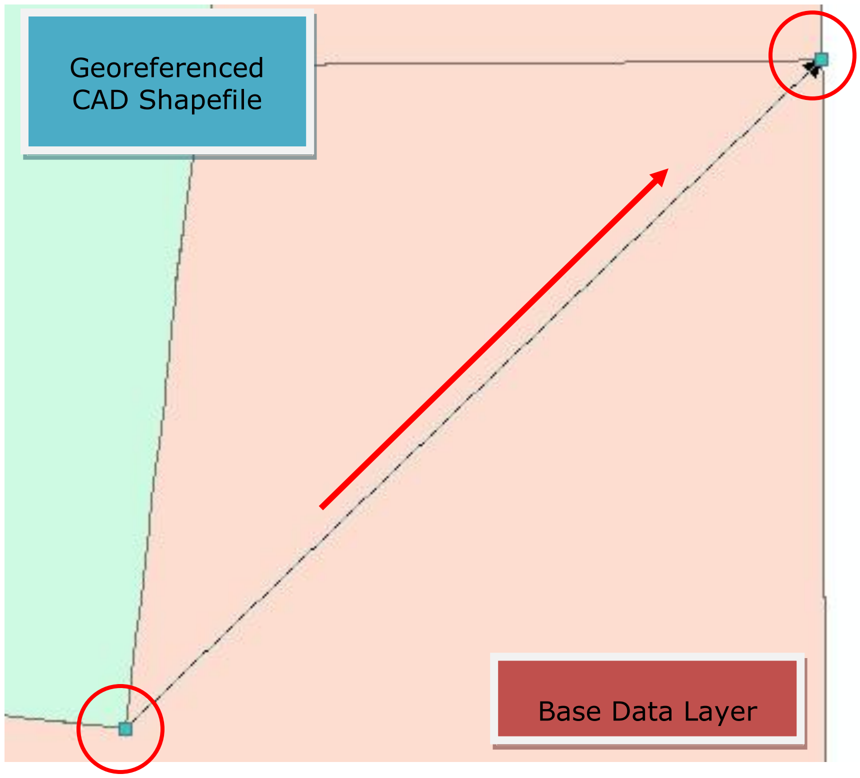
(12)Add remaining layers: Point, Line, or Polygon. All should now automatically adjust to the georeference points in the *.*wld* file.
(13)Export files to a File Geodatabase with appropriate names in order to create shapefiles: Right Click>Data>Export>Navigate to .gdb and Save>OK>Add Features to ArcMap.

5.7.3. Spatial Adjustment

(1) Start Editor Session>Select .gdb with shapefiles/feature classes
(2) Spatial Adjustment>Set Adjust Data…>Select 'All Features in these layers'>Leave only the shapefiles needing spatial adjustment checked'>OK.



(3)  Select Link Tool. First click on the CAD Shapefile and then click on the corresponding point Base Data layer as shown below:



(4) Collect at least 4 links. More may be required in order to properly Adjust.
(5) Spatial Adjustment>Links>Save Links File…>Navigate to proper folder>Name and Save>Select 'YES' to save ID's and Coordinates.
(6) Spatial Adjustment>Adjustment Methods>Transformation-Affine
(7) Spatial Adjustment>Adjust. All layers should adjust to coordinates. Check quality of adjustments. More Links may be needed.

*******NOTE***: If Spatial Adjustment requires more points, do not do multiple Spatial Adjustment sessions. Instead, 'Undo' Spatial Adjustment by selecting the 'Undo' arrow on the main ArcMap tool bar. Add more links or remove bad links. Save Link file again>Overwrite old Link file.*

(8) When Spatial Adjustment is complete, 'Save edits' in Editor>Stop Edit Session.
(9) Verify changes by closing ArcMap and Open a new session. Add 'adjusted' shapefiles and Base Data Layer to review.

5.7.4. Data Selection

(1) Review attribute data in Shapefiles/Feature Classes. Notice AutoCAD will have an abundance of information not necessary for the broadband coverage processing.
(2) Extract Points, Lines or Polygons pertinent to coverage with a 'Select by Attribute' Query. In the case of Phillips County, the 'Layers' field consisted of 96,665 points but only 4500 were necessary to collect coverage data. Those attributes were identified as: Businesses, Schools, Churches, Residences, and Central Offices. The points were extracted selected from the 'Layers' file with the Query:

"Layers" IN("Businesses", "Schools", "Churches", "Residences", and "Central_Offices")

(3) Once Data Points are selected: Right click Layer>Selection>Make Layer from Selection. Rename Layer and export to *.gdb*. Processing to Standard GIS Format can now occur.

6. Processing to Standard GIS Format

6.1. Sub-Processing

6.1.1. DSLAM

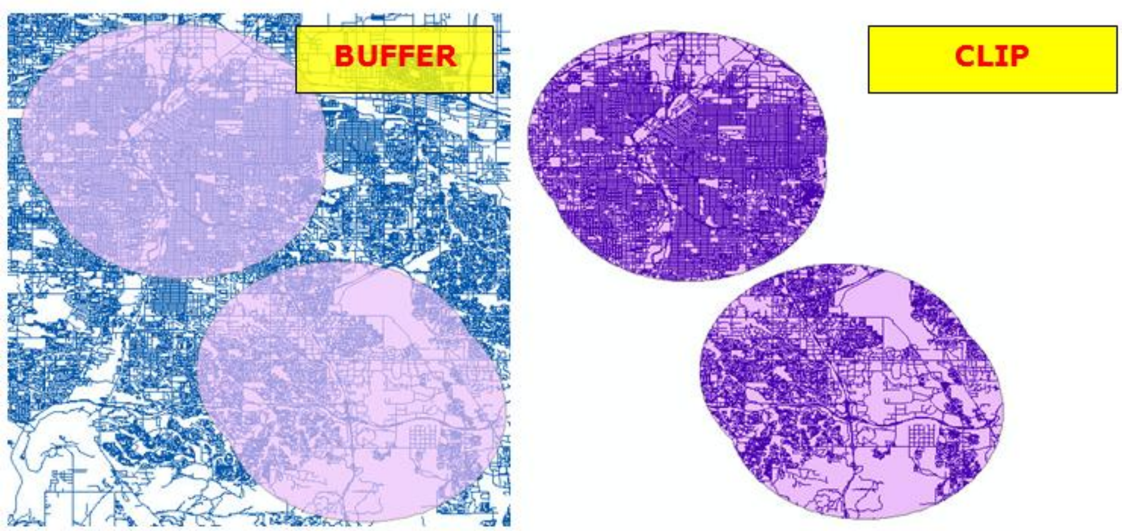
The purpose of this section is to create a DSLAM Road Network (polyline feature class) that will be used for Terrestrial coverage processing.

DSLAM Definition: A digital subscriber line access multiplexer is a network device, located in the telephone exchanges of the telecommunications operators. It connects multiple customer digital subscriber line (DSL) interfaces to a high-speed digital communications channel using multiplexing techniques. By placing additional DSLAMs at locations remote from the telephone exchange, telephone companies provide DSL service to locations previously beyond effective range.

Buffer and Network Analyst:

(1) Start with a point spatial layer of DSLAM Locations

(2) Buffer points with distance of 5 miles, Dissolve type ALL; → dslamPts_5miBuf.



(3) Add **Roads_2010_WGS84.shp** to ArcMap and use dslamPts_5miBuf to CLIP out a subset of the TIGER streets; → clippedTigerRds. Save this layer as a feature class in your *working.gdb*

(4) Using ArcCatalog and within the *working.gdb*, create a new Feature Dataset: Right Click on the *.gdb*>New>Feature Dataset.

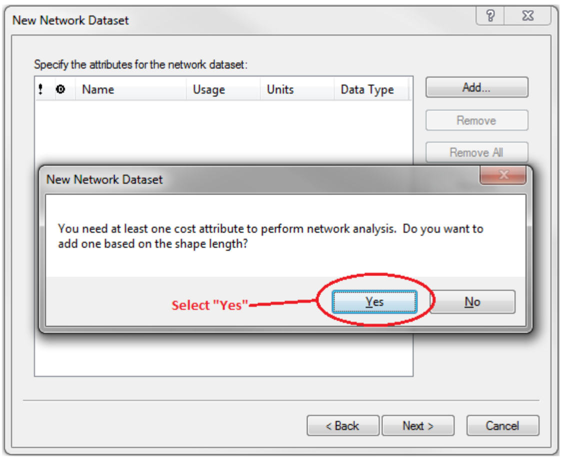
(5) Name Feature Dataset [ProvAlias]_DSLAM and click Next. Select GCS_WGS_1984 (Geographic Coordinate Systems > World > WGS 1984) for the XY coordinate system and <None> for the Z coordinate system. Accept the Default Tolerances and Press Finish.

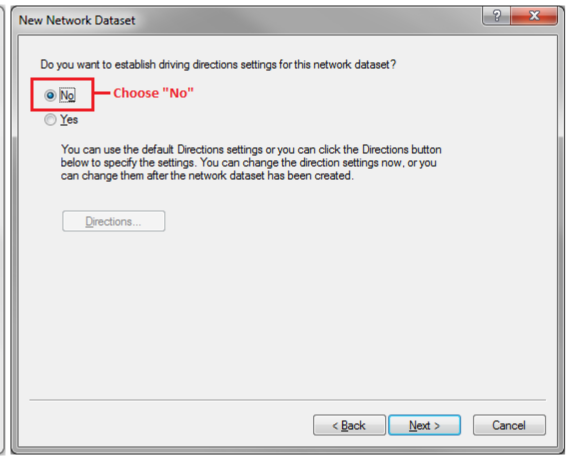
(6) Import *clippedTigerRds.shp* to Feature Dataset

(7) In ArcCatalog, make sure the Network Analyst extension is active: Tools>Extensions>check Network Analyst

(8) Right Click your Feature Dataset>New>Network Dataset.

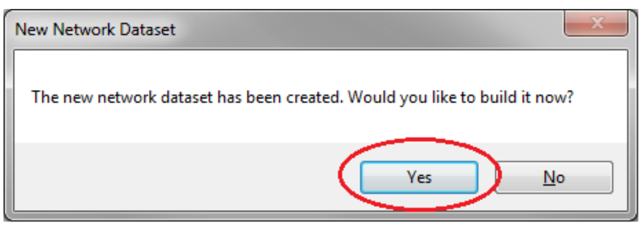
Follow Prompts to accept all Default Settings, except the following 2 screens

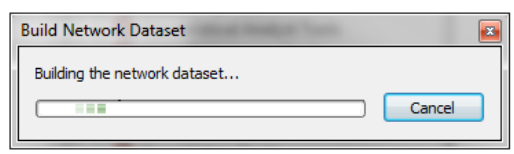




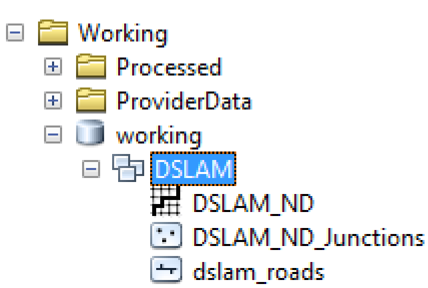
:

(9) You will be prompted to build the new dataset NOW>Select YES





(10) The new Network Dataset will appear in your Feature Dataset

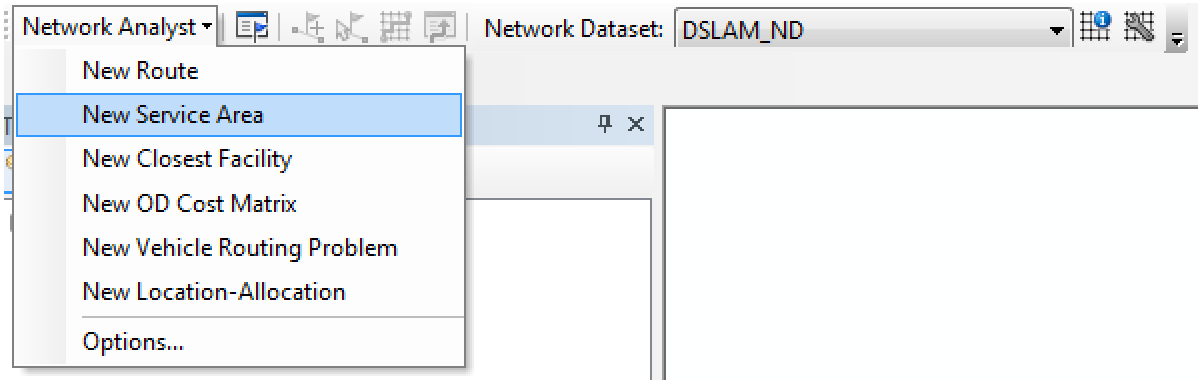


(11) Add the newly created network dataset to ArcMap. Click Yes to add all feature classes that participate in the Network Dataset.

Also add your original DSLAM points.

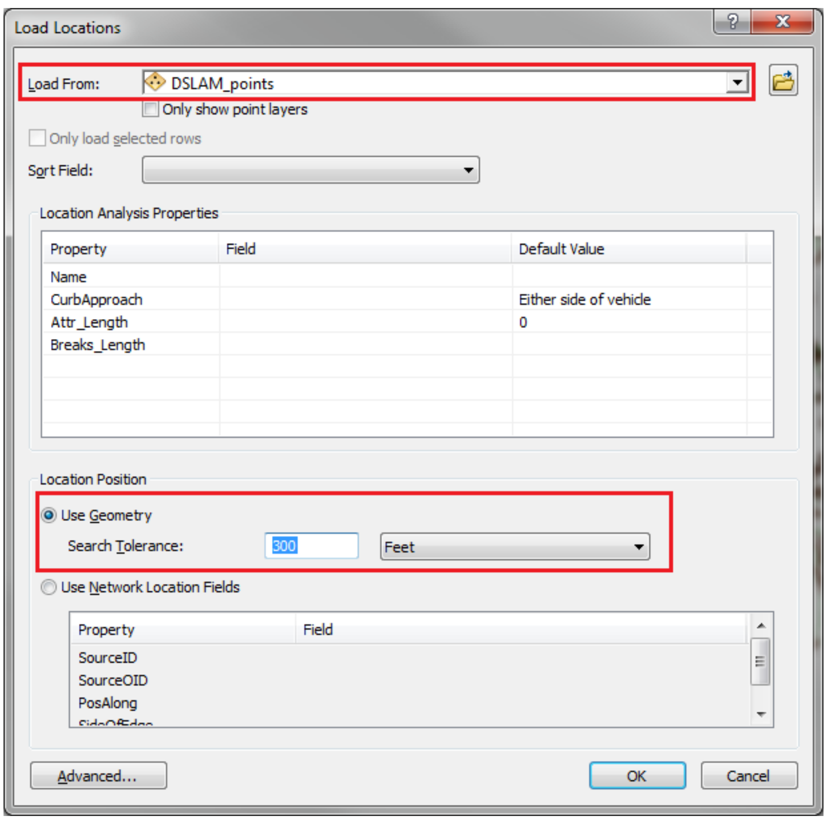
(12) Activate the Network Analyst Extension: Customize>Extensions>Network Analyst; and add the Network Analyst Tool Bar: Customize>Toolbars>Network Analyst.

(13) Click on Network Analyst and create 'New Service Area'.



(14) If Network Analyst window is not open click on 'Show/Hide Network Analyst Window' button 

(15) Right click on the Facilities layer and select Load Locations. In the 'Load Locations' dialog box select your DSLAM points layer in the 'Load From' box (see below).

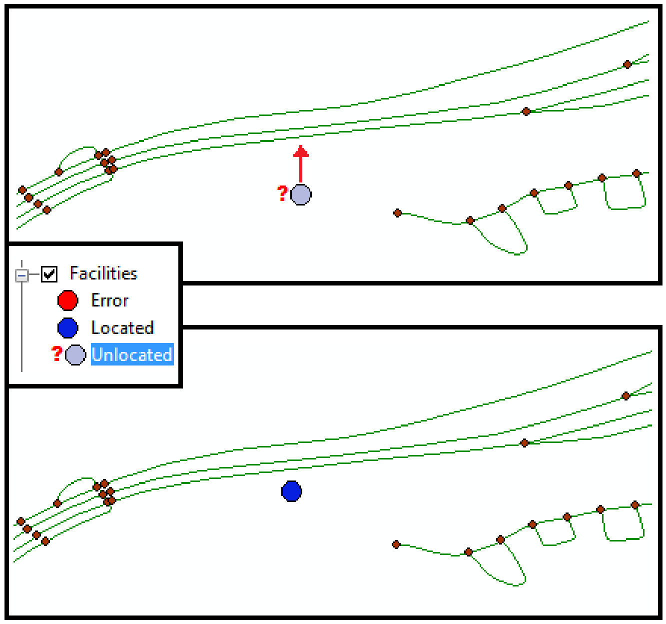


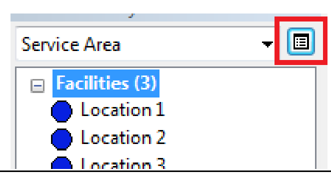
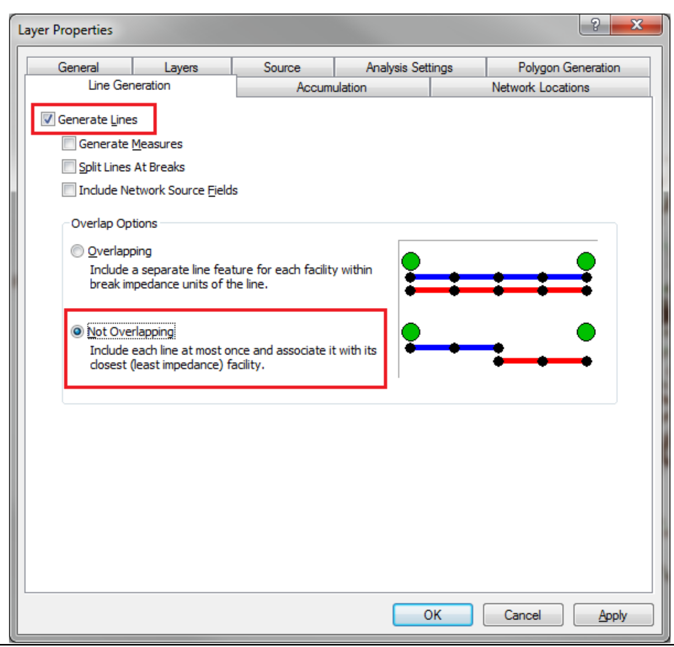
(16) Set Location Position Search Tolerance to a value between 150 to 300 feet. This determines the distance from the DSLAM point to the nearest road segment. Start with 150 feet, and inspect your points after hitting Ok.

- If any of your points are listed as Unlocated, you have 2 options:

Option 1: Delete locations and repeat steps 15 & 16 with a higher Search Tolerance

Option 2: Use the Select/Move Network Locations Tool  to move the Unlocated point close enough to a road segment to show as "Located" as shown below.

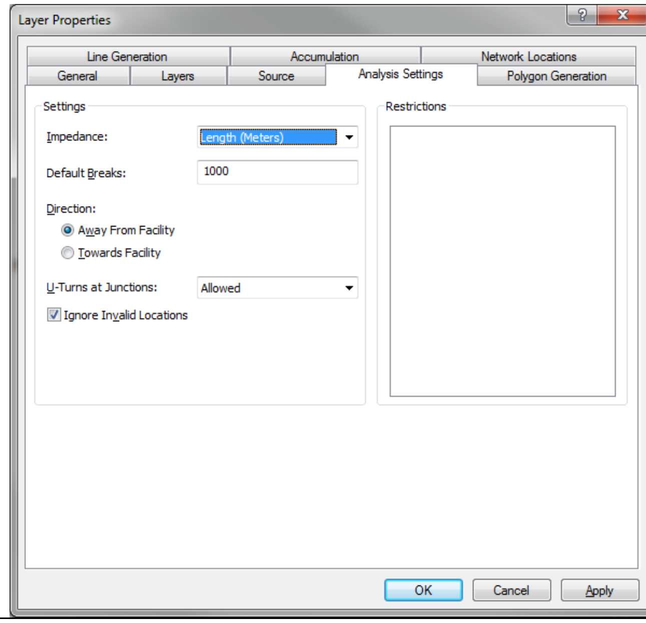


(17) Click on Service Area Properties button (upper right corner of the Network Analyst window).	
(18) Under the Line Generation tab • Check Generate Lines • Select the 'Not Overlapping' radio button.	

(19) Under the Analysis Setting Tab

- Set the Default Breaks to 5486 meters

  This is the metric equivalent of 18000 feet, which is the distance from the DSLAM point that Network Analyst will identify road segments.



(20) On Network Analyst toolbar click the Solve button . This will create a Lines layer under the Service area group layer.

(21) Right click on the Service Area Lines and choose Export Data…

Navigate to your working.gdb and save as networkLines.

(22) This layer is your new coverage area and will be used to select census blocks and roads in sections 6.2.4 and 6.2.5.

You will need to add the TransTech and Speed information to the feature class based on the information from the DSLAM points. Note that if your DSLAM points have differing attributes, the FacilityID field in networkLines can be used to differentiate between the line segments.

6.2. Processing

6.2.1. Middle Mile Points

What you need: Point feature class of your Middle Mile locations

MidMile.shp should have the following fields (as specified in Standard GIS Format Doc.*xlsx*):

PROVALIAS	FRN	OWNERSHIP	BHCAPACITY	BHTYPE	LATITUDE	LONGITUDE	ELEVFEET	FULLFIPSID	WHO	WHEN
15	10	2	2	2	8	8	2	15	10	8

(1) Add any fields necessary to comply with the requirements listed above.

(2) Populate fields with valid data types and verify the data accuracy

a. WHO = Your User ID (first 7 letters of last name and first initial)

b. WHEN = Today's Date

(3) In order to add the Census Block ID associated with the middle mile point data, use one of the following processes:

a. Add *MidMile.shp* and *Blocks_2010_WGS84.shp* into ArcMap. Perform a 'Select by Location' with this layout: **I want to:** 'Select features from' **the following layer(s)** as **'***Blocks_2010_WGS84*', **that** 'contain' **the features in this layer** '*MidMile.shp*' and select 'OK'. Use the selected Census Block(s) to populate the FULLFIPSID Field.

b. Do a 'Spatial Join' with the *Blocks_2010_WGS84*. The Target Feature is the MidMile.shp and the Join is the *Blocks_2010_WGS84*. 'check' Keep All Target Features. In the Field Map, keep only the GEOID10 field in the *Blocks_2010_WGS84*. Select 'Contains' and save output file in .gdb.

6.2.2. Wireless

What you need: feature class of your subscriber or tower locations (points)

or

feature class of your coverage area (polygon)

Wireless.shp should have the following fields (as specified in Standard GIS Format Doc.*xlsx*):

PROVALIAS	FRN	SPECTRUM	TRANSTECH	MAXADDOWN	MAXADUP	TYPICDOWN	TYPICUP	WHO	WHEN
15	10	2	2	2	2	2	2	10	8

Once you have a polygon shapefile derived from one of the processes described below (or a polygon feature class created in previous step):

(1) Add any fields necessary to comply with the requirements listed above.

(2) Populate fields with valid data types and verify the data accuracy

a. WHO = Your User ID (first 7 letters of last name and first initial)

b. WHEN = Today's Date

6.2.2.1. Subscribers Locations

(1) Buffer the Wireless Point Data with a distance of 150 feet.

(2) Take Buffered Layer and Dissolve by TransTech, Spectrum, and Speeds.

(3) The final product will be a polygon multi-part feature.

6.2.2.2. Tower Locations

Intro to Radio Mobile

Radio Mobile is written and maintained by Roger Coudé, VE2DBE. The website is:
http://www.cplus.org/rmw/english1.html
Tutorials and reference websites are listed below:

- http://www.g3tvu.co.uk/Radio_Mobile.htm
- http://radiomobile.pe1mew.nl/
- http://www.pizon.org/radio-mobile-tutorial/index.html
- http://www.ve2dbe.com/getting_started.html
- http://groups.yahoo.com/group/Radio_Mobile_Deluxe/

Installing Radio Mobile

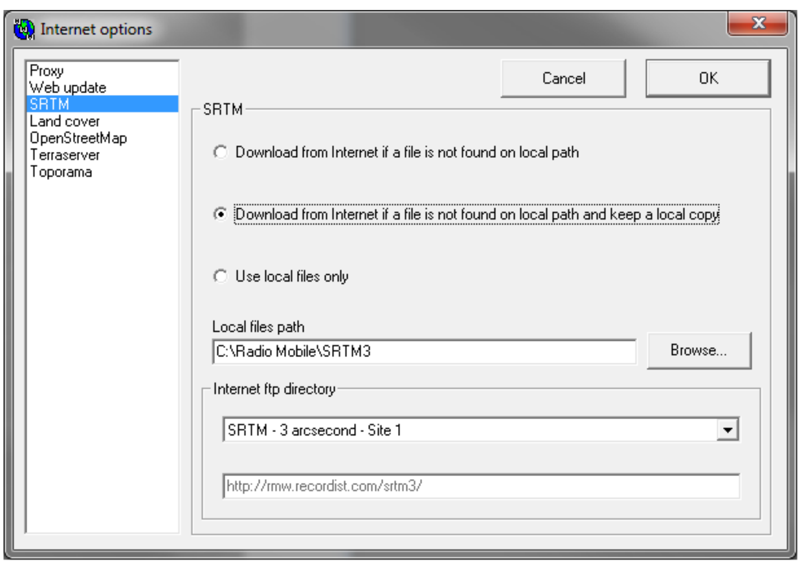
Although you can install the software directly from the Radio Mobile website, the process is complicated and lacks straightforward instructions.

It is recommended that you use the Radio_Mobile_Setup.zip and corresponding instructions found at: http://www.g3tvu.co.uk/Quick_Start.htm

- Download Radio_Mobile_Setup.zip. Unzip the folder. Double click "Radio_Mobile_Setup.exe"
- Accept all of the defaults and click "next" through all of the installer panes. Be sure to click "View Map_Link.txt" on the 6th screen.

Setting up the Program

Open the program. Click Options on the toolbar and choose Internet. In the Internet Options dialog box, click SRTM and choose "Download from Internet if a file is not found on local path and keep a local copy", as shown below:

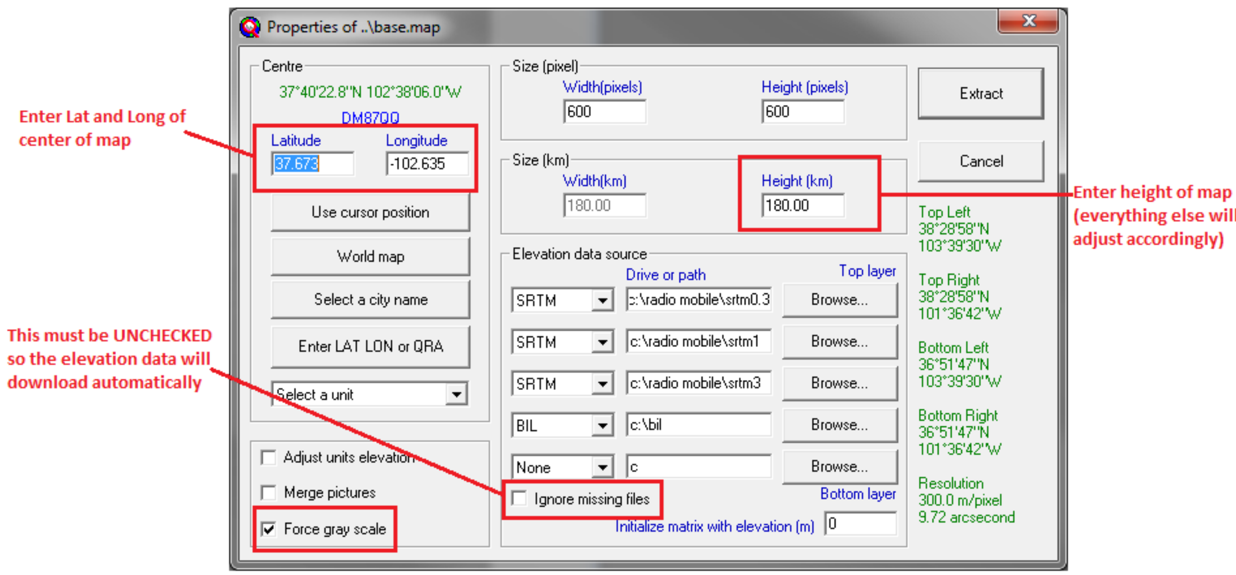


Do the same for "Land Cover", "OpenStreetMap", "Terraserver", and "Toporama"

Processing Provider Data

Step 1 – Create Your Base Map

- Select File > Map Properties > fill out dialog box as shown below > then click "Extract". Be careful when changing the pixels – if you set the value too high, the program may not be able to download the elevation data.
  Note: to find the center and size of your map, load your point feature class into ArcMap:
  - Center: open the Layer Properties of your points layer and choose the Source tab – this will list the Extent of the data. Take the average of the Top/Bottom and Left/Right to determine the center point.
  - Use the Measure tool to determine the height and width of the map – measure from the most northern point to most southern point, and then add an extra buffer (like 30 km) to account for the beam radius of the towers and where the plots will be drawn



Step 2 – Load Tower Locations

Tower locations can be entered manually, but if you have more than a few locations, you can use a either a text file or KML to import the data.

IMPORTANT: You will also need to enter an extra "Mobile" location in order to create the coverage plot. You can just use your center-point unless you have specific information about a mobile unit.

Format

Text: The .txt should be Tab Delimited and include the following. Fill out the highlighted fields and leave the others as default:

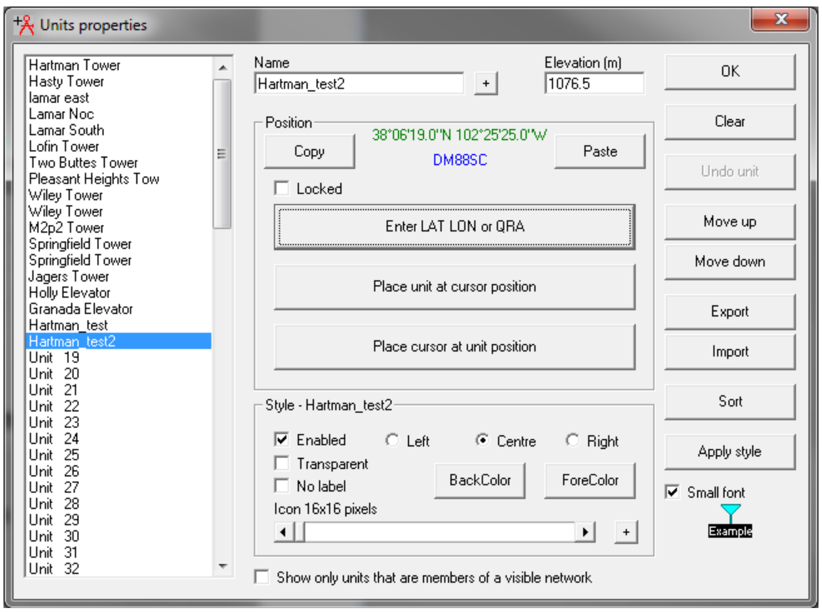
Unit name	Enabled	Latitude(°)	Longitude(°)	Elevation(m)	Icon	Forecolor	Style	Backcolor	Text
Tower name	1	38.1234	-102.1111	1085.5	1	FFFFFF	0	0	
Tower name 2	1	38.1234	-102.2222	1005.0	1	FFFFFF	0	0	

KML: You should be able to load the KML directly into radio mobile. However, some KML files will not load. If you encounter this problem, use the following steps to create a new KML, and load into Radio Mobile again.

- Open the KML in GoogleEarth
- Save each tower location to "My Places" (you can create a new folder under the My Places directory)
- Right-click on the folder > Save Place As… > name the file and choose KML (not KMZ)

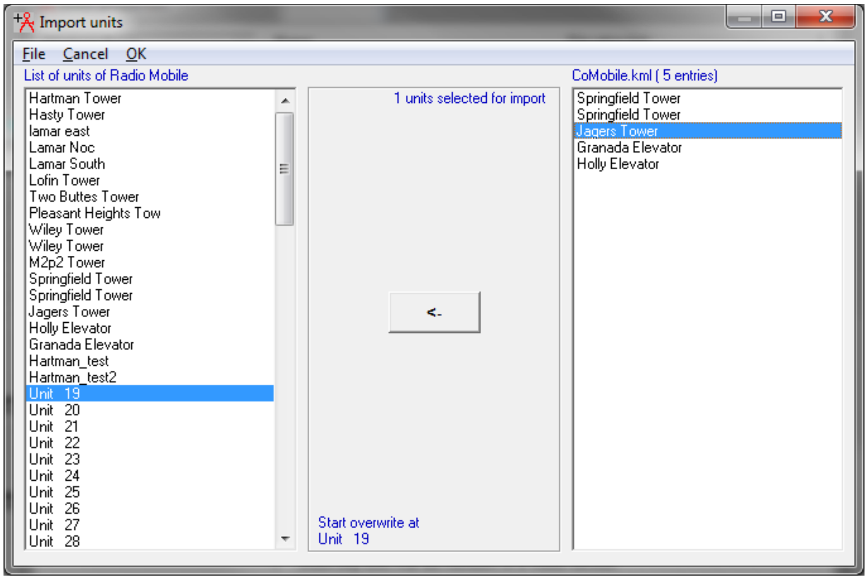
Load Data

Select File > Unit Properties



- To manually enter data, click "Enter LAT LONG or QRA"
- To import data, click "Import":
  - Go to File > Load > navigate to you file
  - The tower locations should show up in the column on the right. Choose which ones to import and where to start the overwrite (you can keep existing units or overwrite them).
  - When finished, click OK

Note: When you import data, the elevation may not match the specific elevation files within the Radio Mobile software (or you may not have elevation data). To improve the accuracy, choose each unit location individually, click "Enter LAT LONG or QRA" and then click OK. This should automatically update the Elevation field.



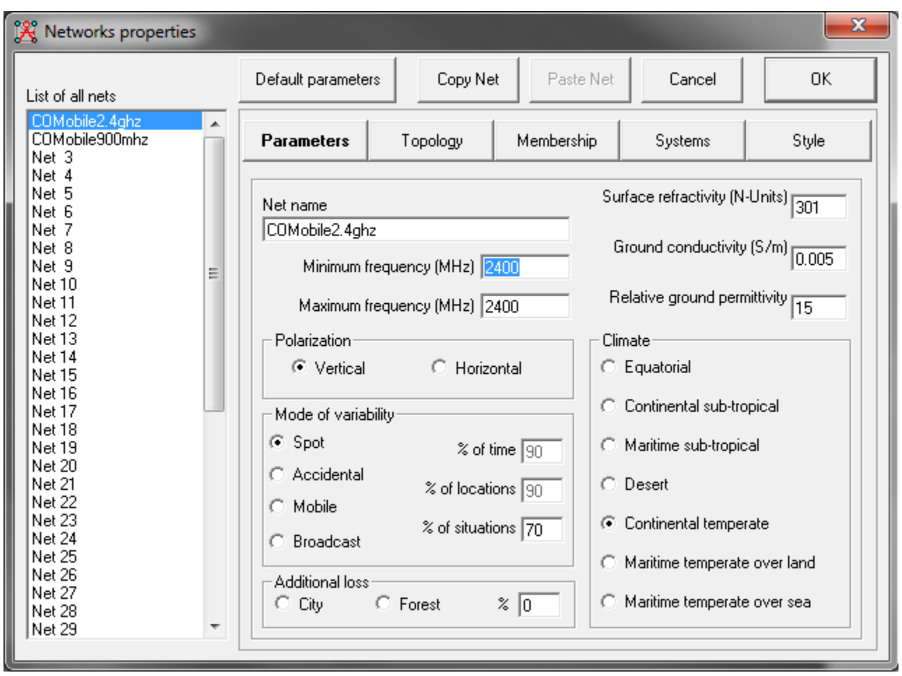
Step 3 – Define Networks, Systems and Memberships

Select File > Network Properties

Networks:

A Network contains a unique frequency. For each frequency value found in your data, create one Network. For example, you may have some towers with 2.4 GHz and some with 5.8 GHz.

- For each Network, fill in:
  - Net Name
  - Minimum Frequency (MHz)
  - Maximum Frequency (MHz)
  - Climate – choose "Continental temperate"



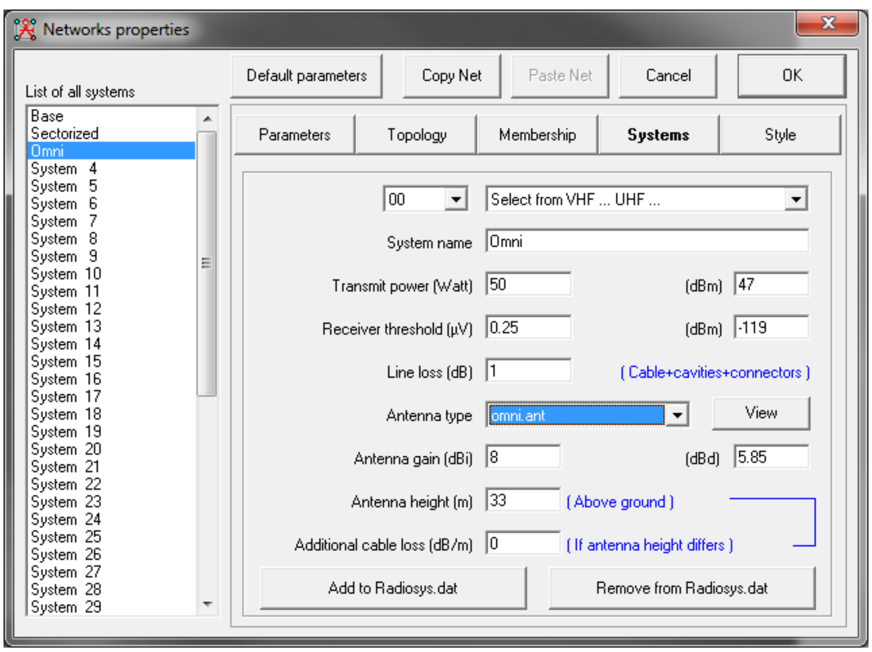
Systems:

A System contains the following unique information:
- Transmit Power
- Receiver threshold
- Line Loss
- Antenna type
- Antenna gain
- Additional cable loss

You will need to create a single system for each unique combination of these attributes. Note that Antenna Height is also listed in the System attributes, however this can be changed for individual Units in the Membership section.

- Click on the Systems Tab
- To create a new system, use the "Base" system as a starting point. Fill in any information that you have from the provider and leave the other fields as their default values.

  Antenna Type:
  - Omni Directional – this is the easiest and most common – just choose omni.ant from the dropdown list.
  - Sectorized – the sectorized antenna is mapped based on the sector type. Work with your provider to get the correct antenna pattern. Antenna patterns can be downloaded
    - You will enter the Azimuth (i.e. the direction of the antenna) in the Membership section



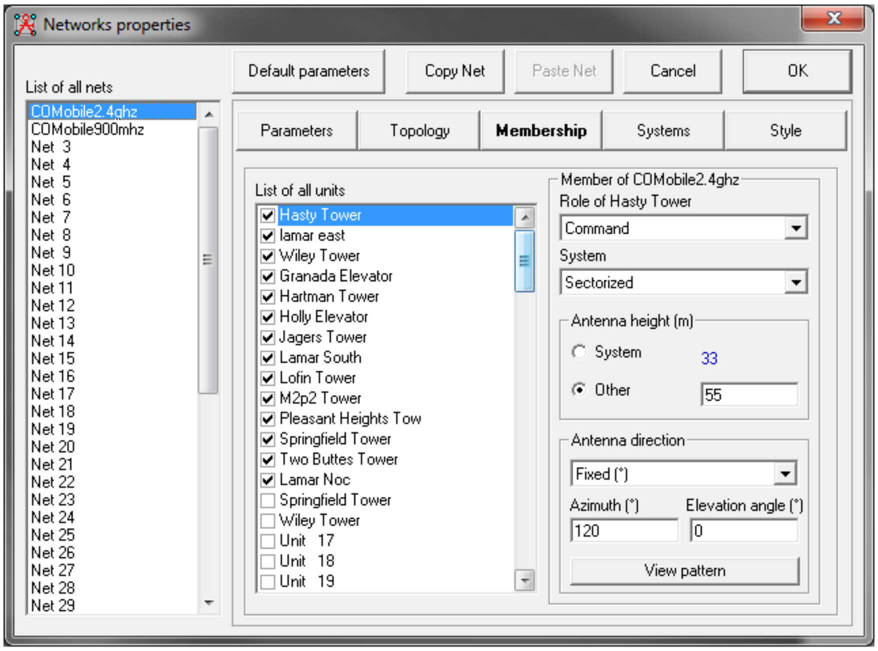
Memberships

The Memberships section defines which Network and System each Unit belongs to:

- Click on the Membership tab
- Choose a Network in the column on the left, and click the checkboxes for all Units that belong to that Network. A Unit can belong to multiple Networks,

but the attributes for that Unit will need to be changed for each separate Membership

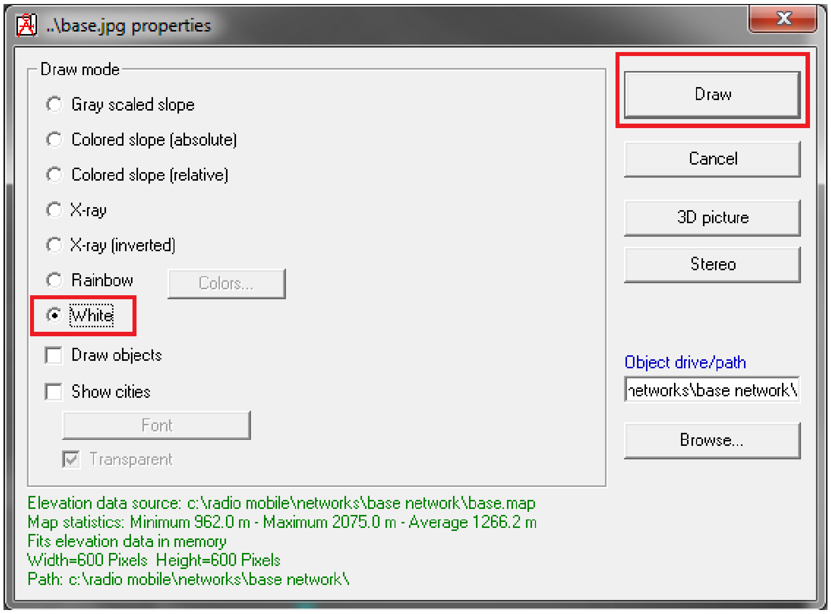
- For each Unit, enter the following attributes:
  - Role (default is Command)
  - System
  - Antenna Height (the System height is defined under the Systems tab, but you can enter heights for individual Units here)
  - Antenna Direction – Enter the azimuth of the antenna; this is only valid for directional antenna patterns (i.e. not Omni)



- Add the Mobile Unit to all Networks

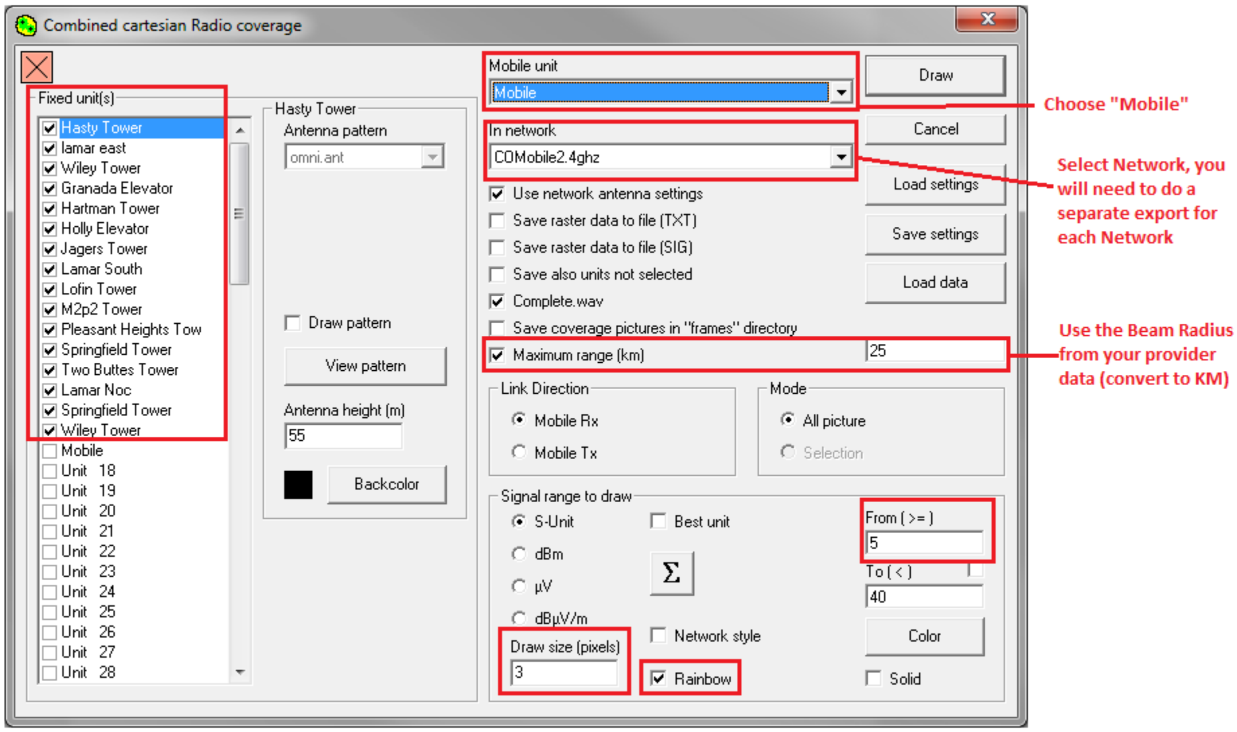
Step 4 – Create Coverage Map

Select File > Picture Properties. Choose "White" as the Draw mode and click "Draw". This helps create a clean export picture.



Select Tools > Radio Coverage > Combined Cartesian

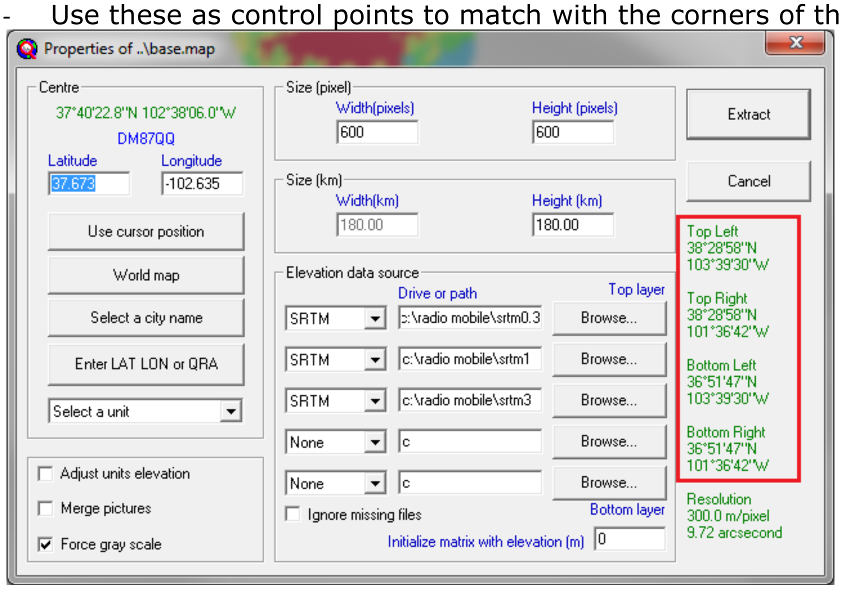
- Select all Units in your data as "Fixed units" in the column on the left.
- Select "Mobile" as the Mobile Unit
- Select a Network – you will need to do a different coverage plot for each Network. The coverage will only draw members of the chosen Network that are checked in the left-hand column, it will ignore Units in other Networks.
- Enter the Maximum Range (this is the Beam Radius found in the Provider data – make sure to convert to km).
- Set the Draw size (pixels). You can experiment with this number based on your coverage area. The default is 5, but smaller numbers will give a more detailed plot (with longer processing time).
- Set the Signal Range to "S-Unit" and the "From (>=)" value to 5
- Check the "Rainbow" box
- Click "Draw"



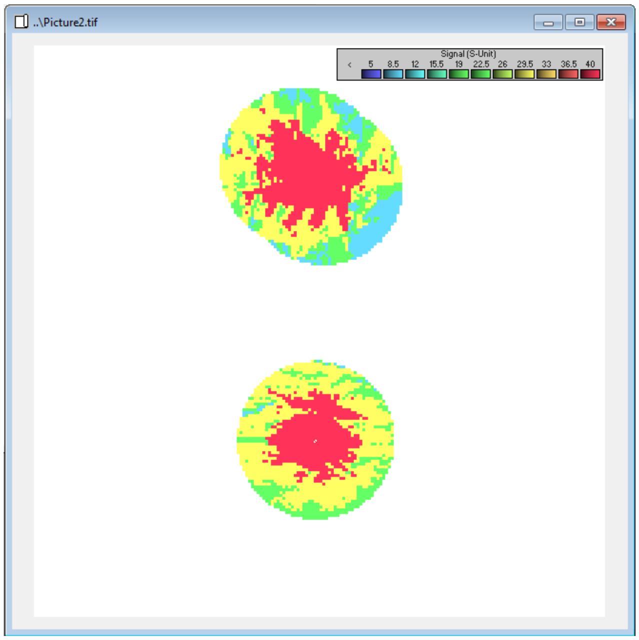
- Your output should look similar to the image below. Select File > Save Picture As…> choose location and save as TIF.

  Note: You will have to Georeference this image in ArcMap, so make sure that you have reference points that will help you create control points. Your image will likely not have any good reference points (like in the one below), but you can use the corner of the image as georeferencing points

  - The corners of the image will correspond with the coordinates listed in the Map Properties window (below).
  - Convert these coordinates to Decimal Degrees and map them in ArcMap.
  - Use these as control points to match with the corners of the image.



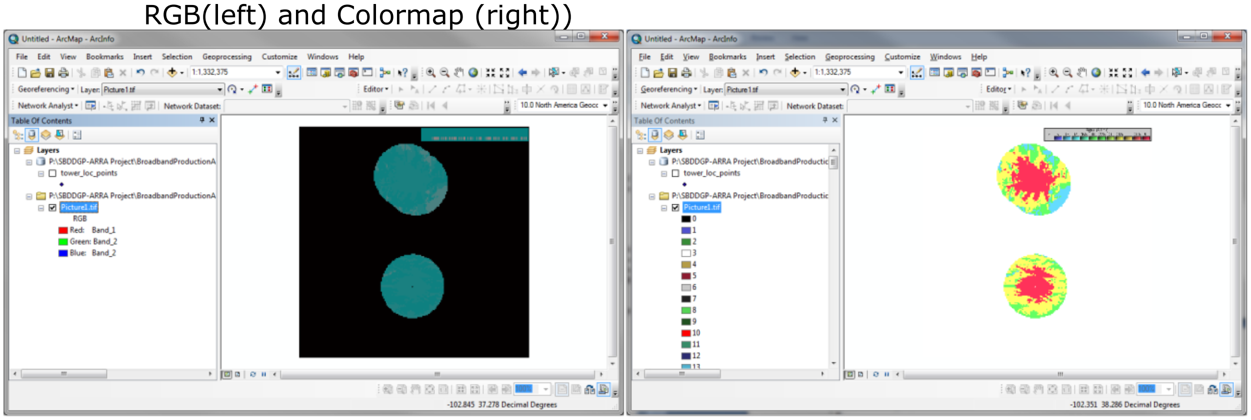
- Check the box for "White is Transparent" and click OK.



Step 5 – Georeference the Image

Refer to the Image Georeferencing instructions in Section 5.6.1.

- Remember that you need useful reference data to create control points (i.e. the corners of the image as described above).
- When you add the TIF to ArcMap, the colors may not look right – test out the different symbology options (the image below shows the same TIF rendered in RGB(left) and Colormap (right))

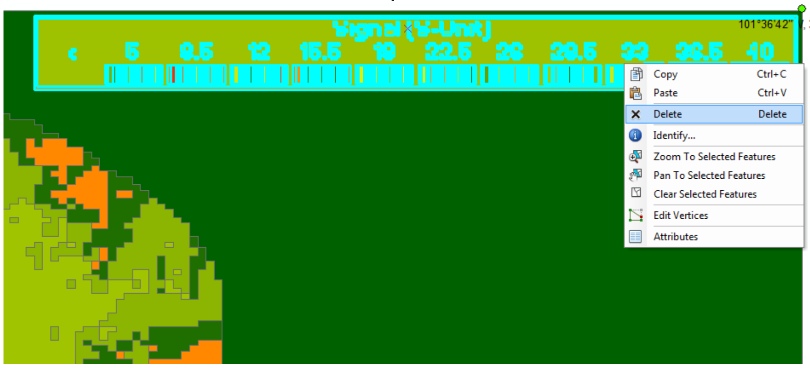


Step 6 – Convert to Shapefile

After the image is georeferenced, use the Raster to Polygon tool to convert the image to a shapefile. The shapefile will need to be cleaned up after conversion.

- Open the Raster to Polygon tool and fill in the dialog box as follows:
    - Input Raster: TIF image. This often works best if you use one band from the TIF image. Preview each band in ArcCatalog to decide which one is best.
    - Field: Value
    - Output: choose a location for the feature class

- The output polygon feature class needs to be edited to delete all of the extraneous data (remember that your image included a legend).
  - Add the shapefile to ArcMap and Start Editing
  - Select all of the features that make up the Legend and the border, and delete them from the shapefile.



Step 7 – Final coverage plot

- Once the extraneous features are gone, you should have 5-10 GRIDCODE values in your attribute table. You can symbolize your shapefile to look like your TIF.
- From here, you will need to choose what signal levels to keep in your final coverage – generally you will keep the first 3 or 4 tiers (i.e. about 15 S-Unit and above)
- Delete the unwanted data by selecting by GRIDCODE value and deleting features.
- Merge the rest of the features together (Select all desired features, Click Editor > Merge)
- If you have multiple networks, you will need to combine the resulting shapefiles

6.2.3. Address Points (Wireline)

What you need: Point feature class of your subscriber information

and

Blocks_2010_WGS84

(1) Add *Address_Point.shp* and *Blocks_2010_WGS84.shp* into ArcMap.

(2) If the address information is parsed into separate Fields: Open Attribute table>Options Button>Add Field>name 'Address'>Text>Length 50

(3) Calculate field with Concatenation: Right Click Address>Field Calculator>Address= [PREDIR] & " " & [STREETNAME] & " " [STREETTYPE] & " " [SUFFDIR]

(4) Do a 'Spatial Join' with the *Blocks_2010_WGS84*. The Target Feature is the *Address_Point.shp* and the Join is the *Blocks_2010_WGS84*. 'check' Keep All Target Features. In the Field Map, keep only the GEOID10 field from the *Blocks_2010_WGS84*. Select 'CLOSEST' > 'Search Radius' 150 Feet>and save output file in *.gdb*.

(5) Verify Appropriate Fields Exist as seen below:

PROVALIAS	FRN	ADDRESS	BLDGNBR	PREDIR	STREETNAME	STREETTYPE	SUFFDIR	CITY	STATECODE	ZIP5
15	10	50	10	2	50	5	2	50	2	5

ZIP4	LATITUDE	LONGITUDE	ENDUSERCAT	TRANSTECH	MAXADDOWN	MAXADUP	TYPDOWN	TYPUP	FULLFIPSID
4	8	8	2	2	2	2	2	2	15

6.2.4. Census Blocks (Wireline)

What you need: feature class of your coverage area (point, line, or polygon)

and

Blocks_2010_WGS84_LT2SqMi

or

Census Blocks layer created in Section 5.4

Census.shp should have the following fields (as specified in Standard GIS Format Doc.*xlsx*):

PROVALIAS	FRN	FULLFIPSID	TRANSTECH	MAXADDOWN	MAXADUP	TYPICDOWN	TYPICUP	WHO	WHEN
15	10	15	2	2	2	2	2	10	8

Census Block selection using Coverage Area Feature Class
In this section, you will use the feature class of your coverage area to select Census Blocks < 2 sq mi.

Use the CensusRoads Tool:
Note: Updates are still being made to this tool, currently it only works with point feature classes.

(1) The following 3 layers are needed for the tool:
   a. Coverage area (point, line, or polygon feature class)
   b. Blocks_2010_WGS84_LT2SqMi
   c. Roads_2010_WGS84_Outside
(2) Your coverage area feature class should contain the following fields:
   a. TransTech - this script will only process TransTech values of 10, 20, 30, 40, 41, and 50, everything else will be deleted
   b. MAXADDOWN
   c. MAXADUP
   d. TYPICDOWN
   e. TYPICUP

Manual process:

(1) If you have point or line data: buffer by 150 feet – use resulting polygon. If you have polygon of coverage area, continue to next step
(2) Dissolve by TRANSTECH, MAXADDOWN, MAXADUP, TYPICDOWN, & TYPICUP
(3) For each TransTech:
   - Select (by Location) Census Blocks – this can be done using a spatial join between Census_Blocks and Buffered_XY_Data (One to Many)

- Dissolve the Spatial_Join layer by Full FIPS ID– keeping max values for MAXADDOWN, MAXADUP, TYPICDOWN, & TYPICUP

(4) Append all TransTech##_Census layers together

Processing Census Block layer

Once you have your Census Blocks layer (Created above OR in Section 5.4):

*****Staging Format Tool: Add and populate fields necessary for Staging Format**

(1) Add any fields necessary to comply with the requirements listed above.

(2) Populate fields with valid data types and verify the data accuracy
   a. WHO = Your User ID (first 7 letters of last name and first initial)
   b. WHEN = Today's Date

6.2.5. Roads (Wireline)

What you need: feature class of your coverage area (point, line, or polygon)

and

Roads_2010_WGS84_Outside

or

Roads layer created in Section 5.6

or

Census blocks greater than 2 sq mi created in Section 5.4

Roads.shp should have the following fields (as specified in Standard GIS Format Doc.xlsx):

PROVALIAS	FRN	ADDMIN	ADDMAX	PREDIR	STREETNAME	STREETTYPE	SUFFDIR	CITY	STATECODE
15	10	10	10	2	50	5	2	50	2

ZIP5	TRANSTECH	MAXADDOWN	MAXADUP	TYPICDOWN	TYPICUP	WHO	WHEN
5	2	2	2	2	2	10	8

6.2.5.1. Select Roads Using Coverage Area Feature Class

In this section, you will use a feature class of your coverage area to select Road Segments outside of Census Blocks < 2 sq mi.

Use the CensusRoads Tool:

Note: Updates are still being made to this tool.

(3) The following 3 layers are needed for the tool:
   a. Coverage area (point, line, or polygon feature class)
   b. Blocks_2010_WGS84_LT2SqMi
   c. Roads_2010_WGS84_Outside

(4) Your coverage area feature class should contain the following fields:

   a. TransTech - this script will only process TransTech values of 10, 20, 30, 40, 41, and 50, everything else will be deleted
   b. MAXADDOWN
   c. MAXADUP
   d. TYPICDOWN
   e. TYPICUP

Manual process:

(1) If you have point or line data: buffer by 150 feet – use resulting polygon. If you have polygon of coverage area, continue to next step
(2) Dissolve by TRANSTECH, MAXADDOWN, MAXADUP, TYPICDOWN, & TYPICUP
(3) For each TransTech:
   - Select (by Location) Roads– this can be done using a spatial join between Roads and Buffered_XY_Data (One to Many)
   - Dissolve the Spatial_Join layer by TLID– keeping max values for MAXADDOWN, MAXADUP, TYPICDOWN, & TYPICUP
(4) Append all TransTech##_Roads layers together

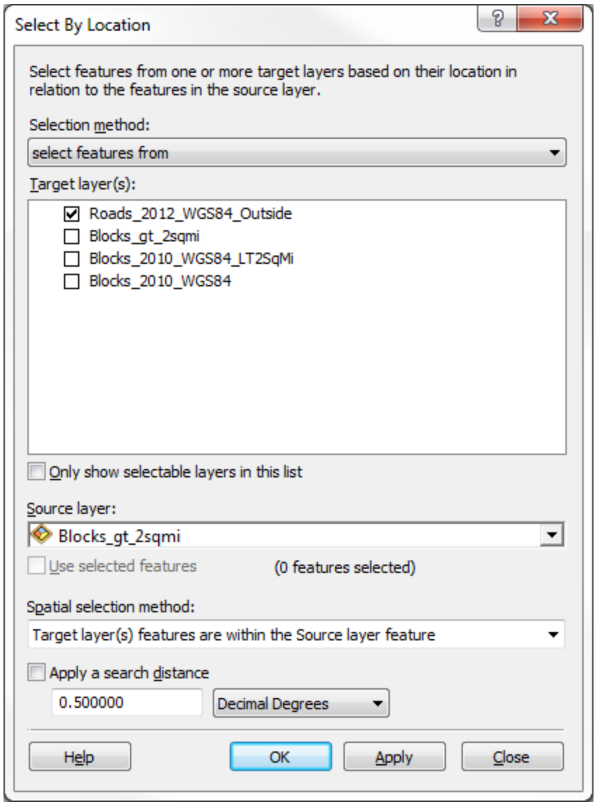
6.2.5.2. Select Roads Using Census Block Feature Class

Roads should only be selected using census blocks if there is no roads data from provider. If you received Census Block IDs of blocks greater than 2 square miles, then you will have created the layer in Section 5.4.

i.e. if the provider data contains only census blocks, the blocks would be separated between less than and greater than 2 sq mi. The blocks greater than 2 sq mi will then be used to select roads

(1) Dissolve the Census blocks greater than 2 sq mi layer by TransTech and Speeds.
(2) Select by location, as seen below:

Select features from *Roads_2010_WGS84_Outside* that are within the Blocks_GT2sqmi_dissolve layer.



(3) Export data to create a new feature class. Right click on the roads layer > Data > Export Data… Export Selected Feature and choose the output location and feature class.

(4) For each TransTech:
   a. Select (by Location) Roads– this can be done using a spatial join between Roads and Census Blocks dissolve layer (One to Many)
   b. Dissolve the Spatial_Join layer by TLID– keeping max values for MAXADDOWN, MAXADUP, TYPICDOWN, & TYPICUP

(5) Append all TransTech##_Roads layers together

Processing Roads layer

Once you have your Roads layer (Created above OR in Section 5.6):

*****Staging Format Tool: Add and populate fields necessary for Staging Format**

(1) Add any fields necessary to comply with the requirements listed above.

(2) Populate fields with valid data types and verify the data accuracy

   a. WHO = Your User ID (first 7 letters of last name and first initial)

   b. WHEN = Today's Date

7. NTIA Staging Area

Processed data in Standard GIS Format will be Loaded into NTIA Standard Template by individual Provider.

7.1. Template

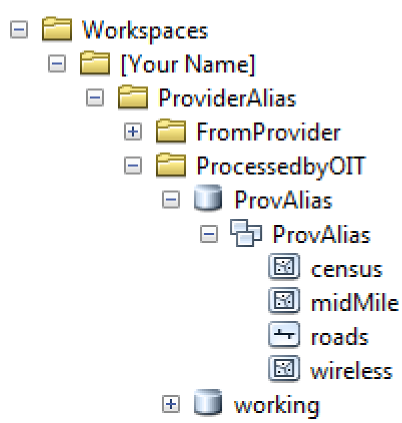
7.1.1. Template Description

A copy of the template was created in your workspace in Section 2.4.2 (if you did not copy the template when setting up your workspace, refer back to Section 2.4.2). The template consists of a File Geodatabase, Standard Metadata, and a Feature Dataset with CensusTemplate, RoadTemplate, WirelessTemplate, and MidMileTemplate.

7.1.2. Load Data into Template

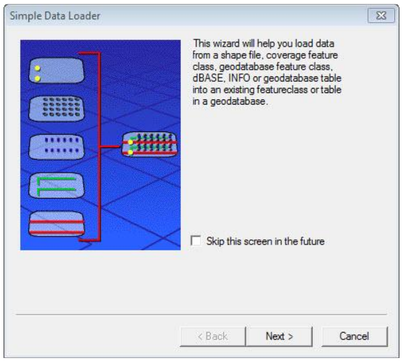
(1) Delete the feature class templates that are not applicable to the Provider data. (i.e. if the provider has only wireless coverage, the census, roads, and midmile can be deleted).

(2) Rename the feature dataset to [ProvAlias] and rename the feature classes to “census”, “midmile”, “roads”, and “wireless”. THE GEODATABASE MUST FOLLOW THIS NAMING CONVENTION IN ORDER FOR THE FINAL LOAD TOOL TO WORK!



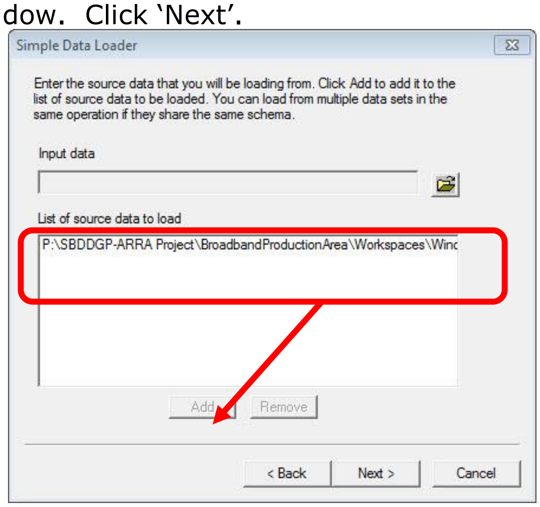
(3) Select a Feature Class template, ‘Right Click’>Load>Load data.

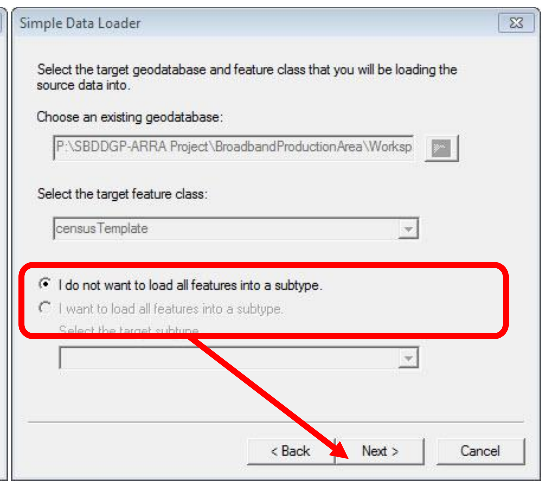
(4) A window form will appear and prompt you to click ‘Next’. In the future, this screen can be eliminated from the process by ‘checking’ the box.



(5) Click the Folder Path button under "Input Data" and navigate to the appropriate feature class within your *working.gdb* for that Provider. For example, if you are loading data into the census feature class, then navigate to the census blocks layer that you created in the *working.gdb.*

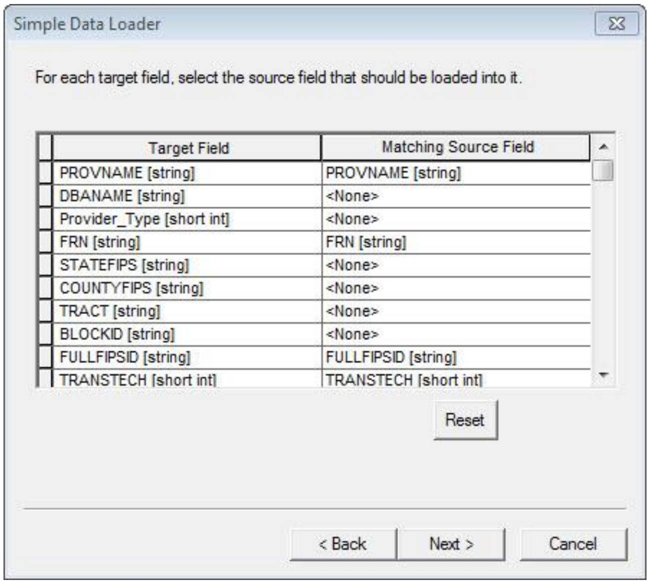
Click 'Add'. The source data will now appear in the **List of Source Data to Load** window. Click 'Next'.





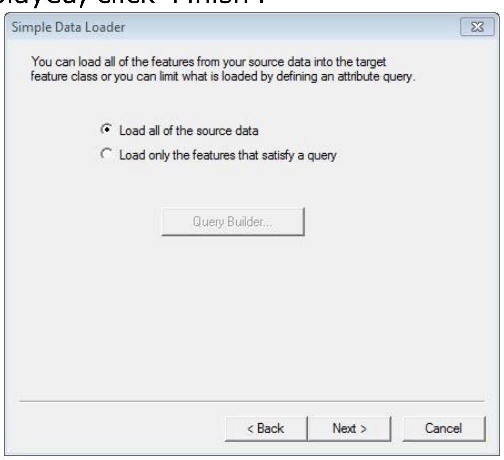
(6) In the next window, make sure the **I do not want to load all features into a subtype** radio button is selected, click 'Next'

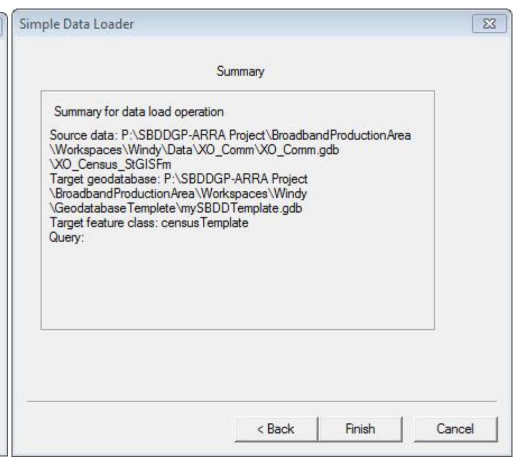
(7) Match the corresponding Fields between the **Target Field** and **the Matching Source Field**. Click 'Next'



***Note: Not all the **Target Fields** will have a field to match to in the **Matching Source Field**

(8) **Load all of the Source Data** should be selected, click 'Next'. A Summary will be displayed, click 'Finish'.





(9) The data will now 'Load' into the template. Open the attribute table in ArcCatalog to confirm data loaded correctly.

(10) Repeat steps 3 through 9 for each feature class.

7.2. Calculate Fields

***** Staging Format Tool: A tool will be available to calculate fields**

7.2.1. Census Blocks

(1) FULLFIPSID Parse:

Calculate from FULLFIPSID

STATEFIPS	COUNTYFIPS	TRACT	BLOCKID
State FIPS	County FIPS	Tract	Block ID
String	String	String	String
2	3	6	4
Left ([FULLFIPSID],2)	Mid ([FULLFIPSID],3,3)	Mid ([FULLFIPSID],6,6)	Right ([FULLFIPSID],4)

(2) Provider Type and ENDUSERCAT

Calculate Manually	
PROVIDER_TYPE	**ENDUSERCAT**
Provider Type	End_User_Category
SmallInteger	String
2	1
See lookup table for values	

(3) PROVNAME and DBNAME

Calculate from PROV_ALIAS	
PROVNAME	**DBNAME**
Provider Name	DBA Name
String	String
200	200
Lookup Table	Lookup Table

7.2.2. Roads

(1) PROVNAME, DBNAME, ZIP4, PROVIDER_TYPE, and ENDUSERCAT

Calculate from PROV_ALIAS		N/A	Calculate Manually	
PROVNAME	**DBNAME**	**ZIP4**	**PROVIDER_TYPE**	**ENDUSERCAT**
Provider Name	DBA Name	End_User_Zip_PLUS4	Provider Type	End_User_Category
String	String	String	SmallInteger	String
200	200	4	2	1
Lookup Table	Lookup Table	N/A	Lookup Table	Lookup Table

7.2.3. Wireless

(1) PROVNAME, DBNAME, and STATEABBR

Calculate from PROV_ALIAS	

PROVNAME	DBNAME	STATEABBR
Provider Name	DBA Name	State_Abbreviation
String	String	String
200	200	2
Lookup Table	Lookup Table	='CO'

7.2.4. Middle Mile

(1) PROVNAME, DBNAME, STATEABBR

Calculate from PROV_ALIAS		
PROVNAME	**DBNAME**	**STATEABBR**
Provider Name	DBA Name	State_Abbreviation
String	String	String
200	200	2
Lookup Table	Lookup Table	='CO'

7.3. Error Check

*****TOOL 4: One or More tools will run error checks**

- Check Valid Data Types
- Check Topology

7.4. Mapbook Production – Data Driven Pages

Map books will be created using the Data Driven Pages ("DDP") toolset in ArcGIS 10. The map books will be emailed to providers for validation and verification purposes.

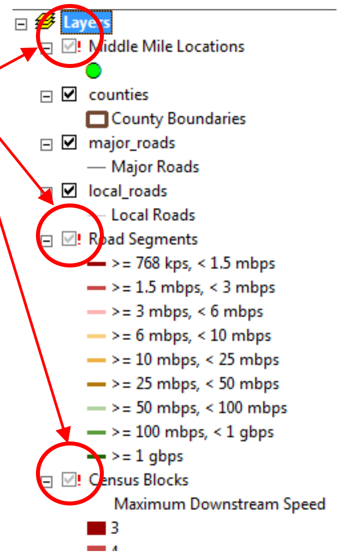
Use the following steps to create both Landline and/or Wireless map books (depending on the provider data)
*******Note****: You must be in Layout View in order to set up the export*

(1) Make copies of the necessary mapbook templates to your workspace. The Landline mapbook will show Census Blocks, Roads, and MidMile. The Wireless mapbook will show Wireless and MidMile. Rename the mxd "*[ProvAlias]_Landline.mxd*" or "*[ProvAlias]_Wireless.mxd*"

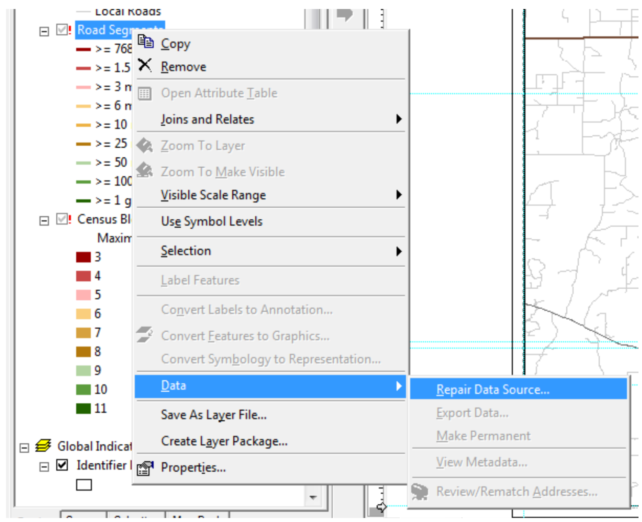
Template Location:

…\BroadbandProductionArea\Validation\MapBook_templates

(2) Open the MXD, the Table of Contents should have **!** next to the provider data layers. The template is set up this way so that it is easy to map to your provider data.



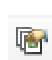
(3) Right click on each layer and choose Data > Repair Data Source. Navigate to your provider data.

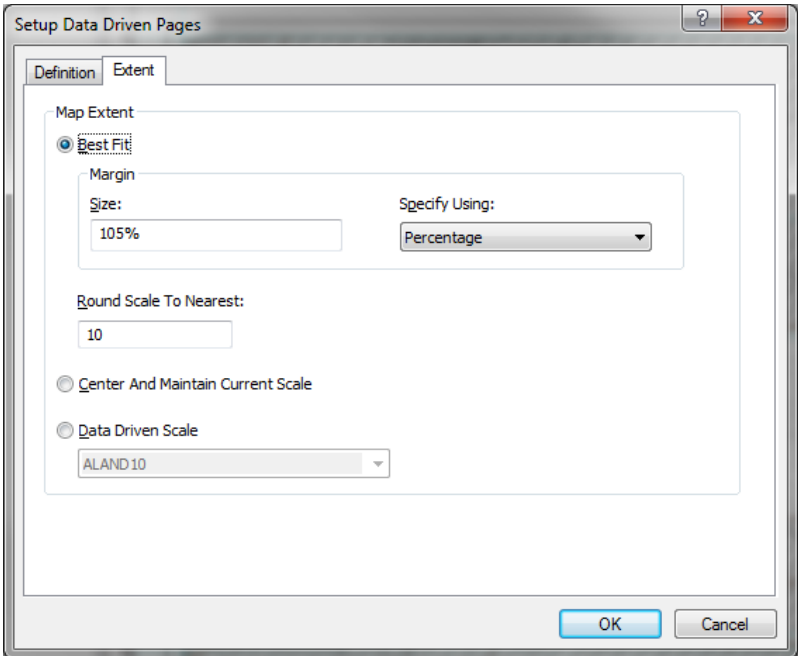


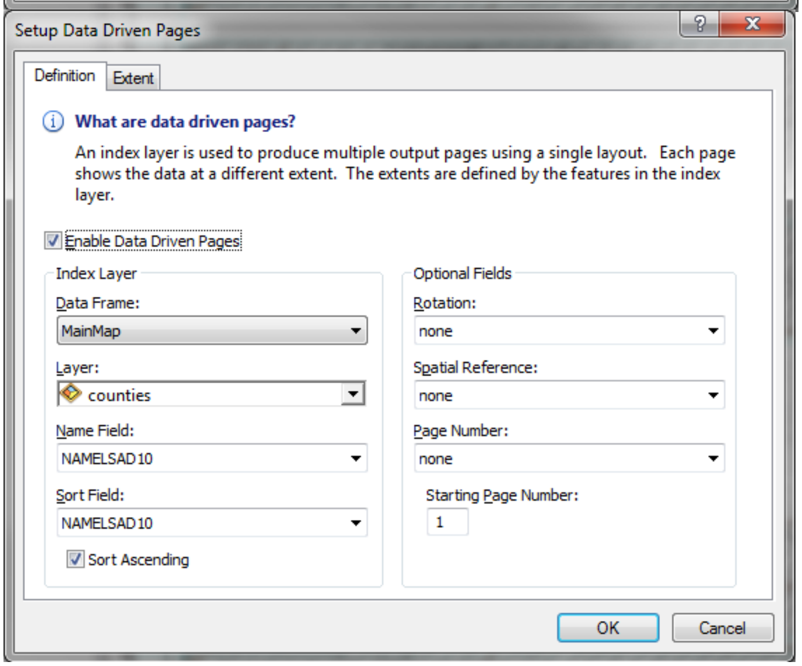
(4) After you map the data source for each layer, open the Properties for each layer and go to the Symbology tab. Click on the "Count" heading in the Category table (this will show the number of records for each category – the symbology might not register if you skip this step)

(5) Replace "Provider Name" with your provider's name in the title. Make sure that the Title still fits in the allocated space, i.e. your provider name may take up 2 lines or you may have to change the text size (easiest solution is to enter your text and then just click the "Size and Position" tab and enter a width of 2.3 inches).

(6) If the DDP toolbar is not showing, go to Customize > Toolbars, and click on Data Driven Pages.

(7) Click on the DDP Setup button  and verify that the settings match what is shown below.

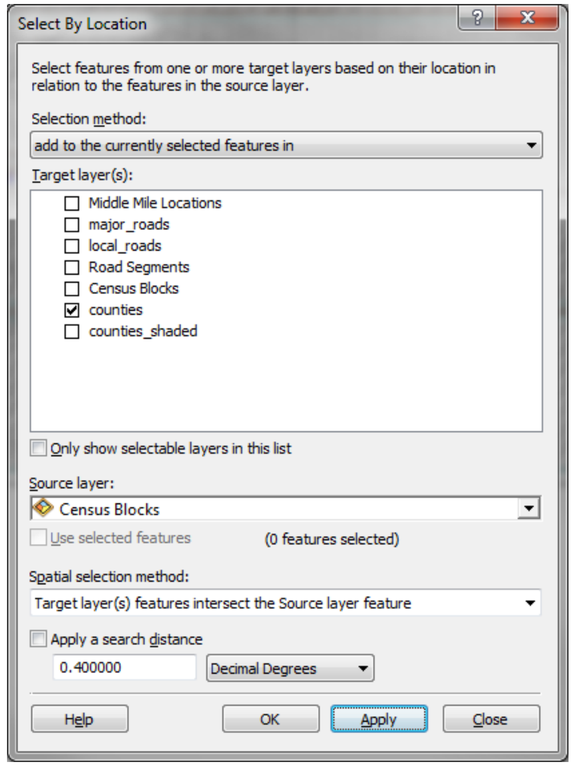




(8) The DDP Toolbar lets you page through to view how each county will be exported. However, we only need to export counties that contain provider data.

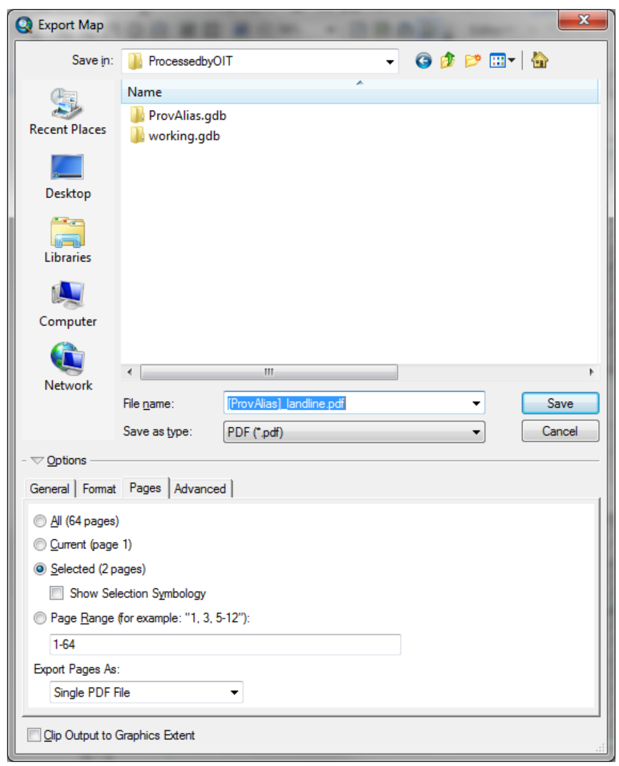
(9) Select the counties that contain provider data (this selection determines which counties are exported to the mapbook document)

- Make sure the MainMap data frame is active and choose Selection > Select by Location.
- Selection method: "add to the currently selected features"
- Target Layer: counties (the top counties layer)
- Source Layer: choose one of your provider data layers
- Click 'Apply'
- After hitting 'Apply', choose a different provider data layer as a Source Layer, and click 'Apply' again
- Repeat for all provider data layers



(10) Export the mapbook:

- Click File > Export Map…
- Navigate to your workspace and name the file *[ProvAlias]_landline.pdf* or *[ProvAlias]_wireless.pdf*
- Change the output image quality to "Normal" on the 'General' Tab under Options (this will reduce the PDF file size)
- Click the 'Pages' tab under Options and click the 'Selected' radio button
- Export Pages As: Single PDF File
- Click 'Save'
- Open the PDF to verify accuracy (ie. all necessary counties are included, all pages were exported correctly)



Note: there have been some issues with the "Local Roads" layer interfering with the export. The temporary solution is to change the Transparency of that layer to 0% for the export.

(11) If the PDF export is too large to send in one email, you can make multiple copies of the PDF, and use Adobe Acrobat Pro to delete pages from each copy accordingly

7.5. Validation

The processed data must be validated against various data sets maintained by the Colorado Broadband Team and the NTIA.

7.5.1. Speed Tests

The Colorado Broadband Team collects and maintains data for various broadband speed testing methods. The data is processed to GIS format (mostly point feature classes with speed and transmission technology information). These databases include:

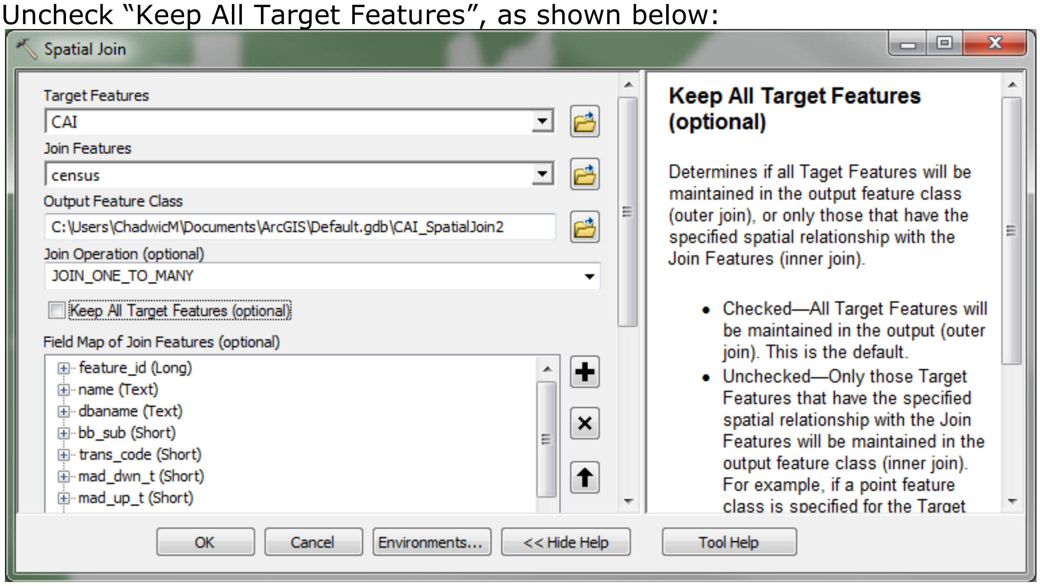
Community Anchor Institute (CAI) Speed Tests
Survey Data
Drive Tests (for Mobile Data Only)
FCC Validation Data

Use the following steps to validate provider data against speed tests:

(1) Open ArcMap and add the desired speed test feature class and the provider census block feature class.

(2) Buffer the Speed Test layer by 150 feet

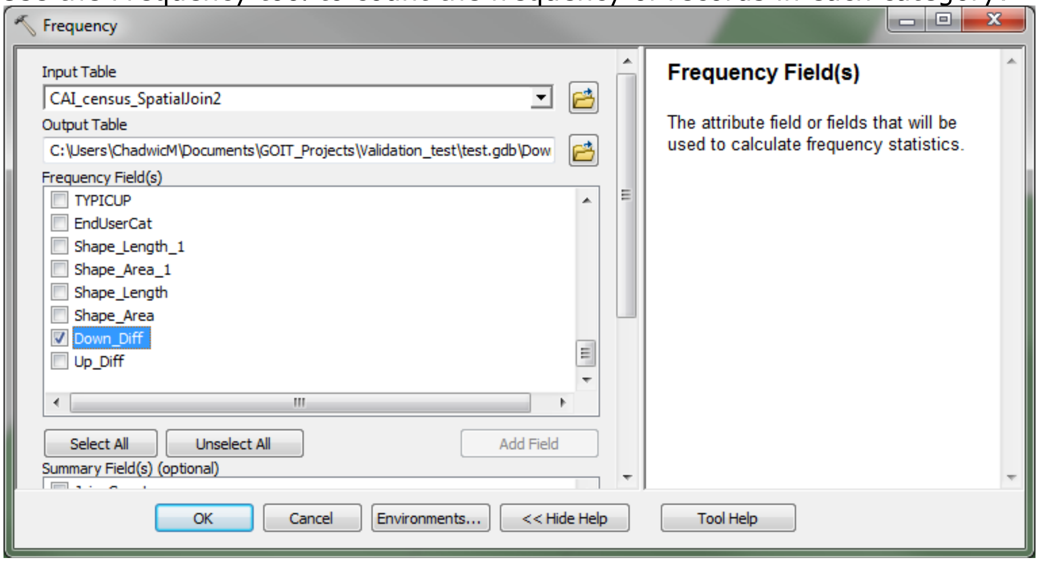
(3) Perform a Spatial Join, using the speed test as the Target Features and the census blocks as the Join Features. Choose JOIN_ONE_TO_MANY as the Join Operation and Uncheck "Keep All Target Features", as shown below:



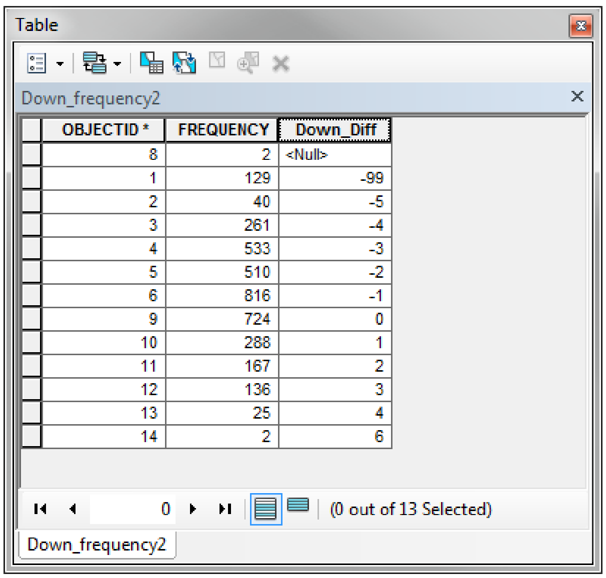
(4) Add 2 fields to the SpatialJoin feature class, and use the code below to Calculate each field:
- Down_Diff (short integer): [mad_dwn_t] - [MAXADDOWN]
- Up_Diff (short integer): [mad_up_t] - [MAXADUP]

(5) Select records that do not qualify as broadband:
- Select records with download speed tests under 768 kbps (i.e. Speed Tiers 1 and 2) and calculate the Down_Diff value to -99.
- Select records with upload speed tests under 200 kbps (i.e. Speed Tier 1) and calculate the Up_Diff value to -99.

(6) Use the Frequency tool to count the frequency of records in each category:



(7) Use the resulting frequency table to fill out the table below:



OBJECTID *	FREQUENCY	Down_Diff
8	2	<Null>
1	129	-99
2	40	-5
3	261	-4
4	533	-3
5	510	-2
6	816	-1
9	724	0
10	288	1
11	167	2
12	136	3
13	25	4
14	2	6

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1		**Speed test Tiers Slower than Adv Speed**							**Same Tier**	**Speed test Tiers Faster than Adv Speed**						**Total**
2	Speed Diff	**<768 kbps**	**-6**	**-5**	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	
3	FREQUENCY	129	0	40	261	533	510	816	724	288	167	136	25	0	2	
4	Totals	2289							724	618						3631
5	Percentage	63.0%							19.9%	17.0%						100.0%

7.5.2. NTIA Assessment

The NTIA provides each state with the results of the National Broadband Map Data Quality Assessment. The assessment compares the following broadband elements (from the previous delivery):

Provider Name
Technology of Transmission
Maximum Advertised Download Speed
Maximum Advertised Upload Speed
Typical Download Speed
Typical Upload Speed

and provides three types of results:

Matched (the compared elements matched)
No-Match (the compared elements did not match)
Not Compared (the elements were not or could not be compared because:
  a. If Provider Name does not match, no other comparisons are performed
  b. If Technology of Transmission does not match, no speed comparisons are performed)

Since this is an assessment of data from the previous data delivery, it is only applicable to past providers. The data may be analyzed to identify any inconsistencies or red flags within the data, and that information can be conveyed to the provider

Data processing involves calculating the number of matched features versus unmatched features for each broadband element:
(1) Calculate percentage of Provider Name matches
(2) Calculate percentage of Technology of Transmission matches, not including the "Not Compared" records (i.e., records with un-matched Provider Name)
(3) Calculate percentage of Speed (for each Max Advertised/Typical, Down/Up) matches, not including the "Not Compared" records (i.e., records with un-matched Provider Name or Technology of Transmission)

Example: Dataset with 100 records. In the provider name comparison there are 10 unmatched records, which are not compared further. Of the 90 records compared for TransTech, there are 10 unmatched records, which are not compared further. The 80 records that matched both Provider name and TransTech are then compared by Speed Tier.

Provider Name				
Unmatched	Matched (#)	Matched (%)		
10	90	90.00%		
	TransTech			
	Unmatched	Matched (#)	Matched (%)	
	10	80	88.89%	
		Speeds		
		Unmatched	Matched (#)	Matched (%)
	MaxAdDown	10	70	87.50%
	MaxAdUp	10	70	87.50%
	TypicDown	20	60	75.00%
	TypicUp	20	60	75.00%

8. NTIA Final Format

******Final Format Tool: loads data from Provider gdbs into the Final gdb.***

(1) Load data from all Providers into the Final Format NTIA Transfer Database:

…\BroadbandProductionArea\Workspaces\2012October_FinalProduct\SBDD_Transfer.*gdb*

(2) Update Metadata

9. Tool Development

9.1. Functional Tools

9.1.1. CalcMaxMinAddr.py

Purpose

Designed for TIGER Streets Feature Class, the script checks address ranges on each row, puts them into a list, sorts the max/min range numbers, and then populates the ADDMAX and ADDMIN address cells.

Tool Initiation

Initiated on TIGER Base Layer with each new update

Tool Properties

Developed with: Python Script 2.5.1
Created By: Larry Norden
January 2012

9.1.2. CalcStreetName.py

Purpose

Designed for TIGER streets feature class, concatenates parsed street address fields 'PRETYPABRV', 'NAME'. TIGER Standard parsed streets into 6 components; whereas, NTIA parses street addresses into 4 components

Tool Initiation

Initiated on TIGER Base Layer with each new update

Tool Properties

Developed with: Python Script 2.5.1
Created By: Larry Norden
January 2012

9.1.3. XYCode.py

Purpose

Automates the process of taking Excel Data, import into .*gdb* as dBASE, convert DMS to DD if necessary, and produce a point.shp as final output with all necessary fields.

Tool Initiation

Tool initiated on Raw Data and automates to GIS Format; output is spatial data.

Tool Properties

Developed with: Modelbuilder 9.3.1, Microsoft Silverlight C#: Windows Application, Python Script 2.5.1
Created By: Windy Fischer
December 2011

9.1.4. CensusRoads.py

Purpose

Automates process where Census Blocks and Roads are selected from coverage shapefile.

Tool Initiation

Tool initiated on Coverage shapefile (point, line or polygon) and selects Census and Roads; output is Census and/or Roads layer

Tool Properties

Developed with: Modelbuilder 9.3.1, Python Script 2.5.1
Created by Megan Chadwick
January 2012

9.1.5. NTIAFinalFormat.py

Purpose

Loads all gdbs in the identified staging area folder into the identified template IF the feature classes are the same schema.

Tool Initiation

Tool initiated on Staging area folder and loads into template. Full dataset template will need to be manually loaded into the final SBDD_TRANSFER

Tool Properties

Developed with: Modelbuilder 9.3.1, Python Script 2.5.1
Created by Megan Chadwick
August 2012

9.1.6. StagingFormat.py

Purpose

Adds and calculates all fields necessary for NTIA delivery. Calculates defaults where NULL values are found. Populates provider information from lookup table.

Tool Initiation

Tool initiated on provider data in processed format. Creates a provider gdb for Staging Area

Tool Properties

Developed with: Modelbuilder 9.3.1, Python Script 2.5.1
Created by Windy Fischer
August 2012

CT Broadband Mapping

Data Processing Report

Supplement

Submission 6

October 1, 2012

CONNECTICUT PROGRAM OVERVIEW

In response to the Notice of Funds Availability published in the Federal Register on July 8, 2009 (NOFA), the State of Connecticut Department of Public Utility Control (CT DPUC) submitted a grant application for consideration under the National Telecommunications and Information Administration's (NTIA) State Broadband Initiative Grant Program (SBI), for broadband mapping. The CT DPUC, pursuant to Executive Order 32-A, was designated as the single Connecticut state entity eligible to apply for funds under this program.

In July of 2011, the CT DPUC was merged with the CT Department of Environmental Protection to form a new agency called the Department of Energy and Environmental Protection (CT DEEP). CT DEEP will now be the lead agency coordinating with NTIA on this program.

The State has long been committed to broadband delivery and enhanced use as a fundamental goal. The State has developed a planning strategy to marshal the State's resources and stakeholders and establish Connecticut as a leader in broadband usage, in addition to being a leader in "e-Government" and other broadband-dependent endeavors.

The State entered its SBI initiative not possessing any data related to broadband service, availability, or infrastructure that could readily support the requirements of the Broadband Data and Development grant program. Due to technical considerations, DEEP has partnered with Applied Geographics Inc., and subcontractor Sanborn, to support the data collection and mapping efforts.

So far CT has been very successful in acquiring the requested information from the broadband service providers, and is utilizing this information on our own http://CT.gov/Broadband website as well as providing the needed information up to NTIA to support the national map.

FALL 2012 SUBMISSION OVERVIEW

According to both our research and lists provided to use by NTIA, there was the potential for CT to have up to 141 broadband providers:

We contacted every provider on this master list.

51 Companies stated they do not provide any type of broadband service in CT. Many of these are either national carriers without a CT presence, or they file 477 reports because they provide VOIP or Video Teleconference services (but not broadband).

360 Networks
8x8, Inc.
Accessline Communications Corporation
Acecape Innovative Networks
AlphaStar
American Fiber Network, Inc.

American Fiber Systems, Inc.
Apptix, Inc
Aptela, Inc
Bellsouth Long Distance, Inc.
Broadcore, Inc.
CIMCO Communications, Inc.
Custom Network Solutions
Cybershore
Echostar
Global Crossing North America, Inc.
GlobalPhone Corp.
GreatCall, Inc
Hickory Tech Corporation
i2 Telecom International, Inc
IDT Corporation
inContact, Inc
InPhonex.com, LLC
Intra Global Communications Inc.
IP Communications, LLC
ITC^DELTACOM Communications
Kosmaz Technologies LLC
M5 Networks, Inc
Matrix Telecom, Inc
New Global Telecom, Inc
Ooma, Inc.
Phone.com, LLC
Qwest Interprise America, Inc.
RCN Corporation
RingCentral, Inc.
Sage Telecom, Inc
SBC Long Distance, LLC
SkyTerra LP
SkyWay, USA
Software Cellular Network Ltd.
Stella Communications
Tata Communications (America) Inc.
Telefonica Data Corp SA
Telefonica USA, Inc.
University Corporation For Advanced Internet Devel
VoiceINC.COM Corporation
VoIPnet Technologies
VoIPStreet, Inc.
Vonage Holdings Corp
Zayo Enterprise Networks, LLC

23 Company names turned out to be a DBA or legal holding names for another firm that is listed in another category. So these duplicates were dropped from our list.

A-R Cable Investments, Inc.
AT&T Corp.
AT&T Services, Inc.
Broadwing Communications, LLC
Cablevision Lightpath CT
Cablevision Systems Corporation
Cellco Partnership
COMCAST CABLE COMMUNICATIONS, INC
Connecticut DataNet, LLC. dba Lightower Fiber Netw
DataNet Communications Group, Inc.
Deutsche Telekom AG
DSLnet Communications, LLC
DSLnet Communications, LLC (Megapath)
Enventis Telecom Inc.
Harron Communications LP
Hudson Valley DataNet, LLC.
Hughes Communications, Inc.
New Cingular Wireless Services, Inc.
Saturn Telecommunications Services, Inc
Verizon Business Global LLC dba Verizon Business
Verizon Communications Inc.
WilTel Communications Group, LLC
Yipes Holdings, Inc

31 Companies reported that they are strictly resellers (which we are not including in our submission).

ACN Communication Services, Inc
Airespring, Inc.
Bandwidth.com, Inc
BCN Telecom, Inc.
BullsEye Telecom, Inc.
Caused Based Commerce Incorporated
Cypress Communications, LLC
Direct TV
Dish Network
Earthlink
Ernest Communications, Inc.
Fionda VOIP, LLC
Granite Telecommunications LLC
Lightyear Network Solutions LLC
Metropolitan Telecommunications Holding Company
New Edge Holding Company
One Communications Corporation

PAETEC Communications, Inc.
Prescient Worldwide
Proximiti Communications
Reallinx, Inc
Smart Choice Communications, LLC
Stage 2 Networks, LLC
Telesphere Networks Ltd
Trans National Communications International
Transbeam Inc.
TW Telecom Data Services
VCOM Solutions, Inc
Wholesale Carrier Services
Wholesale Carrier Services, Inc
Windstream

8 Companies may be broadband providers, but either they indicated they are not willing to provide data, or were completely unresponsive to multiple attempts of contacting them.

Advanced Corporate Networking, Inc.
DSCI Communications, Inc.
Great Auk Wireless (GAW Communication)
Interglobe Communications, Inc.
Meriplex Communications, Ltd.
One Communications Corporation
SkyWay USA

27 Broadband providers submitted new or updated data:

AT&T Inc.
Broadview Networks, Inc.
Cablevision
Charter Communications
Clearwire
Cogent Communications, Inc.
Comcast
Connecticut Educational Network /CEN
Cox Communications
CSC Holdings, Inc
Fibertech Networks, LLC
Groton Utilities
HNS License Sub, LLC
Level 3 Communications, LLC
Light Tower Fiber Long Island, LLC
Megapath/Covad Communications Grou,p Inc.
METROCAST COMMUNICATIONS OF CT
Reliance Globalcom Services, Inc.
Sidera Networks
Skycasters
Sprint Nextel Corporation
StarBand Communications, Inc.
T-Mobile USA, Inc.
Verizon New York Inc.

Verizon Wireless
Wave2Wave Communications Inc.
ViaSat/Wild Blue Communications, Inc.
XO Holdings, Inc.

For the Fall 2012 submission (S6), roughly 60% of the state providers submitted either entirely new or significantly revised data sets. This is slightly down from the last submission where approximately 65% of the providers submitted either entirely new of significantly revised data sets.

In general, the submission 6 processes followed the same basic approach that was used in earlier submissions. This document summarizes the following:

- Submission 6 Processing Assumptions
- Reference Data Creation
- Processing of new provider data
- Additional automated quality control checks
- Improved validation techniques
- NTIA quality control scripts
- NTIA Submission Data Model Schema Changes

An additional quality control step and additional validation were also performed on this submission to assure the quality of the data submitted.

SUBMISSION 6 PROCESSING ASSUMPTIONS

Based on NTIA feedback and information provided in NTIA webinar sessions, the submission 6 data processing workflow is based on the following assumptions to meet NTIA submission requirements.

1. All census blocks and road segments are mapped based on 2010 census data set. Any data submitted in 2000 or 2009 format was converted to 2010 for submission.
2. For this submission we again requested actual speed data from the providers in addition to max advertised and typical speeds. Approximately 80% of the providers provided this data to us. This data was then populated into an internal data model, was used to support validation efforts, and will be used to enhance the functionality of the state broadband web site.
3. Due to our NDA restrictions, last mile points are still not being submitted to NTIA.
4. Due to NDA restrictions and our inability to accurately flag service by “category of end user”, address points were not submitted to NTIA for any commercial provider.
5. Some providers did not submit middle mile elevation. Wherever possible, we went back to providers to obtain their middle mile elevation information, but it is not available for every record. Due to changes in the NTIA check script, when a provider provided us with and elevation that was negative (below grade level), this value was changed to zero so the check script would not report a failure even though we feel this is inaccurate.
6. Terrestrial Mobile Wireless and Terrestrial Fixed Wireless (licensed and unlicensed) were again treated as wireless coverage and were delivered as a shape. In cases where a provider served

the same technology and spectrum with different speeds, overlapping areas were removed and the higher speed was assigned.

7. If a cable based wireline provider can provide both DOCSIS 2.0 and DOCSIS 3.0 service to the same area, the block or road was listed only once with a technology code of 40.
8. Providers were only willing to indicate on a general level if they severed business, residential or both, so we did not get any providers that broke down the type of service by block. Only if the provider stated they only serve business to business customers did we fill in the "category of end user" with a code of 2, otherwise this field was left blank.
9. The submission 6 Provider data model is currently based on the NTIA June 2012 data package.

SUBMISSION 6: REFERENCE DATA

This section describes the reference data used in submission 6.

BLOCK REFERENCE SETUP

For Submission 6, Census 2010 data was utilized. The data was set up as follows:

- Block size (AREA) is calculated combining the 2010 land area (ALAND) and water area (AWATER)
- AREA is converted from square meters to square miles to calculate square mileage (SMI).
- If the SMI of a block is less than or equal to 2, then the less than or equal to 2 square mile indicator (LE2SMI) is set to true.

ROAD REFERENCE SETUP

2010 Tiger Line IDs (TLID) were used for data processing in S6. The data was set up as follows:

- The GT2SMI (Greater Than 2 Square Mile) indicator is set to True when:
  - The 2010 road segment is completely within a block that is NOT less than 2 square miles
- Only minimum and maximum address ranges and a single zip code for each road segment is maintained.

SUBMISSION 6: PROCESSING OF NEW DATA

For submission 6, AppGeo started data collection on July 5, 2012 by sending out data update requests and technical data specifications to all providers. This incorporated all the NTIA changes released as of August, 2012. These were sent to a large list of companies which were compiled from past collection efforts, and the revised FCC 477 list. All new data was requested using Census 2010 geography whenever possible.

We then actively followed up with the providers. As we had discovered in the past, many of the providers listed on the FCC 477 list are either resellers, or not involved in the actual delivery of broadband. (Many are VOIP or teleconference service providers that utilize existing broadband connections.)

In our solicitation for data updates, we told known past providers that if we didn't hear from them by a certain date, we would default to using their data from Submission 5. We contacted them after the due date a few times but for six providers, we eventually had to just reuse Submission 5 data.

All data received went through the following processing steps:

1. **Triage**: All new data was quickly reviewed to understand what was received, and in what format. We also made sure we had all the required components for NTIA's data model, such as their FRN and advertised speed information. We also screened for any known issues that we might have seen before (such as Excel 2003 spreadsheets that cut off at 32k rows.)
2. **Ingest**: At this time the data is actually brought into our systems. Each provider is set up with a unique file geodatabase to store their information. Record counts of what was received is logged so that we can validate we did not drop anything in processing.
3. **Data Processing**: This is where the data goes through a number of ETL routines to convert the raw proprietary information into a format similar to the NTIA format. The exact routine utilized depends on how the data is received:

a. When a wireline provider submits a service boundary, we select all the blocks and roads inside that shape.
b. If a wireline provider submits a customer address list, the points are geocoded, and then the appropriate block or road segment is selected.
c. If a wireline provider submits block and road information using Census data, we just make sure everything is formatted to the appropriate specifications
d. If the wireline provider submits any type of road or line data that does not direct correlate to the TIGER data set, we convert the lines to TIGER by selecting the road centroid and spatially selecting the closed segment in our data set. If the road is in a block less than 2sqmi, than the block is selected. Some manual cleanup is also applied to make sure we do not accidentally drop any road segments that should have been processed.
e. Wireless provider data is formatted to ensure that there are no any overlapping polygons with the technology type. In addition the data is cropped to the state boundary.
f. After each round of processing, we make sure that we only keep unique records. A unique record is defined as having a one of a kind combination of FRN, Block/Road ID, and technology type. If there are multiple records with different speeds, but all else is equal, than we select the maximum of the advertised speeds.

4. **QC Review**: All data is then sent to a different analyst to perform a through quality control review on the processed data set. Record counts are compared to what was submitted. The QC staff also make sure the ETL scripts and routines populated all of the right fields.
5. **QA Review:** Data is then sent to another team for Quality Assurance Review. In this step the data is not only double checked against what was originally submitted, but it also brought up inside standardized MXD templates that allow us to make sure our results make sense. This often involves comparing the new data set with prior submissions, as well as looking for any possible technology or speed anomalies. At this stage we also start in on our validation process. This includes looking at the provider data in comparison to things such as speed test results, franchise boundaries, siting information, and feedback from the planning surveys.
6. **Provider Review:** Processed data is all posted to a customized web application we refer to as our Provider Portal. All providers were notified once their data was available in the site, and they were always given at least ten business days to review the data and respond. In this site, providers can log on and visually see their processed data in a map format. It also allows them to overlay their raw data to help them validate that we did indeed process things correctly. The provider portal also has a suite of markup tools that will allow the providers to edit their data, including adding or removing service areas, and making changes to the data attributes.
7. **Comment Processing:** All comments and feedback received from the provider portal, is then reviewed and applied to the processed data set. This updated data set goes back through our QA and QC processes, and if time allows, back out to the Provider Portal, for the provider to review and sign off on.
8. **Data Append:** After all of the individual data sets are processed and approved, we run an append process which merges all of the individual provider data sets into one geodatabase. This is also the point where our team will do any final transformations to get our working data model into the latest NTIA publishing format.
9. **Submission Comparison Check:** Starting with this submission an additional check was added to our quality review process. An application was written that compares the individual provider's unique data that is stored in their unique file to that which is stored in our final appended file and the NTIA submission data. Any variation in each of these data files in thoroughly investigated and resolved. This was done to assure no data loss or data transformation issues. We also compare the submission 5 dataset to the submission 6 dataset, review any variations and assure that the changes found can be documented as being requested by the provider.

10. **Final QA/QC:** A series of quality checks are run on the final appended data sets to ensure it is ready for submission to NTIA. We also run the latest version of the NTIA receipt tool at this time. If any issues are flagged as failing they are reviewed and corrected. All warnings are also reviewed and either corrected or documented in the attached document which explains that we have validated this data and it should be accepted. Any last issues are corrected, and the data is sent to the state for their review.
11. **Submission to NTIA**

As with the fifth data submission, we followed the following protocols:

1. We did not collect data from resellers
2. We collected data from satellite providers, only if they were able to provide to us all of the required information we need to pass onto NTIA: including spectrum, FRN, and advertised speeds.

COMMUNITY ANCHOR INSTITUTIONS DATA

The community anchor institutions data was primarily populated through State resources, in particular the CEN database which services many schools, colleges, and libraries. The CEN database was significantly improved for this submission by working closely with the state's BTOP team.

We also were able to get a connection survey results for all the libraries through the state library association. Location information for all other CAI points, notably, police, fire, and town halls, were obtained through the Department of Public Safety. All of this information was then populated into an online data gathering and validation web based application. Each town was contacted and asked to update their respective site information. While the web based responses have not been as high as we would like, we do feel that we are fortunate to have a good base set of data from the state.

CONNECTICUT SPECIFIC INFORMATION

Due to Connecticut's geography and population, 99.75% of the census blocks in the state are less than two square miles. The need for us to break apart coverage based on blocks versus roads leads to a lot of unnecessary confusion as well as creates some distorted pictures when you try to visualize this information on a map. For this reason, all of the maps available on the CT.gov/broadband website are published after we convert all of the data to just use blocks.

In the documentation form NTIA there has been a lot of discussion about making sure that a provider uses the same DBA and FRN consistently across all feature classes. We mentioned this to the providers, but there was some push back. Most providers complied with this request, but a few providers pointed out that while they may share a common name, they actually operate as separate organizations. Also, due to regulatory implications of the different FRN's a few providers did insist that their records not be combined.

The State of Connecticut built and maintains the Connecticut Educational Network, which is used to provide one high speed network connection to each town in the state (typically fiber, but some outliers are still on DSL.) CEN network will typically install one fiber uplink in each town, and then it is the town's responsibility to provide connection between facilities. So for example CEN may supply the board of education's office with a 10mb connection, but then the board of education will run lines to each of the schools in the district. Because of this, many towns are reluctant to report speed information as there may technically be 10mb available to the school, but reporting that speed at each school would grossly overestimate how much connectivity they have in total, when in fact there may be 15 schools sharing that same uplink. In addition, CEN's primary mandate is to provide site to site connectivity between towns, and so they do not feel they meet the true definition of an internet provider, and as such, do not have a FRN. CEN is also limited by regulations to only support educational facilities, so they requested that their data only be shown as address points, as they cannot provide service to anyone else in that census block.

District of Columbia Fall 2012

State Broadband Availability Data Collection and Verification

Technical White Paper

District of Columbia Fall 2012
State Broadband Availability Data Collection and Verification Technical White Paper

Award #:	**11-50-M09011**
Award Period:	**10/1/2009 - 9/30/2014**
Project Type:	**State Broadband Initiative**
Organization Name:	**District of Columbia Office of Chief Technology Officer**
Project Title:	**ARRA SBDD - District of Columbia OCTO**
Contact:	**Matthew Crossett, Interim Geospatial Technology Manager**
Email:	**matthew.crossett@dc.gov**
Submission Date:	**October 1, 2012**

Introduction

The State Broadband Initiative (SBI) Program is a grant awarded by The National Telecommunications and Information Administration (NTIA), a division of the U.S. Department of Commerce. This Program is designed to fund projects that gather comprehensive and accurate state-level broadband mapping data, develop state-level broadband maps, aid in the development and maintenance of a national broadband map, and fund statewide initiatives for broadband planning.

The following white paper describes the data integration and verification processes employed by the District of Columbia in preparation of the broadband availability data submission to NTIA. This data collection is to be conducted on a semi-annual basis over a five-year period. The Fall 2012 data submission reflects conditions as of June 30, 2012.

The paper is divided into eight sections:

Section 1 - Data Description: describes October 1, 2012 deliverables to NTIA.

Section 2 - Provider Participation: summarizes provider cooperation.

Section 3 - Data Collection: describes outreach and collection efforts.

Section 4 - DC Geospatial Data: describes the role of DC GIS data in broadband data processing.

Section 5 - Data Integration and Processing: describes data manipulation steps.

Section 6 - Data Validation: describes efforts to validate the data received.

Section 7 – Documentation and Submittal: Includes the NTIA final checklist steps.

Section 8 – Appendix: Documentation, forms, and maps

SECTION 1 - DATA SUBMISSION DESCRIPTION

The District of Columbia's Fall 2012 submission consists of the following files:

DC_SBDD_20121001.zip – Consolidates all other files for the purpose of data transfer.

DC_SBDD_2012_10_01.gdb – An ESRI file based geodatabase that conforms to the data model distributed by NTIA. It contains primary data and metadata. The District provides NTIA with five data sets:

- **Community Anchor Institutions** – The location of community serving institutions and information about their broadband connections – if known.
- **Middle Mile Connections** – The locations and attributes of infrastructure that interconnects broadband networks.
- **Wireless Broadband Availability** – The service territories and attributes of wireless broadband providers including terrestrial fixed wireless and satellite.
- **Wireline Broadband Availability –** The territories and attributes of wireline broadband providers with 2010 Census Block geography.
- **Metadata –** Information about the data sets described above.

DC_DataPackage_2012_10_01.xls –A report on broadband providers contacted and the status of their submissions.

DC_2012_10_01.txt – An analysis of DC_SBDD_2012_10_01.gdb known as the "data submission receipt." This file is created by an automated script supplied by NTIA.

DC_Methodology_2012_10_01.**pdf** – An electronic version of the following document.

DC_Readme_2012_10_01.txt – A reduced file with the same information found in the header and section 1 of this white paper.

SECTION 2 - PROVIDER PARTICIPATION

- The Public Service Commission contacted 125 prospective broadband providers.
- Of those, 33 are believed to be providing broadband service in the District and are listed in DC_DataPackage_2012_10_01.xls.
- Of those, 23 meet the NOFA definition of available (either wireline and or wireless).
- 10 providers submitted middle mile data.

SECTION 3 - DATA COLLECTION

Collection of Broadband Availability Data

The District of Columbia Office of the Chief Technology Officer ("OCTO") was awarded a grant from NTIA to map the availability of broadband services in the District of Columbia ("District"). OCTO has delegated to the District of Columbia Public Service Commission ("PSC") the responsibility for all interaction, including data collection, with the broadband service provider community.

Process Steps

- **Identifying and Contacting Broadband Providers -** The work of identifying providers is conducted by the PSC. The PSC reviewed its own records and those of the FCC. The initial identification of providers took place prior to the spring 2010 data call and has been refined for each NTIA submission. Firms identified as providers were:
  - All firms in PSC records as providing any kind of telecommunications service in the District.
  - All firms identified by the FCC having filed a form 477 for broadband service in the District.
  - **Contacting providers -** The PSC requested the assistance and cooperation of all commercial broadband service providers that provide service to any residential, business, institutional, or government entity located within the District, to provide the PSC with broadband service location data. Whenever possible, providers are initially contacted by email. The package of material sent by the PSC to providers:
    - **A letter from the Chairman of the District of Columbia Public Service Commission.** Sample letters can be found in **Appendix 1**. Providers receive one of two letters based upon their previous submission:
      - Providers that submitted data from the previous round and met the NOFA broadband service and availability definitions.
      - Providers from the previous round that did not meet the NOFA definitions or are new BSPs.
    - **Non-Disclosure Agreement** (NDA) The PSC offers every provider opportunity to enter into a NDA between OCTO and the Provider. The standard OCTO NDA is shown in **Appendix 2**. The NDA explains how OCTO will handle the submitted data; including what portions of the data will be submitted to the NTIA and what derived products will become part of the public website on broadband services available within the District that is maintained by OCTO. Key provisions of the District's standard NDA include:

- OCTO will provide the data to NTIA for the National Broadband Map.
- The service territories of individual providers will not be made public by OCTO, but OCTO has created a public web site that allows users, including potential broadband service subscribers, to enter any valid address in the District of Columbia and be referred to all the broadband service providers offering service at that location.
- Form 477 subscriber count data from all companies will be aggregated by OCTO at the Census Tract level. OCTO will use this information to estimate the residential broadband adoption rate by Census Tract. Estimated broadband service adoption rates will be made public, but the market share of individual broadband service providers will not be revealed.

▪ **Provider Submission Form -** The form is a Microsoft Excel based questionnaire which is accompanied by a glossary. **Appendix 3** contains a copy of the form and glossary. The form collects information on:
  - The Provider (Includes: business name, DBA name, FRN#, URL, etc.)
  - Transmission Technology
  - Business type (facility based or reseller)
  - Service Territory
  - Maximum advertised and typical upload and download speeds
  - Wireless spectrum
  - Middle mile connection points

▪ **Technical Document –** The document provides detailed information on the requested data, data formatting, and data submission. The document is sent to providers that meet the NTIA definition of broadband availability.

o **Interaction with providers –** While we hope that all providers complete our forms, not all do. In practice OCTO will accept a variety of submission types and our policy is to work with providers interactively via email and phone whenever we or they have questions.

SECTION 4 - THE ROLE OF DC GEOSPATIAL DATA

DC GIS maintains several datasets that are integral to processing provider submissions. Each dataset and how it is employed is described below:

DC GIS Data Set (Click link to view and double click and zoom)	**Description**	**How the data is used in broadband processing**
Imagery	6" resolution 2010 ortho corrected imagery	GIS analysts superimpose provider service territory on imagery to ensure that submission fit the ground in a credible way. For example, do we have wireline service over water or parks?
DC Base Map	1" to 100' planimetric map.	Used similarly to imagery.
Master Address Repository	A precisely located point for every address in the District	Used to process address lists submitted by broadband providers. Also used to locate and map Community Anchor Institutions.
Education Libraries Health Public Safety Recreation	A variety of GIS layers that include Community Anchor Institutions locations	Used to identify and survey as many Community Anchor Institutions as possible.
Real Property	Ownership data with use codes	Used to ensure that broadband providers who provide to business are not shown as providing service in residential areas.
InfoUSA ISP Connectivity Database	Connectivity provider and connection type records by IP	Used to verify provider service area.

SECTION 5 - DATA INTEGRATION

- **Broadband Provider Data Submission Check-in**
  - Provider data submissions are received in several ways
    - Providers send email file attachments to the PSC.
    - Providers submit data by courier.
    - Providers upload the data to a secure OCTO FTP site.
    - Provider notifies the PSC that data has not changed since last submission
    - Submit updates through the Provider Portal.
  - PSC will then contact OCTO that new data has been received.
  - Scanned for viruses.
  - Entered into a submission tracking database.
  - Give an initial review to ensure that each major component is present.

- **OCTO Data Ingestion –** The District of Columbia has implemented data submission and data processing tracking software. After the submission has been checked in by the PSC and received by OCTO, the provider submission status is entered into a data tracker database to reflect the current status of receipt and contents of the submitted data package.

- **Wireline Data Processing -** The following information was collected.
  - Provider Name
  - Doing Business As Name
  - FRN (Federal Registration Number)
  - Census Tract and Block number
  - Technology of Transmission
  - Maximum Download speed
  - Maximum Upload
  - Typical Download Speed
  - Typical Upload Speed

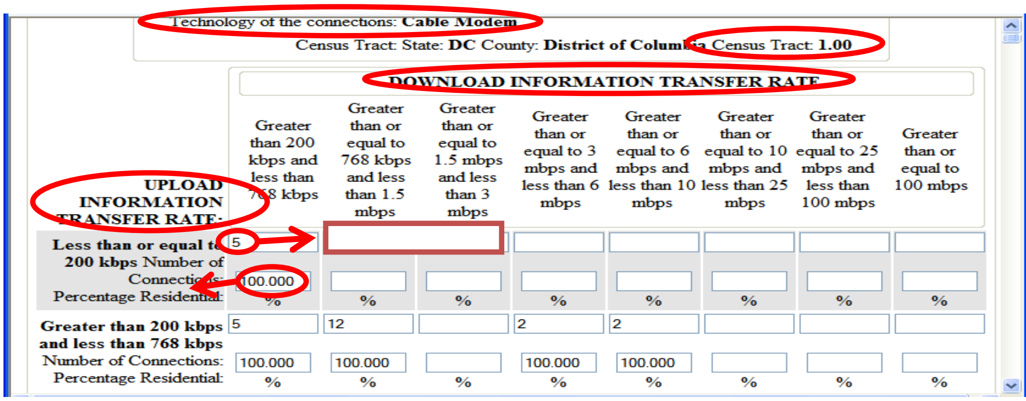
- **Wireline Data Processing - Geography**
  - **Service territory description -** In order for a provider to be eligible and have their data processed, the Company's service territory must offer broadband service to new customers within 10 days of a service order without extraordinary effort. Note: A Company can have multiple service territories within the District of Columbia, and those territories need not be contiguous. NTIA requires that the service territory be mapped

to the Census Block. Companies have several options for describing their service territory:

- **District-wide broadband service provider.** The Company must offer broadband service to all customers of the entire District of Columbia. If the Company meets the definition, the description of the Company's service territory is complete. The following definitions apply:
  - **"Broadband service"** is the provision to end users of two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (Kbps) downstream and greater than 200 Kpbs upstream.
  - **"Offer"** means that the Company can provide broadband service to end users (a residential, business, institutional or government entity) within 10 business days of a service order without an extraordinary commitment of additional resources. It also interprets "offer" to be a commercial service. We are not mapping free services such as Wifi hotspots at this time. District of Columbia's free Wifi hotspots are included in the Community Anchor Data.
  - The **"entire District of Columbia"** means that a wireline company offers service to residential, business, institutional, or government end users in every Census Block in the District. This definition expressly excludes parkland, cemeteries, institutional campuses, bodies of water. The definition also excludes real estate complexes where the landlord, condominium association, or similar entity controls the provision of wireline service. Even if the firm doesn't offer service in all categories, it can still be a District-wide provider. Providers that service non-residential customers only are restricted to reporting service to commercial, high density residential, and industrial areas as defined by property use codes. Any firm claiming to be a citywide provider receives greater scrutiny.
- **Non District-wide broadband service provider.** Any of the following may describe the Company's service territory:
  - **List of Census Blocks –** The Company may provide a list of Census Blocks in which they offer service. The list should be provided in a Microsoft Excel File or Text File with each Census Block listed on a separate row.

	A	B	C	D	E	F	G	H
1	County	Tract	Down	Up	Tech		Residential	%Residential
2	1	18.03	2	3	1		1	100
3	1	18.04	2	3	1		2	100
4	1	21.01	2	3	1		1	100
5	1	22.01	2	3	1		1	100
6	1	22.02	2	3	1		1	100

- **Address File** - If service is only offered to certain addresses, a list of those addresses may be submitted. Address lists (whether for buffering or not) should be submitted in a Microsoft Excel table or text file with each address on a separate row. Address lists are geocoded to the structure using the District's Master Address Repository. OCTO encourages providers to submit all addresses where service can be provided within 10 days not just the address of current subscribers.
- **Written Description –** The Company may describe one or more polygons. For example, a service territory in part of downtown could be described as "East of 23rd Street NW, South of K Street NW, West of 17th Street NW, North of Constitution Ave NW. " Alternatively, the territories can be described by using buffers, for example, "Within 500 feet of 441 4th Street NW Washington DC 20001."
- **Detailed Map(s)** – Submitted maps should delineate the service area boundaries and label all DC streets within those boundaries. The map may be a PDF file. Geographic Information System (GIS) or Computer Aided Design files may be submitted in lieu of a map.
- **Form 477** – The Form 477 already includes a list of Census Tracts where the firm has existing customers. Census Blocks nest within Census Tracts. Optionally, the Company may indicate that it wishes to use the Census Tracts already listed within its Form 477, minus a list of Census Blocks within those Tracts in which it does not offer service.



Technology of the connections: **Cable Modem**

Census Tract: State: **DC** County: **District of Columbia** Census Tract: **1.00**

DOWNLOAD INFORMATION TRANSFER RATE

UPLOAD INFORMATION TRANSFER RATE:	Greater than 200 kbps and less than 768 kbps	Greater than or equal to 768 kbps and less than 1.5 mbps	Greater than or equal to 1.5 mbps and less than 3 mbps	Greater than or equal to 3 mbps and less than 6 mbps	Greater than or equal to 6 mbps and less than 10 mbps	Greater than or equal to 10 mbps and less than 25 mbps	Greater than or equal to 25 mbps and less than 100 mbps	Greater than or equal to 100 mbps
Less than or equal to 200 kbps Number of Connections:	5							
Percentage Residential:	100.000 %	%	%	%	%	%	%	%
Greater than 200 kbps and less than 768 kbps Number of Connections:	5	12		2	2			
Percentage Residential:	100.000 %	100.000 %	%	100.000 %	100.000 %	%	%	%

- **Wireless Data Processing –** Wireless providers provide a polygon shapefile of their coverage area(s). If they are an existing provider they communicate if the coverage information has changed or resubmit a new shapefile of their coverage area. The majority of wireless provider's service areas are District-wide. The following information was collected.
    - Provider Name
    - Doing Business As Name
    - FRN (Federal Registration Number)
    - Technology of Transmission
    - Spectrum
    - Maximum Download speed
    - Maximum Upload Speed
    - Typical Download Speed
    - Typical Upload Speed

- **Middle Mile Data Processing -** Broadband service providers are also asked to list "middle-mile and backbone interconnection points" in the District of Columbia. Interconnection points are facilities that provide connectivity between (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. Collectively, (a) and (b) are middle-mile and backbone interconnection points. The following information was collected.
    - Provider Name
    - Dosing Business As Name
    - FRN (Federal Registration Number)
    - Ownership Status
    - Serving Facility Capacity
    - Serving Facility Type
    - Location
    - Elevation

- **Community Anchor Institutions -** As part of the reporting requirements for the grant, OCTO is required to collect a list of Community Anchor Institutions (CAI) and report broadband service available at these institutions. The dataset consists of schools, libraries, medical and healthcare providers, public safety entities, institutions of higher education, and other community support entities. Data is compiled from various district agencies and by contacting institutions directly. Non-government community anchors are contacted to complete an online survey. The survey requested the internet service type and service speed at the institution's location(s). **Appendix 4** contains a copy of the Community Anchor Institution online survey form.

- **Data Review and Consultation with Providers**
  - If a component of the submission is missing, an OCTO GIS analyst will contact PSC for assistance to receive the missing data from the provider.
  - PSC and OCTO will schedule several meetings before final submittal: to review what providers have submitted data and who has not, discuss action points that need to be addressed, and review the process for areas of improvement.
  - Contact providers as needed to verify the submitted data. Most providers respond openly and are willing to make changes to their submissions when questions are raised.
  - Contact providers to review the processed data through the provider portal mapping application.
  - The NTIA receipt script is run against each provider submitted dataset separately. Repairs and reruns are iterated until the dataset successfully passes.

SECTION 6 - DATA VALIDATION

During this stage, data from providers are compared with data from other sources. Discrepancies are noted and sent to the contributing provider for comment. Validation techniques vary by the type of data submitted [wireless, wire line, or middle-mile]. The following steps were taken to validate the data submitted:

- **Wireless Validation -** The District completed drive testing of major wireless providers. Drive tests were completed in a single vehicle employing multiple laptops and GPS. This was accomplished by installing computer and GPS hardware and software in a vehicle and testing and mapping upstream and downstream transmission speeds. At this time, the District has not shown the drive test data to providers nor discussed our collection techniques with them. This data was collected with public funds and is not covered by NDAs, but DC has not made a decision to release it publically at this time. All providers who claim to be providing citywide wireless service are providing it, and to that end the District will declare all providers who submitted service territories to be "valid". That said, speed of service does drop below the definition of broadband, and does vary across providers, place, and time. The District did not conduct new drive testing for fall 2012. The fall 2010 drive testing results can be found in **Appendix 5.**

- **Wireline Validation**
    - The District, through PSC, has made extensive use of FCC Form 477 data. The Form 477 is used to, verify that we have contacted the correct providers, compare the technology of transmission and speed of transmission between what was reported to the FCC and what was submitted by the provider, compare the geography reported to the FCC by census tracts with the areas submitted to the District by census blocks. When discrepancies are found, the providers are asked for more information.
    - The District purchased a database of broadband subscribers from a commercial mailing list company InfoUSA. This dataset and the FCC broadband test data are used to crosscheck data coming from providers. When discrepancies are found, the providers are contacted to determine the validity of the data.

- **Middle Mile Validation –** To date the district has not attempted to validate middle mile data other than checking locations against GIS base data to be sure they are plausible.

- **Final Review -** All data undergoes a standup review conducted jointly by OCTO and PSC staff. Do service territories seem plausible? Do speeds seem realistic? How do speeds compare to other providers using similar technologies? What is the total DSL, Cable, Fiber coverage and does it seem plausible?

- **Amalgamation and documentation** - Unless a provider's submission is conclusively invalidated (which hasn't happened) and the issue cannot be resolved with the contributing provider, it is included in the amalgamation phase. Until this stage, OCTO handles each submission separately. During this stage, all successful submissions are appended to the latest version of the NTIA/NSGIC geodatabase model, and requested transmittal forms are prepared.
    - The data is appended to the NTIA geodatabase model.
    - The amalgamated data is given a final quality review by the GIS Analysts involved in the broadband grant program.
    - FGDC Compliant metadata is prepared and included in the geodatabase.
    - The NTIA provided script is run for the last time on the data set as a whole.

SECTION 7 - DOCUMENTATION AND SUBMITTAL

Once past the quality review, the data package documents are updated the data sets are submitted to NTIA/FCC via secure FTP. The checklist provided by NTIA is below:

- Have you obtained a new clean Transfer Data Model?
- Have you followed the instructions for loading data into the Transfer Data Model?
- Have you run the receipt process (SBDD_CheckSubmission) and resolved all data integrity issues?
- Have you included your receipt text file as part of the package?
- Have you populated the metadata fields?
- Have you exported the metadata as .xml files?
- Have you obtained a new data_package.xls and filled it out appropriately?
- Have you included methodological description?
- Have you followed the required naming conventions of all the files?
- If you are resubmitting any data for the current collection, have you (a) deleted your previous submission (b) informed the Program Office or the FCC of your resubmission and (c) resubmitted your entire data package (e.g., the Program Office is not accepting an partial submissions)?

Appendix 1
Letters from Public Service Commission to Prospective Broadband Providers

PSC letter to Providers that submitted data from the previous round and meet the NOFA requirements

Dear [Insert Name of Group #1 BSP Contact]:

The District of Columbia ("District") Public Service Commission ("Commission") and the Office of the Chief Technology Officer ("OCTO") would like to thank you for [Insert name of Company or Companies.] continued participation in the District's Broadband Service Mapping Program. To meet the objectives under the National Telecommunications and Information Administration ("NTIA") State Broadband Data and Development Grant Program, the Commission requests the assistance and cooperation of all broadband service providers that enable a residential, business, institutional, or government entity located within the District to use broadband Internet services. At this time, the Commission is now requesting broadband service availability data **current as of June 30, 2012** for processing and review before submittal to NTIA for the Fall 2012 National Broadband Map and database update.

Please note that the NTIA has requested that data be submitted using the Census 2010 geography if applicable. **The Commission requests broadband service providers submit their data updates by Friday, September 7, 2012, to allow an adequate time period for OCTO to process and review the data submission.** Information on data submission options can be found in the attached document.

I request that you also provide us with a copy of [Insert name of Company or Companies.] Broadband Service Report for the District of Columbia (Form 477) filed with the Federal Communications Commission ("FCC") on or before September 1, 2012. This will help OCTO identify any improvements or changes in the adoption rates for broadband services within the District. The Non-Disclosure Agreement with OCTO will continue to be honored.

More information regarding requested data, data formats, and submission options are outlined in the attached document. As a reminder, we have provided access to the District's Broadband Provider Portal to view and edit processed datasets. As a courtesy, account credentials issued during the last round of data collection are provided below. The portal can be accessed at the following URL.

http://host.appgeo.com/DistrictofColumbiaProviderPortal/

Your secure login account is provided as follows:

Username:

Password:

Thank you in advance for completing this data request. We have attempted to make the process minimally burdensome, but understand that questions may arise. Should you have any questions regarding this data request, please contact my Policy Advisor, Cary B. Hinton, at chinton@psc.dc.gov or 202-626-9186.

Thank you for your assistance,

Betty Ann Kane

Chairman

District of Columbia Public Service Commission

ATTACHMENT (1): DC SBDD Technical Document Fall 2012.pdf

PSC letter to Providers that did not meet NOFA requirements from the previous round

Dear [Insert name of Group #2 or Group #3 BSP Contact]:

The District of Columbia ("District") Public Service Commission ("Commission") and the Office of the Chief Technology Officer ("OCTO") would like to thank you for [Insert name of Company or Companies.] interest in the District's State Broadband Mapping Program.

At this time, the Commission is now requesting broadband service availability data current as of June 30, 2012 from providers that meet the definitions described below for processing and review before submittal to National Telecommunications and Information Administration ("NTIA") and inclusion in the National Broadband Map update. **The Commission requests broadband service providers submit their data updates by Friday, September 7, 2012, to allow an adequate time period for OCTO to process and review the data submission.**

Overview

To meet the objectives under the NTIA State Broadband Data and Development Grant Program, the Commission requests the assistance and cooperation of all broadband service providers by submitting data on the availability, technology of transmission, and downstream/upstream services if their company or organization:

- Offers broadband services to end users in the District, or service could be established, without an extraordinary commitment of resources, or
- Owns facilities in the District that make possible the delivery of broadband services by other companies that meet the description above.

Definitions

For the purposes of this Program, NTIA has adopted the following definitions:

"Broadband service" is the provision of data transmission technology that provides two-way data communication with the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and greater than 200 kbps upstream to end users.

An entity is a **"facilities-based"** provider of broadband service connections to end user locations if any of the following conditions are met:

(1) It owns the portion of the physical facility that terminates at the end user location;

(2) It obtains unbundled network elements (UNEs), special access lines, or other leased facilities that terminate at the end user location and provisions/equips them as broadband; or

(3) It provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.

Service is **"available"** at an address if the provider currently provides service to a location, or if broadband service could be established, without an extraordinary commitment of resources, in a 7 to 10 business day period.

"End User" is a residential or business party, institution or state or local government entity, including a Community Anchor Institution, that may use broadband service for its own purposes and that does not resell such service to other entities or incorporate such service into retail Internet-access services. Internet Service Providers (ISPs) are not "end users" for this purpose.

Data Request

If your company or organization meets the NTIA's terms, as described above, and **has not** participated in a previous data submission to the Commission or OCTO, please contact Virgil Young Jr., Senior Telecommunications Analyst, at vyoung@psc.dc.gov for additional information and resources. The Commission encourages all broadband service providers to participate in the data collection effort so as to provide the Commission a better understanding of broadband services offered in the District and at the national level.

If your company or organization does not meet the NTIA's terms, as described above, I respectfully request that the attached service data questionnaire be completed. While not a requirement under the NTIA grant program, it will provide the Commission a better understanding of broadband services offered in the District, see attached "DC Broadband Mapping Questionnaire – Fall 2012". The information will not be part of the NTIA data submission. Please submit the questionnaire as an attachment to an e-mail response to Virgil Young: vyoung@psc.dc.gov. **The Commission requests broadband service providers to submit the questionnaire by Friday, September 7, 2012.**

Additionally, please provide information on the following items to Virgil Young:

1. If your company or organization has merged, sold, or bought another broadband service provider in the District or if your company has ceased operations in the District, please provide a description of such action as that can have an impact on OCTO's data submitted to the NTIA.

2. If your company or organization does not currently provide broadband Internet access services to a residential, business, institutional, or government entity located within the District, please provide a confirmation of such.

Form 477

I also request that you provide us with a copy of the Broadband Service Report for the District of Columbia (Form 477) that your company filed with the Federal Communications Commission ("FCC") on or before September 1, 2012. This will help OCTO identify any improvements or changes in the adoption rates for broadband services within the District. A "Raw data upload file for Part VI" text file, as described in the 'Completing and Filing FCC Form 477' document, is preferred but the District will accept a pdf copy.

The Form 477 can be submitted using one of several methods.

- Submit a new dataset to Virgil Young at the PSC via e-mail vyoung@psc.dc.gov.
- Submit a new dataset by requesting a temporary login to a secure FTP site.
- Submit a new dataset via postal service to:

Matthew Crossett

GIS Program Manager

1100 15th St NW, 9th Floor

Washington, DC 20005

Non-Disclosure Agreement

If your company would like to sign a Non-Disclosure Agreement ("NDA") with OCTO please email your request to Virgil Young: vyoung@psc.dc.gov. The NDA explains how OCTO will handle the submitted data; including what portions of the data will be submitted to the NTIA and what derived products will become part of OCTO's website on broadband services available in the District.

If your company or organization submitted a NDA with OCTO in association with a previous broadband data submission, it will continue to be honored by OCTO even though the two-year term of the NDA has expired. If your company would like to sign an amendment to the previous NDA that extends it for the additional three-years of this program please email your request to Virgil Young: vyoung@psc.dc.gov.

Thank you in advance for completing this data request. We have attempted to make the process minimally burdensome, but understand that questions may arise. Should you have any questions regarding this data request, please contact my Policy Advisor, Cary B. Hinton, at chinton@psc.dc.gov or 202-626-9186.

Thank you for your assistance,

Betty Ann Kane

Chairman

District of Columbia Public Service Commission

ATTACHMENTS (2):

1. DC Broadband Mapping Questionnaire – Fall 2012
2. Broadband Data Definitions – Fall 2012

Appendix 2
Standard Non-Disclosure Agreement

NON-DISCLOSURE AGREEMENT

(District of Columbia Broadband Service Mapping)

This **Non-Disclosure Agreement** ("**Agreement**") is between the Office of the Chief Technology Officer of the District of Columbia ("OCTO") and __________________ ("Company"), a corporation having a business address at ____.

RECITALS

A. Company wishes to disclose and OCTO wishes to receive certain information from Company represented by Company to be confidential and commercial / proprietary information (hereinafter collectively, "Information") pertaining to _________________. This exchange includes all communication of Information between the parties in any form whatsoever, including oral, written and machine readable form, pertaining to the above.

B. OCTO wishes to receive and Company wishes to disclose the Information for the sole purpose of participating in national broadband service mapping activities. OCTO will disclose the information only in the following ways:

To The public:

- The service territories of individual providers will not be made public, but OCTO will create a public web site that allows users, including potential broadband service subscribers, to enter any valid address in the District of Columbia and be referred to all the broadband service providers offering service to that location.

- Form 477 subscriber count data from all companies will be aggregated by OCTO at the Census Tract level. OCTO will use this information to estimate the residential broadband adoption rate by Census Tract. Estimated broadband service adoption rates will be made public, but the market share of individual broadband service providers will not be revealed.

To the U.S. Department of Commerce, National Telecommunications and Information Administration (NTIA):

- The broadband service data required by the NTIA in the Notice of Funds Availability; clarification published in the Federal Register; August 7, 2009 (74 FR 40569).

To the Metropolitan Police Department and the District of Columbia Homeland Security and Emergency Management Agency:

- Middle-mile connection points will be added to the District's critical infrastructure data base. This critical infrastructure database is used only for public safety purposes. These data will not be shared outside law enforcement and homeland security communities.

AGREEMENTS

Therefore, OCTO and Company agree as follows:

1. That the disclosure of Information by Company is in confidence and thus OCTO agrees to:

a. (1) Not disclose the Information to any other person, and (2) use at least the same degree of care to maintain the Information confidential as OCTO uses in maintaining as confidential its own confidential information, but always at least a reasonable degree of care;

b. Use the Information only for the above purpose;

c. Restrict disclosure of the Information solely to those employees or contract staff of OCTO having a need to know such Information in order to accomplish the purposes stated above; The District Government operates an in-house broadband service provider known as DC Net, accordingly, the Information expressly will not be shared by OCTO with DC Net as an organization or its employees.

d. Advise each such individual, before he or she receives access to the Information, of the obligations of OCTO under this Agreement, and require each such individual to maintain those obligations.

2. This Agreement imposes no obligation on OCTO with respect to any portion of the Information received from Company which: (a) was known to OCTO prior to disclosure by Company, (b) is lawfully obtained by OCTO from a third party under no obligation of confidentiality, (c) is or becomes generally known or publicly available other than by unauthorized disclosure, (d) is independently developed by OCTO or (e) is disclosed by Company to a third party without a duty of confidentiality on the third party.

3. This Agreement imposes no obligation on OCTO with respect to any portion of the Information unless such portion is: (a) disclosed in a written document or machine readable media marked as “COMMERCIAL / PROPRIETARY INFORMATION” at the time of disclosure, or (b) disclosed in any other manner and summarized in a memorandum mailed to OCTO within thirty (30) days of the disclosure. Information disclosed by Company in a written document or machine readable media and marked “COMMERCIAL / PROPRIETARY INFORMATION” includes, but is not limited to, the items, if any, set forth in the request for broadband service data from the District of Columbia Public Service Commission (“Commission”); attached hereto. The Commission’s request for broadband service data is incorporated herein by reference. OCTO hereby acknowledges receipt of the items listed in the Commission’s request for broadband service data, if any.

4. The Information shall remain the sole property of Company.

5. In the event of a breach or threatened breach or intended breach of this Agreement by either party, the other party shall be entitled to preliminary and final injunctions, enjoining and restraining such breach or threatened breach or intended breach.

6. OCTO agrees it will not export, directly or indirectly, any technical data acquired from Company or any product utilizing any such data to any country for which the U.S. Government or any agency thereof at the time of export requires an export license or other governmental approval, without first obtaining such license or approval.

7. The validity, construction, and performance of this Agreement are governed by the laws of the District of Columbia, and suit may be brought in the District to enforce the terms of this Agreement.

8. The rights and obligations of the parties under this Agreement may not be sold, assigned or otherwise transferred.

This Agreement is binding upon OCTO and Company and upon the directors, officers, employees and agents of each. This Agreement is effective as of the later date of execution and will continue indefinitely.

Office of the Chief Technology Officer of the District of Columbia

By

Name:________________________________

Title:_________________________________

Date:_________________________________

(Company)

By:

Name:________________________________

Title:_________________________________

Date:___________________________________

Appendix 3
Technical Document

DISTRICT OF COLUMBIA

SBDD DATA SUBMISSION TECHNIAL DOCUMENT

FALL 2012

REQUESTED DATA

Under the directive of the NTIA State Broadband Data and Development grant program, the District requests Internet Service providers in the District submit the following data in an approved data format. OCTO will provide guidance and assistance as needed.

- The provider's available broadband service area, technology of transmission, download and upload speeds
  - **NTIA is requesting that typical upload and download information be included in the data submission.**
- Middle mile infrastructure
- FRN (FCC Registration Number)
- FCC Form 477 (September 1, 2012 filing)
- End User Type. If possible, the NTIA is requesting the type of end user for each record. Please refer to the NTIA code tables at the end of the document.

Please send an email to Mr. Young if your company has merged, sold, or bought another broadband service provider in the District or if your company has ceased operations in the District, as this can have an impact on the data submitted to the NTIA.

NTIA Definition of Terms

"Broadband service" is the provision of data transmission technology that provides two-way data communication with the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and greater than 200 kbps upstream to end users.

Service is "available" at an address if the provider currently provides service to a location, or if broadband service could be established, without an extraordinary commitment of resources, in a 7 to 10 business day period.

Internet Service Providers (ISPs) are not "end users" for this purpose. An entity is a "facilities-based" provider of broadband service connections to end user locations if any of the following conditions are met: (1) it owns the portion of the physical facility that terminates at the end user location; (2) it obtains unbundled network elements (UNEs), special access lines, or other leased facilities that terminate at the end user location and provisions/equips them as broadband; or (3) it provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.

BROADBAND AVAILABILTY AND MIDDLE MILE DATASET SUBMISSION OPTIONS

The broadband service availability and middle mile dataset can be submitted using one of several methods.

- If the dataset has not changed since last submission, the provider can verify so through the provider portal mapping application. OCTO will use this dataset for the Fall 2012 submission.
- The provider can submit a new dataset to Virgil Young at the PSC via e-mail vyoung@psc.dc.gov .
- The provider can submit a new dataset by requesting a temporary login to a secure FTP site.
- The provider can submit a new dataset via postal service.

Matthew Crossett
GIS Program Manager
1100 15th St. NW, 9th Floor
Washington, DC 20005

- The provider can edit the previous submission through the provider portal mapping application to current as of June 30, 2012.

FCC FORM 477 SUBMISSION OPTIONS

The request for Form 477 filings will assist the District track broadband adoption rates and provide an additional resource to verify data submissions. A "Raw data upload file for Part VI" text file, as described in the 'Completing and Filing FCC Form 477', is preferred but the District will accept a pdf copy. The Form 477 can be submitted using one of several methods.

- The provider can submit a new dataset to Virgil Young at the PSC via e-mail vyoung@psc.dc.gov .
- The provider can submit a new dataset by requesting a temporary login to a secure FTP site.
- The provider can submit a new dataset via postal service.

Matthew Crossett
GIS Program Manager
1100 15th St. NW, 9th Floor
Washington, DC 20005

WIRELINE PROVIDER DATA FORMATS

Wireline data are requested in one of the following data submission formats and the tables must include all required information by reporting method (Address point or census block).

- Flat text files (.csv or .txt)
- Spreadsheets (Excel)
- Database tables (Access or SQL).

The data will be processed to NTIA data standards and reviewed. Providers will have the ability to review and verify the processed datasets before the data is submitted to the NTIA grant office.

Address point table definition

Broadband availability can be reported by address. The table should include address records for all locations that are currently serviced and addresses that could be serviced within ten days. Required data in the table include the FRN, address, the Technology of Transmission, Maximum Up/Down speeds, and Typical Up/Down speeds. If more than one transmission type services an address, it must be reported as a separate record. The data will be aggregated to the census block geography. Refer to the code tables at the end of the document to populate the table.

FRN	Address	ZIP Code	Technology of Transmission	Maximum Downstream Speed	Maximum Upstream Speed	Typical Downstream Speed*	Typical Upstream Speed*	End User Category*
12345678	12 3rd St NW	12345	50	8	5	6	4	1
12345678	56 6th St NW	12345	41	5	2	4	1	1

**NTIA is now requesting this information be included in the Fall 2012 data submission*

Census block table definition

Broadband availability can be reported by census block (2010 geography). The table should include census block records for all locations that are currently serviced as well as those that could be serviced within ten days. Required data in the table include the FRN, full FIPS Census Block ID, the Technology of Transmission, Maximum Up/Down speeds, and Typical Up/Down speeds. If more than one transmission type services a census block, it must be reported as a separate record. Refer to the code tables at the end of the document to populate the table.

FRN	Census Block 15-digit FIPS	Technology of Transmission	Maximum Downstream Speed	Maximum Upstream Speed	Typical Downstream Speed*	Typical Upstream Speed*	End User Category*
12345678	123456789012345	50	8	5	6	4	1
12345678	123456789012346	41	5	2	4	1	2

**NTIA is now requesting this information be included in the Fall 2012 data submission*

WIRELESS PROVIDER DATA FORMATS

The wireless data should be submitted as a geographic dataset with polygons depicting the extent of the service area and attributed with the requested broadband service information. Typical data formats include shapefiles or kml files. Required data in the table include the FRN, the Technology of Transmission, Spectrum, Maximum Up/Down speeds, and Typical Up/Down speeds. Please refer to the NTIA code tables at the end of the document to populate records.

FRN	Technology of Transmission	Spectrum	Maximum Downstream Speed	Maximum Upstream Speed	Typical Downstream Speed*	Typical Upstream Speed*
12345678	80	1	4	3	4	2

**NTIA is now requesting this information be included in the Fall 2012 data submission*

MIDDLE MILE DATA FORMAT

Middle mile data are requested in one of the following data submission formats with requested infrastructure information.

- Flat text files (.csv or .txt)
- Spreadsheets (Excel)
- Database tables (Access or SQL).

Required data in the table include FRN, Ownership Status, Serving Facility Capacity, Serving Facility Type, Lat/Long, and Elevation (if known). Addresses can be substituted for lat/long coordinates. OCTO will geocode the addresses and populate the records with the correct coordinates. Please refer to the NTIA code tables at the end of the document to populate records.

FRN	Owned or Leased	Serving Facility Capacity	Serving Facility Type	Latitude (Optional if address provided)	Longitude (Optional if address provided)	Elevation (in feet from grade)
12345678	1	4	1	38.02	-77.23	0

NTIA CODE TABLES

Provider Technology of Transmission Codes

Code	Description
10	Asymmetric xDSL
20	Symmetric xDSL
30	Other Copper Wireline - All copper-wire based technologies other than xDSL (Ethernet over copper and T-1 are examples)
40	Cable Modem - DOCSIS 3.0
41	Cable Modem - Other
50	Optical Fiber or Fiber to the End User
60	Satellite
70	Terrestrial Fixed Wireless - Unlicensed
71	Terrestrial Fixed Wireless - Licensed
80	Terrestrial Mobile Wireless
90	Electric Power Line
0	All Other

Speed Tier Codes

Speed Tier Codes Table		
Upload Speed Tier	**Download Speed Tier**	**Description**
2	n/a	Greater than 200 Kbps and less than 768 Kbps
3	3	Greater than or equal to 768 Kbps and less than 1.5 Mbps
4	4	Greater than or equal to 1.5 Mbps and less than 3 Mbps
5	5	Greater than or equal to 3 Mbps and less than 6 Mbps
6	6	Greater than or equal to 6 Mbps and less than 10 Mbps
7	7	Greater than or equal to 10 Mbps and less than 25 Mbps
8	8	Greater than or equal to 25 Mbps and less than 50 Mbps
9	9	Greater than or equal to 50 Mbps and less than 100 Mbps
10	10	Greater than or equal to 100 Mbps and less than 1 Gbps
11	11	Greater than or equal to 1 Gbps

End User Category Codes

Code	Description
1	Primarily Residential user
2	Primarily Business/Governmental user
5	Residential **and** Business/Governmental user

Wireless Spectrum Codes

Code	Description
1	is Cellular spectrum (824-849MHz; 869-894) used to provide service
2	is 700 MHz spectrum (698-758 MHz; 775-788 MHz; 775-788 MHz) used to provide service
3	is Broadband Personal Communications Services spectrum (1850-1915 MHz; 1930-1995) used to provide service
4	is Advanced Wireless Services spectrum (1710-1755 MHz; 2100-2155) used to provide service
5	is Broadband Radio Service/Educational Broadband Service spectrum (2496-2690 MHz) used to provide service
6	is Unlicensed (including broadcast television "white spaces") spectrum Used to provide service
7	is Specialized Mobile Radio Service (SMR) (817-824 MHz; 862-869 MHz; 896-901 MHz; 935-940 MHz)
8	is Wireless Communications Service (WCS) spectrum (2305-2320 MHz; 2345-2360 MHz), 3650-3700 MHz
9	Satellite (L-band, Big LEO, Little LEO, 2 GHz)

Middle Mile Serving Facility Type Codes

Serving Facility Type Code	Description
1	Fiber
2	Copper
3	Hybrid Fiber Coax (HFC)
4	Wireless

Middle Mile Serving Facility Capacity Codes

Serving Facility Capacity Code	Data Rate
1	Multiple T1s and less than 40 mbps
2	Greater than 40 mbps and less than 150 mbps
3	Greater than 150 mbps and less than 600 mbps
4	Greater than or equal to 600 mbps and less than 2.4 gbps
5	Greater than or equal to 2.4 gbps and less than 10 gbps
6	Greater than or equal to 10 gbps

Middle Mile Ownership Codes

Code	Description
0	Owned
1	Leased

Appendix 4
Provider Questionnaire

District of Columbia - Mapping Questionnaire Spring 2012

This questionnaire is directed to providers that have not qualified for participation in the National Broadband map. Each sheet collects a different type of information. Tabs at the bottom of the workbook allow users to switch among the three sheets.

Date Submitted:<mm/dd/yyyy>	
Company Name:	
Doing Business As:	
FRN #:	
Contact Name:	
Contact Email:	
Contact Address1:	
Contact Address2:	
Contact City, State Zip code:	

1.1 Provide a URL of the Company's website to which the District should refer potential broadband service subscribers.

1.2 Is your Company a facility based provider or a reseller? Please select the cell next to the technology that you provide and choose from the dropdown menu which business type applies.

Technology	Business Type	Technology	Business Type
10 Asymmetric xDSL		60 Satellite	
20 Symmetric xDSL		70 Terrestrial Fixed Wireless - Unlicensed	
30 Other Copper Wireline *(All copper-wire based technologies other than xDSL. Ethernet over copper and T-1 are examples)*		71 Terrestrial Fixed Wireless - Licensed	
40 Cable-DOCSIS 3.0		80 Terrestrial Mobile Wireless	
41 Cable-Other		90 Electric Power Line	
50 Optical Carrier/Fiber to the End User *(Fiber to the home or business end user. Does not include "fiber to the curb")*		0 Other *(Any Specific technology not listed above)*	

1.3 If your company is a resller, who is the facility based provider(s)?

1.4 Complete the following <u>dropdown table</u> **for each Technology of Transmission that your company provides.**
(One row for each Technology of Transmission - click on the cell to view a list of selections per column).

	Technology Transmission		Districtwide*	Maximum Advertised Speed		Typical Speed	
	Code	Description	Yes/No	Download Speed	Upload Speed	Download Speed	Upload Speed
(Ex.1)	*10 Asymmetric xDSL*		*Yes*	*768 kbps to 1.49 mbps*	*201 to 767 kbps*	*1.5 to 2.9 mbps*	*768 kbps to 1.49 mbps*
1							
2							
3							
4							
5							

<u>* Districtwide Definition</u>*: The Company must be able to "offer broadband service" to the "entire District of Columbia", (residential, business, institutional or government entity* ***within 10 business days*** *of a service order without an extraordinary commitment of additional resources.) with advertised speeds of* ***at least 768 kilobits per second (Kbps) downstream and greater than 200 Kpbs upstream****.*

1.5 For each Technology of Transmission that was selected in 1.2 how long does it take to provide service to a customer after service has been ordered? (Click on the cell next to each Technology you provide and select the length of time from a drop-down list).

Technology	Length of time to provide service	Technology	Length of time to provide service
10 Asymmetric xDSL		60 Satellite	
20 Symmetric xDSL		70 Terrestrial Fixed Wireless - Unlicensed	
30 Other Copper Wireline		71 Terrestrial Fixed Wireless - Licensed	
40 Cable Modem - DOCSIS 3.0		80 Terrestrial Mobile Wireless	
41 Cable Modem - Other		90 Electric Power Line	
50 Optical Carrier (Fiber to end user)		0 All Other	

1.6 For each Technology of Transmission that was selected in questions 1.2, please provide your service area in any of the following data formats (each data format should include technology of transmission, maximum advertised download and upload speed, typical download and upload speed):
- GIS or CAD file(s)
- Text file or Excel Spreadsheet listing service addresses
- Text file or Excel Spreadsheet with a list of Census Blocks with Tract numbers

See graphics below of sample data formats

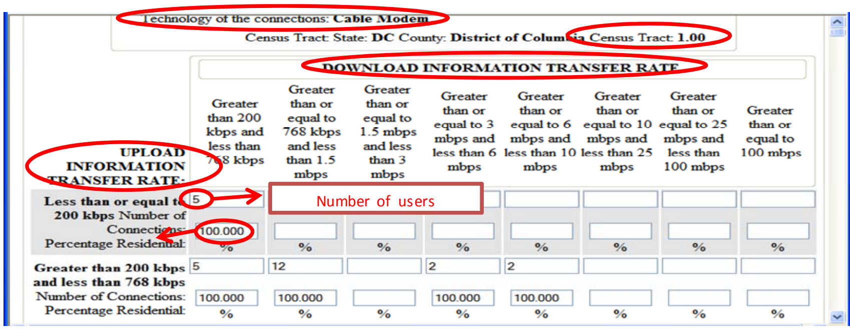
1.7 Does your company primarily make your service available to residential or non-residential (i.e. business) customers?

1.8 Can you provide this service within 10 business days of a service order without extraordinary commitment of additional resources?

1.9 If you provide broadband service and can offer it to customers (residential, business, institutional, or government entity) in the District of Columbia within 10 business days of a service order without extraordinary commitment of additional resources, the District of Columbia Public Service Commission encourages your participation in the State Broadband Mapping Program. We will be happy to discuss the benefits of participation with you.

1.10 Please provide a copy of your most recent filing of Form 477 to the FCC. Provide attachment filenames below. See data request letter for delivery options.

Ex. of Form 477 by Census Tract - Includes Technology of Transmission; Census Tract; Transfer Rate; Number of Users; and Percentage Residential.



Technology of the connections: **Cable Modem**
Census Tract: State: **DC** County: **District of Columbia** Census Tract: **1.00**

DOWNLOAD INFORMATION TRANSFER RATE

UPLOAD INFORMATION TRANSFER RATE:	Greater than 200 kbps and less than 768 kbps	Greater than or equal to 768 kbps and less than 1.5 mbps	Greater than or equal to 1.5 mbps and less than 3 mbps	Greater than or equal to 3 mbps and less than 6 mbps	Greater than or equal to 6 mbps and less than 10 mbps	Greater than or equal to 10 mbps and less than 25 mbps	Greater than or equal to 25 mbps and less than 100 mbps	Greater than or equal to 100 mbps
Less than or equal to 200 kbps Number of Connections:	5							
Percentage Residential:	100.000 %	%	%	%	%	%	%	%
Greater than 200 kbps and less than 768 kbps Number of Connections:	5	12		2	2			
Percentage Residential:	100.000 %	100.000 %	%	100.000 %	100.000 %	%	%	%

Proceed to Sheet 2.

Provider Name

Wireless Spectrum Questions (Wireline only companies may skip this sheet.)

2.1 What spectrum(s) do you use to provide service? See table in Broadband Data Definitions guide for spectrum codes and descriptions.

Proceed to Sheet 3.

Broadband service providers shall provide a list of "middle-mile and backbone interconnection points" in the District of Columbia. Interconnection points are facilities that provide connectivity between (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. (Collectively, (a) and (b) are middle-mile and backbone interconnection points. Middle-mile and backbone interconnection points typically enable relatively fast data rates, are built to handle substantial capacities, and may be service-quality assured. Examples might include: points of interconnection enabling communications between an incumbent local exchange carrier's central office and the Internet, between a cable aggregation point (headend) and the Internet, or between a wireless base station and the provider's core network elements that connect to other networks, including the Internet.

3.1 Do you have any Middle Mile Facilities located in the District of Columbia?

"Yes" or "No"

3.2 If no, do you have Middle Mile Facilities in other states that serve customers within the District of Columbia?

3.3 Please list all Middle Mile Facilities that serve customers within the District of Columbia in the table below

Owned or Leased	*Serving Facility Capacity Code	**Serving Facility Type Code	Facility Address In DC (Street#, Street Name, Street Type, Quadrant)	*** Latitude (Optional if address provided)	*** Longitude (Optional if address provided)	Elevation (in feet from grade. Negative numbers are below grade)
Owned/Leased	*(1-6) See below*	*(1-4) See below*	*123 Main Street NW*	*38° 53' 43.6" N*	*77° 0' 56.35" W*	*15*
			…add rows as needed			

* Serving Facility Capacity Code	Data Rate
1	Multiple T1s and less than 40 mbps
2	Greater than 40 mbps and less than 150 mbps
3	Greater than 150 mbps and less than 600 mbps
4	Greater than or equal to 600 mbps and less than 2.4 gbps
5	Greater than or equal to 2.4 gbps and less than 10 gbps
6	Greater than or equal to 10 gbps

** Serving Facility Type Code	Description
1	Fiber
2	Copper
3	Hybrid Fiber Coax (HFC)
4	Wireless

*** Coordinates must be expressed using the WGS 1984 geographic coordinate system.

Appendix 5
Community Anchor Institution
Data Request Letter and Survey Form

Survey: Broadband Service of Community Anchor Institutions in DC - Fall 2012

Dear Anchor Institution,

The District of Columbia State Broadband Initiative (SBI) is requesting information on the level of broadband service at Community Anchor Institutions across the District. The collection effort is being led by the District's Office of the Chief Technology Officer (OCTO) and is funded by a grant from the National Telecommunications and Information Administration.

We request that your institution(s) participate in this process by completing an online survey. The data you provide will help develop a more accurate, comprehensive dataset of broadband availability in the District and will further assist broadband planning efforts at a national level.

To facilitate this data collection request, OCTO has developed a web-based broadband survey mapping application. The survey can be completed in a few minutes by following these steps.

1) Access the broadband survey website here.
2) Login to the survey with the account information provided below.
   User: Password:
3) Select your Anchor Institution from the drop down menu.
4) Complete the survey questionnaire.
   Note: Fall 2011 and Spring 2012 CAI survey participants should see their responses pre-populated. Please verify and update as needed.
5) Update contact information as needed.
6) Logout when finished.

We request that your institution(s) complete the survey by September 14, 2012.

Your time and effort is appreciated and we thank you in advance for completing this data request. Should you have any questions, please contact me via email davidy.jackson@dc.gov or phone 202.724.5135.

Sincerely,

David Jackson

Direct URL to CAI survey portal:

http://broadband.dcgis.dc.gov/DCLogin.aspx?ReturnUrl=%2fDCcaisurvey.html

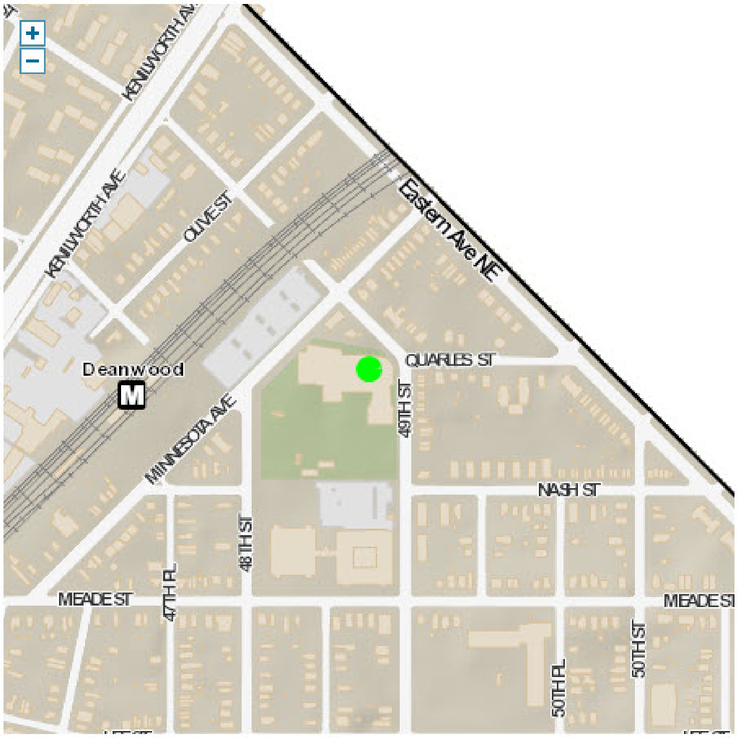
CAI Survey

Please answer the following questions to the best of your knowledge.

Please select the Institution

Deanwood Neighborhood Library

Mapped Location



Location address of Institution:

1350 49TH STREET NE

1. **Website address of Institution**

http://www.dclibrary.org/

2. **Does the Institution subscribe to broadband service at this location?**

◉ Yes ○ No

3. **Who is the broadband provider at this location?**

Other

4. **What type of technology is used for the Institution's broadband transmission?** Click here to view Technology Definitions.

5. **What is the DOWNLOAD speed advertised by the broadband provider?**

6. **What is the UPLOAD speed advertised by the broadband provider?**

7. **Is the broadband service sufficient to meet the Institution's needs?**

○ Yes ○ No

Please Elaborate

8. **Does the Institution provide public access to broadband at this location?**

○ Yes ○ No

9. **Does the Institution have publicly available Wi-Fi at this location?**

◉ Yes ○ No

10. **How many public access terminals are available (answer must be a number)?**

11. **Are you currently physically located at the Community Anchor Institution address provided above?**

○ Yes ○ No

Appendix 6

Wireless Validation

Mobile Broadband Mapping
Commercial Cellular Networks
District of Columbia

Bob Pavlak
Chris San-Gaspar

September 29, 2010

Mobile Broadband Mapping of Commercial Cellular Networks: District of Columbia

Executive Summary

The outdoor downlink and uplink throughput speeds of the commercial cellular networks serving the District of Columbia were measured in September 2010, and compared with measurements made in September 2009. In addition to the three networks tested in 2009 (Verizon Wireless, Sprint, AT&T), our 2010 measurements also include Cricket and T-Mobile.

All five of the service providers deliver broadband service (minimum 768 kbps downlink and 200 kbps uplink) in some areas of the District. However, there is a wide variation in coverage performance. Throughput speeds may be above the “broadband” thresholds in some areas and below the “broadband” thresholds in other areas. This variation in performance is shown by the color codes on the attached citywide maps.

There is also a significant variation in performance between the cellular service providers. The downlink speeds of the AT&T and T-Mobile networks are substantially above the broadband threshold of 768 kbps, with many areas above 1.5 Mbps. The speeds on AT&T’s network are substantially higher in 2010 compared to 2009, which we believe is attributed to the 3G upgrade of the AT&T network to HSPA (High Speed Packet Access), a more recent version of 3G. Both AT&T and T-Mobile operate network infrastructure based on the 3GPP (3rd Generation Partnership Project) set of standards.

The uplink speeds on the AT&T network is by far the highest of any of the commercial service providers. We believe this is due to the more advanced version of the 3GPP standard used by AT&T. Uplink speeds on AT&T’s network exceed 768 kbps and 1.5 Mbps in all but a few areas of the drive route.

The downlink speeds on Verizon’s network, between 2009 and 2010, appear about the same. The uplink performance has improved, with many areas in 2010 above 768 kbps. Many areas in 2009 were above 200 kbps uplink (but less than 768 kbps). Similarly, Sprint’s downlink performance appears about the same between 2009 and 2010, and their uplink performance in 2010 is slightly improved from 2009, but not as high as any of the other service providers.

Sprint, via Clearwire, now offers 4G WiMax broadband service in the District. This network was not included in our broadband drive tests because the mobility performance of WiMax is poor. Sessions are frequently dropped during handoffs and the tool used for drive test measurements is unable to accommodate a high dropped session rate.

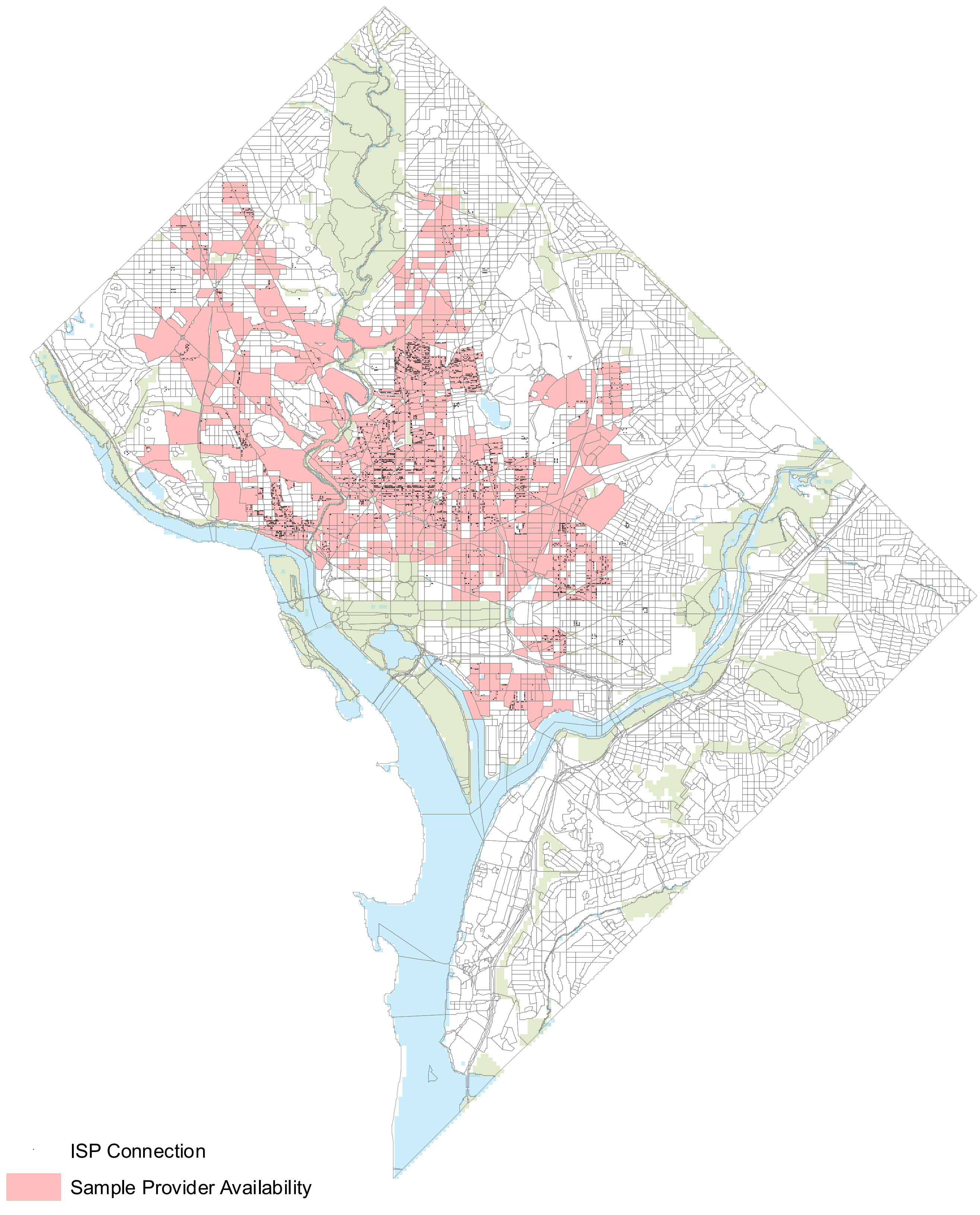
The authors wish to thank Felix Igbedior for his assistance in performing the drive tests with Chris San-Gaspar.

Appendix 7

Wireline Service Area Validation

Sample Map

Sample Provider Reported Availability vs. InfoUSA ISP Connections



Appendix 8
Contacted Providers

PROVIDER LIST

1-800-Reconex, Inc. d/b/a USTel
360Networks (USA), Inc.
AboveNet Communications, Inc. d/b/a AboveNet Media Networks
Access One, Inc.
Access Point, Inc.
Accutel of Texas d/b/a 1-800-4-A-Phone
ACN Communication Services, Inc.
Airband Communications Inc.
Airespring, Inc.
Allconnect
Allied Telecom Group
AOC Connect, LLC f/k/a MFN Global Services, LLC
AT&T Corp, Inc.
AT&T Mobility LLC
ATC Outdoor DAS, LLC
Atlantech Online, Inc.
Bandwidth.Com CLEC, LLC
BCN Telecom, Inc.
Bethel Communications
Bluemont Networks, LLC.
Broadcore, Inc.
Broadnet Solutions LLC d/b/a Broadnet Wireless
Broadview Networks, Inc.
Broadvox CLEC
BT Communications Sales, LLC f/k/a Concert Communications Sales, LLC
Budget PrePay, Inc. d/b/a Budget Phone
Business Telecom, Inc. d/b/a BTI
Cable & Wireless Americas Operations, Inc.
Capsule Communications
Cat Communications International, Inc. d/b/a CCI
Cbeyond Communications, LLC
CityNet Telecom, Inc.
Clearwire Corp.
Cogent Communications, Inc.
Comcast
ComExpress Communications, Inc.
CommPartners Connect, LLC
Comtech 21, LLC
Covista, Inc.
Cox District of Columbia Telcom, LLC

Crexendo Business Solutions
Cricket Communications, Inc.
Cypress Communications Operating Company
DC Access, LLC
DC-CLEC LLC c/o Crown Castle Solutions
DSCI Corporation
Dynalink Communications, Inc.
Enkido, Inc.
Entelegent Solutions
Everest Broadband Networks of DC
Extenet Systems Inc.
Fiber Technologies Networks, L.L.C.
FiberLight, LLC
First Communications, LLC
France Telecom Corporate Solutions L.L.C.
Gateway Communications Services, Inc.
Global Crossing Telemanagement, Inc.
Global Telecom & Technology Americas, Inc.
Google
Granite Telecommunications, LLC
Great American Networks, LLC.
Hughes Network Systems
Hypercube Telecom d/b/a/ KMC Data LLC
IDT America, Corp.
Infotelecom, LLC
Intrado Communications, Inc.
IPC Network Services, Inc.
Iridium Satellite LLC
Kentucky Data Link, Inc.
LCI International Telecom Corporation d/b/a/ Qwest (acquired by CenturyLink)
Level 3 Communications, LLC
Light Tower Fiber LLC
LightSquared Inc. f/k/a SkyTerra Communications Inc.
Magellan Hill Technologies, LLC
Mass Communications
Matrix Telecom, Inc. d/b/a Matrix Business Technologies (Trinsic)
McGraw Communications, Inc.
MegaPath
Metropolitan Telecommunications of DC d/b/a MetTEL
Mitel NetSolutions, Inc. f/k/a Inter-Tel Netsolutions, Inc.
Network Communications International Corp.
Neutral Tandem-Washington, DC, LLC
New Horizons Communications Corp.
NextG Networks Atlantic, Inc.

Nextlink Wireless, LLC
Norlight Telecommunications, Inc.
NOS Communications
One Voice Communications, Inc.
OpenBand of DC, LLC
Pac-West Telecomm, Inc.
Peerless Network of the District of Columbia, LLC
Pelzer Communications Corporation
Primus Telecommunications, Inc.
Quantum Shift Communications, Inc. d/b/a VCOM Solutions
Quintelco, Inc.
RapidDSL & Wireless Inc.
RCN and RCN Business Solutions
Reliance Globalcom Services, Inc. f/k/a Yipes Enterprise Services, Inc.
RNK, Inc.
Roadstar Internet, Inc.
Shenandoah Telecommunications Company d/b/a Shentel Converged Services, Inc.
Sidera Networks, LLC
Smart Choice Communications, LLC
Spectrotel, Inc.
Sprint
StarBand Communications Inc.
Stratos Global Corp.
Telefonica Data Corp. SA d/b/a Telefonica USA, Inc.
Telovations, Inc.
T-Mobile USA. Inc.
Trans National Communications International, Inc.
Transbeam, Inc.
Trident Internet Systems, Inc. d/b/a Trident Wireless Internet
TW Telecom Inc.
VDL, Inc. d/b/a Global Telecom Brokers
Vector Data Systems LLC
Verizon Communications, Inc.
Verizon Wireless
ViaSat Inc.
Wave2Wave Communications, Inc.
Wholesale Carrier Services, Inc.
Windstream Communications
XO Communications Services, Inc.
YMax Communications Corp.
Zayo Bandwidth LLC

Submitted to:

Delaware Department of Technology and Information

Contract No. DTI-08-0013

Delaware Broadband Data and Development

Spring 2012 Data Submission White Paper

Submitted by:

GeoDecisions
A Division of Gannett Fleming

September, 2012

Table of Contents

1 Introduction

As part of the American Recovery and Reinvestment Act (ARRA), the National Telecommunications and Information Administration (NTIA) released its State Broadband Data and Development Grant Program[1] Notice of Funds Availability (NOFA). The NTIA then awarded the State of Delaware funding to create a database of broadband deployment (Project) in the State of Delaware (State). GeoDecisions and its team partner CBG Communications, Inc. (CBG) have been retained by the State of Delaware (collectively referred to as the "State Parties") to perform a variety of tasks as part of the Broadband Data Development process, with the goal being creation of maps of the State showing where broadband is available, Providers' names, and speeds or bandwidth provided to citizens, businesses, and anchor institutions throughout the State.

The NOFA requires mapping of facilities-based Providers' availability of broadband speed internet access in the State. The NTIA, in the NOFA, defined broadband as "Broadband service is 'available' to an end user at an address if a broadband service provider does, or could, within a typical service interval (7 to 10 business days) without an extraordinary commitment of resources, provision two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (Kbps) downstream and at least 200 Kbps upstream to the end user at an address."

The following specific project tasks were to be performed and completed by GeoDecisions and CBG with oversight by State staff:

- Drafting, negotiation, establishment, and status reporting of all Non-Disclosure Agreements (NDAs) with broadband service Providers to support the Delaware broadband expansion initiative.
- Mapping of broadband Providers and service attributes, including technologies utilized and advertised speeds available to end users.
- Support of field verification of broadband mapping (using an approximately 35% sampling rate).
- Development of web-based mapping applications.
- Project, task, and contract management.
- Review of Provider marketing materials.
- Assistance in developing criteria for web-based surveys and speed tests.
- Quality Control and review of all deliverables.
- Assistance in the development of a data maintenance document.
- Identification and assessment of broadband infrastructure (using an approximately 35% sampling rate).
- Participation in weekly status and project meetings with internal staff, NTIA, the University of Delaware, the State of Delaware, Providers, and all other stakeholders.
- Submission of weekly status reports.

[1] http://broadbandusa.gov/files/BroadbandMappingNOFA(FederalRegisterVersion).pdf

The Project began with meetings with the State, GeoDecisions, and CBG to map out the processes that needed to occur in order to produce an accurate map that included all known broadband Providers that were willing to participate in the project. It should be noted that broadband Providers (Providers) were not required to participate in the Project but were encouraged to provide data specific to their networks so the State would have maps that were as accurate as possible. Providers that applied for federal grant funds for network expansion or upgrades, however, would be eliminated from consideration for these grants if they did not cooperate with the State on this project.

1.1 List Compilation

The first task was to compile a list of all known broadband Providers throughout the State and contact information for each of these Providers. Information from FCC databases, Internet research, and the State Parties' overall understanding of the broadband industry was utilized to compile the list.

1.2 NDA Negotiation

Contact was then made to each of the Providers to determine whether they had facilities in the State that provided broadband to end users. If so, the Providers were encouraged to participate in the project by providing the pertinent data needed to create the State's maps. Many Providers believe that some of the information required from them for participation is confidential and cannot be released to the general public. To overcome this obstacle, the State Parties created a Non-Disclosure Agreement (NDA) template whereby information deemed confidential by the Providers would not be released publically by the State Parties. The NDA also ensured that all information requested from the Providers is available for release to the NTIA as required by the NOFA. Based on the variation among Providers on what information is deemed confidential and varying interpretations of the template NDA, negotiations were held with many of the Providers to modify the NDA to meet the Providers' needs while still allowing the State Parties to utilize and share the information as required in the NOFA. Once the Providers and the State Parties signed an agreed-upon NDA, the data gathering process proceeded.

1.3 Data Gathering

As each Provider signed an NDA with the State Parties, they were referred to GeoDecisions' mapping department where they were asked to provide specific data in formats that would be compatible with the State's mapping process. Although many of the Providers had previously provided system data to the Federal Communications Commission (FCC), those submissions showed availability at the Census Tract level. The requirements of this Project were for mapping of network availability at the Census Bock level, which is more granular than previously submitted data. Furthermore, in Census Blocks that are larger than 2 square miles, data was gathered at the street segment level (eg. From # 1 First Street to #111 First Street). As Providers supplied this data, GeoDecisions created maps of the State showing where each of the Providers' footprint(s) was located, as well as other required attributes such as advertised speeds available in these areas and the technologies utilized to provide service to end users.

1.4 Provider Data Submittal

NTIA 6th data submission included 20 Broadband providers data, 11 of the providers have submitted new data updates; the following is a brief description the data provided:

1- AT&T Mobility LLC.

DBA Name: AT&T

FRN	0004979233
Date of submission	8/20/2012
Type of Data Submission	• 2 Coverage Shape file • Excel Sheet
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Mobile Wireless
Data description	AT&T provided 2 shape file that showed coverage of 3G & 4G over the three counties of the state of Delaware. The excel sheet contained speed data, Technology of transmission & Mobile Spectrum.

2- Comcast Cable Communications, LLC.

DBA Name: Comcast

FRN	0004441663
Date of submission	8/1/2012
Type of Data Submission	• Excel Sheet of block coverage • Excel Sheet of street coverage • Excel Sheet with speed information
Census Blocks	12406 Technology 40
Road Segments	723 Technology 40
Middle Mile infrastructure	No
Technology of Transmission	Cable Modem - DOCSIS 3.0
Data description	Three excel sheets, the excel sheets were expressing the Comcast block coverage.

3- DIECA Communications, Inc.

DBA Name: Covad Communications Company

FRN	0003753753
Date of submission	7/11/2012
Type of Data Submission	• Text file tab delimited with block coverage • Text File with Subscriber-Weighted Nominal Speed • Text file with a note "No Middle Miles in DE"
Census Blocks	4049 Technology 10 3349 Technology 20 6640 Technology 30
Road Segments	No
Middle Mile infrastructure	No
Technology of Transmission	Asymmetric xDSL Symmetric xDSL Other Copper Wireline
Data description	Two text files tab delimited, and a read me file.

4- Leap Wireless International, Inc.

DBA Name: Cricket Communications, Inc.

FRN	0002963528
Date of submission	9/4/2012
Type of Data Submission	• Shape file with Coverage, Technology, Spectrum, and speed
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Mobile Wireless
Data description	Coverage shape file.

5- T-Mobile USA, Inc.

DBA Name: T-Mobile.

FRN	0006945950
Date of submission	7/19/2012
Type of Data Submission	• Two shape files with Coverage Area with different speed • Text file with technology and Spectrum and speed • Excel sheet with Subscriber Weighted Nominal Speed. • No Middle Mile Notice.
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Mobile Wireless
Data description	Two shape files that provide Broadband coverage with two different speed ranges for upload and download, the Technology and spectrum were provided by a different text file, Nominal speed came from an excel sheet.

6- Cellco Partnership and its Affiliated Entities.

DBA Name: Verizon Wireless.

FRN	0003290673
Date of submission	7/6/2012
Type of Data Submission	• Shape file for 4G Coverage (LTE) • Shape file for 3G Coverage (EVDO) • Email with Spectrums and speed.
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Mobile Wireless
Data description	The Two shape files provided Coverage area for different speed range (4G – 3G), an email provide the speed and spectrum.

7- Verizon Communications, Inc.

DBA Name: Verizon Delaware, LLC.

FRN	0003271798
Date of submission	7/30/2012
Type of Data Submission	• Text file tab delimited with block coverage • Text file tab delimited with street segment coverage • Text file with Weighted Nominal Speed by technology and county. • Notice with no middle mile
Census Blocks	11606 Technology 10 6697 Technology 50
Road Segments	1132 Technology 10 456 Technology 50
Middle Mile infrastructure	No
Technology of Transmission	Asymmetric xDSL Optical Carrier/Fiber to End User
Data description	Two Text files with Census blocks and Street segment coverage, weighted nominal speed came in a separate text file.

8- Sprint Nextel Corporation.

DBA Name: Sprint.

FRN	0003774593
Date of submission	9/7/2012
Type of Data Submission	• One Shape file with two Coverage areas with different spectrums and speeds.
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Mobile Wireless
Data description	One Shape file specifying the spectrum and speed of two coverage areas.

9- Hughes Communications, Inc.

DBA Name: Hughes Network Systems.

FRN	0018483073
Date of submission	8/24/2012
Type of Data Submission	• Excel sheet with Census blocks coverage
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Satellite
Data description	Excel sheet with Census blocks coverage to be transferred to coverage satellite area.

10- ViaSAT communication

DBA Name: ViaSAT communication

FRN	0007843766
Date of submission	8/27/2012
Type of Data Submission	• One Shape file with Covering the whole state of Delaware
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Mobile Wireless
Data description	One Shape file specifying the spectrum and speed.

11- Skycasters

DBA Name: Skycasters

FRN	0018756155
Date of submission	9/14/2012
Type of Data Submission	• At email with coverage description and speed specification
Census Blocks	N/A
Road Segments	N/A
Middle Mile infrastructure	No
Technology of Transmission	Terrestrial Mobile Wireless
Data description	Email descriping the coverage to be the whole state of Delaware with associated speed and FRN.

1.5 Data Processing

The method for processing the data varies depending on the data received from each provider; the following is a brief summary of the steps taken to process the data for each provider.

1-AT&T Mobility LLC.	
Processing Mobile Coverage Area	• Apply Repair Geometry on coverage Shape file • Load Repaired Shape file into Transfer data model using append. • Use excel sheet values to calculate technology, spectrum and speed. • Result is stored in "BB_Service_Wireless"

2- Comcast Cable Communications, LLC.	
Processing Census Block Coverage Area	• Census block coverage excel sheet exported into dbf after adjusting column name (less than 11 characters) • Template of 2010 Census block < 2SQM joined Technology 40 dbf file (create Census block coverage of Cable Modem-DOCSIS 3.0 • Census Block Coverage is loaded to Transfer Data model using append. • Result is stored in "BB_Service_CensusBlock"
Processing Service Overview	• Template County feature class is loaded into ArcMap • Subscriber Weighted Nominal speed is calculated in each country • County layer is loaded into Transfer Data model using append. • Result is stored in "BB_Service_Overview"

3- DIECA Communications, Inc.	
Processing Census Block Coverage Area	• Load provided text file into excel • Export text file into dbf after altering columns names • Separate dbf file into 3 technologies dbf files (Asymmetric xDSL - Symmetric xDSL -Other Copper Wireline) • Perform Join 3 times with Template census 2010 census block (one join per technology) • Merge the 3 feature classes into one coverage feature class. • Load the output feature class into the transfer data model. • Result is stored in "BB_Service_CensusBlock"

Processing Service Overview	• Template County feature class is loaded into ArcMap • Three Overview county layers are produced, one layer per technology. • County layers are merged. • County layers are loaded into Transfer Data model using append. • Result is stored in "BB_Service_Overview"

4- Leap Wireless International, Inc. (Cricket)	
Processing Mobile Coverage Area	• Apply Repair Geometry on coverage Shape file • Load Repaired Shape file into Transfer data model using append. • Calculate technology, spectrum and speed. • Result is stored in "BB_Service_Wireless"

5- T-Mobile USA, Inc.	
Processing Mobile Coverage Area	• Apply Repair Geometry on two coverage Shape files • Load the two Repaired Shape files into Transfer data model using append. • Calculate technology, spectrum and speed. • Result is stored in "BB_Service_Wireless"

6- Cellco Partnership and its Affiliated Entities. (Verizon Wireless)	
Processing Mobile Coverage Area	• Apply Repair Geometry on coverage on both Shape files (4G-3G) • Load Repaired Shape files into Transfer data model using append. • Calculate technology, spectrum and speed, for each type of coverage. • Result is stored in "BB_Service_Wireless"

7- Verizon Communications, Inc.	
Processing Census Block Coverage Area	• Load provided text files into excel • Census block coverage excel sheet exported into dbf after adjusting column name (less than 11 characters) • Select statement on the dbf file to separate Technology coverage 10 blocks & Technology Coverage 50 blocks. • Template of 2010 Census block < 2SQM joined twice, one time with Technology 10 dbf file (create Census

	block coverage of Asymmetric xDSL), second time with Technology Coverage 50 (create Census block coverage of Optical Carrier/Fiber to End User). • Merge is applied on both Census blocks to create Census Block Coverage • Census Block Coverage is loaded to Transfer Data model using append. • Result is stored in "BB_Service_CensusBlock"
Processing Service Overview	• Template County feature class is loaded into ArcMap • Two Overview county layers are produced, one layer per technology. • County layers are merged. • County layers are loaded into Transfer Data model using append. • Result is stored in "BB_Service_Overview"

8- Sprint Nextel Corporation.	
Processing Mobile Coverage Area	• Apply Repair Geometry on coverage Shape file • Load Repaired Shape file into Transfer data model using append. • Use excel sheet values to calculate technology, spectrum and speed. • Result is stored in "BB_Service_Wireless"

9- Hughes Communications, Inc.	
Processing Satellite Coverage Area	• Load text file into excel • Alter column names and export as a dbf file • Join excel sheet with template census block 2010 shape file using Block_ID to get Satellite block coverage area. • Merge all blocks into one polygon to create Satellite Coverage shape file. • Load shape file into Transfer data model using append • Calculate technology, spectrum and speed. • Result is stored in "BB_Service_Wireless"

10- ViaSAT	
Processing Mobile Coverage Area	• Apply Repair Geometry on coverage Shape file • Load Repaired Shape file into Transfer data model using append.

	• Calculate technology, spectrum and speed. • Result is stored in “BB_Service_Wireless”

11- Skycasters	
Processing Mobile Coverage Area	• Create Statewide shape coverage for Skycasters broadband services. • Load coverage Shape file into Transfer data model using append. • Calculate technology, spectrum and speed. • Result is stored in “BB_Service_Wireless”

1.6 Map Creation/Interactive Web Application

An interactive web application was developed to enable the general public to view a map of Delaware's broadband availability in each of its three counties. Users will be able to see which forms of broadband exist in each area of the State and can also search for Providers by address. This web application is necessary in order to access and employ the data collected. In essence, the data collected is in a static state; this web application will move the data into dynamic, usable form.

With the creation of the web application, the State will move forward in meeting the requirements of this project's grant as outlined in the NOFA. The web application was created in a manner that honors the guidelines established in each NDA executed with each respective Provider. A publically accessible, interactive website is the best means by which the citizens/taxpayers can be informed of broadband availability and options. The applications serve as a hub of broadband coverage information. The resultant functionality is expected to improve service for several user groups. From a citizen standpoint, the application will serve as a gateway to access or improve access to broadband services. Citizens can use the application to gain knowledge of providers, technologies, and access level at their residence or place of business. Planners can use the site to aid in infrastructure construction plans to improve broadband access and capabilities to their assigned region of the State. The State Legislature will use the application to notify politicians of district relevant broadband capabilities and as a catalyst in policy making and a various array of legislative actions.

1.7 Backlab Verification

As the first version of maps covering each of the State's Providers was completed, the State Parties performed backlab verification of the data gathered and input onto the maps. This backlab verification included researching the Providers' websites to verify that the advertised speeds on the websites were consistent with those documented by the Providers as part of their submission to the State. In addition, the team made phone calls to some of the Providers to further verify service availability and speeds where necessary to gain the highest level of confidence in the data gathered.

1.8 Provider Review

After the backlab process was completed for each of the Providers, the data was sent back to the Providers for their review and acknowledgement of the data as being accurate. This phase of the project also allowed the Providers to update their data if changes had occurred since the intiatial gathering of data by the State Parties. Each of the Providers' data was pulled out from the aggregate data base prior to sending it to the Provider for their review. This ensured that the State Parties maintained the agreed-to confidentiality of each of the Providers' data.

1.9 Field Verification

The final step for the State Parties to verify the accuracy of the data was to perform a field verification process. Prior to beginning the original field verification activities in the summer of 2010, The State parties developed a field verification guide for use by each member of the field verification team. The guide included systematic instructions and a checklist related to verification of each broadband system, technology, and service type. The guide and checklist were drafted, reviewed by all State Parties, and finalized prior to the beginning of field verification activities.

To ensure uniformity of the team's approach to field verification, discussions were held with the Project Manager, and the Lead GIS Analyst and the field verification team immediately prior to the beginning of field verification activities in the fall of 2010.

The goal of field verification was revised from the original methodologies to only include verification of updated information from the providers in the State. For example, areas previously verified, which had no reported changes in technology or speed, were not re-verified as part of this round of verification.

New areas of broadband system coverage or where technologies and/or speeds changed from the previous submissions were verified by sampling whether services were available at various points shown on the Providers' system coverage maps that were randomly chosen from all of the census blocks that are within the Providers' systems. Points were chosen to represent areas throughout the Providers' new or upgraded service territory, including system boundary edges.

The State Parties team sample looked to provide a sampling of all broadband Providers who have made changes in coverage, technology or speed in the State, including large and small Providers across the State, being sure to include each of the three counties.

Team members spent a total of 5 days performing Field Verification functions including interviews and infrastructure identification at nearly 45 locations. In addition, the team performed approximately 65 speed tests of Cellular based wireless broadband provider networks.

1.10 Speed Tests

As part of the field verification process, State residents and businesses were given a business card-sized handout that briefly explained the project and pointed them to the state-specific speed test website. The State utilized a project-specific speed test web site[2] run by Ookla in order to gain Information on users' addresses, satisfaction, and the upstream and downstream speeds associated with their broadband connection. Ookla is a company that provides a private web-based reporting portal where customer-specific

[2] http://www.delawarespeedtest.com/

testing can be performed and documented over time. The results of the speed tests performed on the Ookla site are stored and available to the State Parties at any time.

Ookla tracks the end users' Provider name, technology of connection, downstream and upstream speeds, and other parameters such as IP address.

In addition, testing similar to that done by residents and businesses was performed by State Party representatives on four of the five major cellular-based broadband providers' networks. Cricket Wireless' network has not been upgraded since previous speed tests performed by the State Parties and therefore was not tested during this round of field verification. This again verified availability and speeds on each of the remaining four major cellular-based broadband Providers in the State. All speed test locations, to date, are shown on Attachment 3.

Note: The Following Sections discuss data description and field verification for the spring 20112 data submittal. The fall submittal field verification will occur in October 2012.

1.11 Presentation to the NTIA

The data submitted in the State Broadband Data and Development (SBDD) project is governed by the Notice of Funds Availability (NOFA) first published in volume 74, number 129, on page 32545 of the Federal Register and subsequently clarified in volume 74, number 154, on page 40569 of the Federal Register. According to the NOFA, an NDA may be executed with broadband Providers prior to data collection. The NTIA has proposed a National States Geographic Information Council (NSGIC) data model as a means to store the collected broadband data. The NSGIC model includes five main feature classes as follows:

1.11.1 Broadband Service by Census Block (Less than 2 square miles in area)

This feature provides the atomic unit for mapping provider services that, when tied to census demographic and socio-economic data, can provide guidance for the build-out and adoption of broadband. The Census Block feature class is generated by different methods, depending on the data submitted by the Broadband service Provider. The main methods for generating census block data are as follows:

- Broadband providers submit a list of served Census Blocks. In this case, the blocks are joined to the State's Census Block data to obtain its spatial location. Finally, the data are loaded into the Geodatabase model, and attributes are either transferred or filled in manually.

- Broadband Providers submit a list of end users. In this case, an overlay is needed between the submitted geocoded end user points and the State of Delaware Census Block feature class to obtain the list of Census Blocks.

- Broadband providers submit shape files or drawings with their boundary(s) of coverage. The boundary(s) is intersected by the Census Block feature class to obtain Census Block coverage.

1.11.2 Broadband Service by Census Block (greater than 2 square miles in area)

In order to provide a more granular representation of availability in Census Blocks larger than 2 square miles in area, these Census Blocks are described at a street segment level of detail.

There are two methods utilized to garner the data needed to generate street segment coverage maps. Depending on the data submitted by the providers, these methods can be summarized as follows:

- The broadband Provider submits a list of end user addresses. The nearest road segment is then selected, based on the attributes of the end user point.

- The broadband provider submits a shapefile or drawing showing their coverage area. In this case, street segments are selected based on the intersection of its coverage area and street segment feature class.

1.11.3 Broadband Service - Wireless

The maps of wireless technologies provide a representation of the expected, modeled, or field-verified service areas associated with wireless carriers, their service levels, and their utilized spectrums. The data in this feature class are generated based on a drawing (shapefile) submitted by a wireless technology service Provider (Terrestrial Mobile Wireless - Terrestrial Fixed wireless [licensed or unlicensed] - Satellite), as well as through field verification of wireless data.

1.11.4 Broadband Service - Overview

This feature provides a coarse view of speeds at a county level so that any regional or systematic patterns of service and speed can be assessed and mitigated.

The State of Delaware has three counties. The maximum downstream and upstream speed has been stipulated for each provider, along with the technology that they are using to provide these speeds. Most providers were reluctant to provide pricing data, but some have provided data for weighted nominal speed.

1.11.5 Broadband Connection Points – Middle Mile

The purpose of broadband Connection Points, known as Middle Mile locations or points, is to give the locations and elevations of Interconnection points for service Providers working in the State of Delaware. Gathering infrastructure components (Middle Miles) helps leverage opportunities for network deployment after assessing gaps in broadband availability in the State.

The locations of Middle Mile points were provided by Providers either by their geographic coordinates (Latitude & Longitude) or by their street address(s), which are geo-coded to their spatial locations. Intersection between the Middle Mile points and Census block layer is needed to obtain Full Block ID (FULLFIPSID).

The above mentioned processes provided the State with the raw data to develop maps of the State showing where broadband is available, the maximum advertised levels of service, or speed offered to end users, and areas of the State that are unserved or underserved. This information will be updated every 6 months to show changes made by Providers that will impact the broadband landscape throughout the State. This report details some of the most pertinent information derived from the project and can be utilized to help the State during its Broadband Planning Project currently underway.

2 Areas of Delaware Unserved/Underserved by Broadband Providers

One of the main objectives of the NTIA, the State of Delaware, GeoDecisions, and CBG was to determine where broadband is not currently available in the State of Delaware. Having areas where broadband is not available to potential end users helps create a phenomenon known as a Digital Divide. The Digital Divide is defined as the inability of residents to access broadband and Internet services based on economic, educational, or geographic reasons.

The NTIA defines an unserved area as: "An area composed of one or more contiguous census blocks where at least 90 percent of households in the service area lack access to facilities-based terrestrial broadband service, either fixed or mobile, at the minimum broadband transmission speed (set forth in the definition of broadband above). A household has access to broadband service if the household can readily subscribe to that service upon request."

Furthermore, the NTIA defines an Unserved Area as "A service area is defined as consisting of one or more contiguous census blocks, where half the households lack access to minimum broadband service, or an area where no land or mobile service offers broadband with at least 3 Mbps, or areas where less than 40% of households subscribe to any service."

To obtain information about where broadband is not available in the State, the State Parties performed the above tasks to determine where broadband is available in the State and where it is not available to potential end users. After determining where broadband is not available, the State is in the process of utilizing this information to determine what may be done to expand existing networks to provide service to these unserved areas or how new Providers may be enticed into building networks to serve these parts of the State. This is being undertaken by the State and the University of Delaware as part of their planning activities in the next phase of this project.

Although some services delivered by satellite-based Providers meet the requirement for broadband of 768 Kbps downstream and 200 Kbps upstream, for the purposes of this report, we have not included them when detailing broadband availability. While any location within the State is capable of receiving satellite based service as long as there is a clear unobstructed view of the southern sky, the reasoning for not considering satellite-based Internet here is that often times realized speeds on satellite-based networks fall significantly below 768 Kbps in the forward direction and 200 Kbps in the upstream direction. That being said, satellite Internet is an option for citizens and businesses in the State when other high speed connections are not available.

The State of Delaware has the 6th highest population density of the 50 states in the US. This helps the State's overall broadband availability in that broadband Providers are apt to serve high density areas because the cost to build a network is lower on a per-address passed basis. In other words, the amount of infrastructure needed to connect a given address to the Internet lessens as density increases. Conversely, the cost of building a network to more rural areas increases on a per-address (potential customer) basis to the point of not providing the broadband Provider the minimum potential return on their investment that they have established. Large companies have minimum potential customers per mile that must exist or they will not build infrastructure to an unserved area. For instance, a Provider may require a minimum of 20 homes or businesses be passed per mile of new infrastructure before they will build it. Some providers will require a minimum number of homes passed per mile, of new infrastructure, to be in excess of 30 homes. In rural areas, there may be as few as 1 or 2 homes per mile. Therefore, the area will not be built out.

Although the State of Delaware has a relatively small number of areas, and therefore citizens, that do not have broadband available to them, this should still be a concern for the State and its planning group. As in other locales, the State will likely find during its planning project that broadband is a driving force in many aspects of life today, including economic development, health care, all areas of business and institutional users, education, and entertainment to name a few. Consequently, the State will also likely find that encouraging expansion of broadband into the unserved areas of the State will have a positive impact on all of these aspects. Areas of the State that do not have access to broadband are shown on the map included as Attachment 1.

In addition to determining which areas of the State do not have access to broadband, demographics and socio-economic characteristics can be analyzed in areas of the State that do not have broadband availability. For instance, the State Parties have over-laid age, minority status, and income data onto the maps to determine which groups may be most impacted by the lack of broadband service in their areas. This information may prove valuable as the State's planning project moves forward. In addition, maps including other demographic and socio-economic characteristics can be created by the State Parties to show other groups that are impacted by the lack of broadband availability in areas of the State. The maps showing each of these parameters are included as Attachments 6, 7, and 8.

3 Areas of Delaware Served by a Single Broadband Provider

Similar to areas of the State that are unserved or underserved by any broadband Provider, the NTIA and the State desired to know what areas of the State are only served by a single Provider.

Areas that have a single broadband Provider imply that service is available in these areas but that there is no competition. Therefore, associated benefits that competition may bring, including lower pricing, higher speeds, and better customer service, are also not available in these areas. This project did not ask for or document any of these parameters, and therefore, other than speed and pricing information included in the Broadband Service Tiers – Residential, Business Governmental and Academia section of this report, they are not included in this report.

Similar to the unserved/underserved areas of the State, the State's high density makes it a good business decision for broadband Providers to build out the networks throughout most of the State since even with competition, these Providers can make a good return on their investment. As Attachment 2 shows, in addition to the areas of the State with no broadband availability, there are only a few small areas in the State that are not served by at least two Providers. Some of the areas served by fewer than two Providers include:

- An area east of Highway 301 and south of DE-896 in New Castles County
- Augustine State Wildlife Management Area and Silver Run Wildlife Area in New Castle County
- The area east of Highway 9 from Appoquinimink Wildlife Area southeast to Highway 6 East of Smyrna
- The area northeast of Smyrna to Highway 9
- The Bombay Hook National Wildlife Refuge area
- Dover Air Force Base
- The area south of Highway 6 between State Roads 42 and 15
- The Milford Wildlife Area
- The Prime Hook National Wildlife Refuge
- The area north of Highway 54 and south of Road 402 between Highway 30 and Highway 113 in Sussex County

As a percentage, the areas of the State with fewer than two broadband Providers equates to less than 0.5% of the Census Blocks in the State. Furthermore, the estimated total number of households in the State that are not served by a broadband Provider is 3,223 or 0.79% of all households. This is based on the total number of homes in Census Blocks where broadband does not exist as an option to residents. However, as these areas are utilized by residents of the State and as housing and other developments reach these areas, they will not be broadband ready. The lack of broadband availability may hamper expansion into these areas as the need arises in the future.

4 Areas of Delaware Served by Multiple Broadband Providers

The large majority of the State of Delaware has multiple broadband Providers, serving addresses within the area, with over 50% of the State having six or more Providers of broadband service. When including all areas of the State with two or more broadband Providers, over 99% of the State's Census Blocks are offered broadband service by multiple Providers. A map of the State of Delaware with color codes showing the number of Providers is included as Attachment 2 to the report.

Having multiple Providers helps promote competition among the Providers in given areas and should translate into the highest level of speed the Providers can offer at affordable costs. Having multiple Providers in an area also promotes higher customer service standards from Providers as they attempt to keep their existing customer base and increase their numbers of customers.

5 Types of Technology Used to Provide Broadband in Delaware

The NTIA classified broadband technologies into 11 categories plus a 12th category labeled "All Other". These categories represent both hardline cable networks (cable, phone lines, or fiber optic infrastructure connected to the residence or business) and wireless networks (signals are transmitted to and from an address or location). The NTIA further defined each of the technologies into more specific categories. The technologies utilized in Delaware are listed and defined below:

- **Asymmetrical xDSL**
  DSL is a telephone system-based data communications service that utilizes modulation schemes that allow high-speed transmission of data on copper or phone lines. Asymetrical xDSL is a design characteristic where return speed is lower than forward speed. This allows for more of the network's bandwidth capability or throughput to be utilized by the forward portion of the network allowing for faster downloads than uploads. This technology is utilized widely by telephone companies in the State to provide broadband service to end users.

- **Other Copper Wireline**
  Non-DSL telephone system-based data communications service such as T-1 (1.54 Mbps). Other Copper Line technologies tend to be utilized more for business and anchor end users, as bandwidths are often gauranteed verses "up to" speeds.

- **Cable Modem – DOCSIS 3.0**
  A cable modem is a device that converts information from one device (computer) to a usable form for another device (cable TV network). Specifically, information from a computer is converted to a useable format for transport on the cable TV network and converted back to a format useable by a computer at the receive site modem. DOCSIS 3 provides for multiple channels on the cable TV system to be combined and the combination used to enable higher data communications speeds or bandwidths.

DOCSIS 3.0 is widely utilized by cable television network-based Providers throughout the State. Cable TV systems currently utilizing previous versions of DOCSIS will likely migrate to DOCSIS 3.0 in the near term to utilize its higher bandwidth capabilities.

- **Cable Modem – Other**
  Similar to DOCSIS 3.0, except these are all prior versions and revisions of DOCSIS including 1.0, 1.1 and 2.0. These versions offer lower bandwidth or speed than DOCSIS 3.0. Only one Provider reported using Cable Modem – Other in the State. This Provider is primarily DOCSIS 3.0 and will likely migrate the remaining areas of the State from earlier versions of DOCSIS to DOCSIS 3.0 in the near future.

- **Optical Carrier/Fiber to the End User**
  A communications network utilizing fiber optics up to or into a household, business, or other facility – also called Fiber to the Home (FTTH) or Fiber to the Premise (FTTP). Fiber optic cables allow for transmission of modulated light along an optical fiber for significant distances. Fiber optic cables are utilized throughout communications systems due to their ability to transmit signals over longer distances with higher bandwidths, while having significant reductions in noise and distortion effects compared to other wireline and wireless networks. This technology is replacing other traditional telephone technologies throughout more densely populated areas of the State. The local phone company in these areas will likely phase out the traditional phone system over the long term.

- **Satellite**
  Wireless service provided between satellites and the end user. A dish-shaped antenna, similar to those used for satellite TV, is utilized at the end user's location to receive the downstream signal and to transmit the signal upstream. Satellite is available anywhere in the State where a clear view to the southern sky exists. Trees, buildings, and other obstructions are the only obstacles that may keep end users from accessing satellite internet.

- **Terrestrial Fixed Wireless – Unlicensed**
  Broadband service typically provided in a point-to-point configuration from a central tower location, or through a series of towers (hops) as part of a mesh network, to an end user location. The frequencies utilized are not licensed by the FCC and therefore are susceptable to interference or competition for bandwidth from other non-licensed networks. The only system to report utilization of Fixed Wireless – Unlicensed is located in and around the Rohoboth Beach area of the State. This is a WiFi-based system that requires a subscription and is password protected.

- **Terrestrial Fixed Wireless – Licensed**
  Broadband service typically provided in a point-to-point configuration from a central tower location, or through a series of towers (hops) as part of a mesh network, to an end user location. The frequencies utilized are licensed by the FCC and therefore are more immune to interference and competition for bandwidth from other networks.

- **Terrestrial Mobile Wireless**
  Broadband service typically provided in a point-to-multipoint configuration from multiple tower locations, as part of a mesh network, to end user locations. The mesh configuration allows for mobile access to the broadband network. These networks are most commonly known as cellular data networks. The frequencies utilized are licensed by the FCC and therefore are more immune to interference and competition for bandwidth from other networks. Terrestrial mobile based, or cellular, broadband is available throughout the State with the exception of a few areas. These are shown on the accompanying maps as unserved areas of the State.

6 Advertised Upstream and Downstream Transmission Speeds

Broadband Providers often advertise both downstream and upstream speeds as "up to" speeds. In other words, a Provider will advertise speeds "up to" 4 Mbps in the downstream direction and "up to" 1 Mbps in the upstream direction. Consumers may believe that those are the speeds they will most often realize when utilizing the Provider's network for internet access. However, in reality, the actual speeds offered on the network may be significantly less than the advertised "up to" speeds.

Many broadband networks deployed today utilize a shared bandwidth design whereby the network is developed based on customers sharing the total available bandwidth on the network. This is an effective way for a Provider to offer fast speeds to large areas while minimizing the amount of infrastructure needed and thereby reducing the cost of deployment. In many cases, this design provides speeds sufficient for most subscribers' needs that are well within the definition of broadband. However, the actual speeds will most often be lower than the advertised speeds because of the shared bandwidth design, and in some cases they will fall below the threshold stipulated for broadband.

An example of this is – if a network has a total available bandwidth equating to a download speed of 10 Mbps and one person is accessing the network, they will realize speeds at or near 10 Mbps. However, if 10 people are accessing the same network at the same time, they will divide the available network bandwidth among them. Although the actual results will vary, based on the level of utilization of bandwidth by each of the users, for purposes of this example, the result would be approximately 1 Mbps available to each of the 10 people accessing the network. In this example, we assume all 10 users are accessing significant amounts of bandwidth that may be required to download music, video, and large files or that may be required to watch live video. In reality, all 10 users will likely be utilizing differing levels of bandwidth at any given time. This phenomenon makes it difficult to evaluate advertised speeds within a given system, between systems, and throughout the State and beyond.

The Providers that supplied speed information, as verified during the backlab verification process, reported the following ranges of speed by technology:

- **Asymmetrical xDSL**

  Speeds between 768 Kbps to 25 Mbps in the downstream direction with speeds between 200 Kbps to 1.5 Mbps in the upstream direction[3].

- **Symmetric xDSL**

  Speeds between 768 Kbps to 6 Mbps in the downstream direction with speeds between 768 Kbps to 6 Mbps in the upstream direction.

- **Other Copper Wireline**
  Speeds between 768 Kbps to 25 Mbps in the downstream direction with speeds between 200 Kbps to 25 Mbps in the upstream direction.

- **Cable Modem – DOCSIS 3.0**
  Speeds between 50 Mbps to greater than 100 Mbps in the downstream direction with speeds between 10 Mbps to 25 Mbps in the upstream direction.

- **Optical Carrier/Fiber to the End User**
  Speeds between 50 Mbps to greater than 1 Gbps in the downstream direction with speeds between 10 Mbps to greater than 1 Gbps in the upstream direction.

  SatelliteSpeeds between 768 Kbps to 3 Mbps in the downstream direction with speeds between 200 Kbps to 768 Kbps in the upstream direction[4].

RBwifi dropped

- **Terrestrial Mobile Wireless**
  Speeds between 768 Kbps to 25 Mbps in the downstream direction with speeds between 200 Kbps to 6 Mbps in the upstream direction.

7 Samples of Actual Upstream and Downstream Transmission Speeds

Several methods were used to obtain a sampling of the actual broadband transmission speeds achieved by residents, businesses, and institutions. For example, State residents and businesses were given a business card-sized handout that briefly explained the Project and pointed them to the State-specific speed test and survey website. This round of verification focused on areas of the State where providers have reported new technologies and speeds compared to previous data submissions. The State utilized a Project-specific Ookla speed test

[3] These speeds have decreased from previous submissions based on providers' updated data.
[4] These speeds have decreased from previous submissions based on providers' updated data.

website[5] and survey in order to gain information on users' addresses, satisfaction, and the upstream and downstream speeds associated with their broadband connection. In addition, the State Parties' team members performed approximately 65 speed tests, on wireless networks. The locations of these speed tests are included on Attachment 3.

Another verification method, in addition to utilizing the above-mentioned methodologies for verifying system coverage and characteristics, was for team members to enter into discussions with residents in the area. Residents were asked if they knew if a particular Provider's service was available, if they were or had recently been a customer, and if they know what speeds they could achieve. Residents often times did not know what their service level and speeds were but did know who the broadband service Provider was. Questions such as how much they were paying for the service led to a better understanding of their service level. Approximately 150 speed test cards were handed to residents and at business locations such as business strip malls. These cards encouraged the residents to visit the State speed test and survey website, as listed on the card, to assist the State in gathering actual speed data. Thus far, nearly 3,300 speed tests have been performed by both State Party team members on site and residents and business personnel at their locations throughout the State at locations with broadband speeds of at least 768 Kbps in the forward and 200 Kbps in the return direction. In addition to the 3,300 speed tests mentioned, several hundred speed tests have been performed showing less than broadband speeds being achieved.

It should be noted that there are many variables that can affect speed test results. Of these, the most significant are the technology reportedly utilized and the performance characteristics of the computer or device being utilized by the end user performing the test, the number of computers or devices at a location accessing the internet at the same time, the level of throughput being utilized by each, and the day and time of day when the tests are performed. For these reasons, speed tests are best analyzed in the aggregate to give a good understanding of typical speeds being realized. In other words, all cellular tests should be averaged to get an accurate understanding of actual speeds that can be expected from that given technology. Furthermore, speeds for a given Provider can be averaged to again get a better understanding of the actual speeds available from that Provider.

Of the nearly 3,300 speed tests performed, providing broadband speed results, to date, the overall average speeds of all technologies and Providers) were approximately 6.8 Mbps downstream and 3.0 Mbps upstream. Further broken down by technology, the average speeds are:

The Ookla tests are showing the categories incorrectly. For instance, Comcast is many times referred to as a DSL connection which we know it is not. There are no Cable modem connections shown. Do we pull this service specific part out?? We need to take a good look at what Ookla is providing and how we may scrub it going forward and then plot it on a map for comparison to our provider maps.

[5] http://www.delawarespeedtest.com/

Technology	Downstream	Upstream
All Technologies Combined	6.8 Mbps	3.0 Mbps
Mobile Wireless	1.5 Mbps	550 Kbps
Cable Modem – Residential	10.7 Mbps	3.2 Mbps
Cable Modem – Business class	11.6 Mbps	3.3 Mbps
DSL	10.3 Mbps	4.4 Mbps
Fiber To The Premises/Business	23.9 Mbps	14.0 Mbps

As described above, these are aggregate numbers that represent an average of these tests taken by end users. Actual speeds at a given location will vary from these speeds. Overall, the speed tests indicate speeds comparable to those advertised by the providers. For example, mobile wireless providers offer speeds between 768 Kbps to 3.0Mbps (some offer a lower maximum speed) in the downstream direction. The speed tests show an average speed of 1.5 Mbps in the downstream direction. Cable modem DOCSIS 3.0 is advertised to offer speeds between 10 Mbps and 100 Mbps. The average tested speed was 10.7 Mbps. This is on the low end of what is advertised and may reflect end users with a lower than maximum speed plan. In other words, although speeds up to 50 Mbps may be offered to residential end users, many may be signed up for a service with a maximum throughput of 20 Mbps or less, which brings the aggregate average speed for cable modem DOCSIS 3.0 down. Fiber to the premise is similar to cable modem DOCSIS 3.0 in that the tested speeds are lower than the advertised maximum speeds of between 50 Mbps and 1 Gbps. These higher end speeds are more costly and therefore not likely to be the highest selling tier of service. Therefore, the speed tests done on the lower tiered service will bring the overall aggregated average speed down from the advertised "up to" speeds. DSL service is the only technology that had tested aggregated average speeds near the top of the advertised maximum speed range. In fact, the advertised maximum speeds for DSL are between 768 Kbps and 10 Mbps, and the tested speeds for DSL came in at 10.3 Mbps.

8 Broadband Service Tiers – Residential, Business and Anchor Institutions

One of the goals of the project was to find the maximum downstream and upstream speeds offered by the various Providers in the State. The goal was not necessarily to determine the various levels of service or speed being offered up to the maximum by the Providers. However, speed tiers or levels are an important component of determining what services are available to end users, as many will not require or be able to afford the fastest available speeds but do want or need a higher speed connection than is available via a dial-up connection.

Broadband service is provided in many different speed tiers through the various technologies. Most Providers offer more than one level of service or speed whereby end users who need or desire faster connectivity can opt for the highest level of service, and end users who only need lower levels of service can elect to purchase a slower connection at a reduced cost. Speed tiers differ considerably between Providers and are dependent on the technology utilized to provide the service. For instance, Providers using cable modem DOCSIS3 technology offer maximum speeds of between 10 Mbps to 100 Mbps in the downstream direction, while mobile wireless Providers in the State offer maximum downstream speeds between 768 Kbps and 3 Mbps.

Making exact comparisons between broadband service Providers is difficult for a variety of reasons, the most significant of which is that most Providers offer "up-to" speeds. As an example, an end user on one Provider's network with "up-to" speed of 1.5 Mbps may realize close to that maximum speed at most times. However, a customer on another Provider's network with "up-to" speed of 1.5 Mbps may only realize half of that speed at most times. This makes it difficult to accurately determine which Provider has the speeds that will consistently provide the level of service needed by the end user. Other issues that can make shopping for a broadband Provider difficult are introductory pricing, bundled pricing (where broadband service must be purchased with another service such as phone or TV), and long-term contracts. Introductory pricing may provide a benefit in the short term, while offering less competitive pricing in the long term. Long-term contracts can lock an end user into a plan they may not need over the course of the contract term or lock them into a plan that does not fulfill their needs in the future. Additionally, some Providers such as mobile broadband and satellite services have established throughput limits, such as 5 gigabits of throughput per month. After a customer hits that level of throughput, they may be charged additional fees or their service level is cut back significantly for the remainder of the month (such as is done by some satellite based Providers).

Providers are also continually changing their service offerings and pricing. As end users needs for speed continue to increase, Providers continue to offer higher levels of speed with new additional features as discussed elsewhere in this report. Another aspect that must be considered by potential end users is installation, equipment, and activation fees. These can vary from $0.00 to over $100.00. Many Providers that require installation or equipment fees run promotions where these fees are waived or reduced for a limited time.

Other add-ons or extras, which may or may not offer value to the end user, that some Providers offer as a part of their service are security tools such as anti-spam and anti-virus software, home networking, specific web content free such as Disney, ESPN3, and others.

Some examples of available plans and non-introductory, non-bundled pricing as researched on Providers' websites include the following:

Cable Modem Providers (all "up-to" speeds)		
Downstream Speed	Upstream Speed	Price per Month
1.0 Mbps	512 Kbps	$32.95
1.5 Mbps	384 Kbps	$40.95
3 Mbps	Unadvertised	$29.95
15 Mbps	3 Mbps	$59.95
20 Mbps	4 Mbps	$69.95
50 Mbps	10 Mbps	$114.95

Fiber To The Premise (FTTP all "up-to" speeds)		
Downstream Speed	Upstream Speed	Price per Month
15 Mbps	5 Mbps	$54.99
25 Mbps	25 Mbps	$69.99
50 Mbps	20 Mbps	$144.99

Satellite (all "up-to" speeds)		
Downstream Speed	Upstream Speed	Price per Month
1.2 Mbps	200 Kbps	$69.99
1.5 Mbps	256 Kbps	$109.98
1.6 Mbps	250 Kbps	$79.99
2.0 Mbps	300 Kbps	$119.99

Mobile Wireless (all "up-to" speeds)		
Downstream Speed	Upstream Speed	Price per Month
1.4 Mbps	200 Kbps	$40/50/60*
1.4 Mbps	800 Kbps	$20/35/50/80*
*Based on monthly throughput, $20 = 1 Gbit allowance, $80 = 10 Gbit allowance		

DSL (all "up-to" speeds)		
Downstream Speed	Upstream Speed	Price per Month
1 Mbps	384 Kbps	$19.99
3 Mbps	768 Kbps	$29.99
7.1 Mbps	768 Kbps	$39.99
8 Mbps	Not advertised	$39.95

Fixed wireless (Not licensed all "up-to" speeds)		
Downstream Speed	Upstream Speed	Price per Month
1.5 Mbps (residential)	Not advertised	$39.99
1.5 Mbps (business)	Not advertised	$49.99

As the tables above show, shopping for the plan that meets the specific, consistent needs of an end user can be confusing. Many other options and additional features are offered by Providers that are not shown in the examples above, including virus protection, spam filters and pop-up blockers, and subscription only websites. In addition, end users must decide if long-term commitments are a concern for them prior to signing up for many types of broadband service offerings.

Some Providers such as the cable modem, DSL, and wireless Providers also offer business class service. These services may be identical to residential service with additional add-on services, such as Outlook for e-mail, and may include a higher level of, or faster, service response when problems arise.

In addition, some Providers offer faster speeds as business class service at a higher monthly cost. These Providers also will offer business class and residential class services to Anchor Institutions. Some Providers will offer higher speeds on a per site basis, such as fiber optic connections, with speeds as high as 1 Gbps symmetrical such as those supplied to the cities of Dover and Wilmington and the University of Delaware.

As shown below in the Broadband Availability at Anchor Locations section, Anchor locations' requirements vary significantly based on their size, the number of internet users, and the applications being run at the location. Costs will vary on these services based on speed and necessary infrastructure expansions needed to connect the Anchor Institution.

9 Locations of Towers Utilized to Provide Broadband

During the previous Field Verification portion of the project, the State Parties noted the locations of towers that are utilized by cellular Providers and for other radio communications.

These locations have been plotted onto a map for potential future reference. These locations can serve as transmit and receive sites for wireless broadband Providers. As a potential wireless Provider evaluates whether to deploy a network to offer broadband to residents and businesses, one of the most significant costs can be construction of a tower that is high enough to provide service to the surrounding areas. These existing towers may have space available that can be leveraged for placement of broadband related antennas at a significantly lower cost than building new towers and therefore may allow a Provider to deploy a network where one may not otherwise exist. The available space must be at a height on the antenna that will meet the needs of a new occupant on the tower. Furthermore, like any business, the Provider must recoup their investment over a set period of time. Using a lower cost option such as existing towers may allow a Provider to offer service at a lower monthly cost to the end user.

The goal during the Field Verification phase of the project was to document all towers passed while performing the more pertinent task of verification of broadband availability where the Providers indicated service was available. This process did not identify all towers in the State but does provide a useful database that can be built upon over time. The Towers that were located are shown on the map included as Attachment 4.

10 Wireless Spectrums Utilized to Provide Broadband

Several wireless frequency spectrums are being utilized by the various wireless Providers to offer broadband service. These include both fixed and mobile wireless Providers. As part of the data request sent to all of the Providers, they were asked to include which frequencies they are utilizing to offer broadband service in a wireless format. The spectrums utilized, as reported by the Providers, are as follows:

Cellular Providers are using several spectrum ranges including:

- 700 MHz band
- 698 – 758 MHZ
- 775 – 788 MHz
- 805 – 806 MHz
- 824 – 849 MHz
- 862 – 869 MHz
- 1.850 – 1.915 GHz
- 1.930 – 1.995 GHz
- 1.710 – 1.755 GHz
- 2.100 – 2.155 GHz

  2.496 – 2.690 GHz

Satellite Providers are using licensed frequencies as provided by the FCC in the L-band, Big LEO, Little LEO, and 2 GHz spectrums.

GeoDecisions® A Division of Gannett Fleming

11 Broadband Availability at Anchor Locations

The NTIA's NOFA required that "Awardees shall provide NTIA with a list of community anchor institutions in their state, along with the associated information described below." The information gathered includes address data, Provider name, technology, and speeds of broadband connection. The NOFA defined Community Anchor Institutions (CAIs) in the following manner: Schools, libraries, medical and healthcare Providers, public safety entities, community colleges and other institutions of higher education, and other community support organizations and entities.

The State tasked the Institute for Public Administration at the University of Delaware (IPA) with performing the tasks of gathering the information needed related to Anchor Institutions.

The IPA first compiled a master list of all CAIs throughout the State. This list was then subdivided into categories of:

- Schools – K-12 (public and private)
- Libraries
- Medical/Healthcare facilities (public and private)
- Public Safety entities (public and private)
- Universities, colleges and other post-secondary (public and private)
- Other community support – governmental
- Other community support – non-governmental

The IPA verified each CAI's name, street address, map coordinates, and proper categorization into the above groups. A few of the small municipalities only have Post Office boxes on file for addresses and were therefore mapped with the Post Offices' mailing address.

The previous list of known CAIs in the State, as reported in March 2012, totaled 907. Through the process of making follow-up contacts and obtaining additional CAI lists to identify the level of Internet connectivity the CAIs were utilizing, a September 2012 adjusted total of 901 CAIs was determined. The IPA has been able to elicit usable responses from 634 of those 901 CAIs. This is an increase of 36 above the number of responsive CAIs (598) that were reported in March of 2012. Of this current subset of 634 respondents, 612 do have broadband connections, while 22 report that they do not have broadband. The other 267 presumed CAIs have remained non-responsive, to date. The IPA will continue its attempts to make contact with the CAIs that have not yet been included in the study so that their data can be included in the subsequent update.

612 of the 634 CAIs that have been responsive to date—about 97%-- reported they have some level of broadband connectivity to their Internet Service Provider (ISP). This leaves just about 4% of respondent institutions that indicated a lack of broadband connectivity.

The breakdown of all known CAIs is as follows:

- Schools – K-12 (public and private)
  Total = 390
  With Broadband = 274
  Without Broadband = 3
  Non-responsive = 113

- Libraries
  Total = 33
  With Broadband = 33
  Without Broadband = 0
  Non-responsive = 0

- Medical/Healthcare facilities (public and private)
  Total = 30
  With Broadband = 23
  Without Broadband = 0
  Non-responsive = 7

- Public Safety entities (public and private)
  Total = 120
  With Broadband = 76
  Without Broadband = 1
  Non-responsive = 43

- Universities, colleges and other post-secondary (public and private)
  Total = 32
  With Broadband = 22
  Without Broadband = 1
  Non-responsive = 9

- Other community support – governmental
  Total = 69
  With Broadband = 58
  Without Broadband = 7
  Non-responsive = 4

- Other community support – non-governmental
  Total = 227
  With Broadband = 126
  Without Broadband = 10
  Non-responsive = 91

The speeds achieved by the CAIs vary considerably overall; there are also significant differences within categories of CAIs. For example, of the 274 K-12 schools that reported having broadband connectivity, 207 reported the use of Optical Carrier/Fiber with downstream and upstream speeds of 10 Mbps or greater; 15 reported the use of Cable Modems and 35 reported the use of Other Copper Wireline – with widely varying downstream speeds and upstream speeds in both cases; while 5 reported a reliance upon DSL connections (12 schools indicated that they had broadband connectivity but were unresponsive regarding any specifics concerning the technology being utilized). Among the libraries (all of which are on the State network and use Optical Carrier/Fiber), 3 reported downstream and upstream speeds in the range of 100 Mbps - 1 Gbps, while the other 30 reported downstream and upstream speeds in the range of 10 Mbps - 25 Mbps. The highest downstream and upstream speeds of any CAIs (greater than or equal to 1Gbps in both directions, using Optical Carrier/Fiber) were reported by the Delaware Special Olympics, the cities of Dover and Wilmington, the University of Delaware Police and the University of Delaware. Of all the entities that did indicate they had broadband service, the slowest connections were reported by non-governmental community support institutions (typically Senior Centers), some of which were using DSL connections with downstream speeds as low as 768 Kbps - 1.5 Mbps and Upstream speeds of 200 Kbps or less.

In addition to determining if CAIs have broadband, the data collection for September 2012 addressed whether the CAI provides public access to WiFi. In the case of Delaware's libraries, the availability of public access to broadband via terminals far outweighs the availability of Public WiFi— while all 33 of the libraries do provide public access to broadband, only 14 reported the capability to provide public WiFi in September 2012. System-wide availability of public WiFi at Delaware libraries was, however, reported as in the process of implementation.

By allowing public access to broadband, CAIs can help serve populations in the State that otherwise may not have broadband access available to them. These include people living in unserved or underserved areas of the State or who cannot afford access at their residence. IPA plans to focus on these CAIs in its planning activities to determine how such facilities best meet the needs of population groups that do not otherwise have access.

12 Conclusion

The State of Delaware, with direction and grant funds from the NTIA, began the process of determining the level of broadband availability in the State of Delaware in early 2010. As components of the project, Providers were asked to provide data detailing where they provide broadband service, the advertised maximum downstream and upstream speeds, and the technology deployed to offer the service. The data gathered from the Providers was verified using multiple methods, including checking the data against websites; field verification and speed tests by State Party team members and the general public. The data was then sent to the Providers for one final check for accuracy. The State has now completed its 4th submission or version of the project with updates being included in the data base each time.

Because, in part, the State has a relatively high population density, broadband providers offer service throughout much of the State. Additionally, in more than 50% of the State more than six different Providers offer broadband in the same areas. Over 99% of the State has broadband service availability from at least two Providers.

There are several technology types being utilized in the State to provide broadband to residents, businesses, and Anchors. These vary from telephone-based technologies such as asymmetrical and symmetrical DSL and other copper wireline to cable-modem based technologies, optical carrier or Fiber-To-The end user, satellite, and mobile wireless. Each of the technologies brings broadband to end users in different ways and fills various needs such as speed, price, reliability and mobility.

Determining and documenting speed offerings can be a complicated task. Most broadband providers offer "up to" speeds. The actual speeds of these networks at a given time may vary drastically from the "up to" speed that is advertised. In addition, Providers often include other services such as virus protection, anti-spyware, and others or require a customer to bundle their broadband service with other services such as phone or TV to get the best price. Consumers need to weigh all aspects of the Providers' service prior to signing up for service and potentially signing a long-term contract.

As a part of the Project, the State Parties documented existing cellular and other communications towers throughout the State. These locations may provide a potential cost reduction for future broadband providers to enter the broadband marketplace.

This may allow the State to encourage build out of existing wireless networks or deployment of new networks where broadband service is lacking today.

The Institute for Public Administration at the University of Delaware (IPA) has had contact with 634 of the 901 known Anchor Institutions in the State. Of these, only 22 do not have broadband service today. The State should continue to make efforts to contact the Anchors that have not responded thus far. The State should then work with the Anchors during its Planning Project to determine if the broadband services available to the Anchors are meeting their needs today, as well as being able to meet their anticipated short- and long-term needs in the future.

The State can utilize availability documentation gathered during this Project to continue to help direct the Planning Project that is currently underway. During the Planning Project, the State and the University of Delaware's Institute for Public Administration will determine broadband-related needs of the general public, businesses, and Anchor Institutions throughout the State in today's environment as well as into the future.

13 Glossary of Terms

Access Point (AP) – Transmitter and receiver utilized to create a wireless connection between devices. End users connect wirelessly to the network via an Access Point.

Asymmetrical Speeds – A network system design characteristic where return speed is lower than forward speed. This allows for more of the network's capability or throughput to be utilized by the forward portion of the network allowing for faster downloads than uploads.

Broadband – (as defined in the NTIA's NOFA) – Data transmission technology that provides two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (Kbps) downstream and at least 200 Kbps upstream to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end users within the project area.

BPL (Broadband-Over Powerline) – A network utilizing electrical conductors (a power Provider's lines) as its transport medium.

Cable Modem – A device that converts information from one device (computer) to a usable form for another device (cable TV network), i.e., Information from a computer is converted to a useable format for transport on the cable TV network and converted back to a format useable by a computer at the receive site modem.

Community Anchor Institutions – Schools, libraries, medical and healthcare Providers, public safety entities, community colleges and other institutions of higher education, and other community support organizations and entities.

Digital Divide – The inability of residents to access broadband and Internet services based on economic or geographic reasons.

Digital Subscriber Line (DSL) – A telephone system-based data communications service that utilizes modulation schemes that allow high-speed transmission of data on copper or phone lines.

Downstream, also known as "download" or "forward direction" – Connectivity path from a network service Provider, or ISP, to the customer's location.

Fiber Optic Cable – Cable made from glass that provides the medium for transmission of light along a designated path. Single mode fiber is utilized to transport light over long distances.

Fiber To The Premises (FTTP) – A communications network utilizing fiber optics up to or into a household, business or other facility, also called FTTH or Fiber To The Home.

Fixed Wireless – Broadband service typically provided in a point-to-point configuration from a central tower location, or through a series of towers (hops) as part of a mesh network, to a customer premise location.

Gigabits per Second (Gbps) – One billion bits of information transmitted between devices in one second, i.e., 1 Gbps = 1,000,000,000 bits of information transported over a network per second.

Internet Protocol (IP) – Internetworking protocol used to transmit data across and between switched networks. Also specifies the formatting and addressing scheme of information packets.

ISP – Internet Service Provider – Private company or other organization offering connectivity to the Internet.

Kilobits Per Second (Kbps) – One thousand bits of information transmitted between devices in one second, i.e., 256 Kbps = 256,000 bits of information transported over a network per second.

Megabits per Second (Mbps) – One million bits of information transmitted between devices in one second, i.e., 1.5 Mbps = 1,500,000 bits of information transported over a network per second.

Middle Mile/Backbone/Backhaul – Transmission media utilized to connect APs or network nodes within a system to each other and to the main network and to the Internet. Backhauls can consist of fiber optic cables, WiMAX, and other wireless technologies.

Symmetrical Speeds – A system design characteristic allowing equal speeds in the forward and return paths of the network.

Upstream – Also known as "upload" or "return direction" – Connectivity from the customer back to the network service Provider or ISP.

Voice over IP (VoIP) – Transmission of voice communications as IP packets, allowing for transportation of voice over the Internet, LANs and WANs.

Wi-Fi (Wireless Fidelity) – Wireless local area networks based on the IEEE's (Institute of Electrical and Electronics Engineers, Inc.) 802.11 standards. 802.11 refers to a group of standards in place today as well as standards that are currently being developed.

WiMAX (**Worldwide Interoperability for Microwave Access)** – Wireless wide area networks based on the IEEE's 802.16 standards. Capable of transmission speeds up to 70 Mbps over 70 miles with actual speed and coverage far less based on applications and terrain.

Version Information

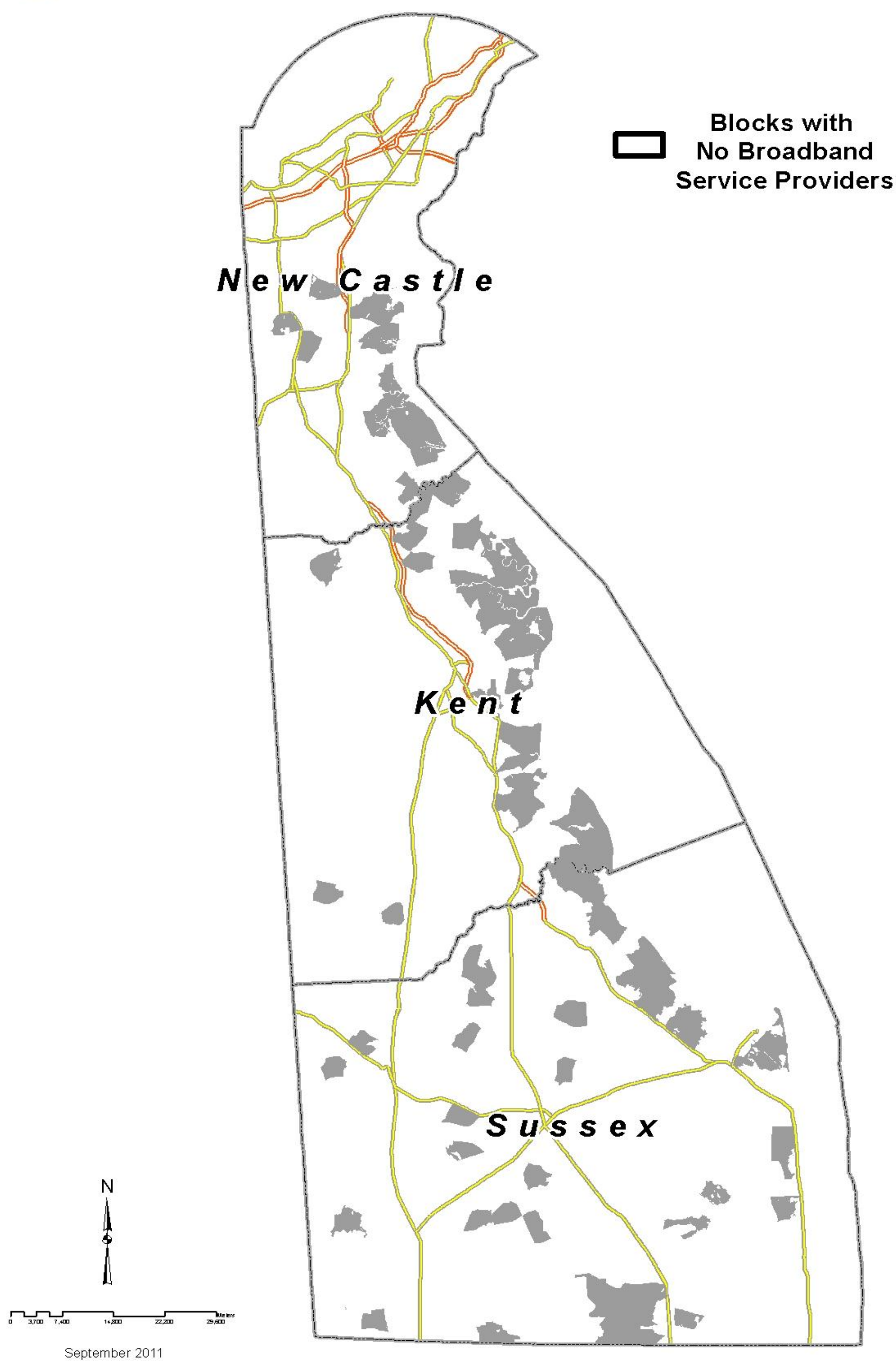
Version Num.	Edit Date	Edited By	Comments
0.1	12/07/10	Nielsen, Robinson	Draft Document
1.0	12/10/10	Jensen, Conway	Draft Document Revisions
1.1	04/26/11	Jensen	Spring 2011 Updates
1.2	06/13/11	Tuttle	Updated 2011 Anchor Stats
2.0	09/22/11	Cloud	Updated 2011 CAI Stats for Fall submission from UD-IPA
2.1	01/25/12	GeoDecisions	Fall 2011 Updates
3.0	03/20/12	GeoDecisions	Spring 2012 Updates
3.1	03/29/12	Cloud	Minor edits, Updated CAI Stats for

			spring submission from UD-IPA
4.0	9/25/12	GeoDecisions	Fall 2012 Updates (June 2012 data submission)
4.1	9/27/12	GeoDecisions	Updated CAI section with information submitted by UD-IPA
4.2	10/1/12	Cloud	Updates to numbers in the conclusion section

Attachments

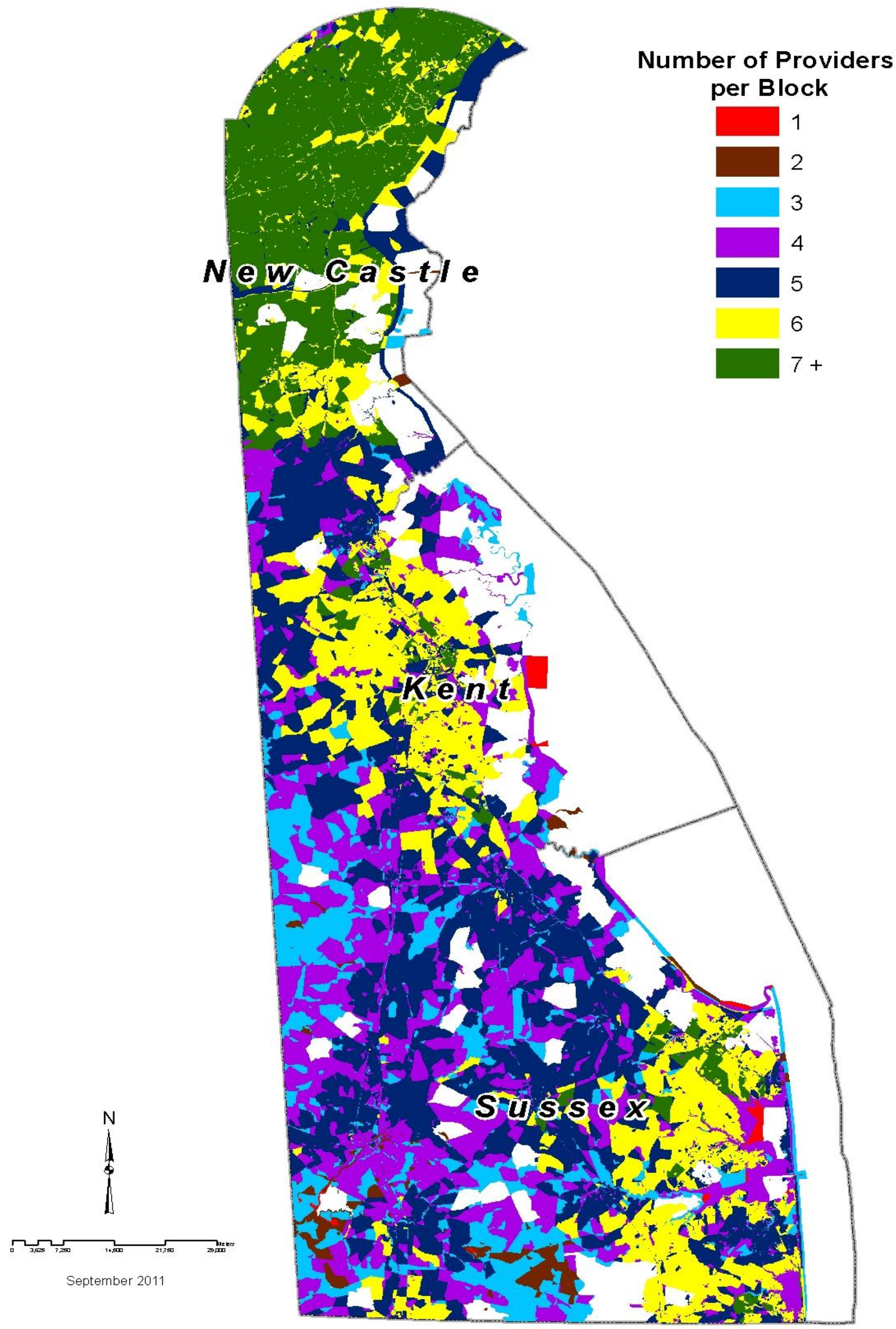
Attachment 1

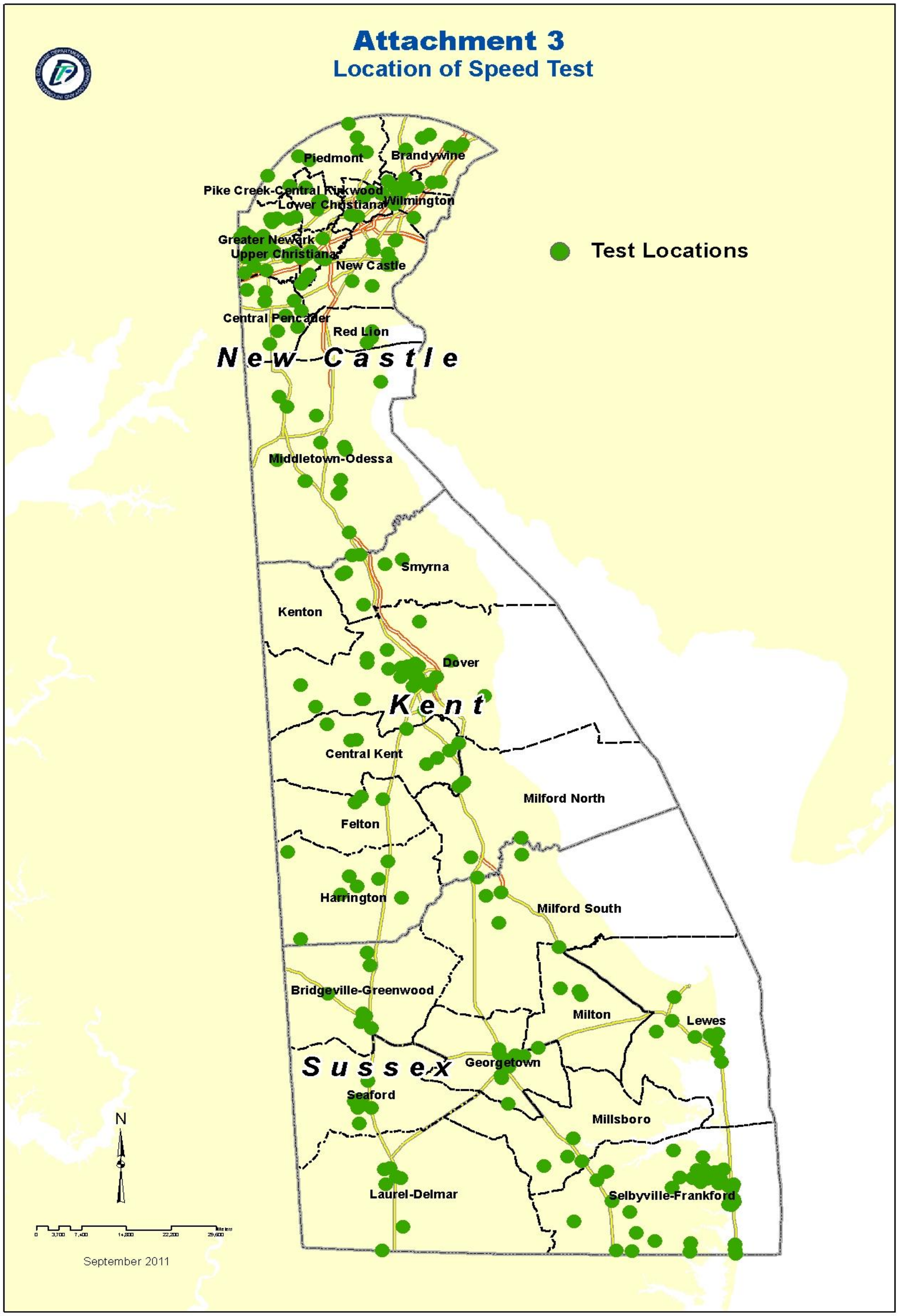
Areas with No Access to Broadband

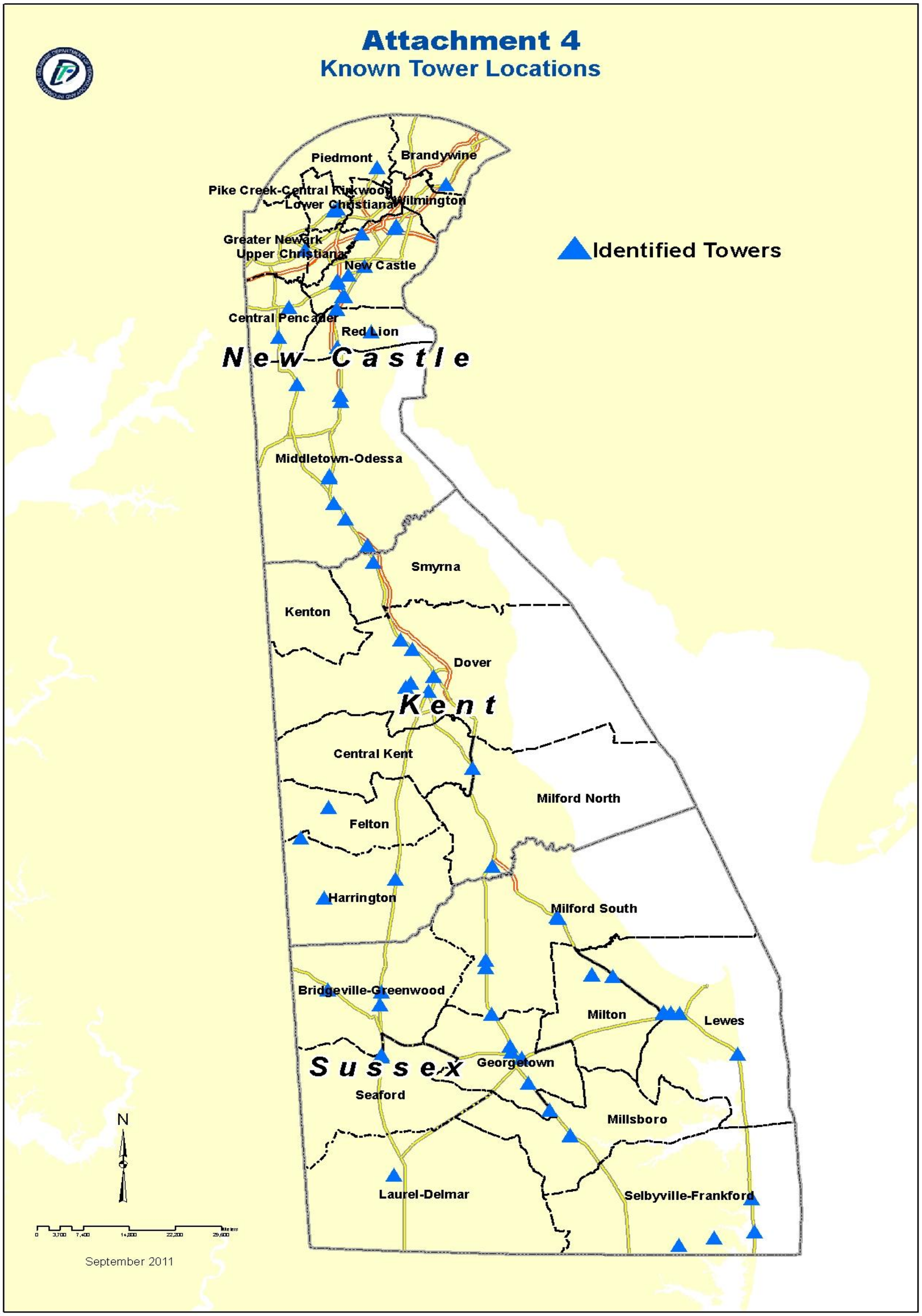


Attachment 2

Number of Broadband Providers per Block

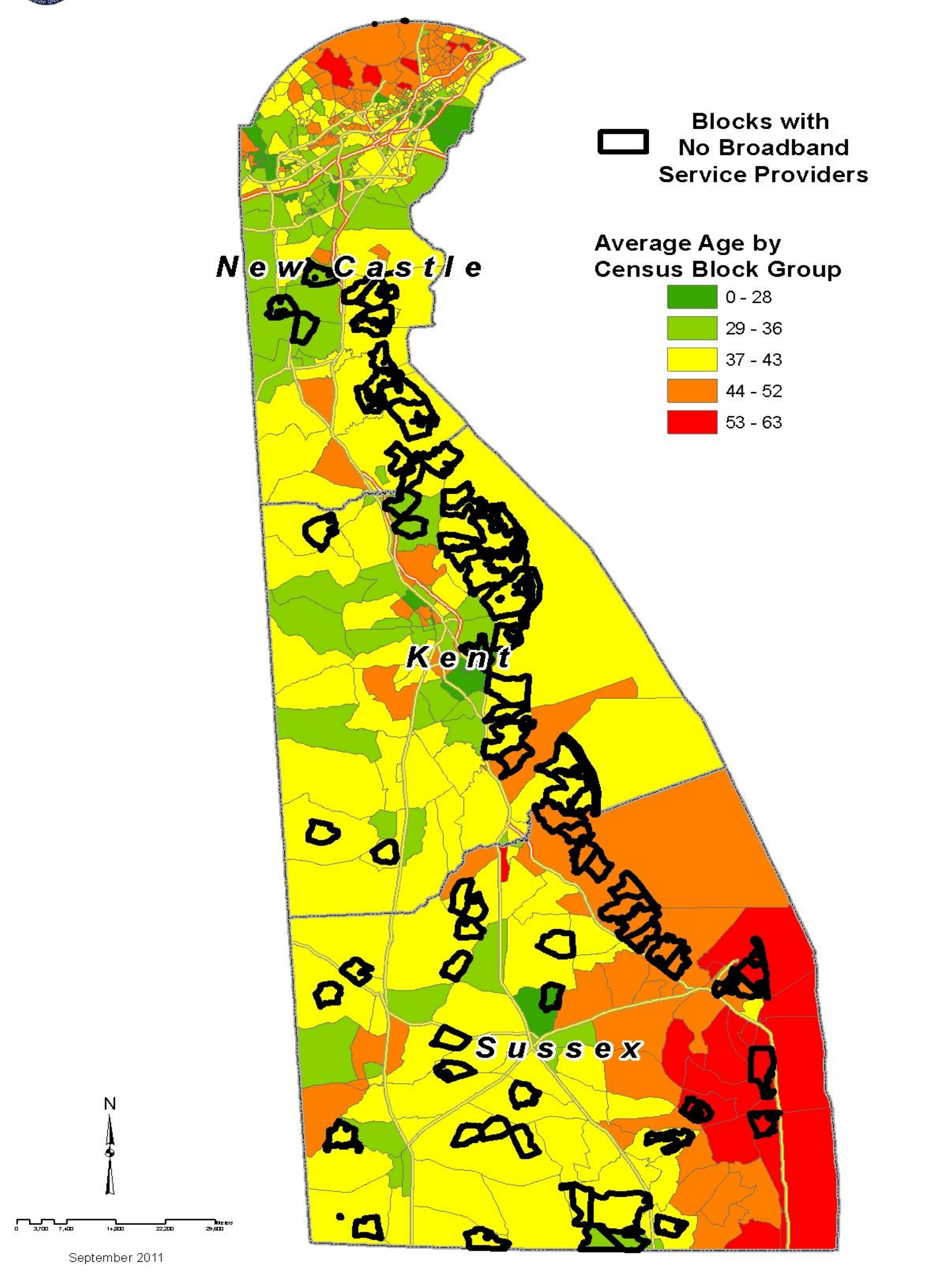



Attachment 3
Location of Speed Test
Test Locations
Piedmont
Brandywine
Pike Creek-Central Kirkwood
Lower Christiana
Wilmington
Greater Newark
Upper Christiana
New Castle
Central Pencader
Red Lion
New Castle
Middletown-Odessa
Smyrna
Kenton
Dover
Kent
Central Kent
Milford North
Felton
Harrington
Milford South
Bridgeville-Greenwood
Milton
Lewes
Sussex
Georgetown
Seaford
Millsboro
Laurel-Delmar
Selbyville-Frankford
N
September 2011

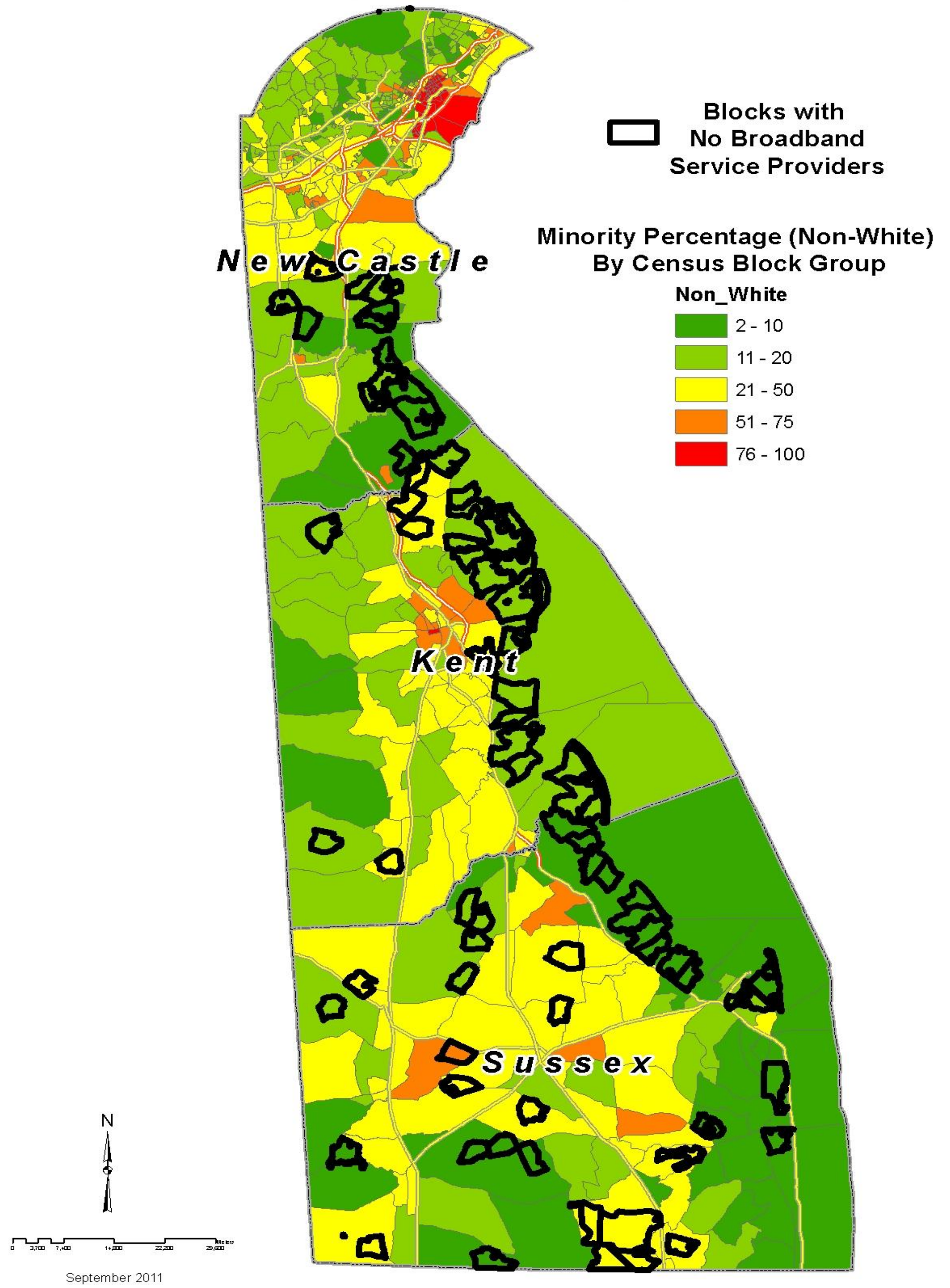

Attachment 4
Known Tower Locations
Identified Towers
Piedmont
Brandywine
Pike Creek-Central Kirkwood
Lower Christiana
Wilmington
Greater Newark
Upper Christiana
New Castle
Central Pencader
Red Lion
New Castle
Middletown-Odessa
Smyrna
Kenton
Dover
Kent
Central Kent
Milford North
Felton
Harrington
Milford South
Bridgeville-Greenwood
Milton
Lewes
Sussex
Georgetown
Seaford
Millsboro
Laurel-Delmar
Selbyville-Frankford
N
September 2011

Attachment 5

Average Age by Census Block Group

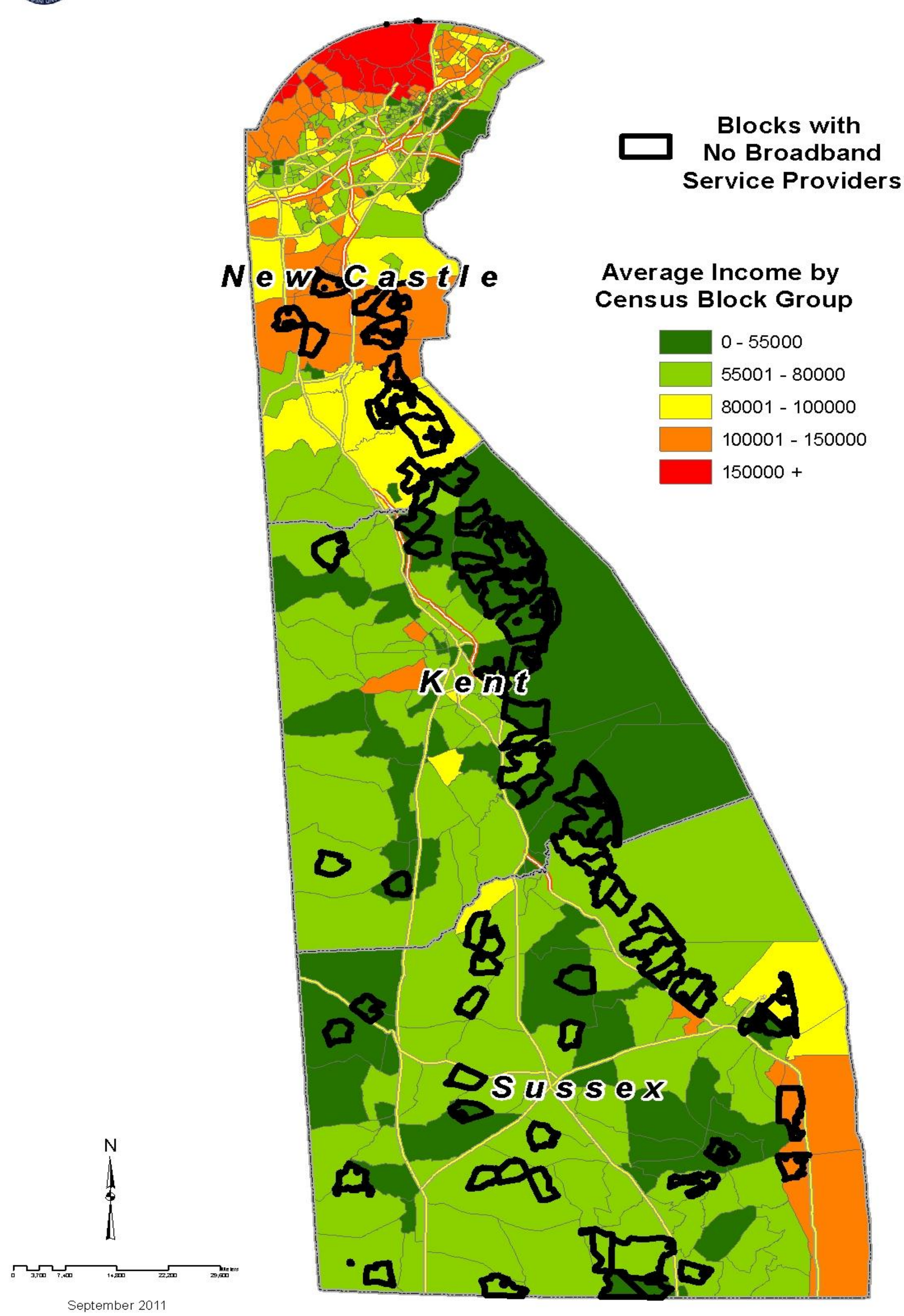


Attachment 6
Minority Percentage (Non-White) By Census Block Group



Attachment 7

Average Income By Census Block Group



OFFICIAL OCTOBER 2012 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE PROGRAM FOR THE STATE OF FLORIDA

BROADBAND Florida

October 1, 2012

TABLE OF CONTENTS

BROADBAND FLORIDA COVER LETTER

October 1, 2012

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
1401 Constitution Avenue, NW Room 4716
Washington, DC 20230

Dear Ms. Neville:

The state of Florida is pleased to present this submission for Florida's State Broadband Initiative (SBI) Grant Program.

These artifacts should be found to be compliant with the October 1, 2011, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability.

Within the timeframe of this reporting cycle the Florida Department of Management Services (the Department or DMS) continued the transition of services from our former contractor to an interim contractor and reviewed the processes from the April 2012 submission to identify ways to improve our submission for the October 2012 submission. The Department started negotiations in reference to our Invitation to Negotiate (ITN) to secure a new contract for GIS services and announced an award of the contract to BroadMap, LLC. The anticipated start date of the contract is October 1, 2012, ensuring that all processes will be transitioned and ready to go for the April 2013 submission. The Department experienced an increase in responsiveness to the initial outreach and was able to successfully negotiate additional non-disclosure agreements as well as work with providers to familiarize them with the data and process. While we did not get final data submissions from all providers in time to include with this submission, the increase in communication, interest in the project, and willingness of the providers to submit data to the State of Florida will hopefully result in additional data for the April 2013 submission.

This October 2012 semi-annual data update under the State Broadband Initiative Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

<u>Broadband Service Availability — Provider Outreach and Verification</u>

The Department made every effort to contact the providers and sent each non-responsive company an individual coverage map requesting that the provider either confirm or correct the information. A complete roster by provider depicting participation status is included in the narrative. This data update submission under the SBI program includes datasets for approximately 56 percent of the Florida provider community, or 42 of 75 total providers. There are an additional 21 providers that have agreed to provide the state with data and are in the process of signing NDAs and/or collecting data. Of the 40 actively participating providers, 23 supplied an update to their network or coverage area(s). A total of 17 providers reported there was no change in their coverage area. There are 2 providers who previously supplied data but were non-responsive in the October 2012 update effort; therefore their previous dataset, with the exclusion of any middle mile data is being put forward as part of this compilation. Of all of the providers that are not represented in the attached datasets, only 2 refused to participate in the voluntary program and 10 were non-responsive to multiple contact attempts. ***Overall, the state had an increase in responsiveness of 33 percent, going from 51 percent as of the April 2012 submission up to 84 percent in the current submission.***

Broadband Florida believes that all commercially reasonable efforts were made to account for 100 percent of the known Florida broadband provider community, pursuant to this semi-annual data update submission.

Broadband Florida continued to develop our state mapping tool, which can be found at http://broadbandfla.com, includes additional datasets not required by NTIA, a street level view widget, the ability to identify broadband coverage and providers by address, provider footprints, various speed layer views, and layer selection capability. Once the new contract with BroadMap is executed, the tool will transition to the standard BroadMap template, but continue to provide information unique to the Broadband Florida map. The Department selected a vendor to develop a Broadband Florida portal that will produce a high quality product to showcase the Broadband Florida Initiatives. The new site will include pages for each of the Broadband Florida funded projects, various surveys to collect data, a way for consumers to contact members of the Broadband Florida team, opportunities for consumers to submit feedback, and useful historical and reference information.

The Department is currently concentrating on how to make the data available through the map useful to Florida citizens. It recently provided data for a Department of Transportation project that is mapping available infrastructure in the state and assisted in determining commercially available broadband access along two hurricane evacuation routes for the Public Safety Bureau. The Department is currently collecting information on commercially available data to determine the possibilities and the best value for the state.

Community Anchor Institutions

DMS continues to reach out to CAIs to obtain broadband connectivity data through its relationships with other state agencies. Additionally, it began the process of investigating the possibility of obtaining data using a screen scraper utility. BroadMap committed to develop a screen scraper that directly obtains information from the USAC database and will also be providing a CAI survey to collect additional information.

DMS recognizes the role that statewide associations play in promoting the importance of broadband connectivity at anchor institutions and participation in this data collection process.

The Department will continue to build upon the relationships over the coming months and to utilize its contacts throughout the state to collect data and raise awareness of this project.

We appreciate the chance to participate in the SBI project and believe that the projects have and will create opportunities for citizens of Florida throughout all regions and demographic categories in the state. We plan to continue to bring best practices to our efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

If you have any questions about this Data Narrative, please do not hesitate to contact me, at (850) 410-0709.

Respectfully submitted,

Bill Price
Director of Broadband Programs
Department of Management Services
State of Florida

DATA ACQUISITION: FLORIDA COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

Broadband Florida (DMS and its contractors) put forth considerable efforts within this reporting period to, not only identify additional broadband connectivity information, but also to ensure quality of the existing dataset. The CAI data was once again audited by our contractor and modified to increase accuracy.

Additionally, the Department obtained all new data, which consisted of over 4,800 locations, for entities that utilize the state network known as MyFloridaNet. The data was divided into subcategories to increase usability and value of the data to consumers and other state agencies.

The CAI featureclass was enhanced to provide more broadband information percentage overall. The data was reviewed over a period of time and due to data quality and ambiguity the Department decided to repopulate the CAI data from scratch with the intent of tracking the source and quality of the derived data. Broadband Florida also decided to ensure that all CAI data collected could be mapped back to the original sources through the use of unique identifiers that exist in public datasets to ensure that the data could be updated on a regular basis. The confidence level of site placement is greater as well for sites that still have unknown broadband status. Geocoding was run through multiple address locators for higher match scores.

The Department's mission is to continue to seek out CAI data resources and to promote the importance of the project to CAIs within the state. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map. The Department of Management Services will continue working to identify new outreach methods that will be beneficial to the project.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Federal CAI ID	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12	6785	6785	5655	6785	510	707	0
Libraries	1066	1066	535	1066	519	514	6
Healthcare	346	346	228	346	137	129	130
Public Safety	2989	2989	145	2989	370	370	0
Higher Ed Institutions	719	719	192	719	81	81	0
Other Government	4369	4369	0	4369	3565	3565	0
Other Non-Government	280	280	0	280	280	280	0
Total	**16,554**	**16,554**	**6,755**	**16,554**	**5,462**	**5,646**	**136**

SBI Data Submission Methodology

The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on August 9, 2012. Broadband Florida has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion. Guidance from the Technical Mapping Guide, as released on the Grantee Workspace, as well as the pre-submission webinar the week of the submission to NTIA, was also followed to ensure the completeness and validity of the submission.

As the NTIA has requested a provider worksheet page to reflect only the providers included in the geodatabase submission. A table that summarizes the status of all providers can be found at the end of the narrative. Providers deemed non-viable that have been excluded from continued outreach may have been eliminated for reasons such as (i) the company offers Internet service but at speeds below the current definition of broadband; (ii) the company was listed in advertisements as a broadband provider, but is actually a network solution or consulting firm, etc.; (iii) the company may build or install network infrastructure, but does not actually provide the broadband service to consumers; and (iv) the company has gone out of business.

In addition to the methodologies contained herein, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the state of Florida.

Inventory of Deliverables, Broadband Florida: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband service availability of facilities-based providers. Encompassed in Census Blocks of no greater than two square miles in area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband service availability of facilities-based providers by road segment in Census Blocks larger in area than two square miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband service availability of wireless services not provided to a specific address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband service infrastructure Middle-Mile locations
Appendix A: 4	BB_Service_CAInstitutions	Community anchor institution locations

The provider data collected by Broadband Florida has been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, address point, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Broadband Florida, through its contractors, has continued reach out to satellite providers on their availability, technology, and speed information, but focused sub-state coverage is not yet available. Included within the wireless feature class are the satellite companies providing service to Florida as a polygon of the state boundary.

ACCURACY AND VERIFICATION: PROVIDER VALIDATION METHODOLOGY

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and resolution. The NTIA has assigned various levels of classification for the bandwidth speed and transmission technology. These classifications are not a perfect fit for all providers, but the data they submit in a variety of formats has to be molded into a common framework, and this framework is the geodatabase with stacked layers. Having these stacked layers in a mappable geodatabase does not necessarily mean they are correct. A number of checks and balances must be performed to ensure a reasonable snapshot of the last six months of broadband availability in the state of Florida. These methods include (but are not limited to): *spatial coverage provider verification, topological validation and table consistency checks, public feedback, propagation modeling, enhanced covert purchase validation, speedtest metrics, and drive testing.*

<u>Spatial Verification</u>

Once these featureclasses or layers in the geodatabase are checked for spatial errors and anomalies, check plots are provided to the provider for initial verification. If further detail and focus is required, Broadband Florida devotes attention to the provider and verification correction begins. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by Broadband Florida, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; Broadband Florida will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. After approval by the provider, the spatial depiction of the data is considered a success.

These same layers that are deemed suitable for public viewing by the NOFA are incorporated into the web map service application on the Broadband Florida map site. Public display of the layers on the Florida map site and BroadbandMap.gov site allow the general public a chance to provide feedback if in fact service is not available where it might say it is on the maps.

Topological Validation

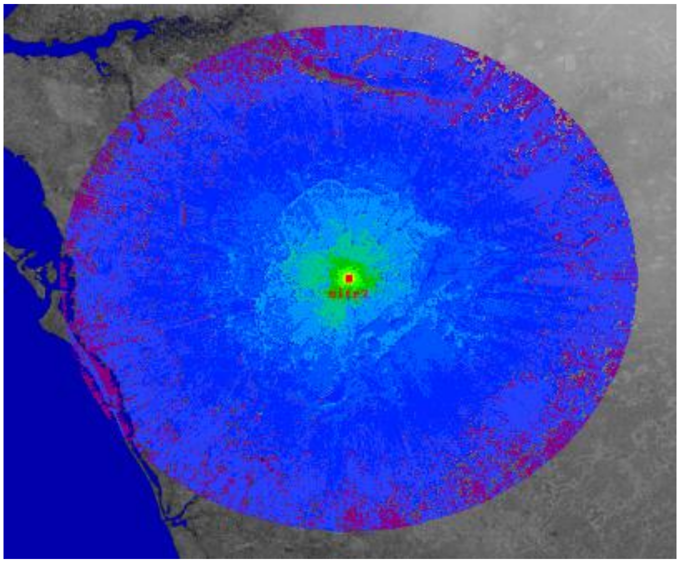
GIS data, when imported and created from a variety of sources can look pretty or it can look ugly. We try to prevent the data from looking ugly early in the process by running the resulting data from providers through a number of filters for lack of another term. The first filter is 'eyeballing' the data for inconsistencies and strange outliers. Much of the work involved with this SBI project involves geocoding. Geocoding results can literally be all over the map. The eyeballing of the geocoding results can pick up misses of machine coding return scores that would otherwise be considered valid. If left to using the address ranges on their own, street segment creation from address ranges can produce a messy unrealistic patchwork of availability. Another filter is transferring the data to topologically correct features. This 'conflation' process can filter out strange anomalies produced from using TIGER line files as the base for road segments. Many providers dump the TIGER line data of more than just the roads, such as water bodies and political lines. Conflation solves the strange outlier availability by transferring the data over to road segments that are spatially accurate. The result is road segments that spatially depict where broadband infrastructure would most likely be deployed. In some cases, however, even though data is transferred over to correct roads, source data reveals only a certain segment of addresses. No matter how bad it may look, over-correcting is changing the data, so only when there is logical evidence that a road segment should be extended considerably, or cut down, will we correct the data in this manner.

The data inside the table itself may have been exported or imported with errors. Many times, data had been imported only to be unusable or considerable work has to get it corrected after it is inside a featureclass or shapefile. It is always best to correct the data before import or loading. This type of validation can catch improper field character imports like lat/lon values that get truncated or rounded. The same can happen of Census Block FIPS code transfers that are not properly formatted as text. ArcGIS has tendency to round those into scientific notation.

Wireless Propagation

Providers may submit wireless data in GIS format or in the form of tower locations and various output characteristics. In a perfect world, all providers would have all the data at their fingertips to produce their own propagation models. In rural Florida, service providers can be small operations. Most of the time they are understaffed, and running on a tight budget. These same providers welcome an entity to come in and do propagation analysis for them.

Broadband Florida undertook the role of propagation modeling for these small rural broadband providers. The goal is to get surface coverage of their wireless output at their designated spectrum. We chose SPLAT! to model fixed wireless in Florida. Splat can do an impressive job of coverage modeling armed with just a few key parameters. Namely, the parameters consist of the tower location in latitude and longitude, tower height, the spectrum frequency, ERP wattage, polarization of antenna, and a few other optional parameters. SPLAT! uses the Longley-Rice Irregular Terrain model as well as ITWOM v3.0 model. The following displays the typical SPLAT! results:



After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. Propagation output is delivered to the provider for verification and quality check. Further inquiries are made to determine optimum decibel range results typical end-user receives. After all verification methods have passed, the resulting field strength coverage is merged with other towers (if there are any) and loaded into SBI model with populated field attributes.

Covert Purchase Scenario Validation

Many times during the data validation process, it becomes necessary to derive real-world results for areas that may be flagged for issues or extent of coverage is questionable. One approach to validate the data is to check availability for broadband packages and services online. This used be an easier process where entering an address would get you results showing whether the broadband (DSL, cable, fiber) was available at that time. Increasingly, the service providers are building in controls that prevent random address availability to generate a yes or no for purchasing service. Currently, a few providers incorporate customer database data into the searches, so if you land on an address that has service, the application will throw up a page that asks you to call the office for availability. Sometimes it is possible, with Google Maps and guessing an address, to have the web application supply you with availability and package bundling options. Other times, no matter what address you put in, the application generates the 'please call' result. That will lead to making the phone call and the sales staff can either be helpful with divulging what service is available at that address, or they will be confused as to why you want to know if you are in another part of the state. We found it best to proceed as if you are helping out your mother who is looking to get high-speed internet. This is tricky, as the web application will display the please call page if there is a customer already at the address. By using property appraiser data, it is possible to find vacant parcels near your desired area of inquiry. This can offset the current customer issue. Providers are very helpful with this approach and are happy to help.

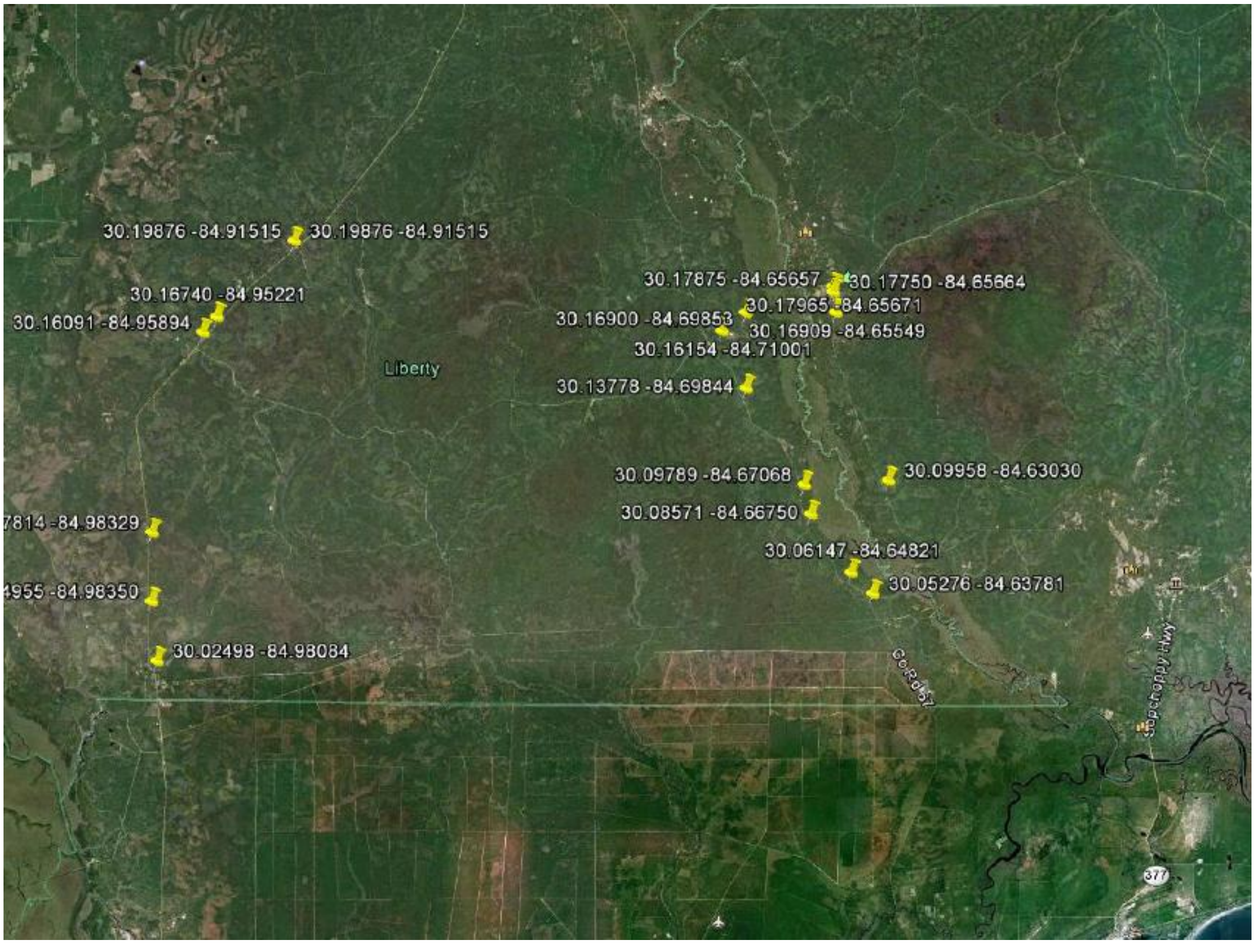
Speed Test Verification

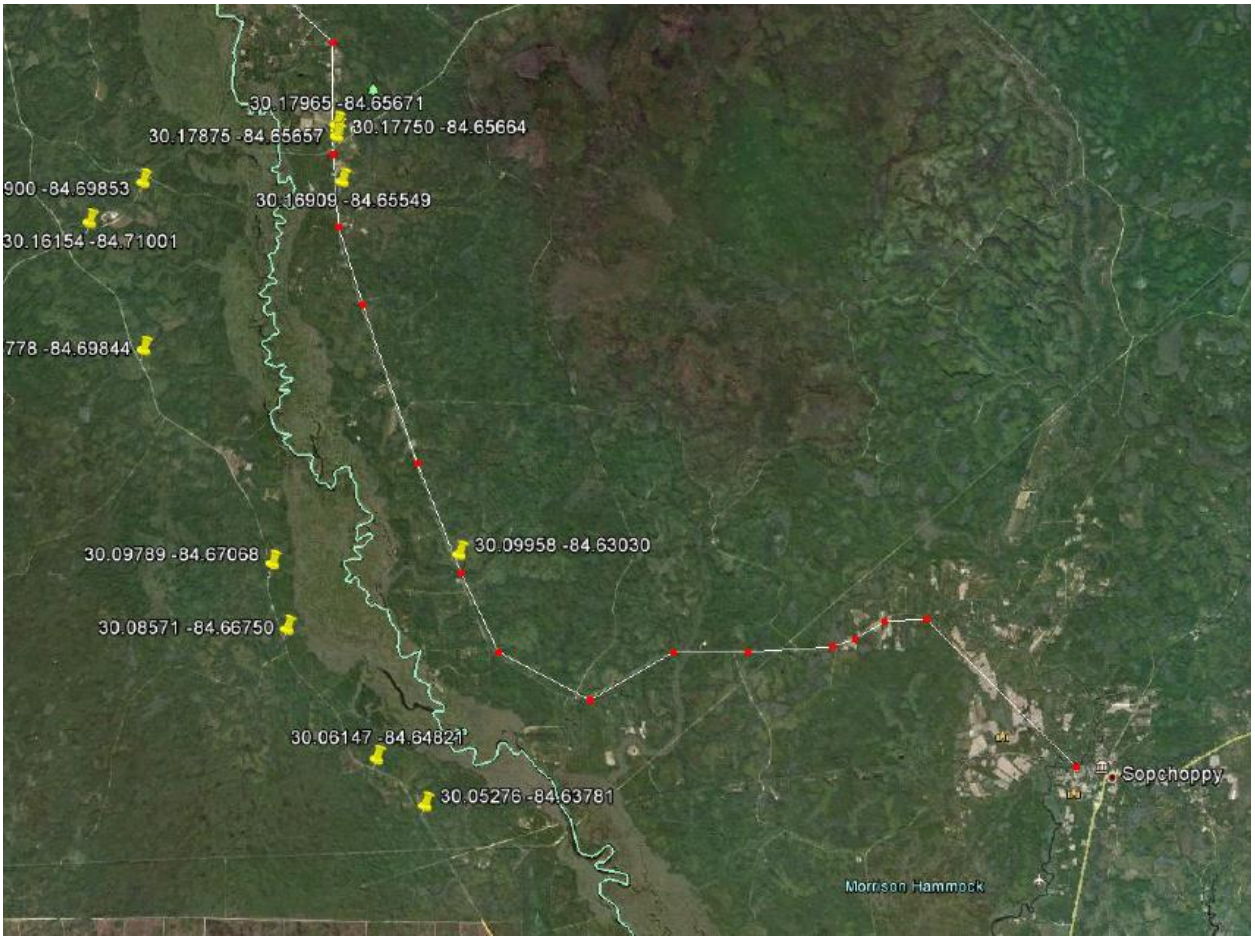
Broadband Florida has continued its subscription with Ookla for website portal speedtest application to gather speedtest statistics from around the state. Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Florida speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

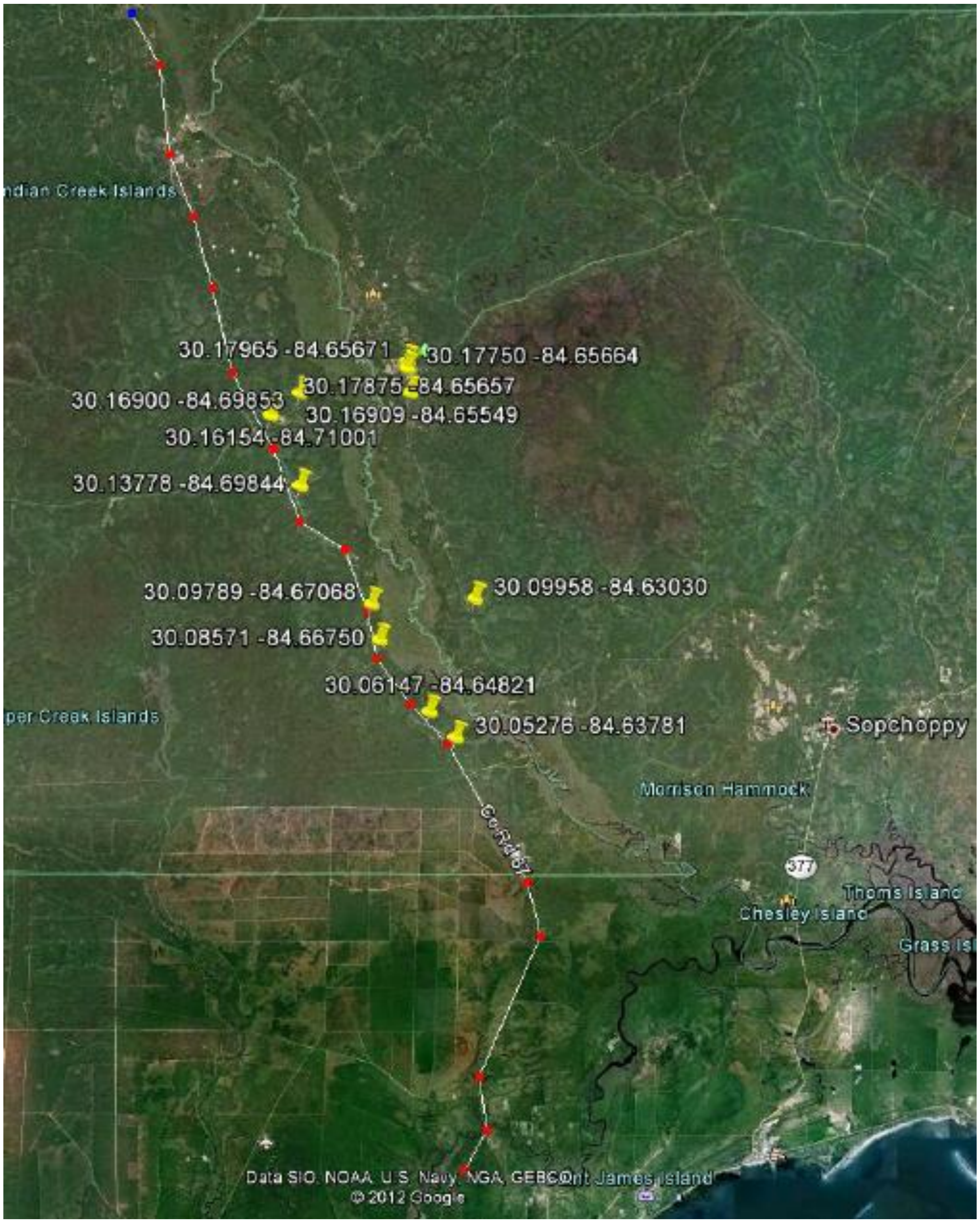
Drive Testing

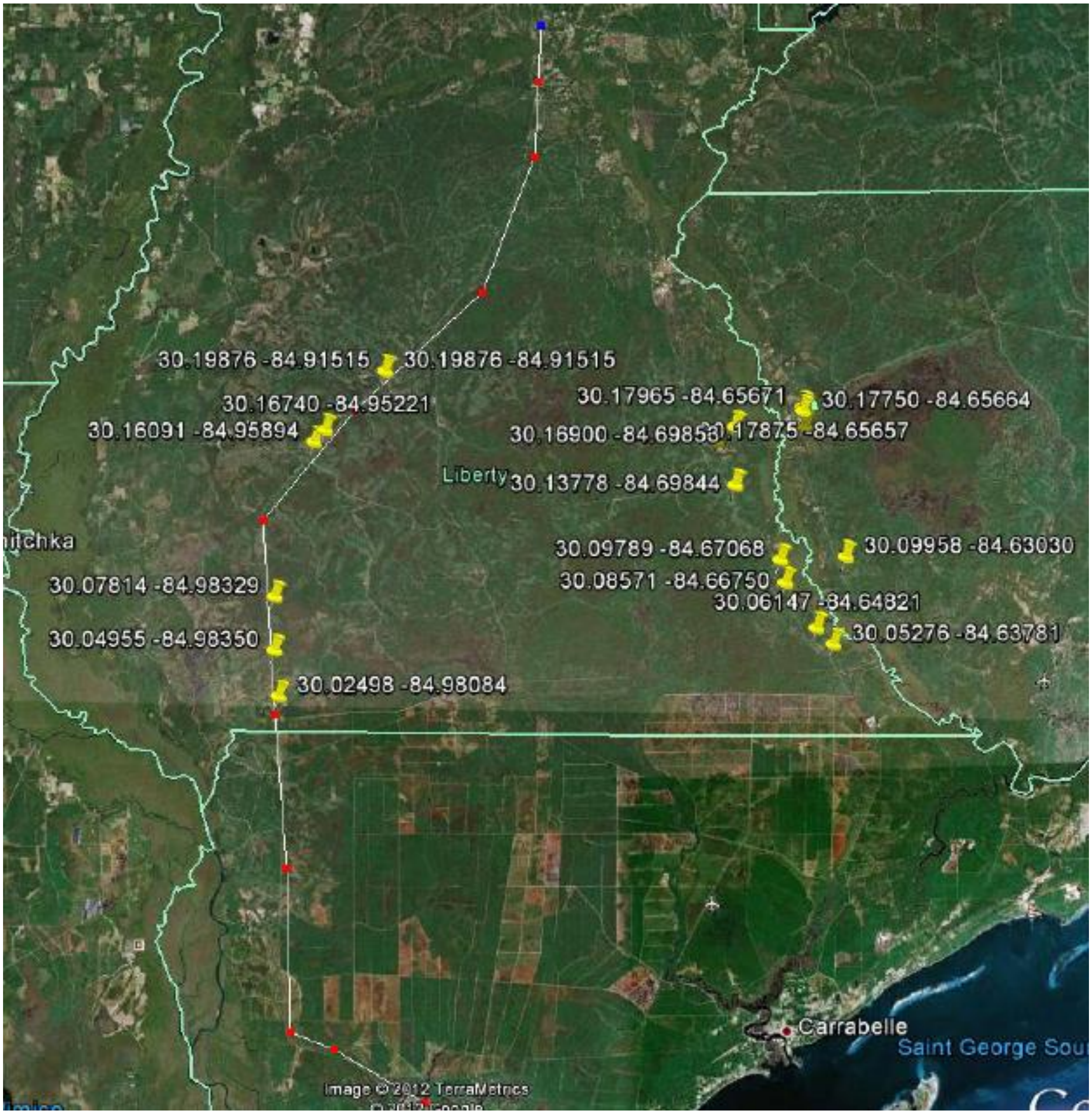
The Department conducted drive testing along 3 hurricane evacuation routes in Wakulla and Franklin counties regarding wireless coverage due to a request from the Public Safety Bureau. The request came after they were contacted by two counties that stated the service to public safety personnel was deficient. We initially contacted Verizon Wireless which is the only provider that reports providing service in the identified routes to discuss the coverage in that area. We proceeded to conduct the drive testing to verify the stated coverage. We used a Verizon iPhone running the Signal Alert application. The tests indicated dropped service in 21 different locations. We did report the results back to Verizon for their use. The detailed dropped signal locations are represented in the pictures below.


Wireless Signal Drive Test
Apalachicola
National Forest
Tate's Hell
State Forest
Sopchoppy
Sumatra
Co Rd 67
Co Rd 379
Forest Rd 13
Smith Creek Rd
Co Hwy 67


30.19876 -84.91515
30.19876 -84.91515
30.16740 -84.95221
30.16091 -84.95894
Liberty
30.17875 -84.65657
30.17750 -84.65664
30.17965 -84.65671
30.16900 -84.69853
30.16909 -84.65549
30.16154 -84.71001
30.13778 -84.69844
30.09789 -84.67068
30.09958 -84.63030
30.08571 -84.66750
7814 -84.98329
30.06147 -84.64821
30.05276 -84.63781
4955 -84.98350
30.02498 -84.98084
377


30.17965 -84.65671
30.17875 -84.65657
30.17750 -84.65664
900 -84.69853
30.16909 -84.65549
30.16154 -84.71001
778 -84.69844
30.09789 -84.67068
30.09958 -84.63030
30.08571 -84.66750
30.06147 -84.64821
30.05276 -84.63781
Sopchoppy
Morrison Hammock


ndian Creek Islands
30.17965 -84.65671
30.17750 -84.65664
30.17875 -84.65657
30.16900 -84.69853
30.16909 -84.65549
30.16154 -84.71001
30.13778 -84.69844
30.09789 -84.67068
30.09958 -84.63030
30.08571 -84.66750
30.06147 -84.64821
per Creek Islands
30.05276 -84.63781
Sopchoppy
Morrison Hammock
Co Rd 67
377
Thoms Island
Chesley Island
Grass Isl
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
© 2012 Google
Saint James Island


30.19876 -84.91515
30.19876 -84.91515
30.16740 -84.95221
30.16091 -84.95894
30.17965 -84.65671
30.17750 -84.65664
30.16900 -84.69858
30.17875 -84.65657
Liberty
30.13778 -84.69844
itchka
30.09789 -84.67068
30.09958 -84.63030
30.08571 -84.66750
30.06147 -84.64821
30.05276 -84.63781
30.07814 -84.98329
30.04955 -84.98350
30.02498 -84.98084
Carrabelle
Saint George Sou
Image © 2012 TerraMetrics

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive				Non-Responsive	
						Refused to Participate	Submitted Updated Data	No Change in Data	Missed Deadline; No Data Included in Submission	Data from previous submission included	No Data Included
1	21Globe, Inc.	2	9999	.	.	.	.	.	.	.	.
2	3oaks.com	4	9999	.	.	.	.	.	.	.	.
3	561net	4	9999	✓	.	.	.	.	.	.	✓
4	650Net	4	9999	.	.	.	.	.	.	.	.
5	A 007 Access	2	9999	.	.	.	.	.	.	.	.
6	AAA Internet Service	4	9999	.	.	.	.	.	.	.	.
7	Aaccess Network Communications	4	9999	.	.	.	.	.	.	.	.
8	Access123.net	4	9999	.	.	.	.	.	.	.	.
9	ACERX.NET	2	9999	.	.	.	.	.	.	.	.
10	ACES of Jacksonville, Inc.	4	9999	.	.	.	.	.	.	.	.
11	Adelphia	4	9999	.	.	.	.	.	.	.	.
12	Advanced Cable Communications	1	1795798	✓	✓	.	.	✓	✓	.	.
13	Advantage Group of Florida Communications, LLC	2	18515692	.	.	.	.	.	.	.	.
14	AirCom Broadband, Inc.	2	9999	.	.	.	.	.	.	.	.
15	AirComm Associates	4	9999	.	.	.	.	.	.	.	.
16	Airespring, Inc.	2	6875322	.	.	.	.	.	.	.	.
17	Airewaves Broadband, LLC	4	9999	.	.	.	.	.	.	.	.
18	Airface	4	9999	.	.	.	.	.	.	.	.
19	Airimba Wireless	4	9999	.	.	.	.	.	.	.	.
20	AirLink Corporation	4	9999	.	.	.	.	.	.	.	.
21	Airmail247.com	4	9999	.	.	.	.	.	.	.	.
22	Airpath Wireless, Inc.	4	9999	.	.	.	.	.	.	.	.
23	airPowered	1	16106239	✓	✓	.	.	.	.	✓	.
24	AirWire Net	2	9999	.	.	.	.	.	.	.	.
25	Akeva	4	9999	.	.	.	.	.	.	.	.

BROADBAND Florida

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive				Non-Responsive	
						Refused to Participate	Submitted Updated Data	No Change in Data	Missed Deadline; No Data Included in Submission	Data from previous submission included	No Data Included
26	AKODI	4	9999	.	.	.	.	.	.	.	.
27	America Outdoors Camper Resort and Marina	4	9999	.	.	.	.	.	.	.	.
28	American Telephone Company LLC	2	15414642	.	.	.	.	.	.	.	.
29	Antioch Wireless Broadband	4	9999	.	.	.	.	.	.	.	.
30	Anywhere Internet, Inc.	4	9999	.	.	.	.	.	.	.	.
31	AreYouOnline.Net	1	9999	✓	✓	.	.	✓	.	.	.
32	Arrowheadnet.com	4	9999	.	.	.	.	.	.	.	.
33	AstroTel, Inc.	2	8779878	.	.	.	.	.	.	.	.
34	AT&T Florida	1	1857952	✓	✓	.	✓	.	.	.	.
35	AT&T Mobility LLC	1	4979233	✓	✓	.	✓	.	.	.	.
36	Atlantic Broadband, LLC	2	9596826	✓	✓	.	.	✓	.	.	.
37	AugLink Communications, Inc.	4	9999	.	.	.	.	.	.	.	.
38	bargainisp.net	4	9999	.	.	.	.	.	.	.	.
39	Birch Communications, Inc.	1	4319299	✓	.	✓	.	.	.	.	.
40	Bluemont Networks, LLC	4	16802266	.	.	.	.	.	.	.	.
41	Break Free Wireless Corporation	4	9999	.	.	.	.	.	.	.	.
42	Bright House Networks	1	7508237	✓	✓	.	.	✓	.	.	.
43	Broadband National	2	9999	.	.	.	.	.	.	.	.
44	Broadcore, Inc.	4	18122523	.	.	.	.	.	.	.	.
45	Broadstar, LLC	4	16981573	.	.	.	.	.	.	.	.
46	Broadview Networks Holdings, Inc.	2	10296853	.	.	.	.	.	.	.	.
47	BullsEye Telecom, Inc.	2	4350930	.	.	.	.	.	.	.	.
48	Business Telecom, Inc.	4	3744935	.	.	.	.	.	.	.	.
49	Cablevision of Marion County LLC	1	11406675	✓	.	.	.	.	✓	.	.
50	CAC MediaNet, Inc.	4	9999	.	.	.	.	.	.	.	.
51	Camino-Net Internet Services	4	9999	.	.	.	.	.	.	.	.

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive				Non-Responsive	
						Refused to Participate	Submitted Updated Data	No Change in Data	Missed Deadline; No Data Included in Submission	Data from previous submission included	No Data Included
52	Caviair Corporation	4	9999	.	.	.	.	.	.	.	.
53	Cbeyond Communications, LLC	2	3759602	.	.	.	.	.	.	.	.
54	CCIS.net	4	9999	.	.	.	.	.	.	.	.
55	Celito Communications	4	9999	.	.	.	.	.	.	.	.
56	Cellular South, Inc.	1	13247325	✓	✓	.	.	✓	·	·	.
57	CenturyLink	1	18626853	✓	✓	.	✓	.	.	.	.
58	CIMA Telecom	2	8570111	.	.	.	.	.	.	.	.
59	Circle Net	4	9999	.	.	.	.	.	.	.	.
60	Citi WiFi Networks	4	9999	.	.	.	.	.	.	.	.
61	Citicom Comm Serv	4	9999	.	.	.	.	.	.	.	.
62	Citrus Hills Cable TV, Inc.	4	9999	.	.	.	.	.	.	.	.
63	City of Leesburg	1	10556496	✓	✓	.	✓	.	.	.	·
64	Citynet, LLC	4	14281588	.	.	.	.	.	.	.	.
65	Clear	1	17775628	✓	✓	.	✓	.	.	.	.
66	ClearSurf Communications, Corp	4	9999	·	.	.	.	.	.	.	·
67	Cleartouch.Com	4	9999	.	.	.	.	.	.	.	.
68	Cogent Communications, Inc.	2	19066034	✓	.	.	.	.	.	.	✓
69	Comcast	1	4441663	✓	✓	.	✓	.	.	.	.
70	CommFunction, LLC	1	9999	✓	.	.	·	.	✓	.	·
71	Computer Cable Connection	4	9999	.	.	.	.	.	.	.	.
72	Cox Communications	1	1524461	✓	✓	.	✓	.	.	.	.
73	Creative Network Innovations	4	9999	.	.	.	.	.	.	.	.
74	CyberStreet Inc.	1	9999	✓	.	.	.	.	.	.	✓
75	CyberXpress, Inc.	4	9999	.	.	.	.	.	.	.	.
76	Data Wave, Inc.	4	9999	.	.	.	.	.	.	.	.
77	DayStar Communications	4	9999	.	.	.	.	.	.	.	.
78	DeltaCom	1	5183025	✓	✓	.	✓	.	.	.	·

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive				Non-Responsive	
						Refused to Participate	Submitted Updated Data	No Change in Data	Missed Deadline; No Data Included in Submission	Data from previous submission included	No Data Included
79	Deltaforce	4	9999	.	.	.	.	.	.	.	.
80	deluxehost.com	4	9999	.	.	.	.	.	.	.	.
81	Desoto Life	4	9999	·	.	.	.	.	.	.	·
82	DGUI	4	9999	.	.	.	.	.	.	.	.
83	DHR Technologies, Inc.	4	9999	.	.	.	.	.	.	.	.
84	Dial National	4	9999	.	.	.	.	.	.	.	.
85	Dialer.net	4	9999	.	.	.	.	.	.	.	.
86	Digital Canopy	4	9999	.	.	.	.	.	.	.	.
87	Digital Downtown	4	9999	.	.	.	.	.	.	.	.
88	DISH Network Corporation	2	10500338	✓	✓	.	.	✓	.	.	.
89	Dixie-Net, Incorporated	4	9999	.	.	.	.	.	.	.	.
90	DSL @ Interlync	2	9999	.	.	.	.	.	.	.	.
91	DTNet	4	9999	.	.	.	.	.	.	.	.
92	DTS-NET.COM	2	9999	.	.	.	.	.	.	.	.
93	Dynalink Communications	2	9999	.	.	.	.	.	.	.	.
94	eHarbor	4	9999	.	.	.	.	.	.	.	.
95	Enventis Telecom Inc.	4	8394322	.	.	.	.	.	.	.	.
96	ethX.biz	4	9999	.	.	.	.	.	.	.	.
97	ETI - Connecting Your World	2	9999	.	.	.	.	.	.	.	.
98	eTully, Inc.	4	9999	.	.	.	.	.	.	.	.
99	EWOL	4	9999	.	.	.	.	.	.	.	.
100	Expedient	4	9999	.	.	.	.	.	.	.	.
101	FairPoint Communications, Inc.	1	1824606	✓	✓	.	✓	.	.	.	.
102	Fast Dependable Access	4	9999	.	.	.	.	.	.	.	.
103	FiberLight LLC	1	14117139	✓	·	.	.	.	✓	.	·
104	FiberTower Corporation	4	4237178	.	.	.	.	.	.	.	.
105	FLAccess, Inc.	4	9999	.	.	.	.	.	.	.	.

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive: Refused to Participate	Responsive: Submitted Updated Data	Responsive: No Change in Data	Responsive: Missed Deadline; No Data Included in Submission	Non-Responsive: Data from previous submission included	Non-Responsive: No Data Included
106	Florida Broadband	4	9999	.	.	.	.	.	.	.	.
107	Florida Cable, Inc.	1	7170558	✓	.	.	.	.	✓	.	.
108	Florida Georgia Online	4	9999	.	.	.	.	.	.	.	.
109	Florida High Speed Internet aka Brevard Wireless	1	16346991	✓	.	.	.	.	.	.	✓
110	Florida Keys Wireless	4	9999	.	.	.	.	.	.	.	.
111	Florida LambdaRail, LLC*	1	9999	✓	.	.	.	.	✓	.	.
112	Florida Multi-Media Services, Inc.	2	18567123	.	.	.	.	.	.	.	✓
113	Florida Phone Systems, Inc.	4	18624494	.	.	.	.	.	.	.	.
114	Florida Rural Broadband Alliance	4	9999	.	.	.	.	.	.	.	.
115	Florida Wireless	4	9999	.	.	.	.	.	.	.	.
116	FlyFi	4	9999	.	.	.	.	.	.	.	.
117	FPL FiberNet, LLC	1	8338683	✓	.	.	.	.	✓	.	.
118	FPUAnet Communications	1	1813369	✓	.	.	.	.	✓	.	.
119	Frontier Communications of the South, LLC	1	3766987	✓	✓	.	✓	.	.	.	.
120	Fullsail Group	4	9999	.	.	.	.	.	.	.	.
121	Fuzion Wireless	4	9999	.	.	.	.	.	.	.	.
122	GBS Online	1	9999	✓	.	.	.	.	.	.	✓
123	General Computer Services Inc.	4	18596882	.	.	.	.	.	.	.	.
124	Global Data Systems	4	9999	.	.	.	.	.	.	.	.
125	Global WiFi Plus	4	9999	.	.	.	.	.	.	.	.
126	GLS3C Systems	4	9999	.	.	.	.	.	.	.	.
127	GRUCom*	1	18584425	✓	.	.	.	.	✓	.	.
128	Gulf Coast Internet Company	4	9999	.	.	.	.	.	.	.	.
129	Hi Development	4	9999	.	.	.	.	.	.	.	.
130	Home Town Plus	1	9470766	✓	✓	.	.	✓	.	.	.
131	Hotwire Communications, Ltd.	4	9846494	.	.	.	.	.	.	.	.

BROADBAND Florida

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive				Non-Responsive	
						Refused to Participate	Submitted Updated Data	No Change in Data	Missed Deadline; No Data Included in Submission	Data from previous submission included	No Data Included
132	Hubwest Protected Networks LLC	4	9999	.	.	.	.	.	.	.	.
133	Hughes Network Systems, LLC	1	17434911	✓	✓	.	.	✓	·	·	.
134	Imbris, Inc.	4	9999	.	.	.	.	.	.	.	.
135	IMGISP.NET	4	9999	.	.	.	.	.	.	.	.
136	Immedia Sea	4	9999	.	.	.	.	.	.	.	.
137	Incredible Networks	4	9999	.	.	.	.	.	.	.	.
138	Inercom Communications Inc.	4	9999	.	.	.	.	.	.	.	.
139	Interactive Services Network, Inc.	2	4328456	.	.	.	.	.	.	.	.
140	Interactiveinfo.com Inc.	4	9999	.	.	.	.	.	.	.	.
141	Interatworld	4	9999	.	.	.	.	.	.	.	.
142	IntNet	2	9999	.	.	.	.	.	.	.	.
143	IPacket Networks, LLC	4	16724494	.	.	.	.	.	.	.	.
144	iRadical	4	9999	.	.	.	.	.	.	.	.
145	ISPartner.net	4	9999	.	.	.	.	.	.	.	.
146	ITS Telecom	1	3731734	✓	✓	.	.	✓	·	.	.
147	James Cable LLC	1	16914137	✓	.	.	.	.	✓	.	.
148	JaxWIZ	4	9999	.	.	.	.	.	.	.	.
149	Jenco Speed Web	4	9999	.	.	.	.	.	.	.	.
150	Joytel Communications	4	9999	.	.	.	.	.	.	.	.
151	JTEL Communications	4	9999	.	.	.	.	.	.	.	.
152	K.Tek	4	9999	.	.	.	.	.	.	.	.
153	KCL	2	9999	.	.	.	.	.	.	.	.
154	Kentucky Data Link, Inc.	4	7345754	.	.	.	.	.	.	.	.
155	Kissimmee Utilities Authority	4	9999	.	.	.	.	.	.	.	.
156	Knology of Florida, Inc.	1	3766268	✓	✓	.	.	✓	.	.	.
157	Knology of Panama, Inc.	1	1808666	✓	✓	.	.	✓	.	.	.
158	LARIAT.NET	4	9999	.	.	.	.	.	.	.	.

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive				Non-Responsive	
						Refused to Participate	Submitted Updated Data	No Change in Data	Missed Deadline; No Data Included in Submission	Data from previous submission included	No Data Included
159	LCN	4	9999	.	.	.	.	.	.	.	.
160	LCSisp.com	4	9999	.	.	.	.	.	.	.	.
161	Leap Wireless International, Inc.	4	9999	.	.	.	.	.	.	.	.
162	Level 3 Communications, LLC	1	3723822	✓	.	.	.	.	✓	.	.
163	LightEdge Solutions, Inc.	4	15546443	.	.	.	.	.	.	.	.
164	Lightning Wireless	4	9999	.	.	.	.	.	.	.	.
165	Lightyear Network Solutions, LLC	2	9999	.	.	.	.	.	.	.	.
166	LinkAmerica.Net	4	9999	.	.	.	.	.	.	.	.
167	Litestream Holdings, LLC	1	999	✓	.	.	.	.	✓	.	.
168	Litestream Technologies	1	1149800086	✓	.	.	.	.	✓	.	.
169	Long Hammock Wireless	1	9999	✓	✓	.	.	✓	.	.	.
170	Magnolia Belle Data Systems, Inc.	4	9999	.	.	.	.	.	.	.	.
171	Main Street Broadband LLC	1	14962880	✓	✓	.	✓	.	.	.	.
172	MainBoard	4	9999	.	.	.	.	.	.	.	.
173	Maine Cable and Wireless	4	9999	.	.	.	.	.	.	.	.
174	Marcin Company	4	9999	.	.	.	.	.	.	.	.
175	Marco Island Cable, Inc.	1	4243689	✓	.	.	.	.	.	.	✓
176	Marlowe & Associates	2	9999	.	.	.	.	.	.	.	.
177	Mediacom	1	4036778	✓	✓	.	.	✓	.	.	.
178	Megapath Corporation	1	3753787	✓	✓	.	✓	.	.	.	.
179	Metropolitan Telecommunications Holding Company	2	9806019	.	.	.	.	.	.	.	.
180	MFI.net	2	9999	.	.	.	.	.	.	.	.
181	Millenicom Inc.	2	9999	.	.	.	.	.	.	.	.
182	Mobile Area Networks, Inc.	4	9999	.	.	.	.	.	.	.	.
183	Myakka Technologies, Inc.	1	16084857	✓	✓	.	✓	.	.	.	.
184	Nanomega.Com	4	9999	.	.	.	.	.	.	.	.

BROADBAND Florida

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive					Non-Responsive	
						Refused to Participate	Submitted Updated Data	No Change in Data	Missed Deadline; No Data Included in Submission	Data from previous submission included	No Data Included	
185	National Access Point	4	9999	.	.	.	.	.	.	.	.
186	Nationwide Computer Systems, Inc.	4	9999	.	.	.	.	.	.	.	.
187	Nature Coast Networks	1	9999	✓	.	.	.	.	.	.	✓
188	NEbuTel	4	16467649	.	.	.	.	.	.	.	.
189	NEFCOM	1	4928750	✓	✓	.	.	✓	.	.	.
190	Neighbor Networks, LLC	4	6221287	.	.	.	.	.	.	.	.
191	Neopolitan Networks	4	9999	.	.	.	.	.	.	.	.
192	Net Bypass Wireless	4	9999	.	.	.	.	.	.	.	.
193	NetAccess, Inc.	4	9999	.	.	.	.	.	.	.	.
194	NetComm Internet Technologies	4	9999	.	.	.	.	.	.	.	.
195	NetCon.com	4	9999	.	.	.	.	.	.	.	.
196	Netlogic, Inc.	4	6825954	.	.	.	.	.	.	.	.
197	NetQuincy	1	4572533	✓	✓	.	.	✓	.	.	.
198	NetSpeed Online	4	9999	.	.	.	.	.	.	.	.
199	New Edge Network, Inc.	2	3720471	.	.	.	.	.	.	.	.
200	Next Level Wireless	4	9999	.	.	.	.	.	.	.	.
201	Nextlink Wireless, Inc.	4	14286934	✓	.	.	.	.	✓	.	.
202	North Florida Broadband Authority	4	9999	.	.	.	.	.	.	.	.
203	Northwest ISP	4	9999	.	.	.	.	.	.	.	.
204	NuVox, Inc.	4	4319414	.	.	.	.	.	.	.	.
205	NXCONN Wireless	4	9999	.	.	.	.	.	.	.	.
206	Oak Run Associates Ltd.	2	3745767	.	.	.	.	.	.	.	.
207	Ofinet	4	9999	.	.	.	.	.	.	.	.
208	Oltronics Wireless	4	9999	.	.	.	.	.	.	.	.
209	Omnispring LLC	1	9999	✓	.	✓	.	.	.	.	.
210	Open Range, Inc.	4	15246895	.	.	.	.	.	.	.	.
211	Orlando Web Solutions	4	9999	.	.	.	.	.	.	.	.

BROADBAND Florida

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive				Non-Responsive	
						Refused to Participate	Submitted Updated Data	No Change in Data	Missed Deadline; No Data Included in Submission	Data from previous submission included	No Data Included
212	Overarch Broadband	4	9999	.	.	.	.	.	.	.	.
213	Pacific Internet Exchange	4	9999	.	.	.	.	.	.	.	.
214	Paknet Limited	4	9999	.	.	.	.	.	.	.	.
215	Palm Coast-Flagler Internet, LLC	4	9999	.	.	.	.	.	.	.	.
216	PDMNet	1	17149014	✓	✓	.	.	.	.	✓	.
217	Planet Online	4	9999	.	.	.	.	.	.	.	.
218	PNA Networks	4	9999	.	.	.	.	.	.	.	.
219	Power One	2	16106239	✓	.	.	.	.	.	.	✓
220	PremoWeb	4	9999	.	.	.	.	.	.	.	.
221	PrimeVision	4	9999	.	.	.	.	.	.	.	.
222	Pure Connection	4	9999	.	.	.	.	.	.	.	.
223	Qmega Technologies	4	9999	.	.	.	.	.	.	.	.
224	Qwest Communications Company, LLC	4	3605953	.	.	.	.	.	.	.	.
225	Rapid Systems Corporation	1	14499438	✓	.	.	✓	.	.	.	.
226	Regional Internet Media	4	9999	.	.	.	.	.	.	.	.
227	Reliance Globalcom Services, Inc.	2	8072803	.	.	.	.	.	.	.	.
228	Renaissance Networks	4	9999	.	.	.	.	.	.	.	.
229	RJS Networks	4	9999	.	.	.	.	.	.	.	.
230	Sago Networks, Inc.	1	18151878	✓	✓	.	✓	.	.	.	.
231	Sands River Wireless	4	9999	.	.	.	.	.	.	.	.
232	Saturn Telecommunication Services Inc.	4	4343828	.	.	.	.	.	.	.	.
233	SBB Communications, LLC	4	19088624	.	.	.	.	.	.	.	.
234	SETEL	4	9999	.	.	.	.	.	.	.	.
235	Shentel Converged Services, Inc.	2	13962170	.	.	.	.	.	.	.	.
236	Simply Dialup A Metrogeek Company	4	9999	.	.	.	.	.	.	.	.

BROADBAND Florida

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive				Non-Responsive	
						Refused to Participate	Submitted Updated Data	No Change in Data	Missed Deadline; No Data Included in Submission	Data from previous submission included	No Data Included
237	Skycaster	1	9999	✓	.	.	.	.	✓	.	.
238	Skyhive	4	9999	.	.	.	.	.	.	.	.
239	Skyline Broadband	4	9999	.	.	.	.	.	.	.	.
240	SKYNAP	4	9999	.	.	.	.	.	.	.	.
241	SkyNet360	1	9999	✓	.	.	.	.	✓	.	.
242	Sling Broadband	1	9999	✓	.	.	.	.	✓	.	.
243	Smart City	1	4381505	✓	✓	.	.	.	.	·	.
244	Smartresort Co, LLC	2	17103979	.	.	.	.	.	.	.	.
245	SmartWires	4	9999	.	.	.	.	.	.	.	.
246	Southeastern Services, Inc.	4	10211167	.	.	.	.	.	.	.	.
247	Southern Light	4	6694111	·	.	.	.	·	·	.	·
248	Spacenet, Inc.	4	4314704	.	.	.	.	.	.	.	.
249	Speakeasy DSL	4	9999	.	.	.	.	.	.	.	.
250	Sprint	1	3774593	✓	✓	.	✓	.	.	.	.
251	Sprint Broadband Direct	4	9999	.	.	.	.	.	.	.	.
252	StarBand Communications, Inc.	1	5087457	✓	.	.	.	.	✓	.	.
253	Stratos Offshore Services Company	4	2147353	.	.	.	.	.	.	.	.
254	Summit Broadband	1	8410102	✓	✓	.	✓	.	.	.	.
255	Sun Digital Computers & Services	4	9999	.	.	.	.	.	.	.	.
256	Sun-Tel USA	2	18079152	.	.	.	.	.	.	.	.
257	Surferz.Net	4	9999	.	.	.	.	.	.	.	.
258	Suwannee Valley Internet	4	9999	.	.	.	.	.	.	.	.
259	SVIC Internet & Computers	4	9999	·	.	.	.	.	.	.	·
260	Systemlink Broadband	4	9999	.	.	.	.	.	.	.	.
261	T1 Shopper	4	9999	.	.	.	.	.	.	.	.
262	TDS Telecom	1	1824689	✓	✓	.	✓	.	.	.	.

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive				Non-Responsive	
						Refused to Participate	Submitted Updated Data	No Change in Data	Missed Deadline; No Data Included in Submission	Data from previous submission included	No Data Included
263	Teccom USA	4	9999	.	.	.	.	.	.	.	.
264	Telcomprice.Com	4	9999	.	.	.	.	.	.	.	.
265	Telefonica USA, Inc.	2	18547828	.	.	.	.	.	.	.	.
266	Telovations, Inc.	4	15331390	.	.	.	.	.	.	.	.
267	TerraNova Net Internet Services	1	16098147	✓	.	.	.	.	.	.	✓
268	Terranovus.net	4	9999	.	.	.	.	.	.	.	.
269	The City of Daytona Beach	4	18522409	.	.	.	.	.	.	.	.
270	The Hometown Network, Inc.	1	19072339	✓	✓	.	.	✓	.	.	.
271	The Ultimate Connection, LLC	2	4557724	.	.	.	.	.	.	.	.
272	Tier 3 Communications; Ft. Myers Telephone; Naples Telephone	1	8882979	✓	.	.	.	.	.	.	✓
273	T-Mobile	1	6945950	✓	✓	.	✓	.	.	.	.
274	Total Access Networks, Inc.	4	9999	.	.	.	.	.	.	.	.
275	Towerstream, Inc.	4	7097355	.	.	.	.	.	.	.	.
276	Transbeam Inc.	4	8904690	.	.	.	.	.	.	.	.
277	Trillion Digital Communications	4	9999	.	.	.	.	.	.	.	.
278	Triple Crown Communications	4	9999	.	.	.	.	.	.	.	.
279	TSISP.NET	4	9999	.	.	.	.	.	.	.	.
280	TW Telecom of Florida LLC	1	4351466	✓	✓	.	✓	.	.	.	.
281	Ultrawave Technologies	4	9999	.	.	.	.	.	.	.	.
282	Umbrella Wireless	4	9999	.	.	.	.	.	.	.	.
283	University Corporation for Advanced Internet Development	4	9999	.	.	.	.	.	.	.	.
284	UNUM Telecommunications, Inc.	4	9999	.	.	.	.	.	.	.	.
285	US Metropolitan Telecom, LLC	1	16713497	✓	.	.	.	.	✓	.	.
286	USA Airnet, Inc.	4	9999	.	.	.	.	.	.	.	.
287	Utilities Commission, City of New Smyrna Beach, FL	4	18603779	.	.	.	.	.	.	.	.

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive				Non-Responsive	
						Refused to Participate	Submitted Updated Data	No Change in Data	Missed Deadline; No Data Included in Submission	Data from previous submission included	No Data Included
288	Valparaiso Communication System	1	9999	✓	.	.	.	.	✓	.	.
289	Velocity Online	1	16126971	✓	.	.	.	.	✓	.	.
290	Verizon	1	1824804	✓	✓	.	✓	.	.	.	.
291	Verizon Wireless	1	3290673	✓	✓	.	✓	.	.	.	.
292	Vortex Broadband	4	9999	.	.	.	.	.	.	.	.
293	Wave2Wave Communications Inc.	2	15329394	.	.	.	.	.	.	.	.
294	WebNet	4	9999	.	.	.	.	.	.	.	.
295	WildBlue Communications	1	7843766	✓	✓	.	✓	.	.	.	.
296	WilTel Communications, LLC.	4	3716511	.	.	.	.	.	.	.	.
297	Wind Serve	4	9999	.	.	.	.	.	.	.	.
298	Windstream Florida, Inc.	1	4967360	✓	✓	.	.	✓	.	.	.
299	Wireless Broadband, Inc.	4	9999	.	.	.	.	.	.	.	.
300	Wireless Online Services	4	9999	.	.	.	.	.	.	.	.
301	Wireless Roanoke, Inc.	4	9999	.	.	.	.	.	.	.	.
302	Wireless Web Access, Inc.	4	9999	.	.	.	.	.	.	.	.
303	wisbin	4	9999	.	.	.	.	.	.	.	.
304	WISP Networks	4	9999	.	.	.	.	.	.	.	.
305	WiVo	2	9999	.	.	.	.	.	.	.	.
306	WorldCom Broadband	4	9999	.	.	.	.	.	.	.	.
307	WPMedia	4	9999	.	.	.	.	.	.	.	.
308	www.AmericanAngel.us	4	9999	.	.	.	.	.	.	.	.
309	Xecu.net	4	9999	.	.	.	.	.	.	.	.
310	XO Communications Services, Inc.	1	6275945	✓	.	.	.	.	✓	.	.
311	XP Internet	4	9999	.	.	.	.	.	.	.	.
312	Xtremeaccess	4	9999	.	.	.	.	.	.	.	.
313	YEYZOO.NET	4	9999	.	.	.	.	.	.	.	.
314	YLISP (Your Local ISP)	2	9999	.	.	.	.	.	.	.	.

Broadband Provider Status Log

No.	Filing Company DBA	Provider Type: Broadband=1, Reseller=2, Other=3, N/A=4	FRN	Viable Provider	Data Included in Submission	Responsive				Non-Responsive	
						Refused to Participate	Submitted Updated Data	No Change in Data	Missed Deadline; No Data Included in Submission	Data from previous submission included	No Data Included
315	YourT1Wifi.com	4	9999	.	.	.	.	.	.	.	.
316	ZOOM Internet Services, LLC	4	9999	.	.	.	.	.	.	.	.
Total				75	42	2	23	17	21	2	10

Georgia Broadband Mapping Project: Product Release White Paper

Contact Name Manager:	Bailey White
Contact Phone Number:	407-775-1039
Contact E-mail:	**bailey@civitium.com**
Submitted By:	Bailey White
Contact E-mail:	**bailey@civitium.com**
Product Specification:	Fall 2012 NTIA Data Model
Product/Process:	NTIA—October 1, 2012 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's October 1st, 2012 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Provider Participation Statistics Summary

Summary	Count
Total Providers Researched/Contacted	152
Total Valid Broadband Providers	107
Non-Responsive/Researching Providers	30
Non-Cooperative Providers	6
Number of DBAs – Represented in Data Submission	83
Number of Providers - Supplied Updates for this Submission	51
Number of Providers - Confirmed No Updates	13

- New Providers Since Last Data Submission
    - City of LaGrange (TT-50)

- Existing Providers – Confirmed No Updates
    - Bulldog Cable Georgia, LLC
    - Cogent Communications Inc.
    - Hargray
    - Hughes Network Systems
    - Nextlink Wireless Inc.
    - SGRITA
    - Shentel Converged Services, Inc.
    - Skycasters
    - StarBand Communications Inc.
    - Unite Private Networks, LLC
    - WildBlue Communications Inc. (ViaSat, Inc.)

- Windstream
- XO Communications Services Inc.

- Providers that Supplied Coverage Updates

Advanced Technology Group	ETC Communications LLC
AL-GA Wireless Broadband LLC	FairPoint Communications
AllTel	Flint Cable Television
AT&T Georgia	Frontier Communications of Fairmount LLC
ATC	Frontier Communications of Georgia LLC
Brantley Telephone Inc.	Hart Telephone Company
Bright House Networks LLC	Kings Bay Communications
CenturyLink	Knology of Georgia Inc
Charter Communications Inc.	MainStreet Broadband
Chickamauga Telephone Corporation	Pembroke Telephone Company Inc
Citizens	Pineland Telephone Company Inc.
City of Cairo	Plant Telephone Company
CITY OF CAMILLA	Planters Rural Telephone Cooperative
City of Dublin	Progressive Rural Telephone
City of LaGrange	Ringgold Telephone Company
MonroeAccess.net (City of Monroe)	Southeastern Services Inc.
City of Moultrie	Sprint
CITY OF THOMASVILLE	SyncGlobal
Clearwire	TDS Telecom
Comcast	T-Mobile
ComSouth	tw telecom of georgia l.p.
Covad Communications Company	Verizon Wireless
Cox Communications	Waverly Hall Telephone LLC
Cricket Communications Inc.	Wilkes Telephone and Electric Co.
Darien Telephone Company Inc.	Zayo
DeltaCom Inc.	

- Non-Responsive/Research Providers

Airimba and Windchannel Communications	Gosuto Wireless Internet
Albany Water Gas & Light	Habersham Electric Membership Corporation
Blue Ridge Mountain EMC	KitePilot Wireless Internet
Broadstar, LLC	MediaStream
Bulloch County Rural Telephone Cooperative Inc.	MetroPCS Georgia, LLC
City of Augusta	North Georgia Network Cooperative, Inc
City of Cartersville- FiberCom	One Ring Networks
City of Milledgeville	Parker Fibernet
City of Statesboro	Peachnet
Columbia Country Information Technology Department	Plantation Cablevision, Inc.
Communicom	Quitman Wireless
Dalton Utilities	Talk America Inc
DirectPath	University Corporation for Advanced Internet Development
Georgia Business Net	VectorLink
Georgia Public Web, Inc.	Wave2Wave Communications

- Non-Cooperative Providers
  - Birch Communications, Inc.
  - Birch Telecom of the South, Inc
  - Brightlan.net
  - Kennedy CableVision Inc.
  - NuLink Digital
  - Smartresort Co, LLC dba Beyond Communications

- Providers researched and identified as non-broadband providers can be viewed within the table at the end of this document.

COVERAGE AREA CHANGES

- Coverage Footprint Reductions/Map Refinement - Resulting from Validation (Provider Portal)
  - CenturyLink (TT-10)
  - Comcast (TT-41)
  - ComSouth (TT-10)
  - Cox Communications (TT-40)
  - Darien Communications, Inc. (TT-50)
  - Frontier Communications of Fairmount, LLC (TT-10)
  - TW Telecom of Georgia l.p. (TT-10)

- Coverage Footprint Expansion –
  - AT&T Georgia (TT-10)
  - AT&T Georgia (TT-50)
  - Charter Communications Inc. (TT-40)
  - Comcast (TT-40)
  - FairPoint Communications (TT-10)
  - Frontier Communications of Georgia, LLC (TT-10)
  - Main Street Broadband (TT-71)
  - Pembroke Telephone Company, Inc (TT-50)
  - TDS Telecom (TT-10)
  - TW Telecom of Georgia l.p. (TT-50)
  - ViaSat (TT-60)
  - Zayo Group LLC (TT-50)

- Provider Attribute/Name/TT Changes –
  - New Edge Networks, Inc. (TT-10/TT-20/TT-30/TT-41 Removed / Non-Cooperative)
  - WildBlue Communications, Inc. (TT-60, Changed Name to ViaSat)
  - AboveNet Communications Inc (TT-50 Removed / Sold to Zayo)

COMMUNITY ANCHOR INSTITUTION (CAI) DETAILS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	CAIID Counts	Broadband Subscriber	Trans Tech	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	2087	2037	2077	2077	2077	2077
Category 2 - Library	451	368	383	383	382	382
Category 3 - Medical/Healthcare	2633	0	0	0	0	0
Category 4 - Public Safety	2656	0	0	0	0	0
Category 5 - Universities/Colleges	202	110	99	99	99	99
Category 6 - Other: Government	747	0	0	0	0	0
Category 7 - Other: Non-Government	0	0	0	0	0	0
Total	**8776**	**2515**	**2559**	**2559**	**2558**	**2558**

CAI CHANGES

- Increase in the data collected for Category 1 – Schools K through 12.
- We will be focusing on collecting broadband information for Category 3 – Healthcare and identifying what information can be gathered for Categories 4 and 6 to create a more complete inventory.
- The CAI inventory was review again against the database mentioned below for the following categories: Category 1: K-12 Schools, Category 2: Libraries and Category 5: Colleges
  These databases are as follows:
  - For K-12 institutions (CAI type 1) please add the NCES ID CCD ID value found here: **http://nces.ed.gov/ccd/bat/**
  - For Higher Education (CAI type 5) please add the NCES IPEDS ID value found here: **http://nces.ed.gov/ipeds/datacenter/**
  - For Libraries (CAI type 2) please. Combine (do not add) "FSCSKey" and "FSCs_SEQ" from the "puout08av2000" file and place them here: **http://harvester.census.gov/imls/data/pls/index.asp** (FYI the LIBID is your state's unique ID for libraries)

SUBMISSION RECEIPT

SUBMISSION RECEIPT RESULTS

- Attached are the results from the NTIA data submission receipt quality script.

GA_2012_9_27.txt

- Error Report
  - The main items flagged within the submission receipt were the technology and speed matches, which were validated by the provider and/or are within the ranges communicated in the NTIA data model.
  - All items are included within the accompanying ReadMe file.

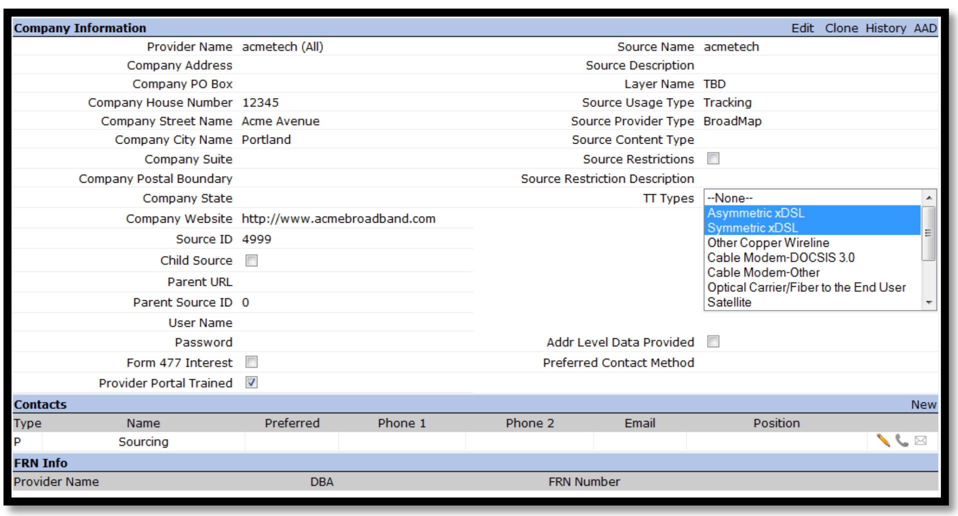
HIGH-LEVEL SUMMARY

DATA GATHERING

BROADBAND SERVICE AREAS, MIDDLE MILE AGGREGATION POINTS AND BROADBAND SERVICE OVERVIEW

The collection of Broadband Service Areas, Middle Mile Aggregation Points and Broadband Service Overview information is handled through the following Provider Outreach Process:

- Build and maintain an inventory of Broadband providers through currently known providers and research.
- The inventory and everyday interaction with providers is tracked using the Provider Catalog (PCat). Below are some examples of the web application, which has a shared access between our team and mapping partner (BroadMap).



Company Information Edit Clone History AAD

Provider Name	acmetech (All)	Source Name	acmetech
Company Address		Source Description	
Company PO Box		Layer Name	TBD
Company House Number	12345	Source Usage Type	Tracking
Company Street Name	Acme Avenue	Source Provider Type	BroadMap
Company City Name	Portland	Source Content Type	
Company Suite		Source Restrictions	☐
Company Postal Boundary		Source Restriction Description	
Company State		TT Types	--None-- Asymmetric xDSL Symmetric xDSL Other Copper Wireline Cable Modem-DOCSIS 3.0 Cable Modem-Other Optical Carrier/Fiber to the End User Satellite
Company Website	http://www.acmebroadband.com		
Source ID	4999		
Child Source	☐		
Parent URL			
Parent Source ID	0		
User Name			
Password		Addr Level Data Provided	☐
Form 477 Interest	☐	Preferred Contact Method	
Provider Portal Trained	☑		

Contacts New

Type	Name	Preferred	Phone 1	Phone 2	Email	Position
P	Sourcing					

FRN Info

Provider Name	DBA	FRN Number

Confidence			New
TT Type	Confidence	Last Modified	Comment

Status Tracking

Non Facilities Based Provider	☐		
Business Only Provider	☐		
Reseller	☐	Non Responsive Provider	☐
NDA Review - Internal	☐	Non Cooperative Provider	☐
NDA Review - External	☐	Source Closed	☐

Service Provider Details

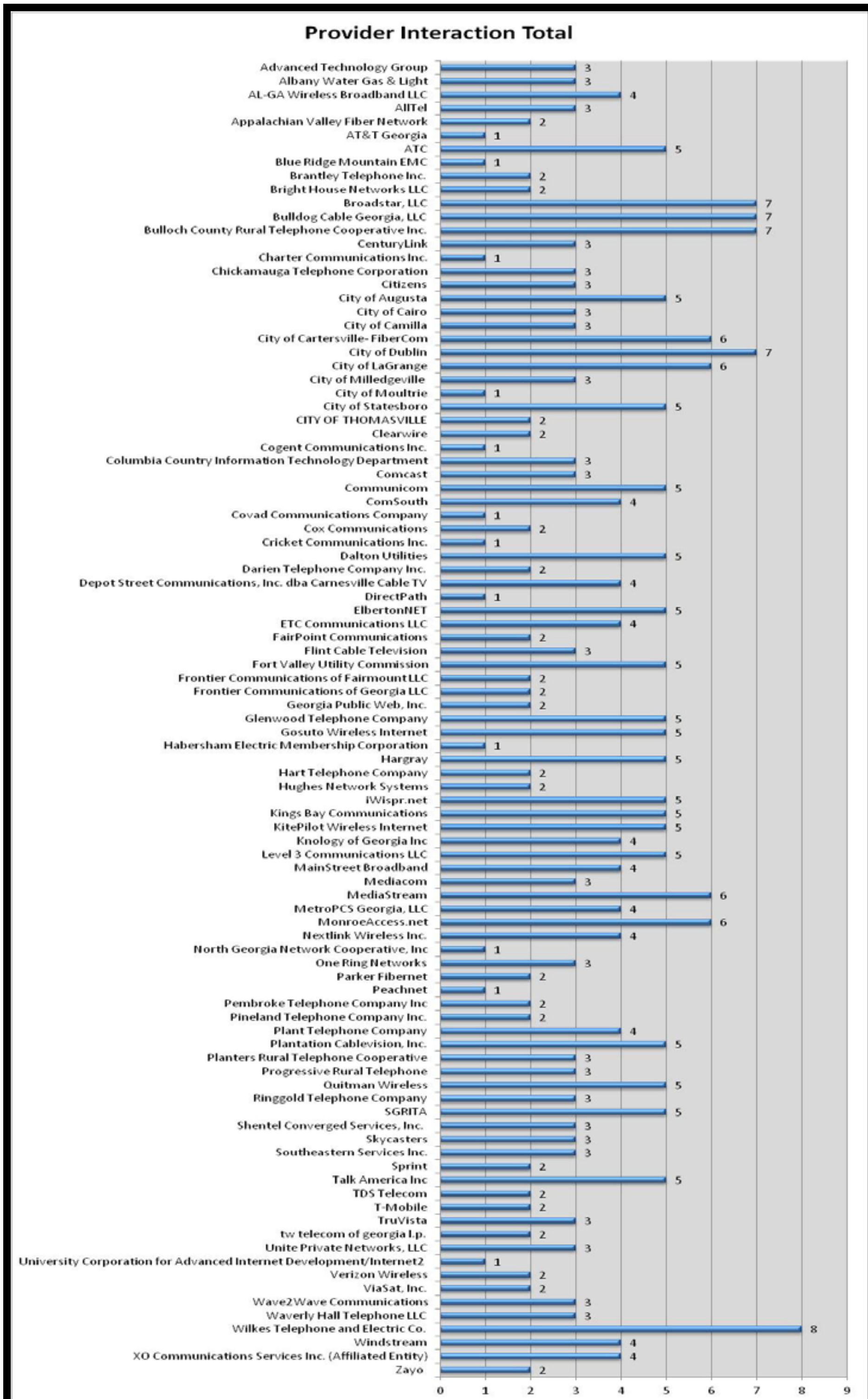
BroadMapper	--None--	BroadMap Status	Unassigned
Initial State Outreach Date		Initial Contact Vehicle	
Provider Origin		Member Association	
		Initial State Outreach	☐
		NDA Status	--None--
		NDA Not Required	☐
Provider Packet Exchanged	☐	NDA Requested	☐
Provider Packet Info Sent		NDA Exchanged	☐
Provider Meeting Status	--None--	NDA Exchange Date	
Technical Meeting Requested	☐	NDA Signed	☐
Technical Meeting Scheduled	☐	NDA Signed Date	
Number of Subscribers			
		Date Loaded	
		Source Closed Date	

BDIA Delivery 0412			Edit
Status	--None--	Provider Data Reviewed	☐
Outreach Date		Provider Data Reviewed Date	
Initial Response		FootPrint	
Meeting Date		MiddleMile	
No Update Date		Subscriber	
Waiting For Data Date		Provider Login	☐
Data Received Date		Provider Login Date	
Data Accepted Date			
Source Ingested		Source Ingested Date	

Additional Data

Notes			
Next Steps			
Inactive	☐	Owner	briordan
Created By	briordan 2011-06-13 12:06:35	Last Modified By	krousseau 2012-03-16 13:41:58

- In order to encourage participation throughout the life of the program, we feel it's important to foster relationships with the providers and encourage a collaborative team effort between all parties for each data submission. The chart below represents that interaction count with each provider.



- Update provider material that describes the data requirements and logistics for data transfer.
- Update Non-Disclosure Agreement (NDA) for use in the project, where applicable.
- Maintain multiple protocols for the provider to submit data, including Secure File Transfer Protocol (SFTP) technology when desired.
- Conduct one-on-one informational discussions with each provider to communicate the following:
    - Requirements of this project;
    - Broadband data required to support the product data model;
    - Submission protocols available;
    - Capability to validate how the supplied data is aggregated.
- Download/receive provider data.
- Establish a repeatable process with provider. Maintain provider communication, transaction and data handling records throughout the project (dates contacted, data received, etc.).

COMMUNITY ANCHOR INSTITUTION (CAI)

The collection of CAI information is handled through the following CAI Collection Process:

- Collect and maintain inventory of CAIs through currently known CAIs, data mining, and research.
- Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.
- Upload web-based data to Core Database for standardization.
- Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.
- Geocode CAI locations.
- Translate Core Database data to deliverable-ready format.
- Continue engagement with non-responsive institutions.

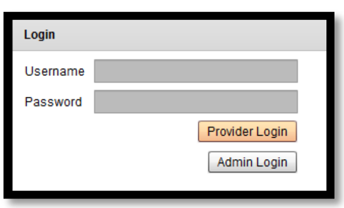
DATA INTEGRATION PROCESS

The data integration and processing mechanisms currently used allows for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

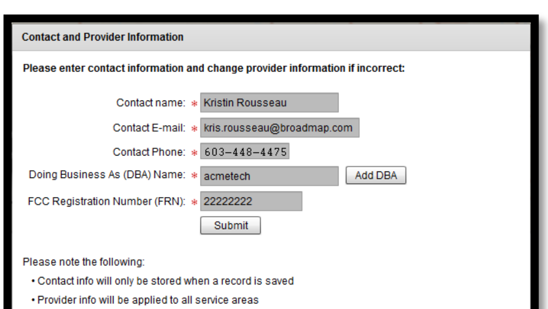
- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type category (addresses, block lists, paper maps, etc.).
- Standardize input based on data type within Staging Database.
- Create Compact Polygons (CP)—(internal methodology for generating area-based feature for coverage in Staging Database).
- Apply broadband attribution to CP; apply metadata to CP.
- Perform quality analysis of the CP against the source supplied to identify any completeness or accuracy issues.
- Request additional information from the provider if elements of coverage are missing or contain discrepancies. This is a second manual quality check to ensure data is complete.
  - Process coverage area to build the required NTIA data model layers.

With the deployment of the Provider Portal this round, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it supplies them with more visibility into how their data is being represented and gives them knowledge and ownership of their coverage representation. Below are some bullet points and supporting screen shots on how the portal is used.

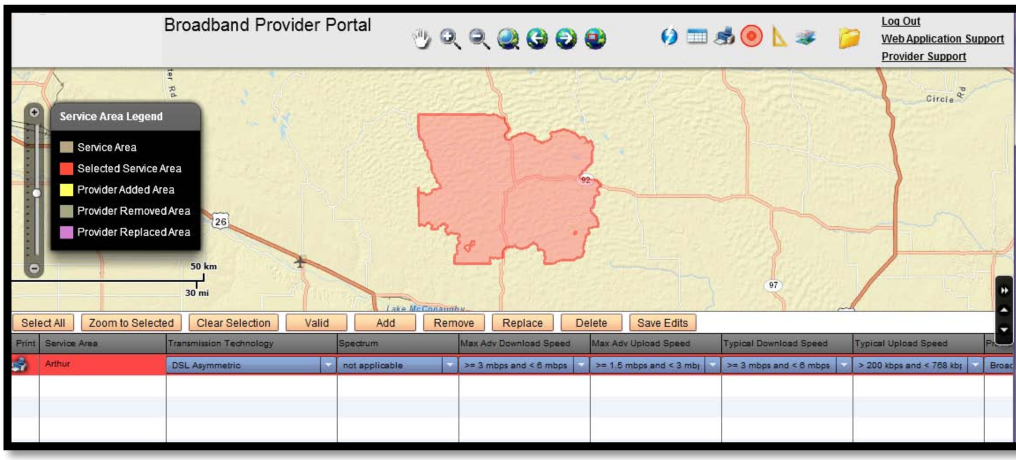
- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration



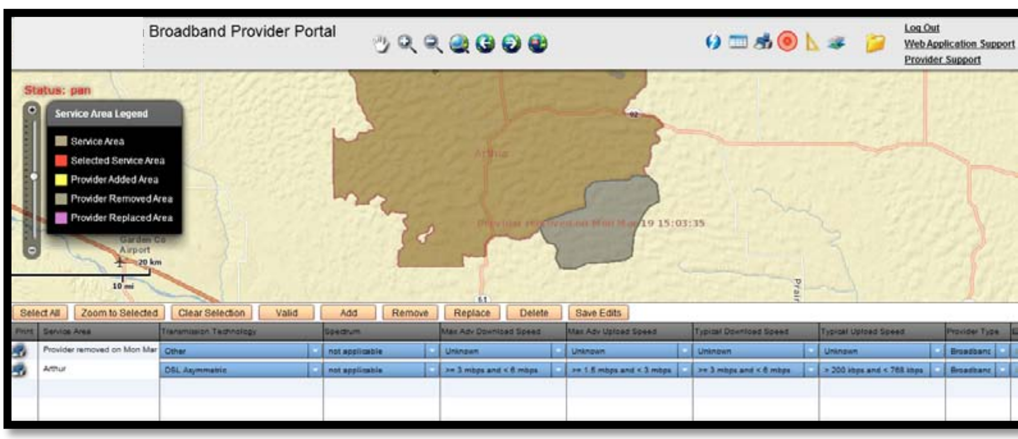
- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy



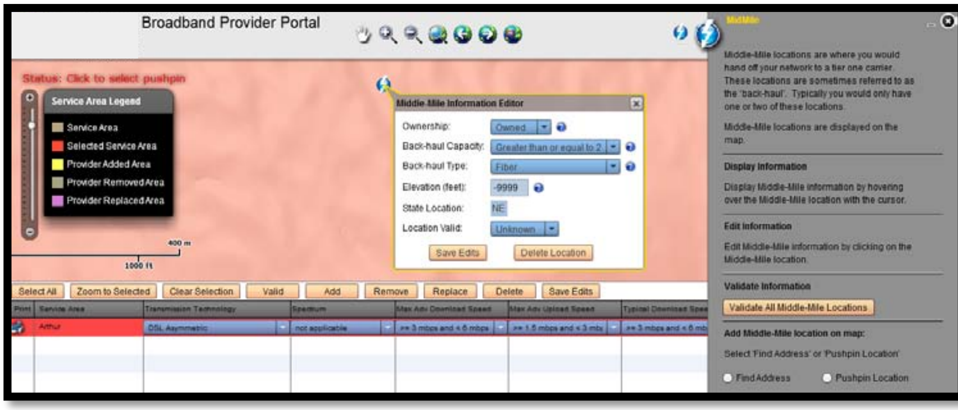
- Capability to review and request changes to the coverage footprint

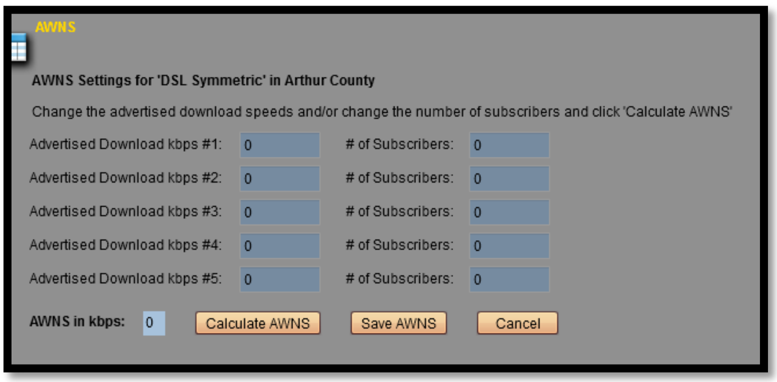


- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

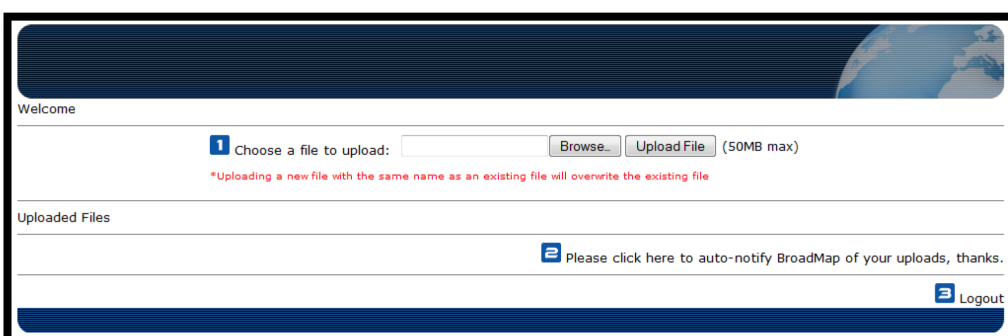


- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





- File upload functionality to support providers that would prefer a shapefile, spreadsheet, PDF, KMZ/KML file be used to reflect changes for the data round



- Once the provider has review completed changes to their coverage, middle mile and AWNS, then can validate them all by signing off that everything is accurate.

DATA VALIDATION AND VERIFICATION

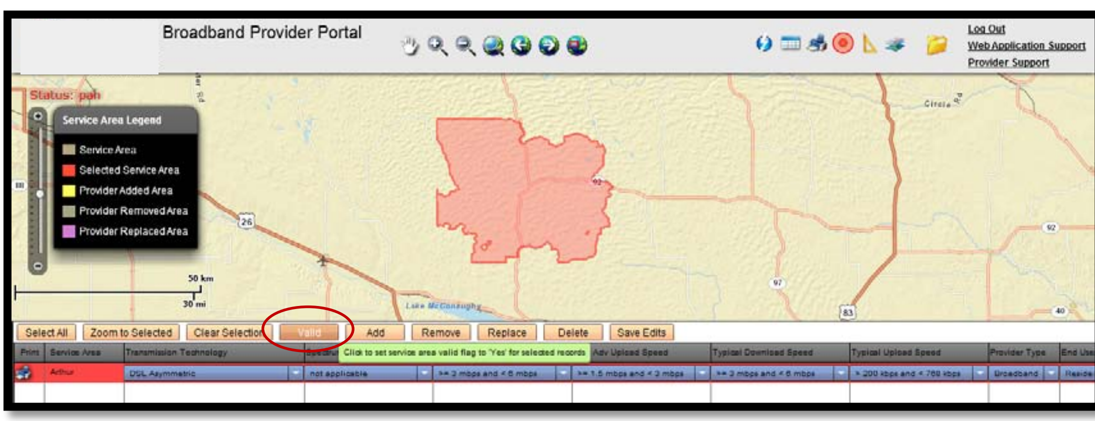
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage areas and serviceability claims, additional reviews are performed using the methods described in the subsections below in order of action (**Broadband Provider Validation**, **SME Verification, Public Verification, Third-Party Data Verification and Confidence Values**).

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

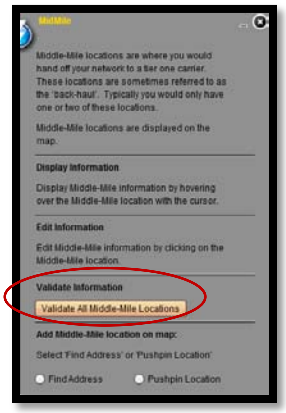
Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the **Data Integration Process** and are reviewed with the provider to complete validation.

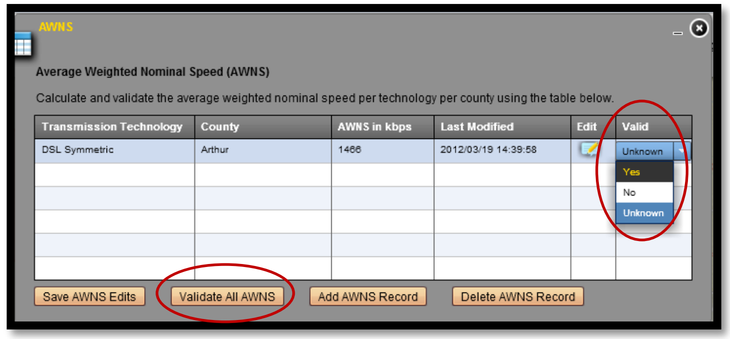
With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

- Coverage validation can be done on one record/footprint at a time or by selecting footprints and selecting the 'Valid' button. The provider could also print off or download their coverage for their own tracking purposes.



- Middle Mile & AWNS Validation





All validation results are tracked internally through our Validation Table, which also improves the overall **Confidence Value** as mentioned below.

SME VERIFICATION – PROVIDER PORTAL ADMIN

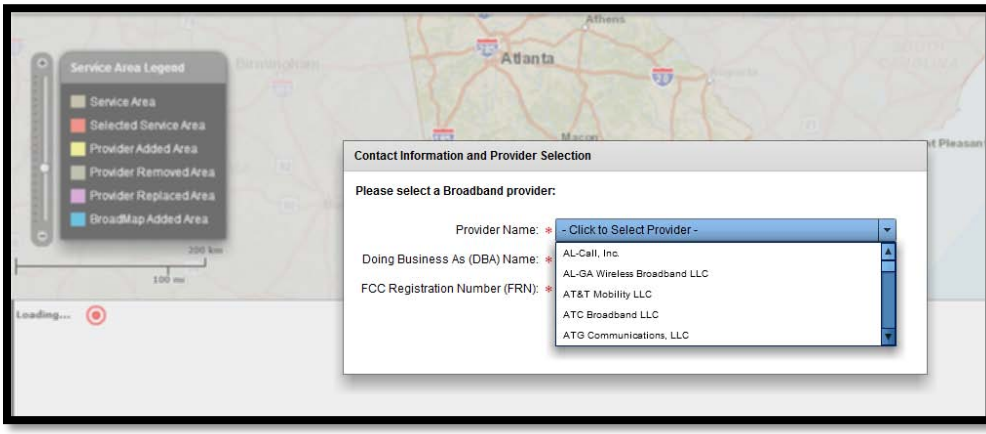
For this dataset submission, Georgia introduced new verification enhancements to the Provider Portal that supports administrative functionality for Subject Matter Experts (SMEs) to review the provider coverage areas and supply feedback/commentary on the accuracy and completeness. These enhancements allowed Georgia to:

- Review the coverage submitted by the carriers online
- Use our subject matter expertise to evaluate the accuracy of the data against local knowledge, online advertising, personal meetings, etc.
- Document a dialogue with its providers for verification purposes. We were able to review many of the provider submissions manually and submit questions to the providers if speeds, coverage areas, technology types, or other items appeared.
- Update provider entries if appropriate.
- Report our verification comments and any responses from the providers to NTIA in the dataset.

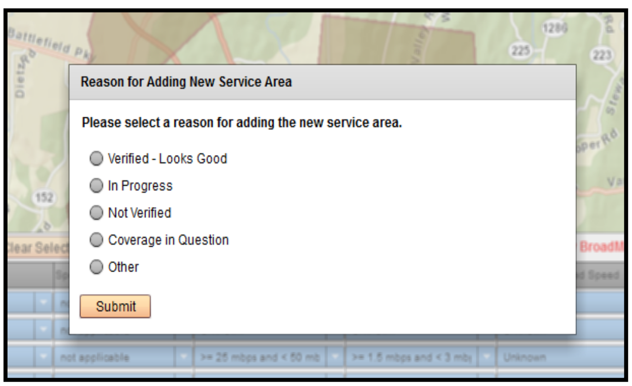
NOTE: Georgia analyzed every carrier who did not meet the NTIA Technology/Speed table matches and documented our justification, submitted question/commentary to the carrier, or corrected the carrier's entry. All commentary extracted from the administrative portal can be found with the data package that accompanied this data submission.

Below are some screen shots illustrating the administrative capability of the Provider Portal.

As shown below, the SME can login through the secure web application and choose the provider to be reviewed.

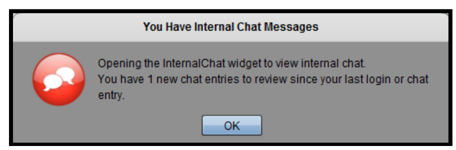


The portal supports two ways of verification at a coverage footprint level. The SME can draw areas of concern or approval on the map and supply a categorized comment that can easily be extracted at anytime.

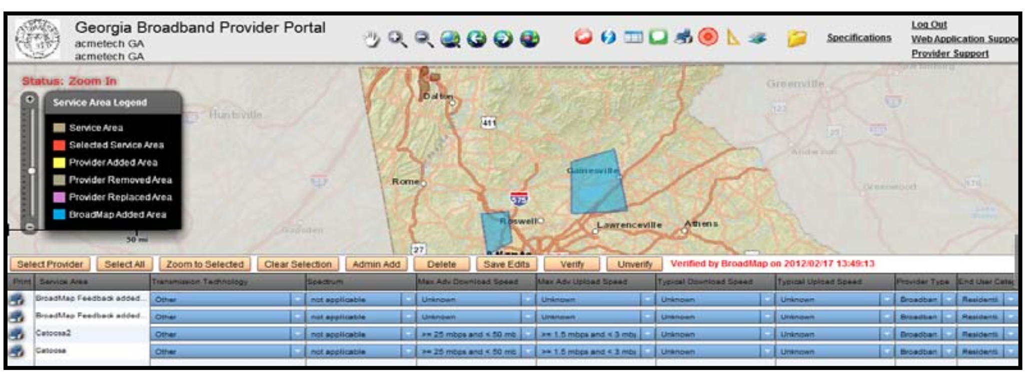


Additionally, the SME can leave commentary that will then be automatically e-mailed to the provider for their review and displayed as a pop-up when the first login to the Provider Portal. This includes historical tracking so you can see all commentary between the SME and provider, as well as the date/time stamp for each comment.

The administrative Provider Portal also allows for commentary between team members, which will only be viewable by the internal admin team members. The team members are notified automatically via e-mail when a comment is submitted, as well as when they login.



Similar to how the providers update and validate their coverage within the Provider Portal, the administrative version walks the SME through the verification assignments to ensure everything is reviewed and documented with a status and date/time stamp.



Through the testing and initial release of the portal, the providers have been very responsive to the commentary and supplying updates where needed. As we progress with this tool, the commentary and verification status will be included in future submission documentation. Some is already included within this submission's data package.

CROWD SOURCING

The collection and use of public feedback on provider coverage areas is planned for deployment soon after the spring data submission. An updated version of the State public interactive map will be released with enhanced feedback capability, which can then be brought to the provider for potential map refinement.

THIRD PARTY DATA VERIFCATION

We are currently in the process of acquiring 3rd party data to extend our verification efforts. The data that will e acquired will allow comparisons against exchange and cable boundaries. We will also continue our reviews against the Form 477 data as provider coverage areas change from submission-to-submission.

CONFIDENCE VALUES

All verification, validation and manual quality review results are tracked by provider/technology type and stored and maintained within a **Validation table**. A confidence value is assigned, based on internal assessments of the collected information, to highlight the provider coverage areas and/or attributions that would benefit from further investigation and/or enhancements.

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention. We're currently at the initial stages of this initiative, but will have a more complete picture in time for the next data submission.

QUALITY CONTROL

Following collection, processing and analysis of the provider and CAI data, the product is checked manually and algorithmically against the NTIA data model. Some of the items included within these checks are:

- Format correctness;
- Table and field structure;
- Valid values, including default values, where applicable;
- Geographic extent and topology errors.

Prior to data submission, another quality control script supplied by NTIA is run. This script, SBDD_CheckSubmission.py, creates an output in text form that is required to be submitted along with the final deliverable. All errors must come up clean, unless otherwise specified by NTIA.

DETAILED PROCESS REVIEW

To review the detailed process, please review the attached object:

BMap_ProcessDetails
_2012_10_01.docx

PROVIDERS RESEARCHED

Below is a list of providers that were researched and contacted, but identified as non-broadband providers and didn't require inclusion within the data submission. Some may be due to different naming conventions or inaccurate FRN/DBA names and were therefore considered a closed source.

5LINX Enterprises, Inc.
8x8, Inc.
Access One, Inc.
Access Point, Inc.
Accessline Holdings, Inc.
ACN, Inc.
ACN, Inc.
Airespring, Inc.
Albany State University
Albany, Water, Gas and Light Commission
ALEC, Inc.
Alma Telecom, Inc.
Alternative Phone, Inc.
America Internet & Communications
American Telephone Company LLC
Appalachian Valley Fiber Network
Applied Satellite Technology Systems
Apptix, Inc.
Aptela, Inc.
AT&T Mobility LLC
Atlantic Tele-Network
Avaya Inc.
Bandwidth.com, Inc.
BCN Telecom, Inc.
BetterWorld Telecom, LLC
Big River Telephone, LLC
Birch Communications Inc.

Dialtone & More, Inc
Digital Agent, LLC
DoveTel Communications, LLC
DOW Management Company, Inc.
DSLnet Communications LLC
Echostar
ECR Voice, LLC
Electric Power Board
Equinox, Inc.
Ernest Communications, Inc.
EveryCall Communications, Inc.
Evolve IP, LLC
Fidelity Voice Services LLC
Fionda VoIP, LLC
First Communications, LLC
Global Connection Inc. of America
Global Crossing North America, Inc.
GlobalPhone Corp.
Granite Telecommunications, LLC
GreatCall, Inc.
Hickory Tech Corporation
iCore Networks, Inc.
IDT Corporation
InPhonex.com, LLC
Interface Security Systems Holdings, Inc.
Interglobe Communications, Inc.
IP Communications, LLC

OneTone Telecom, Inc.
ONS-Telecom, LLC
OnWav, Inc
PaeTec Corporation
Peerless Network, LLC
Phone.com, LLC
Plant Tifnet
PNG Telecommunications, Inc.
Preferred Long Distance, Inc.
Professional Resources Management of Rabun, LLC
Proximiti Technologies, Inc.
Public Service Telephone Company
Quick Connect Telecommunications, Inc.
Quincy Telephone
Qwest
Razorline LLC
Reynolds Cable TV Inc.
Ring Connection, Inc.
Saturn Telecommunication Services Inc.
Seimitsu Corporation
Semperon Corporation
Single Source Integrated Services, Inc.
SinglePipe Communications
South Carolina Net, Inc.
South Georgia Governmental Services Authority
Southern Communications Services, Inc.
Southern Telecom, Inc.

Blue Ridge Mountain EMC
Blue Ridge Telephone
Board of Water, Light & Sinking Fund Commissioners
Broadview Networks Holdings, Inc.
Broadvox Go!, LLC
Budget Prepay Inc.
BullsEye Telecom, Inc.
Call Catchers, Inc.
Cause Based Commerce Inc.
Cbeyond Communications, Inc.
CCP Holdings, LLC
Cincinnati Bell Inc.
City of Cartersville
City of Decatur
City of Elberton, Georgia
City of Hapeville
City of LaGrange
City Of Manchester
City of Manchester, Georgia
City of Savannah
City Of Wadley
CommPartners Holding Corporation
Computer Office Solutions, Inc.
Conexiz Corporation
ConnectMe, L.L.C.
Corr Wireless Communitcations, LCC
Covista, Inc.
Cypress Communications, Inc.

IP Networked Services, Inc.
ipSBS Managed Services, LLC
Kosmaz Technologies, LLC
LightEdge Solutions, Inc.
LightSquared LP
LY Holdings, LLC
M5 Networks, Inc.
Matrix Telecom, inc.
Megapath
MetroPCS Georgia, LLC
Metropolitan Telecommunications Holding Company
Midwestern Telecommunications Inc.
Millicorp
Mitel Netsolutions Inc.
Mix Networks, Inc.
MOMENTUM TELECOM INC
N.W.ComTech, Inc
Navigator Telecommunications, LLC
Negia, Inc.
Netlink IP Communications
Netlogic, Inc.
Network Billing Systems LLC
Nexus Communications, Inc.
nexVortex, Inc.
Northland Communications Corp.
Northwest Georgia Regional Commission
NOS Communications, Inc.
Ojo Service LLC

StarBand Communications Inc.
TCO Network, Inc.
TDS Telecom2
Telapex, Inc.
Tele Circuit Network Corporation
Teledias Communications, Inc.
TelefÃ³nica USA, Inc
Telekenex, Inc.
Telesphere Networks Ltd.
Telovations, Inc.
Tennessee Telephone Service, LLC
The Edge Group Inc
Think 12 Corporation
Thinking Phone Networks, LLC
Tphone.us
Trans National Communications International, Inc.
Transbeam Inc.
Trenton Telephone Co.
Unite Private Networks, LLC
vCom Solutions
Velocity Networks Inc.
VoIPStreet, Inc.
Vonage Holdings Corp.
WildBlue Communications, Inc.
Windjammer Communications LLC

Guam Broadband Mapping Project: Product Release White Paper

Contact Name Manager:	Daniel Calarco
Contact Phone Number:	202-393-1175
Contact E-mail:	**dcalarco@one-economy.com**
Submitted By:	Kristin Rousseau
Contact E-mail:	**kristin.rousseau@broadmap.com**

Product Specification:	Fall 2012 NTIA Data Model
Product/Process:	NTIA—October 1, 2012 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's October 1st, 2012 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Providers Included
  - Docomo Pacific
  - GTA
  - IT&E
  - MCV
  - PDS (Pacific Data Systems) Guam

- New Providers Since Last Data Submission
  - None

- Other Provider Comments
  - iConnect
    - Currently not a broadband service provider; however they are still researching further on entering the Terrestrial Fixed Wireless market

COVERAGE AREA CHANGES

- Coverage Footprint Reductions/Map Refinement –
  - MCV decreased in their TT-41 coverage based on crowd sourcing and provider feedback

- Coverage Footprint Expansion/Attribution Changes –
  - IT&E increased in their TT-80 coverage
    - IT&E also updated their AWNS

DATA CORRECTIONS

- There were no data corrections required for this data submission
  - There was also no NTIA 3rd Party data review results posted on the Broadband State Data Management Tool that could lead to potential data corrections.

COMMUNITY ANCHOR INSTITUION (CAI) DETIALS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	CAIID Counts	Transmission Technology	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	56	38	0	0	0
Category 2 - Library	9	6	5	5	5
Category 3 - Medical/Healthcare	8	0	6	6	6
Category 4 - Public Safety	28	0	19	19	19
Category 5 - Universities/Colleges	5	3	0	0	0
Category 6 - Other: Government	80	0	0	0	0
Category 7 - Other: Non-Government	68	0	0	0	0
Total	**254**	**47**	**30**	**30**	**30**

CAI CHANGES

- The CAI's within the following categories were reviewed again against the below-mentioned databases to identify if any CAIID's need to be updated or added.
    - For K-12 institutions (CAI type 1) please add the NCES ID CCD ID value found here: **http://nces.ed.gov/ccd/bat/**
    - For Higher Education (CAI type 5) please add the NCES IPEDS ID value found here: **http://nces.ed.gov/ipeds/datacenter/**
    - For Libraries (CAI type 2) please. Combine (do not add) "FSCSKey" and "FSCs_SEQ" from the "puout08av2000" file and place them here: **http://harvester.census.gov/imls/data/pls/index.asp** (FYI the LIBID is your state's unique ID for libraries)

SUBMISSION RECEIPT

SUBMISSION RECEIPT RESULTS

- Attached are the results from the NTIA data submission receipt quality script.

GU_2012_9_21.txt

- Error Report

  The only items detected were for the TT-10 service coverage areas that have a maximum advertised download speed of 7 or 8.

  The technology and speeds were validated by the provider and are within the ranges communicated in the NTIA data model.

  All items are included within the accompanying ReadMe file.

  Update: There was an update made to the submission receipt on 09/20/12 that introduced the longitude issue for Middle Mile layer.

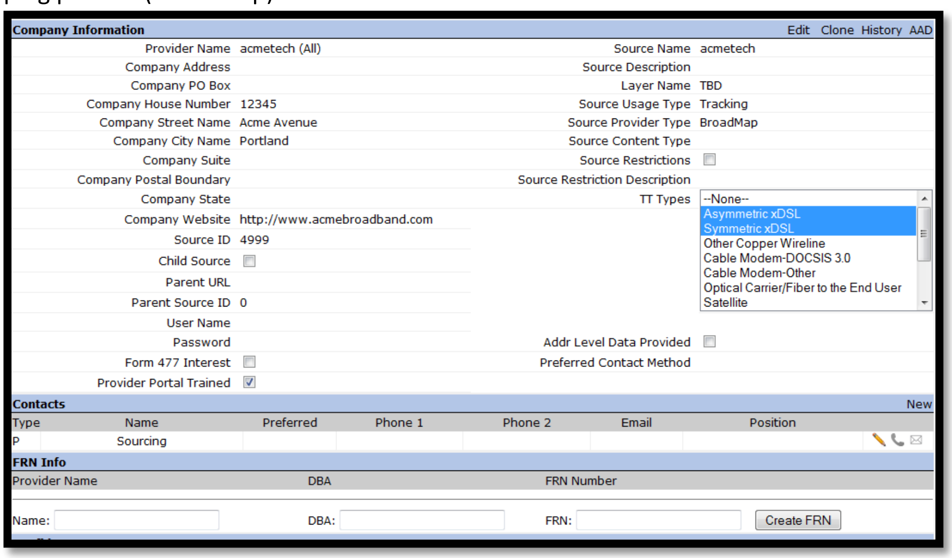
HIGH-LEVEL SUMMARY

DATA GATHERING

BROADBAND SERVICE AREAS, MIDDLE MILE AGGREGATION POINTS AND BROADBAND SERVICE OVERVIEW

The collection of Broadband Service Areas, Middle Mile Aggregation Points and Broadband Service Overview information is handled through the following Provider Outreach Process:

- Build and maintain an inventory of Broadband providers through research and State inputs.
- The inventory and everyday interaction with providers is tracked using our Provider Catalog (PCat). Below are some examples of the web application, which has a shared access between our team and mapping partner (BroadMap).



Company Information — Edit Clone History AAD

Provider Name: acmetech (All)
Company Address:
Company PO Box:
Company House Number: 12345
Company Street Name: Acme Avenue
Company City Name: Portland
Company Suite:
Company Postal Boundary:
Company State:
Company Website: http://www.acmebroadband.com
Source ID: 4999
Child Source:
Parent URL:
Parent Source ID: 0
User Name:
Password:
Form 477 Interest:
Provider Portal Trained:

Source Name: acmetech
Source Description:
Layer Name: TBD
Source Usage Type: Tracking
Source Provider Type: BroadMap
Source Content Type:
Source Restrictions:
Source Restriction Description:
TT Types: --None--, Asymmetric xDSL, Symmetric xDSL, Other Copper Wireline, Cable Modem-DOCSIS 3.0, Cable Modem-Other, Optical Carrier/Fiber to the End User, Satellite
Addr Level Data Provided:
Preferred Contact Method:

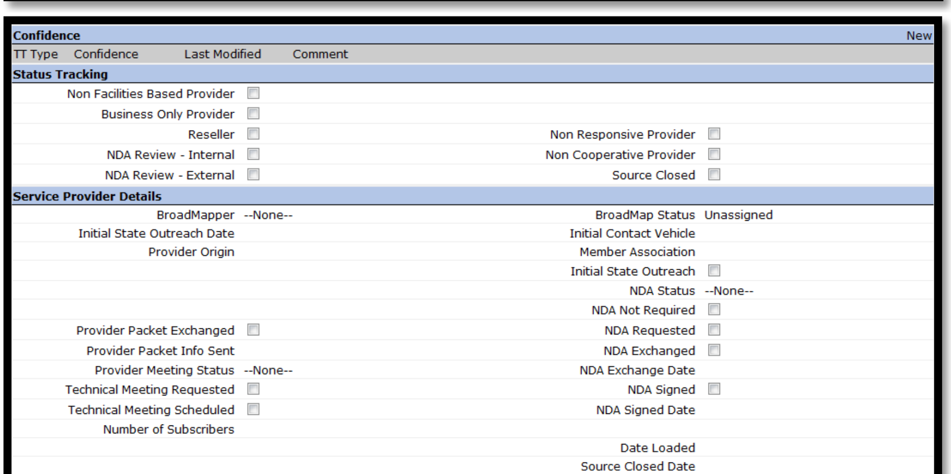
Contacts — New

Type	Name	Preferred	Phone 1	Phone 2	Email	Position
P	Sourcing					

FRN Info

Provider Name	DBA	FRN Number

Name: DBA: FRN: Create FRN



Confidence — New

TT Type	Confidence	Last Modified	Comment

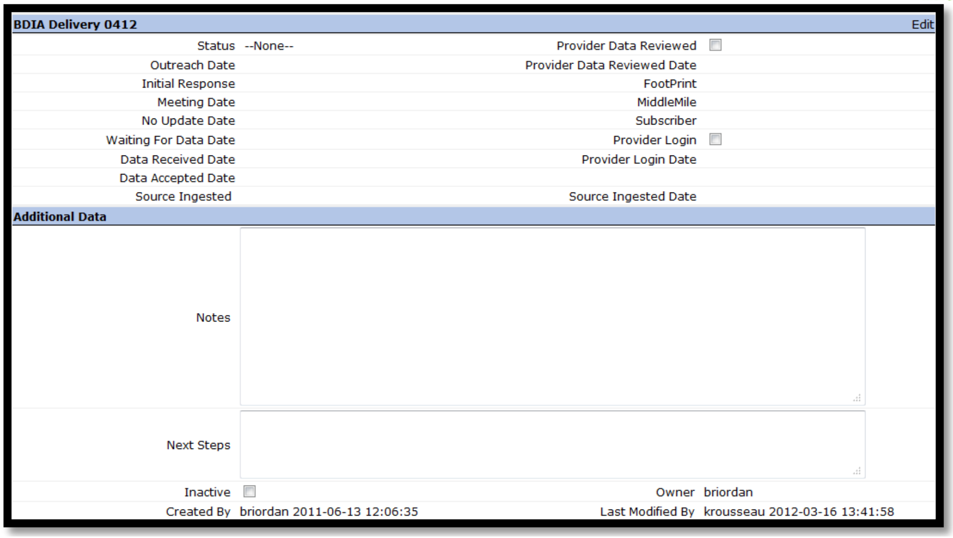
Status Tracking

Non Facilities Based Provider:
Business Only Provider:
Reseller:
NDA Review - Internal:
NDA Review - External:
Non Responsive Provider:
Non Cooperative Provider:
Source Closed:

Service Provider Details

BroadMapper: --None--
Initial State Outreach Date:
Provider Origin:
Provider Packet Exchanged:
Provider Packet Info Sent:
Provider Meeting Status: --None--
Technical Meeting Requested:
Technical Meeting Scheduled:
Number of Subscribers:

BroadMap Status: Unassigned
Initial Contact Vehicle:
Member Association:
Initial State Outreach:
NDA Status: --None--
NDA Not Required:
NDA Requested:
NDA Exchanged:
NDA Exchange Date:
NDA Signed:
NDA Signed Date:
Date Loaded:
Source Closed Date:



BDIA Delivery 0412 Edit

Status	--None--	Provider Data Reviewed	☐
Outreach Date		Provider Data Reviewed Date	
Initial Response		FootPrint	
Meeting Date		MiddleMile	
No Update Date		Subscriber	
Waiting For Data Date		Provider Login	☐
Data Received Date		Provider Login Date	
Data Accepted Date			
Source Ingested		Source Ingested Date	

Additional Data

Notes			
Next Steps			
Inactive	☐	Owner	briordan
Created By	briordan 2011-06-13 12:06:35	Last Modified By	krousseau 2012-03-16 13:41:58

- In order to encourage participation throughout the life of the program, we feel it's important to foster relationships with the providers and encourage a collaborative team effort between all parties for each data submission.

- Update provider material that describes the data requirements and logistics for data transfer.
- Update Non-Disclosure Agreement (NDA) for use in project, where applicable.
- Maintain multiple protocols for the provider to submit data, including Secure File Transfer Protocol (SFTP) technology when desired.
- Conduct one-on-one informational discussions with each provider to communicate the following:
  - Requirements of this project;
  - Broadband data required to support the product data model;
  - Submission protocols available;
  - Capability to validate how the supplied data is aggregated.
- Download/receive provider data.
- Establish a repeatable process with provider. Maintain provider communication, transaction and data handling records throughout the project (dates contacted, data received, etc.).

COMMUNITY ANCHOR INSTITUTION (CAI)

The collection of CAI information is handled through the following CAI Collection Process:

- Collect and maintain inventory of CAIs through data mining, research and State inputs.
- Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.
- Upload web-based data to Core Database for standardization.
- Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.
- Geocode CAI locations.
- Translate Core Database data to deliverable-ready format.
- Continue engagement with non-responsive institutions.

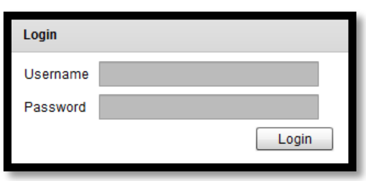
DATA INTEGRATION PROCESS

The data integration and processing mechanisms currently used allow for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

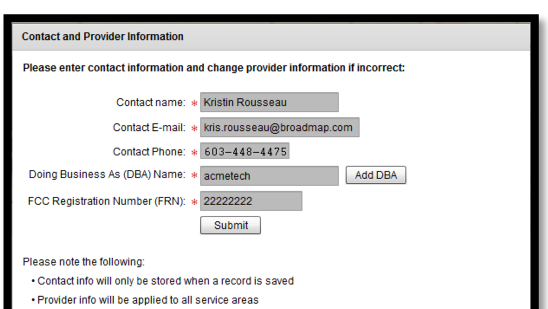
- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type category (addresses, block lists, paper maps, etc.).
- Standardize input based on data type within Staging Database.
- Create Compact Polygons (CP)—(internal methodology for generating area-based feature for coverage in Staging Database).
- Apply broadband attribution to CP; apply metadata to CP.
- Perform quality analysis of the CP against the source supplied to identify any completeness or accuracy issues.
- Request additional information from the provider if elements of coverage are missing or contain discrepancies. This is a second manual quality check to ensure data is complete.
    - Process coverage area to build the required NTIA data model layers.

With the deployment of the Provider Portal this round, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it's allows them more visibility into how their data is being represented and gives them knowledge and ownership of their coverage representation. Below are some bullet points and supporting screen shots on how the portal is used.

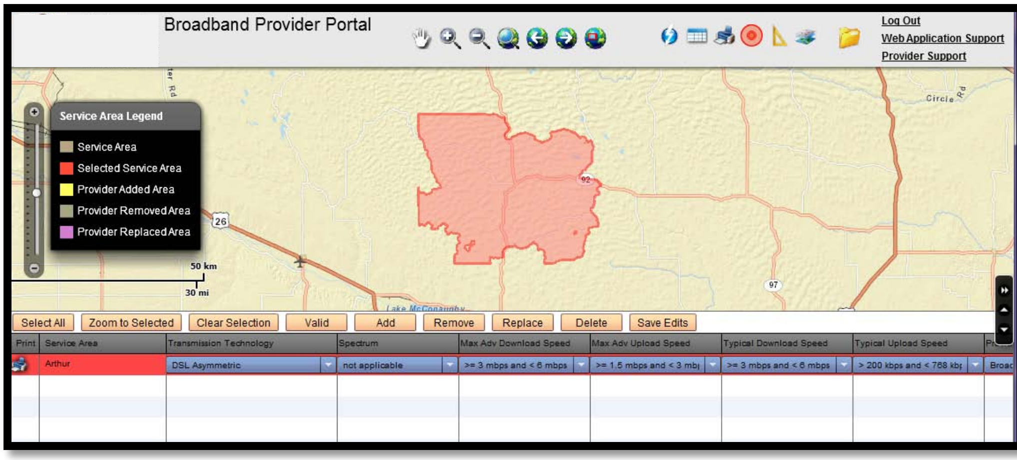
- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration



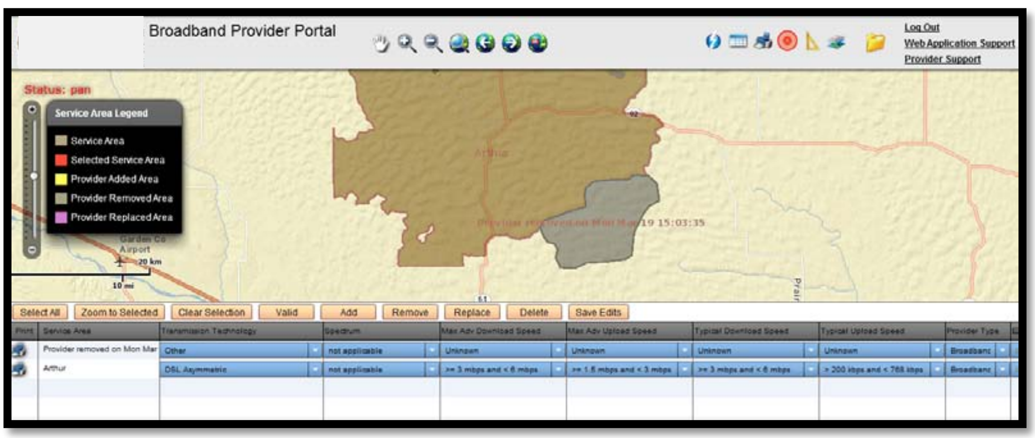
- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy



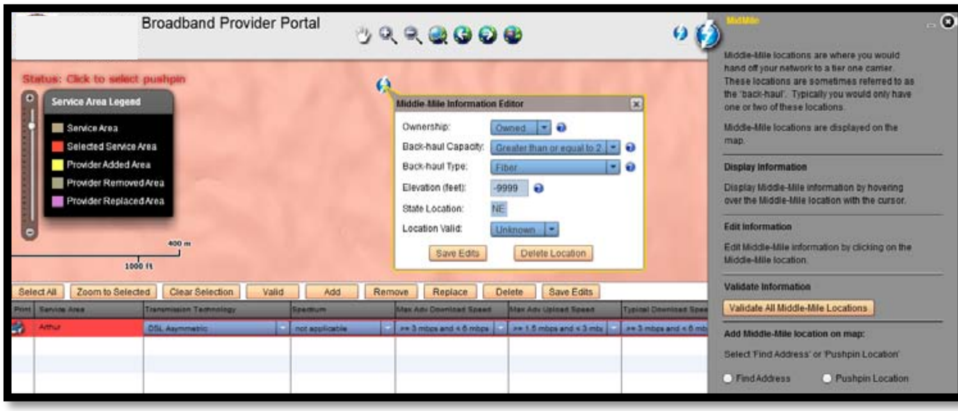
- Capability to review and request changes to the coverage footprint

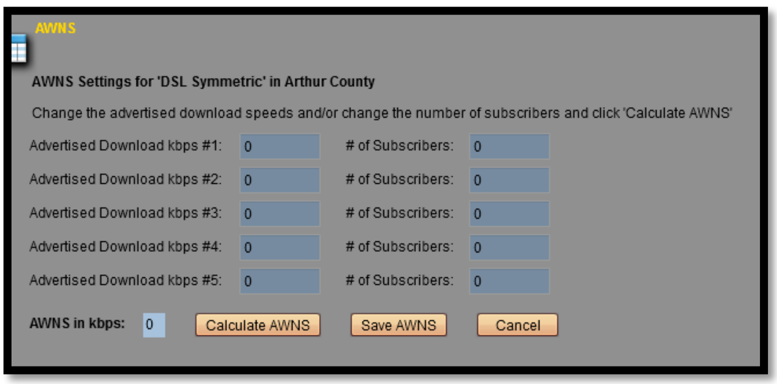


- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

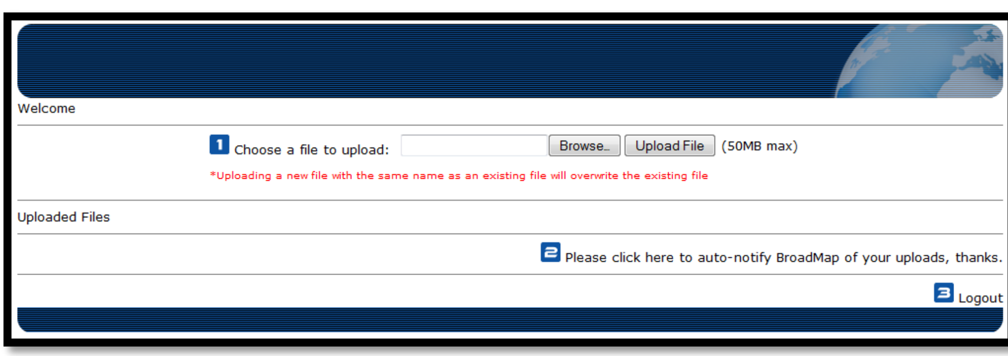


- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





- File upload functionality to support providers that would prefer a shapefile, spreadsheet, PDF, KMZ/KML file be used to reflect changes for the data round



- Once the provider has review completed changes to their coverage, middle mile and AWNS, then can validate them all signing off that everything is accurate.

DATA VALIDATION AND VERIFICATION

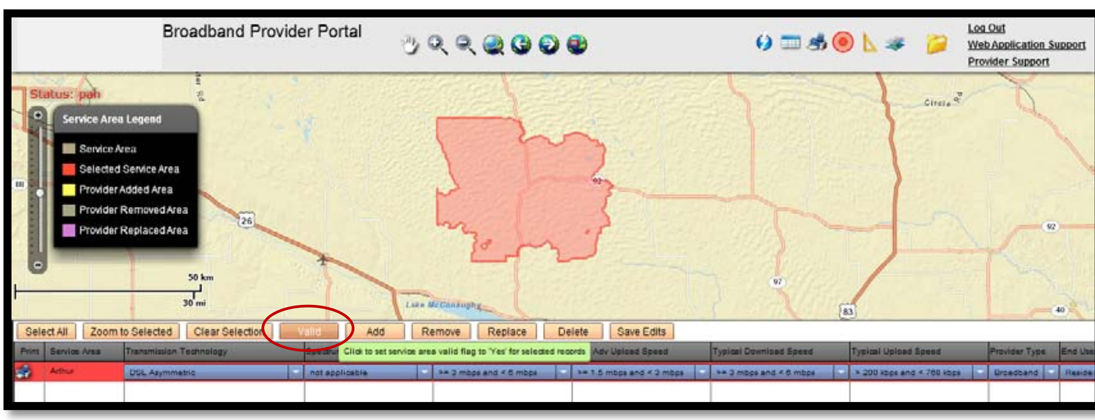
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage areas and serviceability claims, additional reviews are performed using the methods described in the subsections below in order of action (**Broadband Provider Validation**, **Third-Party Data Verification**, **Public Verification, and Confidence Values**).

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

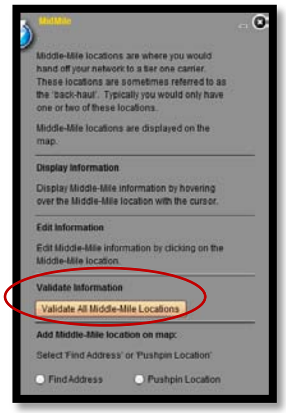
Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the **Data Integration Process** and are reviewed with the provider to complete validation.

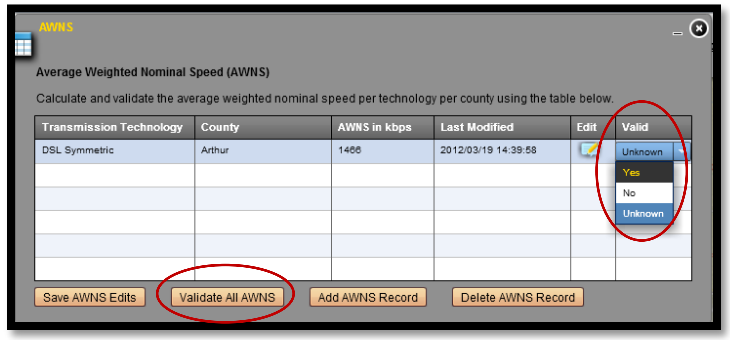
With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

- Coverage validation can be done on one record/footprint at a time or by selecting footprints and selecting the 'Valid' button. The provider could also print off their coverage for their own tracking purposes.



- Middle Mile & AWNS Validation





All validation results are tracked internally through our Validation Table, which also improves the overall **Confidence Value** as mentioned below.

THIRD-PARTY DATA VERIFICATION

For this submission, the NTIA 3rd Party Data summary was reviewed again to ensure any corrections required were represented in the final product and the supporting documentation. This includes additional feedback received directly from NTIA, prior to this data submission.

This submission was also compared to the previous data submission, April 2012, as a quality check to identify and resolve any potential erroneous discrepancies between the two products.

PUBLIC VERIFICATION

The broadband interactive map has been released to the public, which includes functionality to collect feedback on the provider's coverage areas, as well as running a speed test. The feedback and speed results are collected and reviewed with the providers prior to the next data submissions to identify if any map refinement is required.

The public website can be viewed at the following hyperlink:

http://gubb.broadmap.com/PublicMap/

CONFIDENCE VALUES

All verification, validation and manual quality review results are tracked by provider/technology type and stored and maintained within a **Validation table**. A confidence value is assigned, based on internal assessments of the collected information, to highlight the provider coverage areas and/or attributions that would benefit from further investigation and/or enhancements.

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will continue to be utilized further to identify specific areas in need of attention.

QUALITY CONTROL

Following collection, processing and analysis of the provider and CAI data, the product is checked manually and algorithmically against the NTIA data model. Some of the items included within these checks are:

- Format correctness;
- Table and field structure;
- Valid values, including default values, where applicable;
- Geographic extent and topology errors.

Prior to data submission, another quality control script supplied by NTIA is run. This script, SBDD_CheckSubmission.py, creates an output in text form that is required to be submitted along with the final deliverable. All errors must come up clean, unless otherwise specified by NTIA.

DETAILED PROCESS REVIEW

To review the detailed process, please review the attached object:

BMap_ProcessDetails_2012_10_01.docx

Methodology Guidance

The white paper should:

1. Effectively describe the deliverable data;
2. Effectively describe the data collection process;
3. Effectively describe the verification process.

1. Data Description Provide a general description / summary of data submission including file names and a brief description of each dataset.

Contents of the data submission folder:

1. Data Transfer Model (HI_SBDD_2012_10_01.gdb)

Description: This data submission follows FCC/NTIA guidelines including Metadata for the project.
The SBDD File Geodatabase contains the following layers:

BB_Service_Address	4 Records
BB_Service_Road_Segment	6,576 Records
BB_Service_CensusBlock	16,158 Records
BB_Service_CAInstitutions	1,306 Records
BB_Service_Wireless	15 Records
BB_Service_Overview	0 Records
BB_ConnectionPoint_LastMile	119 Records
BB_ConnectionPoint_MiddleMile	1 Records

2. Data Package Report (HI_DataPackage_2012_10_01.xlsx)

Description: This is the NTIA “datapackage.xls” spreadsheet that is used to document the data submission.

3. Data Submission Receipt (HI_2012_10_01.txt)

Description: This is the submission receipt from the NTIA receipt tool.

4. Methodology Paper (HI_Methodology_2012_10_01.pdf)

Description: This is the methodology guidance document requested by NTIA to document the data submission. Page 1 of 6 (this document)

5. ReadMe.txt (HI_ReadMe_2012_10_01.pdf)

Description: This is the ReadMe that contains the explanation of any failures or warnings that we received in running the submission script.

6. Changes and Corrections (HI_Changes_and_Corrections_2012_10_01.pdf)

Description: This is the NTIA "Changes and Corrections" document that is used to describe the changes and corrections to the data submission.

2. Provider Participation Provide a summary of provider cooperation (datapackage.xls).

The project team has been collecting and processing broadband data from twelve (12) providers (Oceanic Time Warner Cable, Hawaiian Telcom Communications, Inc., Clearwire Corp.,TW Telecom Holdings, Inc., Verizon Communications, Inc., Sprint Nextel, AT&T Inc., MOBI PCS, T-Mobile USA, Inc., Sandwich Isles Communications, Inc., BlueStreak Broadband, Inc. and Skycaster). These twelve (12) providers account for the overwhelming majority of actual broadband subscribers in Hawaii. The project team has identified 3 additional providers which would bring the total providers to 15. The following providers have been identified as:
-Pacific Light Net, Inc. dba/Wavecom Solutions, VIASAT dba/ Big Island Satellite, and Starband but the team has not yet received from these providers.

Hawaii Department of Commerce and Consumer Affairs ("DCCA") has encountered challenges in fully executing NDAs with providers and subcontracts under the grant. This has affected the signing of certain NDAs with data providers as well as subcontracts dealing with data processing and delivery. Subsequently, throughout this term, DCCA has experienced some delays in obtaining necessary information. However, to-date DCCA has been able to process data representing the overwhelming majority of broadband providers in the State of Hawaii. – DCCA continues to overcome these challenges through cooperation between the parties and improving process expediency. Eleven (11) of the twelve (12) Providers identified have executed confidentiality agreements for data sharing.

Hawaiian Telcom Communications, Inc. and Oceanic Time Warner Cable: Last-mile and middle-mile facility capacity and more specifically backhaul from the facilities are deemed proprietary. Further, providers maintain that they do not have information documented in a form that they would be able to easily provide. No information regarding this has been shared to-date by these providers. DCCA is working to compel these Providers to furnish more detailed information.

Clearwire Corp., Sandwich Isles Communications, Inc., BlueStreak Broadband, Inc. , TW Telecom and MOBI PCS did not provide new data updates for the Fall 2012 data delivery. However, BlueStreak Broadband, Inc. and MOBI PCS verified the existing coverage was accurate and there was no need for Fall 2012 data update. MOBI PCS did state that they are in the process of expanding their service area and will provide that data in their next data submission.

Three satellites broadband providers were identify but only one provider, Skycaster, provided data. Additional data obtained via provider websites are as follows:

- Hughes (aka Hughes Net) - is not offered in Hawaii.
- VIASAT -does offer broadband through a local company called "Big Island Satellite". They offer service for Maui County (Maui, Lanai, and Molokai) and Oahu. Their maximum advertised speeds are up to 12Mbps Downstream/3Mbps Upstream. Most of their business is in Hawaii County.

- StarBand –advertises 0.5Mbps to 1Mbps Downstream and 0.07Mbps to 0.256Mbps Upstream. They have declared that they cover all Hawaii Islands.
- Skycaster has declared that they cover all of Hawaii. Their data has been included in this submission.

The project team continues to verify these coverage areas and broadband speed claims as well as to collect data from other providers as they are identified.

The most recent iteration of updated and verified mapping data was submitted to NTIA on October 1, 2012 in accordance with the latest FCC/NTIA broadband data model.

3. Data Collection and Integration

a. Primary Data Collection describes the data collection process and list any surveys distributed to retrieve data.
Data was obtained by working with Providers (phone conference calls and email) to get the latest information at the most detailed level possible. The team furnished Providers with a data request including the latest table specifications via email that included the specific information needed for the project. All other terrestrial broadband Providers maintained census block level detail. Wireless providers submitted RF propagation polygons illustrating coverage.

Broadband coverage data for Hawaiian Telcom Communications has been extrapolated as a one-mile buffer from each Central Office location. For every other provider, the DCCA has obtained census block level information and coverage footprints from the wireless providers. Since the data is being provided at the census block level or via a coverage footprint from wireless providers, exact levels of service provided within these boundaries in some cases has been limited to a single tier of service per census block or wireless footprint. TW Telecom has furnished customer addresses which have been geocoded and inserted into the FCC file geodatabase model as appropriate. We have received information from the public via the hibroadbandmap.org website, stating that fiber to the premise existed for Hawaiian Telcom Communications, Inc. at a few addresses which were verified with the provider and added to the database.

A very small amount of address level detail from Providers has been submitted for this data submission. For wireless providers, the project team is requesting more detailed RF propagation maps, tower locations, and greater detail on wireless service coverage and technology. Further, the project team will be analyzing and adjusting existing census block data to fit within Tax Map Key (TMK) boundaries in an effort to increase the accuracy of the stated data coverage areas for use on the State's broadband website and for planning purposes.

b. Community Anchor Institutions Summarize Community Anchor Institutions by type, describe your data collection process, and list any surveys distributed to retrieve data.
The baseline Community Anchor Institutions database has been amended, updated and verified. The Community Anchor Institutions database is composed of 1,306 points that include:

Schools – K through 12 (public and private)	367
Libraries	56
Medical/Healthcare	212

Public Safety	95
Universities, Colleges, other Post-Secondary (public and private)	44
Other Community Support – Nongovernmental (Hotels, Resorts, Other)	532

The data was collected from various State databases (i.e. Schools, Libraries, Public Safety), and from InfoUSA data downloads. Data was verified by personal telephone calls and information collected from websites. No surveys were distributed. The project team plans to include restaurant lounges, malls and coffee shops with advertised free Wi-Fi in the next deliverable, as well as, continue with telephone verification to obtain more information from CAI's.

For this data submission we included private businesses providing free Wi-Fi services for their customers (Nongovernmental).

4. Validation

a. **Overview Provide a general summary of the validation process and methodology used**.
   See below.

b. **Business Logic Rules Define the business logic related to data validation including a clear structure or methodology used.**
   Data Excluded by Business Rules (Organized by layer)
   Broadband_Service_CensusBlock - Total Excluded: 10,674 Census Blocks
   - Excluded by Business Rule
     - The block must contain population
       - 3,433 Census Blocks – Hawaiian Telecom
       - 5,843 Census Blocks – Oceanic Time Warner Cable (20 blocks were over 2 sq miles and were converted to Road layer)
       - 414 Census Blocks – TW Telecom
       - 984 Census Blocks – Sandwich Isles Communications
     - Combination business rule for transmission technology speed combinations
       - 3 Census Blocks – TW Telecom

   Broadband_Service_RoadSegment - Total Excluded: 1,266 Segments
   - Excluded by Business Rule
     - The block must contain population
       - 734 Segments – Hawaiian Telecom
       - 47 Segments – Sandwich Isles Communications
       - 485 Segments – Oceanic Time Warner Cable

c. **Feedback Loop Describe any outreach to Broadband Providers after you processed their data.**

   We are working with providers on an ongoing basis to rectify data including the provision of coverage maps.

d. Statistical Models List and describe any statistical models used to compile and analyze the data.

None used to date.

e. 3rd Party Publicly Available Data identify all 3rd party datasets used and describe how they were used to validate the data. (3rd party datasets include American Roamer, Form 477, Form 325, etc.

- Info USA used for address validation of CAI's.
- Used updated Hawaiian Homelands boundaries.

f. Crowd Sourced Data Identify whether or not crowd sourced data was used and how the data was used for validation.

Hawaii broadband website Ookla tools are being collected on a monthly basis. The State's Broadband Speed Test (http://hawaiispeedtest.net) has been advertised and has experienced over 25,000 tests taken. The data is being analyzed to determine actual speeds versus provider stated speeds. Also, we have received email reports of unserved areas from residents using the http://www.hibroadbandmap.org website.

The project team is implementing the following verification activities:

- Coverage Verification via Website: DCCA launched a dedicated website (hibroadbandmap.org) that contains the latest information on the project as well as a speed and line test application and database for consumers to use. Additionally, consumers are able to report unserved areas on the website. – Completed December 1, 2010

- CAI Verification by Telephone: DCCA will independently verify access to broadband services by Community Anchor Institutions ("CAI") where no data currently exists via personal contact by telephone. – Ongoing

- CAI Verification by External Data Source Comparison: The project team will be collecting data from InfoUSA to verify the completeness of the CAI inventory. – Ongoing

- Provider Verification via Map Products: DCCA will present the data to the individual providers in the form of a map product, ask them to verify the results visually, and, if necessary, ask them to provide more accurate information if available. – Ongoing

- Speed Test Verification via Website: DCCA will announce the speed and line test application and website for consumers via press releases and newspaper articles to encourage subscriber participation. The database will be maintained throughout the course of the project. – Completed January 25, 2012 and Ongoing

- Speed Test Verification via FCC Ookla/MLabs: FCC databases are being collected on a monthly basis and integrated into a coverage verification layer that will also appear on the website. – Ongoing

- Provider Verification via Website: Providers will also be able to access the maps of their data through a secure portal on the website. – Ongoing

The project team's status on implementing the following verification activities:

- Coverage Verification via Website: The dedicated website (hibroadbandmap.org) was launched on December 1, 2010 and includes a customized Ookla speed test application and database for consumers to use, as well as, ESRI's BBStat application. – In Progress.
- CAI Verification by Telephone: DCCA has and will continue to verify Community Anchor Institution data via telephone. – In Progress.
- CAI Verification by External Data Source Comparison: InfoUSA data is being downloaded to augment and verify the completeness of the CAI inventory. – In Progress.
- Provider Verification via Map Products: Maps that illustrate coverage gaps are being prepared for provider review. – In Progress.
- Speed Test Verification via Website: The dedicated website (hibroadbandmap.org) launched on December 1, 2010 includes a customized Ookla speed test application and database for consumers to use, as well as, ESRI's BBStat application.– In Progress.
- Speed Test Verification via FCC Ookla/MLabs: FCC speed test data is also being integrated into an independent map layer. – In Progress.
- Provider Verification via Website: Providers will also be able to access the maps of their data through a secure portal on the website. – In Progress.

Note: These verification activities and direct updates from providers are anticipated to continue through the next data delivery date.

In addition, the project team is participating in a program sponsored by Akaku: Maui Community Television on Broadband. Our website Hibroadbandmap.org will be listed on their site and they will be requiring all students to perform daily speed tests using our Site to test as well as theirs. The team will be talking about broadband, the national and state programs and the importance of speed test accuracy. Phase 1 was complete in Dec 2011, which consisted of broadband mapping team members being interview by Akaku at their studios in Kahului, Hi. Phase 2: TBD

OFFICIAL OCTOBER 2012 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND DATA AND DEVELOPMENT GRANT PROGRAM FOR THE STATE OF IOWA

CONNECT IOWA®

October 1, 2012

TABLE OF CONTENTS

October 1, 2012

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

As the State Broadband Designated Entity, in partnership with the Iowa Economic Development Authority, please accept this submission from Connected Nation on behalf of the state of Iowa's State Broadband Initiative (SBI) Grant Program, known as Connect Iowa.

The Connect Iowa program and its collective stakeholder community continue to be faithful and energized contributors to the National Telecommunications and Information Administration's (NTIA) SBI program. Now more than ever, the significance of complete and validated data as compiled through the Federal Communications Commission's (FCC) National Broadband Map is instrumental in forging the innovation economy of the 21st century. As the Commission relies upon this unique resource to distribute monies under the Connect America Fund, through the Universal Service Fund reform, the Connect Iowa program equally values this data in informing meaningful program interventions relating to broadband access, adoption, and use initiatives. Truly, this coordination embodies the spirit of the SBI and demonstrates the joint effort of the NTIA, FCC, state governments, industry, and non-profits like Connected Nation as it continues to serve as a key tool for the American public and policymakers. We are proud of the role that Connect Iowa has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit broadband providers, consumers, and businesses nationwide.

The artifacts that comprise this submission should be found to be compliant with the October 1, 2012, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connect Iowa: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area

Appendix A:	1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles
Appendix A:	1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A:	3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A:	4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A:	4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)		n/a	Accuracy and Verification Report
n/a		DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a		n/a	List of Changes and Corrections to the Dataset
n/a		n/a	Non-Participating Provider (NPP) Narratives
n/a		n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the April 2012 SBI data submission for the Connect Iowa program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on August 9, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance
New to the semi-annual submission for October 2012 is a more robust version of the ReadMe text file. As per the template released on the Grantee Workspace on May 18, 2012, this file contains a high-level summary of the items contained within the submission, including the exact file deliverables, a description of the errors and warnings from the Check Submission report, and extraneous information of which the NTIA and other users of the dataset should be made aware.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the April 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That practice continues in this submission as technology and speed combinations are reviewed and scrutinized; any questionable information supplied by providers is reviewed more in depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

Also in this submission is a narrative describing the data and coverage estimation of a non-participating provider. While Connect Iowa continues outreach to all providers prior to each submission period, the need to submit broadband service data for all providers regardless of their participation is evident as the SBI program continues into this sixth round of data submissions. The submission of this estimated broadband service area for providers that have not supplied data to Connect Iowa is essential in being able to portray a more accurate depiction of the current broadband landscape.

In addition to the requirements mentioned above, please find this methodology paper to be inclusive of the ongoing section pertaining to industry mergers and acquisitions – specifically this section details any and all mergers or acquisitions that have taken place in Iowa since the April 2012 submission. The intent of this updated section is to provide a better understanding of how the broadband provider landscape has changed since the last submission cycle.

This October 2012 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for 98.5 percent of the Iowa provider community, or 197 of 200 total providers. There are 196 participating providers and one additional non-participating provider whose estimated coverage areas has been submitted. Of the 196 participating providers, 50 supplied an update to their network or coverage area(s), while 119 have reported no change. The remaining 27 represent providers who previously supplied data but were non-responsive in the October 2012 update effort; therefore their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact record is contained herein. Of the 3 providers that are not represented in the attached datasets, 2 have refused to participate in the voluntary program or were non-responsive to multiple contact attempts, and one provider is currently in some form of progress toward data submission but was not able to submit coverage areas at the time of this submission.

In addition to the facilities-based and middle-mile broadband providers tracked above, this submission contains datasets for three resellers that were able to provide sufficient information on their service area(s) to be included in the data transfer model.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connect Iowa principals that all commercially reasonable efforts were made to account for 100 percent of the known Iowa broadband provider community, pursuant to this semi-annual data update submission.

Connect Iowa has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Iowa conducts field validation efforts. To date, 133 (66.50 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connect Iowa website, (www.connectiowa.org), continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connect Iowa website encountered 5,426 unique visits during this reporting period (26,431 total to date for the life of the grant awarded on January 1, 2010). Additionally, this pronounced Web activity netted 13 broadband inquiries over this same reporting period (219 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connect Iowa website and the Connect Iowa interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connect Iowa mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Iowa to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connect Iowa has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

In conjunction with Iowa Economic Development Authority, outreach was conducted during this data update reporting period by Connect Iowa to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect Iowa website. During this reporting period Connect Iowa has developed a number of new relationships with statewide associations such as Iowa Library Services, Iowa Department of Public Safety, Association of Community Colleges and Iowa League of Cities, to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. It became apparent that these relationships are beneficial to the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connect Iowa will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connect Iowa has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connect Iowa is also working hard to clarify CAI information associated with wireless broadband. NTIA has requested in-depth questioning of CAI listing a wireless broadband service as their sole form of connectivity. This follow-up allows us to better understand the reason for adopting the wireless broadband service.

From our work in Iowa, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connect Iowa efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connect Iowa program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Iowa, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,

Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

DATA ACQUISITION: IOWA COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this sixth reporting period of the SBI, Connect Iowa, working in close coordination with the state of Iowa, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connect Iowa has continued to identify and process CAI data obtained through an ongoing statewide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connect Iowa through Esri ArcGIS software.

Connect Iowa continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connect Iowa website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the state as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the state client. Connect Iowa will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link:
http://www.surveymonkey.com/s/RRZ9KHC

In addition to the survey, Connect Iowa has developed a number of new relationships with statewide associations such as Association of Community Colleges, Iowa Department of Public Safety, Iowa League of Cities, and Iowa Library Services, to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connect Iowa will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connect Iowa has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connect Iowa conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect Iowa continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect Iowa works with the Iowa Economic Development Authority to identify existing relationships that can support CAI outreach.

Connect Iowa has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Iowa project as well as self-awareness of their own CAI connectivity (specifically upload and download speeds). Connect Iowa will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the Iowa Economic Development Authority will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the state.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	1853	1853	1844	121	121	123
Libraries	602	602	600	313	399	233
Healthcare	177	177	177	68	60	60
Public Safety	1,174	1,174	1,170	73	65	66
Higher Ed Institutions	105	105	102	30	30	30
Other Government	678	678	676	297	251	280
Other Non-Government	3	3	3	1	2	2
Total	4,592	4,592	4,572	903	928	794

During the coming months, CAI data collection will be supported by regular reporting to the Connect Iowa team. The CAI data is proving an invaluable resource to all components of the Connect Iowa effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on August 9, 2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.

Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the state of Iowa.

Inventory of Deliverables, Connect Iowa: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the state of Iowa have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Iowa as a polygon of the state boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development is underway at CN as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

DATASETS FOR IN-KIND MATCH

Connect Iowa received a listing of Community Anchor Institution (CAI) addresses and technology data from the Iowa Communications Network as part of an in-kind match contribution to assist Connect Iowa with its mapping and planning goals - $25.

IOWA FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets and Trips;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and
- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff conducted on-site validation tests in Iowa on the following providers: Ace Telephone Association; Algona Municipal Utilities; Alliance Communications; Alpine Communications; Ambercomm; AT&T Inc.; Atkins Telephone; Aventure Communications; Ayrshire Farms Mutual Telephone Company; Bitwind Communications LLC; Brooklyn Mutual

Telecommunications Cooperative; Butler-Bremer; Cable ONE Inc.; Casey Mutual Telephone Company; Cedar Falls Utilities; Central Scott Telephone; CenturyLink (acquired Qwest Corporation); Chat Mobility; Circle Computer Resources (d.b.a. Cramer IT); Citizens Mutual Telephone Cooperative; City of Hawarden; Clarence Telephone Company; Clearwire Corporation; CML Telephone Cooperative Association of Meriden, Iowa; Colo Telephone Company; Community Cable Television Agency of O'Brien County; Community Digital Wireless; Complete Communication Services; Coon Rapids Municipal; Coon Valley Cooperative Telephone; Cooperative Telephone Company; Cooperative Telephone Exchange; Cornbelt Telephone; Cumberland Telephone; Danville Mutual Telephone Company; East Buchanan Telephone Cooperative; Ellsworth Cooperative Telephone Exchange; Evertek Enterprises; Farmers & Merchants Mutual Telephone Company; Farmers Cooperative Telephone Company-Dysart; Farmers Mutual Cooperative Telephone Company – Harlan; Farmers Mutual Telephone Company-Jesup; Farmers Telephone Company-Essex (also d.b.a. Heartland Net); Farmers Mutual Telephone of Stanton; Fenton Co-Op Telephone Company; FiberComm LC; Frontier Communications Corporation; Goldfield Access Network; Grand Mound Cooperative; Grand River Mutual Telephone Corporation; Griswold Cooperative Telephone; Grundy Center Municipal Utilities; Harlan Municipal Utilities; Hickory Tech; Hubbard Cooperative Telephone Association and Cable; Huxley Communications Cooperative; I-35 Telephone Company; IAMO Telephone Company; ImOn Communications; Internet Consulting Services LLC; Internet Solver, Inc.; Iowa Telecom Service Inc.; JAB Wireless (formerly d.b.a. KeyOn Communications, Dynamic Broadband); Jefferson Telephone Company; Junction Telephone; Kalona Cooperative Telephone Company; KDSC Inc.; Killduff Telephone; LaPorte City Telephone Company; Laurens Municipal Communications Utility; Leap Wireless International; Lenox Municipal Utilities; LoganNet; Lone Rock Cooperative Telephone Company; Long Lines; Mahaska Communications Group; Manning Municipal; Marne and Elkhorn Telephone; Martelle Telephone; Massena Telephone Company; MCC Iowa (d.b.a. Mediacom Iowa LLC); Mediapolis Telephone Company; MidIowa Net; Millford Cable TV Inc.; Minburn Communications; Minerva Valley Telephone Cablevision, Inc.; Muscatine Power & Water (d.b.a. MachLink); Mutual Telephone Company; Mutual Telephone Company of Morning Sun Iowa; NetConx; Nexgen Integrated Communications, LLC; Northern Iowa Telephone Company; Northwest Telephone Company; Ogden Telephone Company; Panora Communications Cooperative; Partner Communications Cooperative; Prairie iNet; Premier Communications; Radcliffe Telephone Company, Inc.; Readlyn Telephone; Reasnor Telephone; RingTel Communications; River Valley Telecommunications Coop.; Royal Telephone Company; Ruralwaves Wireless Internet; Sac County Mutual Telephone; Scranton Telephone Company; Sharon Telephone Company; SpeedNet LLC; Spencer Municipal Utilities; Sprint Nextel Corporation; Sully Telephone Association; Superior Telephone Cooperative; Swisher Telephone; Templeton Telephone Company; Terril Telephone Cooperative; T-Mobile USA; Traer Municipal Utilities; U.S. Cellular; USA Communications (d.b.a. Farmers Mutual Telephone Cooperative-Shellsburg); Van Buren Telephone Company Inc.; Verizon Communications Inc.; Villisca Farmers Telephone Company; Walnut Telephone Company; Webster-Calhoun-Cooper Telephone Association; Wellman Cooperative Telephone Association; West Liberty Telephone Company (also d.b.a. Cloudburst 9 LLC and Liberty Communications); Western Iowa Networks; Western Iowa Telephone Association; Windstream (d.b.a. Iowa Telecom Services); Woolstock Mutual Telephone; and WTC Communications, Inc.

In addition to the field verification tests that have been conducted, Connected Nation has also conducted work in the field to collect information for the Non-Participating Provider RuralWaves Wireless Internet, which, by nature of the methodology required for this collection, is also included in the above list.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 133 companies (out of a universe of 200 viable providers) totaling 66.50 percent within the state of Iowa. This percentage also considers the non-participating provider (NPP) records submitted to NTIA for RuralWaves Wireless Internet as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Provider" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on August 9, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

Alpine Communications, LC
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

Package	Speed	Monthly Prices
Silver	Up to 300 kbps	$28.95
Fusion Gold	**Up to 6MB/500kbps**	**$39.95**
Gold	Up to 3MB/512kbps	$39.95
Fusion Platinum	**Up to 12MB/1MB**	**$49.95**
Platinum	Up to 6 MB/512kpbs	$49.95
Fusion Diamond	**Up to 15MB/3MB**	**$99.95**
Diamond	Up to 12MB/1MB	$99.95

Blue Earth Valley Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

Surf the Internet at speeds from 1Mb to 15Mb/second. All plans allow for multiple users at the same location, business or residential. Stop wasting time waiting for web sites and files to download and see the benefits of BEVCOMM High Speed Internet today!

BTC, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

Community 256K 1Mbps 3Mbps 5Mbps 8Mbps 10Mbps 12Mbps

Cascade Communications Group
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

ZOOM WARP SPEED
Up to 1 Mbps Upload/12 Mbps Download
For just $64.95/month*

Central Scott Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps service; screenshot below.

Residential High-Speed Internet Service

Connection speeds up to 20 Mbps

CenturyTel, Inc.
Issue: DSL platform with maximum advertised download speed in tiers 7, 8, and 10, higher than expected value range for the technology.
Resolution: Provider website advertises 25 and 40 Mbps service; screenshot below.

Farmers Mutual Telephone – Stanton
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 mbps service; screenshot below.

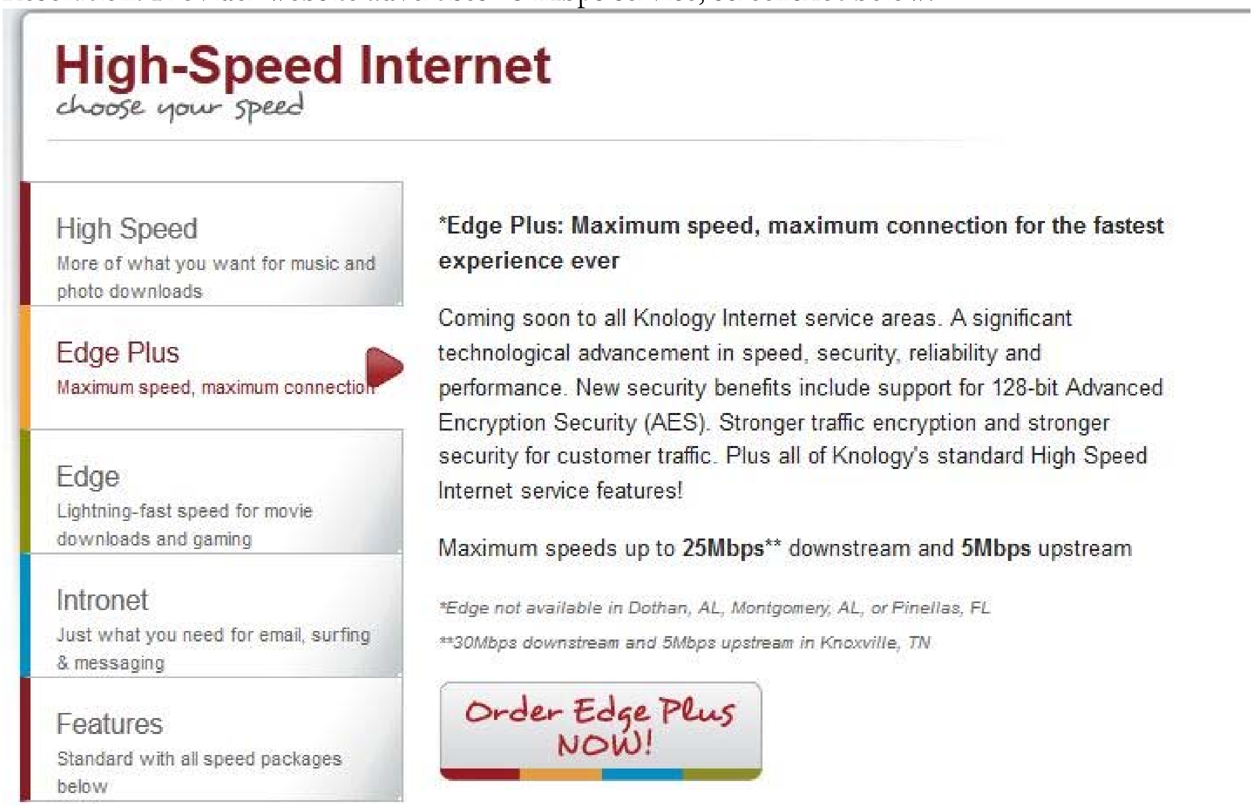
10 Mb and customer speeds are also available. Call for details!

Farmers Mutual Telephone – Nora Springs
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider confirmed that they offer tier 8 speeds on DOCSIS 3.0.

Hawkeye Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider confirmed that 12 Mbps service is available, but speeds are not advertised on the website.

Jab Wireless
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider confirmation was not received prior to submission; Jab Wireless acquired the KeyOn service area and neither advertises the speeds on their websites.

Knology of the Plains, Inc.
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below.



La Motte Telephone Company, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider confirmed that 10 Mbps service is available, but they have not updated their website yet.

Marne & Elk Horn Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider confirmed that 10 Mbps service is available, but they do not advertise it on their website.

Northern Iowa Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

Download	128K	3 Meg	8 Meg	15 Meg
Upload	128K	384K	512K	1 meg
Static IP	$10.00	$10.00	$10.00	$10.00
Filtering	$2.00	$2.00	$2.00	$2.00

Osage Municipal Utilities
Issue: Technology of transmission code 41 with maximum advertised download speed in tier 8, higher than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below.

Speed	Residential	Business
Lite (1 mbps/512 kbps)	$29.95	$29.95
Plus (10/2 mbps)	$45.95	$55.95
Premium (15/4 mbps)	$65.95	$75.95
Extreme (25/10 mpbs)	$99.95	$249.95

Palmer Mutual Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

Monthly Fee - Residential 10 Mb (Residential customers ONLY)	**$44.95**

Peoples Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

10 Mbps	$59.95
10 MBps + NU-Basic TV	$71.90
10 Mbps + NU-Entertainment TV	$104.90
10 Mbps + NU-Variety TV	$109.90

River Valley Telecommunications Coop
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative confirmed that tier 7 service is available, but they are in the process of updating their website to reflect the upgraded speeds.

Spiral Solution and Technologies
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

Extreme

$49.99 per month

10.0 mbps download speed

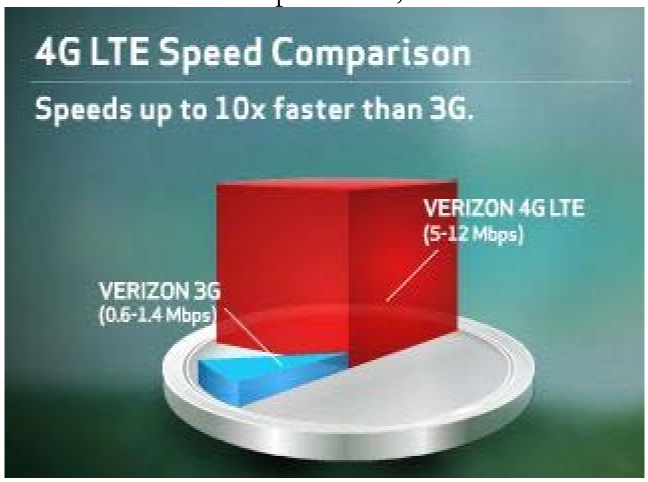
3.0 mbps upload speed

T-Mobile USA, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website confirms that download speeds greater than tier 6 are available; screenshot below.

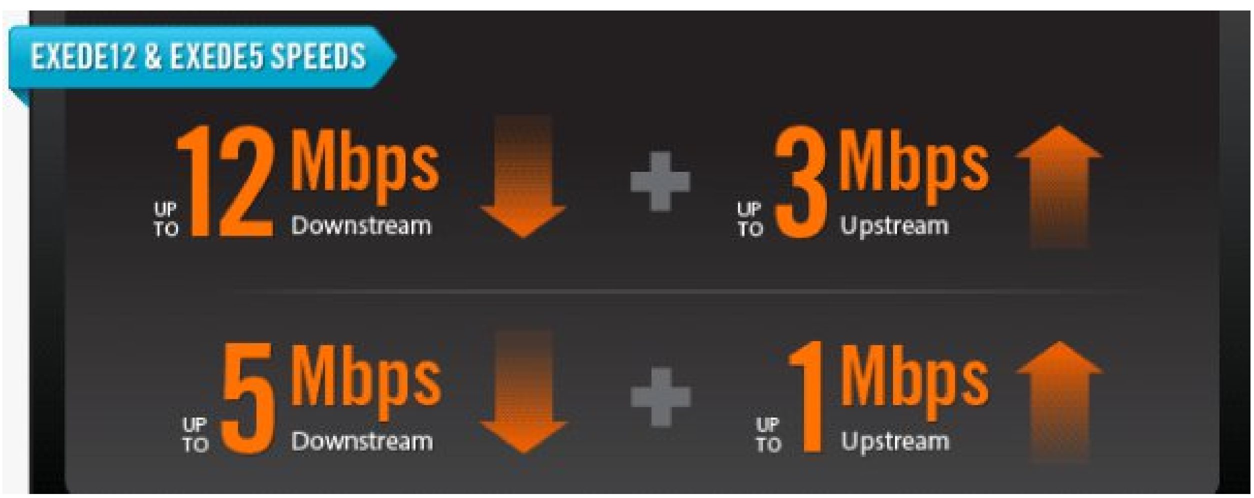
T-Mobile customers with 4G phones are already experiencing data speeds that are comparable to or faster than the speed of a home broadband network. And with recent improvements to our 4G network-doubling our theoretical download speeds-we're giving our customers enhanced 4G data speeds. We've seen average download speeds on our HSPA+ 42 Mbps-capable data stick approaching 10 Mbps with peak speeds of 27 Mbps, and download speeds approaching 8 Mbps with peak speeds of 20 Mbps on our upcoming HSPA+ 42 Mbps-capable smartphones.

Terril Telephone Cooperative
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Confirmed with provider that tier 7 service is available, but website has not yet been updated.

Verizon Wireless
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.



ViaSat, Inc.
Issue: Satellite platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.



West Iowa Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps service; screenshot below.

RURAL AREAS

	Breeze	Zip	Whiz	WOW	Crusin'	Bazinga
Download Speeds Up To	128 kbps	1.5MB	3MB	5MB	10MB	20MB
Upload Speeds Up To	64 kbps	768 kbps	1.5MB	2.5MB	2.5MB	2.5MB

Windstream
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

See which of our speeds matches your online activities. Choose the right Internet speed (WATCH VIDEO)	3 Mbps (Basic Use)	6 Mbps (Most Popular)	12 Mbps (Fastest Option)

WTC Communications, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

Here are our new Internet speeds and pricing:

Download	Upload	Price
1 Mbps	512K	34.95
5 Mbps	1 Mbps	49.95
7 Mbps	1 Mbps	64.95
10 Mbps	2 Mbps	79.95

Data Submission and Coverage Estimation of Non-Participating Provider

As part of its ongoing broadband mapping efforts, CN has developed a series of processes with the goal of submitting coverage estimation mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of platform type (cable modem, DSL, fixed wireless, etc.). This state specific collection of coverage estimation methodology papers (see Appendix A) demonstrates the estimated broadband service territory for the providers in this state that have either been non-responsive or that have refused to participate in the SBI mapping initiative.

Accuracy and Verification: Provider Validation Methodology

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a statewide level, static maps of statewide and county-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Additionally, non-participating provider narratives that were submitted in previous mapping cycles are subjected to the same level of scrutiny. Occasionally, a provider may elect to voluntarily participate (thus eliminating the need for future data estimation activities in the field). However, more often than not, the NPP narrative is updated with a combination of data gleaned from the provider's website, data obtained through FCC research and/or data collected/verified in the field by a CN staff engineer.

Estimates derived from provider-validated data indicate that approximately 2.02 percent of Iowa households do not have terrestrial fixed broadband service available, and approximately 0.01 percent of Iowa households have neither mobile nor fixed broadband service available.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 3.65 percent of rural Iowa households do not have terrestrial fixed broadband service available, and approximately 0.01 percent of rural Iowa households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard. This research often proves to be exceptionally effective when estimating the coverage area of an NPP.
6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).

10. Antenna pattern (e.g. omni-directional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).
15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).
23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hillshade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

BROADBAND INQUIRIES METHODOLOGY

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connect Iowa website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information requested by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at other such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,600 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connect Iowa project has received a total of 13 inquiries (219 grant inception to date). As more inquiries are submitted to Connect Iowa, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

MY CONNECTVIEW METHODOLOGY

My ConnectView is an online, interactive mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connect Iowa project launched My ConnectView on April 2, 2012, and has received 1,599 visits this reporting period; to date the interactive mapping applications have received 8,033 visits.

Speed Test Methodology

The 784 speed tests that are represented in the Connect Iowa Speed Test Report during this reporting period (5,347 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Iowa speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connect Iowa project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connect Iowa with the information on where broadband services are available. Second, unlike theoretical speed information which was received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the state of Iowa.

Providers Deemed Non-Viable

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the October 2012 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	21Globe, Inc.	n/a	This company is not a broadband provider.
2	360networks	http://www.360networks.com	Acquired by another company.
3	650Net	n/a	This company is not a broadband provider.
4	A 007 Access	n/a	This company is a nonfacilities-based reseller.
5	AAA Internet Service	n/a	This company is no longer in business.
6	Aaccess Network Communications	n/a	This company is not a broadband provider.
7	Access Media 3, Inc.	n/a	This company has no service offerings in Iowa.
8	Access123.net	n/a	This company is not a broadband provider.
9	ACERX.NET	n/a	This company is not a broadband provider.
10	Affinity Wireless Solutions, LLC	n/a	This company was acquired by KeyOn Communications.
11	Airespring, Inc.	http://www.airespring.com/	This company is a nonfacilities-based reseller.
12	Airewaves Broadband, LLC	n/a	This company is no longer in business.
13	AirNet	n/a	This company is no longer in business.
14	American Relay	n/a	This company is not a broadband provider.
15	Arrowheadnet.com	n/a	This company is not a broadband provider.
16	Bannon Communications	n/a	This company is not a broadband provider.
17	bargainisp.net	n/a	This company is not a broadband provider.
18	Barnes City Cooperative Telephone Company	n/a	This company is not a broadband provider.
19	Bel-Net Network Services	n/a	This company is no longer in business
20	Broadband National	http://www.broadbandnational.com/	This company is not a broadband provider
21	BTC	n/a	This company was acquired by Western Iowa Networks.
22	Cable Television	n/a	This company is no longer in business.
23	Calhoun County Electric Co-Op	n/a	This company is not a broadband provider.
24	Camino-Net Internet Services	n/a	This company is not a broadband provider.
25	Cannon Valley Telecom, Inc.	n/a	This company does business in MN.
26	Celito Communications	n/a	This company has no service offerings in Iowa
27	cFree Wireless Network	n/a	This company is no longer in business.
28	CFY-CyberNet	n/a	This company is doing business as Cedar Falls

			Utilities.
29	City of Brookings Telephone Fund	http://www.swiftel.net/	This company is a nonfacilities-based reseller of Sprint.
30	Cleartouch.Com	n/a	This company is no longer in business.
31	Com Link	n/a	This company is no longer in business.
32	CommSpeed Iowa, L.L.C.	n/a	This company was acquired by SpeedNet, LLC.
33	Community Internet Service	n/a	This company is no longer in business.
34	Covad Communications	n/a	This company has no service offerings in Iowa.
35	CyberStorm Wireless	n/a	This company is no longer in business.
36	Deltaforce	n/a	This company is not a broadband provider.
37	deluxehost.com	n/a	This company is not a broadband provider.
38	DGUI	n/a	This company is no longer in business.
39	Dial National	n/a	This company is no longer in business.
40	Dialer.net	n/a	This company is not a broadband provider.
41	Digital Telecommunications, Inc.	n/a	This company is no longer in business.
42	DSL @ Interlync	http://www.interlync.com/	This company is a nonfacilities-based reseller.
43	DTS-NET.COM	n/a	This company is a nonfacilities-based reseller.
44	Dura Cable	n/a	This company is not a broadband provider.
45	Farmers Telephone Company - Batavia	http://www.bataviatelephone.com	This company offers service but it is below the FCC definition of broadband.
46	Fast Dependable Access	n/a	This company is no longer in business.
47	Forbin Wireless	http://www.forbin.net/	This company offers service but it is below the FCC definition of broadband.
48	fyreSTORM Wireless	n/a	This company is no longer in business.
49	Global Crossing Telecommunications, Inc.	http://www.globalcrossing.com	Acquired by another company.
50	Great Lakes Communication Corp.	http://www.glccom.com	This company offers service but it is below the FCC definition of broadband.
51	Hubwest	n/a	This company is not a broadband provider.
52	Hubwest Protected Networks LLC	n/a	This company is not a broadband provider.
53	I Spot ACCESS	n/a	This company is not a broadband provider.
54	Imbris, Inc.	n/a	This company is no longer in business.
55	IMGISP.NET	n/a	This company is not a broadband provider.
56	Incredible Networks	n/a	This company is no longer in business.
57	Indianola Municipal	n/a	This company is not a broadband provider.

	Utilities		
58	Inercom Communications, Inc.	n/a	This company is no longer in business.
59	Interactiveinfo.com Inc.	n/a	This company does business in New York and has no service offerings in Iowa.
60	Inter-County Cable Company	n/a	This company is doing business as Brooklyn Mutual Telecommunications Cooperative.
61	Interlink LC	n/a	This company is no longer in business.
62	Iowa Cable and Telecommunications Association	n/a	This company is not a broadband provider.
63	Iowa City Telecommunications	n/a	This company is not a broadband provider.
64	IowaOne.net	n/a	This company is no longer in business.
65	IPNS	n/a	This company does business in Oregon and has no service offerings in Iowa.
66	iRadical	n/a	No information found for this company.
67	i-rule.net	n/a	This company is no longer in business.
68	ISPartner.net	n/a	No information found for this company.
69	Jenco Speed Web	n/a	This company offers fixed wireless in Ohio and has no service offerings in Iowa.
70	LCSisp.com	n/a	This company is not a broadband provider.
71	LightEdge Solutions, Inc.	n/a	This company is not a broadband provider.
72	Lightyear Network Solutions, LLC	http://lightyear.net/	This company is a nonfacilities-based reseller.
73	Local Link	n/a	This company has no service offerings in Iowa.
74	Longview Communications	n/a	This company has no service offerings in Iowa.
75	MainBoard	n/a	This company has no service offerings in Iowa.
76	Maine Cable and Wireless	n/a	No information found for this company.
77	Manilla Telephone Company	n/a	This company was acquired by Farmers Mutual Telephone Cooperative of Harlan, IA.
78	Maple Leaf Networks	n/a	This company has no service offerings in Iowa.
79	Marcin Company	n/a	No information found for this company.
80	Metropolitan Telecommunications Holding Company	n/a	This company is a nonfacilities-based reseller.
81	MFW Cable	n/a	This company is not a broadband provider.
82	Millenicom Inc.	http://www.millenicom.com/	This company is a nonfacilities-based reseller.
83	Nanomega.Com	n/a	This company is no longer in business.
84	NetAccess, Inc.	n/a	This company is not a broadband provider.
85	NetSpeed Online	n/a	This company is no longer in business

86	New Century Telecommunications	n/a	This company is not a broadband provider.
87	New Edge Network, Inc.	n/a	Acquired by another company.
88	Northwest Internet Services	n/a	This company has no service offerings in Iowa.
89	Northwest ISP	n/a	This company is no longer in business
90	One Communications Corporation	n/a	Acquired by another company.
91	Oneota Net	http://www.oneota.net/wirelessdsl.shtml	This company offers service but it is below the FCC definition of broadband.
92	OpenCom, Inc.	n/a	This company is a nonfacilities-based reseller
93	OrbitCom, Inc.	n/a	This company is a nonfacilities-based reseller
94	Overarch Broadband	n/a	This company has no service offerings in Iowa.
95	Pacific Internet Exchange	n/a	This company is a nonfacilities-based reseller
96	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company.
97	Prairie Communication	n/a	This company is no longer in business.
98	Prairie Fire Internet	n/a	This company is no longer in business.
99	PremoWeb	n/a	This company is not a broadband provider.
100	Professional Computer Solutions	http://www.pcsia.net	This company offers service but it is below the FCC definition of broadband.
101	Quad-Cities Online Broadband Plus	n/a	This company is not a broadband provider
102	RACOM	n/a	This company is not a broadband provider.
103	Rankin Communication Systems	n/a	This company is not a broadband provider.
104	RockRapids.net	n/a	This company is not a broadband provider.
105	S & S Wireless Internet	n/a	This company is no longer in business.
106	Siebring-Kruss Wireless	n/a	This company is no longer in business.
107	Simply Dialup A Metrogeek Company	n/a	This company is not a broadband provider
108	SIRIS	n/a	This company is not a broadband provider.
109	Sling Broadband	n/a	This company has no service offerings in Iowa.
110	Sparkplug Central, Inc.	n/a	This company was acquired by Airband Communications.
111	Speakeasy DSL	n/a	This company is a backhaul provider and a general reseller of DSL; part of a 2010 merger between Covad, Megapath, and Speakeasy.
112	State Wireless	n/a	This company is not a broadband provider.
113	Support Corps of America	n/a	This company is no longer in business.
114	Surferz.Net	n/a	This company is not a broadband provider.

115	T1 Shopper	http://www.t1shopper.com/	This company is not a broadband provider.
116	Total Access Networks, Inc.	n/a	This company is not a broadband provider.
117	TRX, Inc.	n/a	This company is not a broadband provider.
118	TSISP.NET	n/a	This company is no longer in business.
119	Twin Rivers Valley	n/a	This company is no longer in business.
120	United Western Net	n/a	This company is no longer in business.
121	UNUM Telecommunications, Inc.	n/a	This company is no longer in business.
122	VPM Global Internet Services, Inc.	n/a	This company is a nonfacilities-based reseller.
123	WilTel Communications, LLC	n/a	This company was acquired by Level 3 Communications.
124	Wireless Roanoke, Inc.	n/a	This company is no longer in business.
125	wisbin	n/a	This company is not a broadband provider.
126	WispAir	n/a	This company is no longer in business.
127	www.AmericanAngel.us	n/a	This company is no longer in business.
128	YEYZOO.NET	n/a	This company is no longer in business.
129	YLISP (Your Local ISP)	n/a	This company is not a broadband provider.
130	YourT1Wifi.com	n/a	This company has no service offerings in Iowa.

Appendix A: Estimation of Non-Participating Provider: Rural Waves, LLC

RURALWAVES, LLC

As part of its ongoing broadband mapping efforts, Connected Nation has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) program.

The following narrative provides detail regarding the ongoing data collection and coverage estimation activities related to RuralWaves, LLC (RW) a wireless Internet service provider (WISP), located in Correctionville, Iowa with a service area around Galva, Holstein, Schaller, Early, Correctionville, Washta, Battle Creek, and Anthony, Iowa. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation and site verification techniques that support the underlying data.

Background
CN staff members attempted to obtain the participation of the provider with 25 instances of communication (via telephone and e-mail between April 8, 2010, and December 5, 2011). During the period from May 1, 2012 through August 13, 2012, 7 additional attempts were made to contact the provider; no responses were received.

The Issue
RW by its lack of responsiveness since April 8, 2010, has predicated its unwillingness to participate in the Connect Iowa broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing
CN began has built a file based on research information from the public domain (e.g. provider's website, etc.) and, as time progressed, enriched the file with information obtained through on-the-ground data collection, site verification, and coverage estimation exercises. For example, CN reviewed the provider's website (www.ruralwaves.us) and called the RW office to determine the residential service plans **(Exhibit A)** as 1 Mbps download x 256 kbps upload of the providers' service area **(Exhibit B)**. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0016095986 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any spectrum authorizations that may be held by the provider that could supplement the dataset of estimated coverage by isolating and identifying active wireless access points for the service area. This process yielded a 3650 MHz license for Station WQKB927 **(Exhibit D)**, Radio Service: NN-3650-3700MHZ with 0 unique locations. Research conducted during this mapping cycle indicates that there has been no change to the provider's service area or maximum advertised speeds.

Exhibit A: Service Plans

CLIENT_CITY	ISP	TEST_DATE	SERVER_N	DOWNLOA	UPLOAD_	LATENCY	ZIP_CODE	LOCATION	COUNTY	ADDRESS	CITY
Correctionville	Long Lines Internet	5/18/2010 08:54:17 CDT	Chicago	1422	495	30	51004	Work	Woodbury	301 E Main St	Anthon
Correctionville	Qwest Communications	5/3/2010 14:38:38 CDT	Chicago	505	240	57	51016	Work	woodbury	312 driftwood street	correctionville
Schaller	netINS	5/18/2010 14:32:44 CDT	Chicago	509	498	26	51020	Work	ida	116 S. Main St.	Galva
Schaller	netINS	5/17/2010 10:16:04 CDT	Chicago	1988	525	30	51338	Work	Clay	202 N. Main St.	Everly
Washta	Qwest Communications	4/23/2010 17:31:40 CDT	Chicago	588	241	61	51016	Home	Woodbury	1488 Lenox Ave	Correctionville
Washta	Qwest Communications	5/12/2010 20:52:12 CDT	Chicago	504	79	89	51048	Home	cherokee	231 650th	pierson

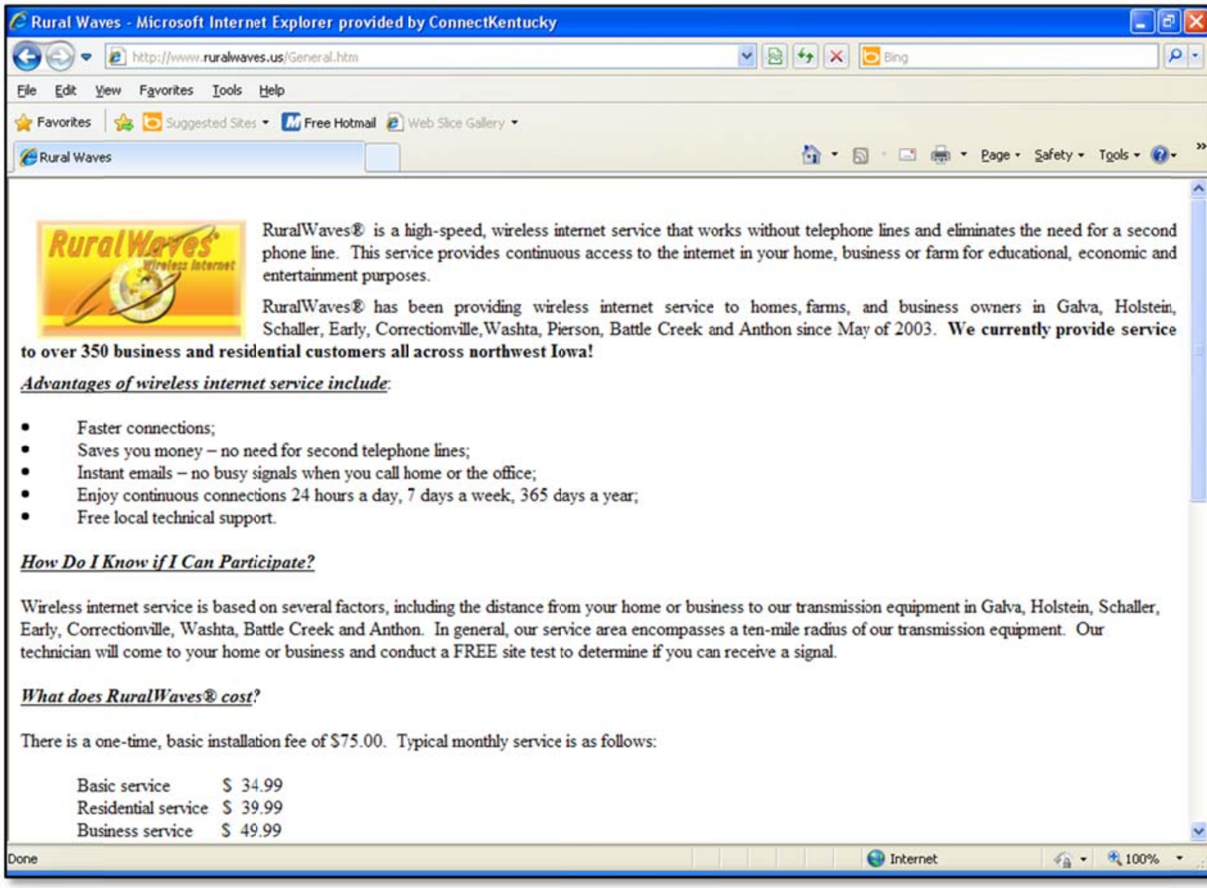


Exhibit B: Service Area

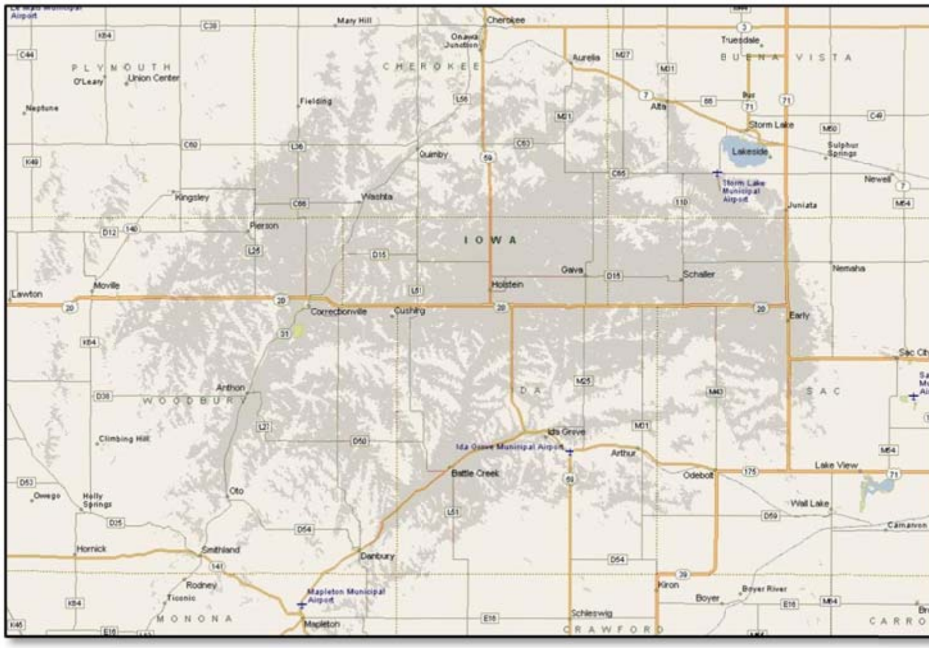
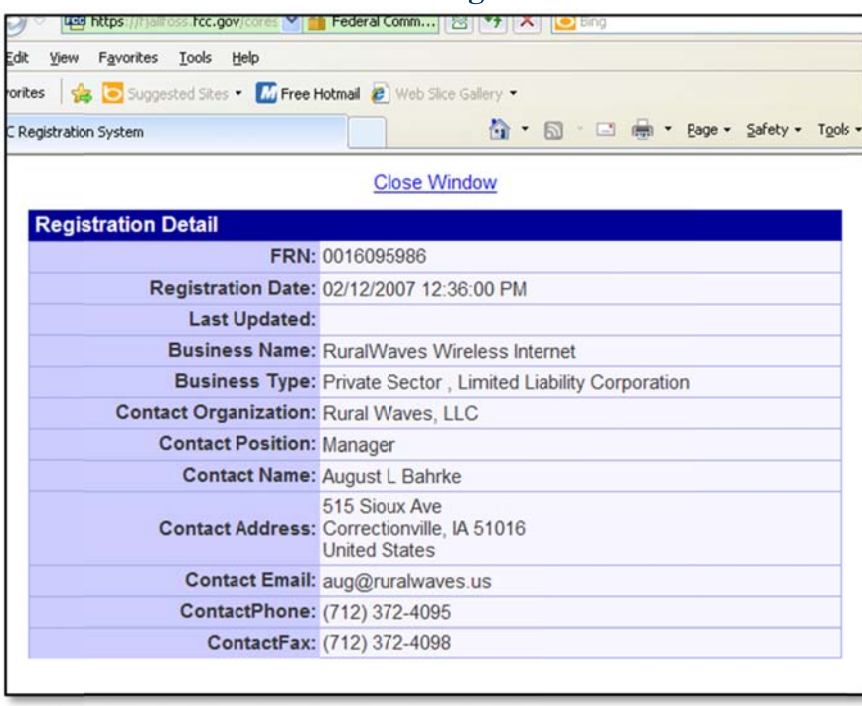


Exhibit C: Federal Registration Number

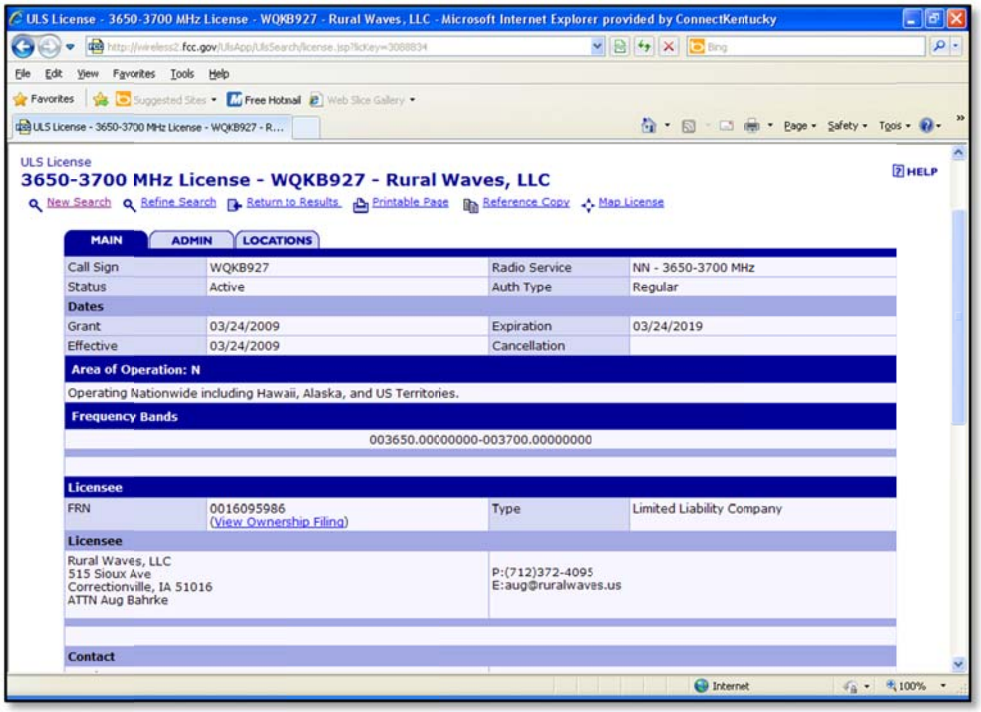


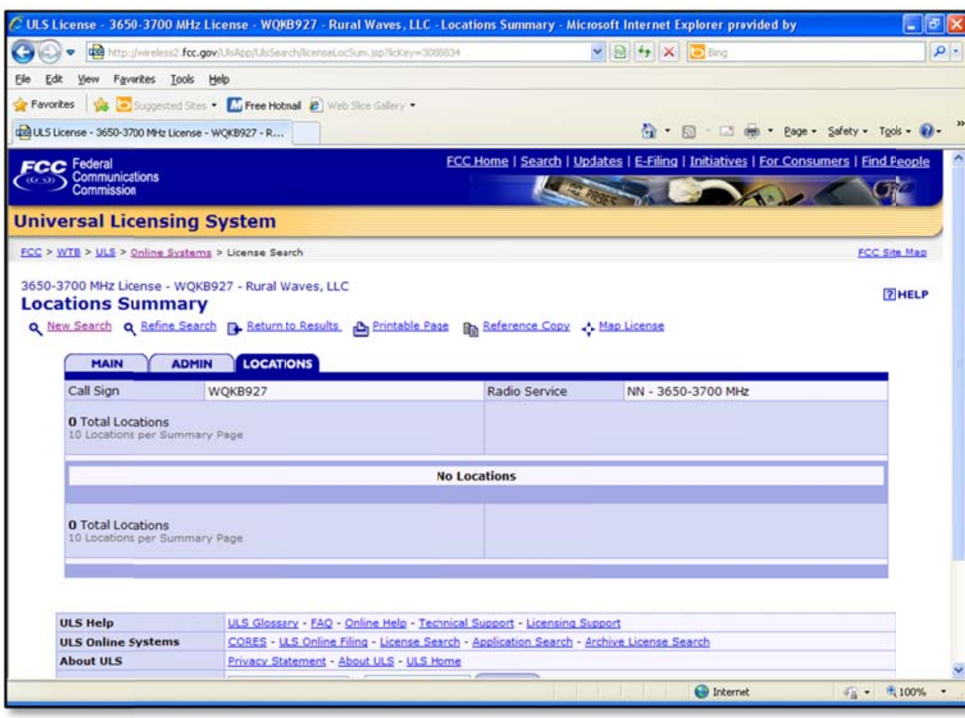
Close Window

Registration Detail

FRN:	0016095986
Registration Date:	02/12/2007 12:36:00 PM
Last Updated:	
Business Name:	RuralWaves Wireless Internet
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	Rural Waves, LLC
Contact Position:	Manager
Contact Name:	August L Bahrke
Contact Address:	515 Sioux Ave Correctionville, IA 51016 United States
Contact Email:	aug@ruralwaves.us
ContactPhone:	(712) 372-4095
ContactFax:	(712) 372-4098

Exhibit D: WQKB927 License Reference



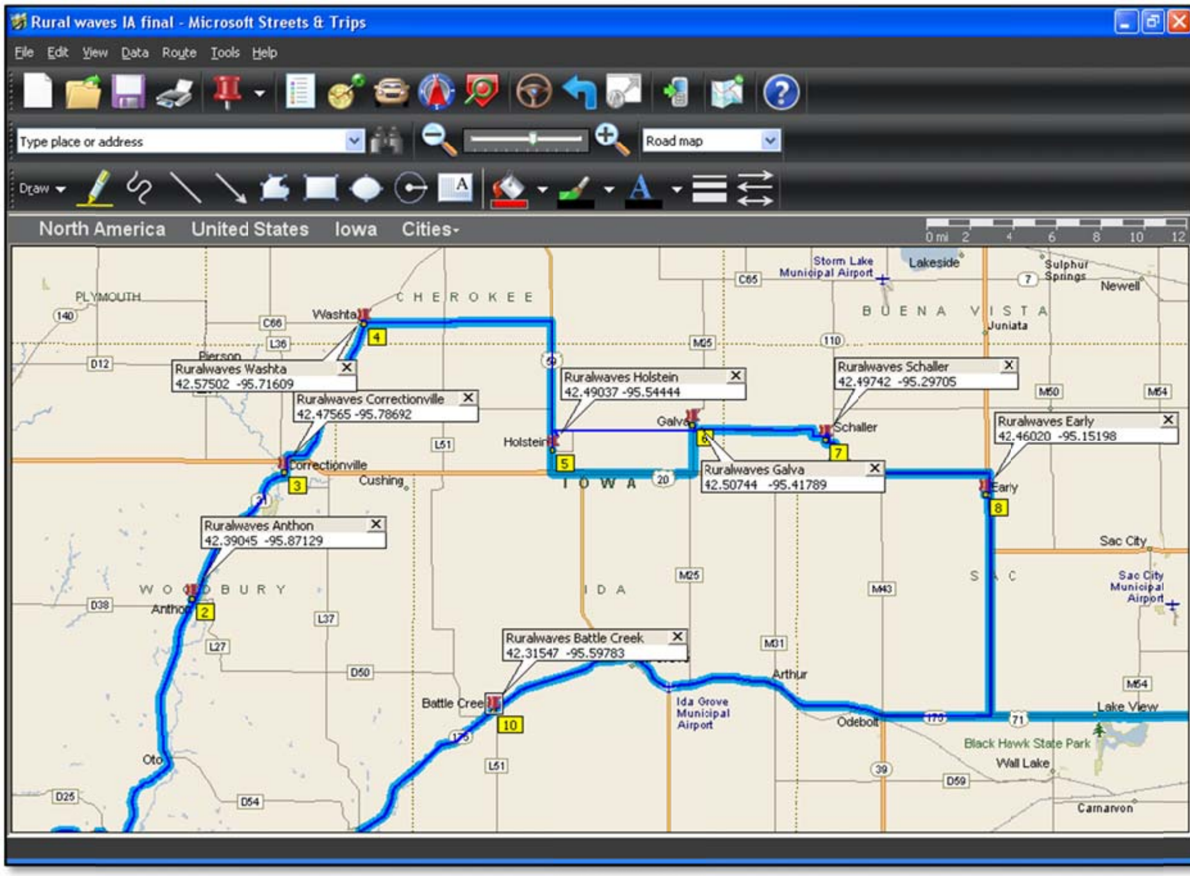


Preliminary Identification of Provider's Coverage Area

CN extracted the RW service area map directly from the provider's website. Information from that website was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .5 mile (2,640 ft.) to establish a minimum search criteria of a given wireless access point. The provider's service area depiction is represented by the wireless propagation model as shown in Exhibit B. Using the Google Earth overlay each location was examined via an aerial zoom and street level observation to identify possible wireless access point structures at the center points of the studies. The location's center coordinates were inputted into Google Earth and examined utilizing the zoom option of the aerial imagery. A portion of the transmitting locations structures were identified. This process provided a means of establishing coordinates for 10 validation points to identify structures with operational equipment. All 10 locations were entered into the Microsoft *Streets & Trips* mapping application **(Exhibit F)** to develop a route for the validation process.

Exhibit E: Google Earth: Provider's Service Area Image Overlay

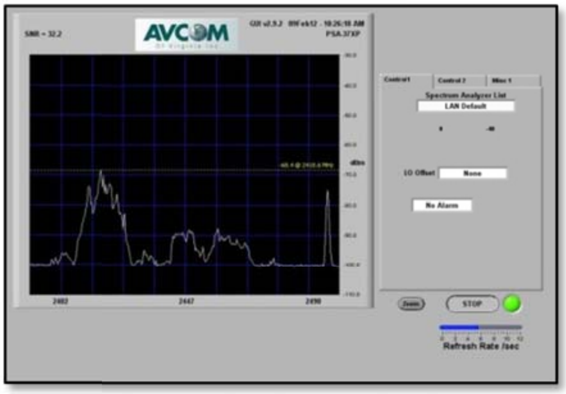
Exhibit F: Validation Points for AP Structures

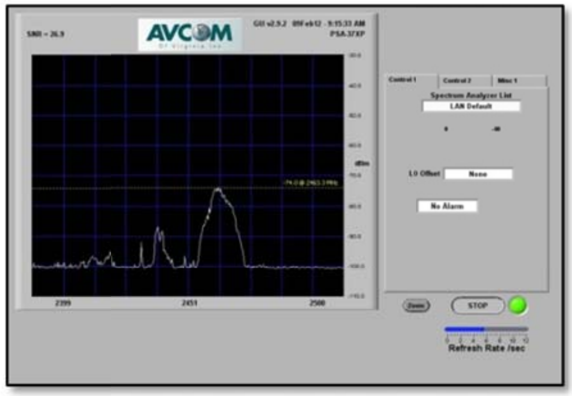


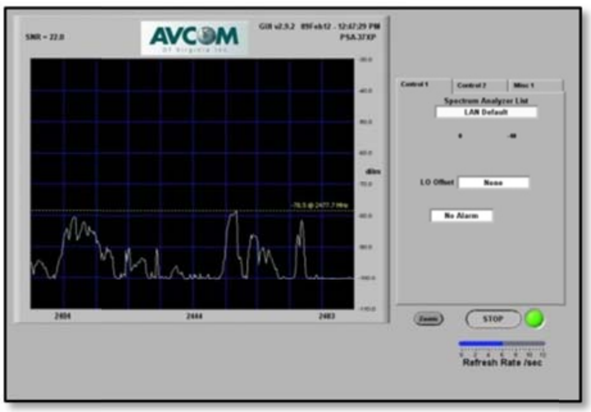
Testing Techniques

CN staff developed a data collection and site validation route based on information derived from the Google Earth image overlay and data obtained from RW's publicly available coverage on its website. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or directional antenna), and photographs were taken of the access points.

Exhibit G: Field Data for Rural Waves, LLC Office/Hub Locations







Primary Population Center Covered by Service (city, county, etc.)	Transmission Location (water tank, tower, silo, rooftop or other structure)	Decimal Degree Conversion (automatically converted here if you completed columns K, L and M)	Decimal Degree Conversion (automatically converted here if you completed columns O, P and Q)	Is the Transmit Antenna Omni-Directional?	Transmit Frequency (MHz)	Polarity (V or H)	Antenna Elevation (feet above ground)
Anthon	**Watertower**	***42.390450***	***-95.871290***	☐ Yes ☑ No	**2400**	☐ V ☑ H	**70**
Correctionville	**Elevator**	***42.475650***	***-95.786920***	☑ Yes ☐ No	2400	☐ V ☑ H	120
Washta	Elevator	***42.575020***	***-95.716090***	☑ Yes ☐ No	2400	☐ V ☑ H	140
Holstein	Elevator	***42.490370***	***-95.544440***	☐ Yes ☑ No	2400	☐ V ☑ H	200
Galva	Elevator	***42.507440***	***-95.417890***	☐ Yes ☑ No	2400	☐ V ☑ H	180
Schaller	Tower	***42.497420***	***-95.297050***	☑ Yes ☐ No	2400	☐ V ☑ H	110
Early	Elevator	***42.460200***	***-95.151980***	☑ Yes ☐ No	2400	☐ V ☑ H	150
Battle Creek	Elevator	***42.315470***	***-95.597830***	☑ Yes ☐ No	2400	☐ V ☑ H	180

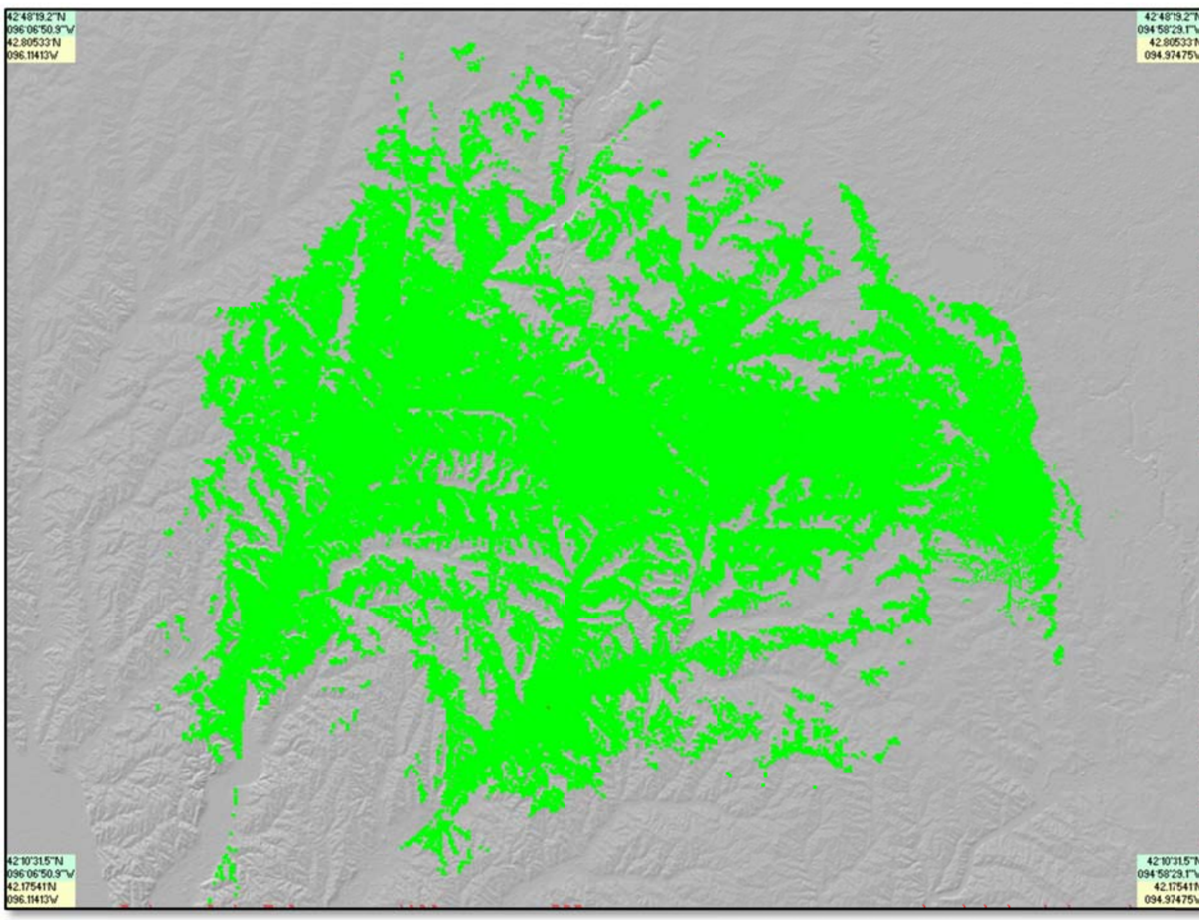
<u>Results and Submission for October 2012</u>

Of the 10 locations visited during the original coverage estimation and validation point route, 8 access points were identified and relative information was logged into the RW field validation notes file **(Exhibit H)**. The field data and the publicly available data were transferred to the CN Provider Information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to RW as courtesy copies, and the provider was advised that the estimated coverage information would be submitted to Connect Iowa and the NTIA unless the provider notified CN, within 48 hours, of discrepancies of the estimated coverage. The provider did not respond to CN and, as of this date, CN continues to believe that the information is an accurate estimation of the service area of Rural Waves, LLC based on all research conducted from April 1, 2012, to present.

Exhibit H: Field Validation Notes

Test City	Test State	Test County	Location Description	Engineer	(N) Lat Decimal	(-)(W) Long Decimal	Peak Freq	Peak Sig Strength	Spectrum Analyzer	Notes
Anthon	IA	Woodbury	Watertower	John Determan	42.390450	-95.871290	2463	-74	Avcom PSA-37XP	On small water tower on hill low foliage
Correctionvillle	IA	Woodbury	Elevator	John Determan	42.475650	-95.786920	2454	-76	Avcom PSA-37XP	On elevator low foliage
Washta	IA	Cherokee	Elevator	John Determan	42.575020	-95.716090	2433	-79	Avcom PSA-37XP	On elevator low foliage
Holstein	IA	Ida	Elevator	John Determan	42.490370	-95.544440	2418	-64	Avcom PSA-37XP	On elevator low foliage 900 Also
Galva	IA	Ida	Elevator	John Determan	42.507440	-95.417890	2406	-77	Avcom PSA-37XP	On elevator low foliage Comtrend also
Schaller	IA	Sac	Tower	John Determan	42.497420	-95.297050	2460	-79	Avcom PSA-37XP	By school on small tower
Early	IA	Sac	Elevator	John Determan	42.460200	-95.151980	2454	-74	Avcom PSA-37XP	On elevator Low foliage
Battle Creek	IA	Ida	Elevator	John Determan	42.315470	-95.597830	2477	-78	Avcom PSA-37XP	On elevator Low foliage

Exhibit I: RuralWaves Composite Coverage



APPENDIX B: BROADBAND PROVIDER LOG

Broadband Provider Log

Complete	350
Non-Responsive/Refused	5
In Progress	2
Count of Datasets by Status	**357**
Total Unique Providers Represented	**200**

Provider Name	Platform	Status	NDA Execution Date	Notes
Alliance Communications Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	1/28/2010	[JUL-17-12 Matthew Brunt] Change: Fiber coverage expanded due to DSL coverage area being converted over to fiber.
AT&T Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[AUG-20-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[AUG-08-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Clear Lake Independent Telephone Company	Fiber	Data Added to Statewide Inventory	5/6/2020	[AUG-06-12 Matthew Brunt] Change: Provider expanded fiber service area.
Clear Lake Independent Telephone Company	DSL	Data Added to Statewide Inventory	5/6/2020	[AUG-07-12 Matthew Brunt] Change: Provider converted portions of DSL coverage area over to fiber.
Communications 1 Network, Inc.	Fiber	Data Added to Statewide Inventory	4/14/2010	[AUG-08-12 Matthew Brunt] Change: Provider expanded fiber coverage.
Community Digital Wireless, LLC	Fixed Wireless	Data Added to Statewide Inventory	5/6/2010	[AUG-06-12 Matthew Brunt] Change: Provider added an additional tower and can now offer tier 6 download speeds in portions of their service area.
Corn Belt Telephone Company	Fixed Wireless	Data Added to Statewide Inventory	2/15/2010	[AUG-14-12 Matthew Brunt] Change: Provider added an additional tower.
CoxCom Inc.	Cable	Data Added to Statewide Inventory	1/29/2010	[AUG-13-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
F&B Communications, Inc.	Fiber	Data Added to Statewide Inventory	2/19/2010	[AUG-01-12 Matthew Brunt] Change: Provider now offers fiber in portions of their coverage areas.
F&B Communications, Inc.	DSL	Data Added to Statewide Inventory	2/19/2010	[AUG-01-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Farmers Mutual Telephone Company - Nora Springs	Fiber	Data Added to Statewide Inventory	1/26/2010	[AUG-23-12 Matthew Brunt] Change: Provider expanded fiber coverage area.
Farmers Mutual Telephone Company - Nora Springs	Cable	Data Added to Statewide Inventory	1/26/2010	[AUG-23-12 Matthew Brunt] Change: Provider converted portion of cable over to fiber.
Farmers Mutual Telephone Company - Nora Springs	DSL	Data Added to Statewide Inventory	1/26/2010	[AUG-23-12 Matthew Brunt] Change: Provider converted portion of DSL over to fiber.
Frontier Communications Corporation	DSL	Data Added to Statewide Inventory	1/22/2010	[AUG-09-12 Matthew Brunt] Change: Provider added one DSLAM location.
Grand Mound Cooperative Telephone Association	Fiber	Data Added to Statewide Inventory		[AUG-22-12 Matthew Brunt] Change: Provider expanded fiber coverage area.
Hawkeye Telephone Company	DSL	Data Added to Statewide Inventory	2/12/2010	[AUG-30-12 Matthew Brunt] Change: Provider can now offer tier 10 download speeds in portions of their coverage area.
Hospers Telephone Exchange, Inc.	Cable	Data Added to Statewide Inventory	1/11/2010	[AUG-01-12 Matthew Brunt] Change: Provider expanded cable coverage and can now offer tier 7 download speeds and tier 3 upload speeds.
Kalona Cooperative Telephone Company	Fiber	Data Added to Statewide Inventory	1/20/2010	[AUG-23-12 Matthew Brunt] Change: Provider expanded fiber coverage.
Kalona Cooperative Telephone Company	DSL	Data Added to Statewide Inventory	1/20/2010	[AUG-23-12 Matthew Brunt] Change: Provider converted portions of DSL coverage area over to fiber.
La Motte Telephone Company, Inc.	Fiber	Data Added to Statewide Inventory	2/16/2010	[JUL-19-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer fiber throughout coverage area.
Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/6/2010	[JUL-18-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Lenox Municipal Utilities	Fiber	Data Added to Statewide Inventory	4/20/2010	[JUN-14-12 Matthew Brunt] Change: Provider converted cable coverage area over to fiber.
Miles Cooperative Telephone Association	Fiber	Data Added to Statewide Inventory	5/17/2010	[AUG-21-12 Matthew Brunt] Change: Provider now offers fiber in portions of their coverage areas.
Monarc Technologies	Fiber	Data Added to Statewide Inventory	2/16/2011	[AUG-07-12 Matthew Brunt] Change: Provider expanded fiber coverage area.
Northeast Iowa Telephone Company	Fixed Wireless	Data Added to Statewide Inventory	4/13/2010	[AUG-06-12 Matthew Brunt] Change: Provider added an additional tower and can now offer tier 6 download speeds in portions of their service area.
Spacenet Inc.	Satellite	Data Added to Statewide Inventory		[SEP-12-12 Matthew Brunt] Correction: Initial submission of provider's coverage, but they were in service previously.
Spiral Communications LLC	Fixed Wireless	Data Added to Statewide Inventory		[AUG-22-12 Matthew Brunt] Change: Initial submission for this provider.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[JUL-18-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[AUG-09-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
United States Cellular Corporation	Mobile Wireless	Data Added to Statewide Inventory	2/15/2011	[AUG-06-12 Matthew Brunt] Change: Provider now offers tier 6 download speed and tier 5 upload speeds to portions of their service area.
USA Communications	Fiber	Data Added to Statewide Inventory	1/27/2010	[JUL-31-12 Matthew Brunt] Change: Provider upgraded a portion of their infrastructure over to fiber, and can now offer tier 7 download speeds and tier 4 upload speeds.
USA Communications	Cable	Data Added to Statewide Inventory	1/27/2010	[JUL-31-12 Matthew Brunt] Change: Provider converted portion of their cable coverage area over to fiber.

Verizon Communications, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[JUL-18-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
ViaSat, Inc.	Satellite	Data Added to Statewide Inventory	1/8/2010	[AUG-30-12 Matthew Brunt] Changes: Provider can now offer tier 7 download and tier 5 upload speeds to portions of their service area.
West Liberty Telephone Company	Fixed Wireless	Data Added to Statewide Inventory	1/25/2010	[AUG-21-12 Matthew Brunt] Change: Provider added two fixed wireless towers and now offers tier 6 download speeds.
Western Iowa Networks	Fiber	Data Added to Statewide Inventory	2/22/2010	[AUG-07-12 Matthew Brunt] Change: Provider converted portion of their DSL coverage over to fiber.
Western Iowa Networks	DSL	Data Added to Statewide Inventory	2/22/2010	[AUG-07-12 Matthew Brunt] Change: Provider converted portion of their DSL coverage over to fiber.
Woolstock Mutual Telephone	Fixed Wireless	Data Added to Statewide Inventory	5/19/2010	[AUG-22-12 Matthew Brunt] Change: Provider added two fixed wireless towers.
Butler-Bremer Communications	Backhaul	Backhaul Provider Only Processing Complete	4/20/2010	
Fibernet Communications, LLC	Backhaul	Backhaul Provider Only Processing Complete	3/9/2010	
Sprint Nextel Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/14/2010	
Andrew Telephone Company	DSL	Speed Only Update; Data Processing Complete	1/19/2010	[JUL-19-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 6 download speeds.
Butler-Bremer Communications	DSL	Speed Only Update; Data Processing Complete	4/20/2010	[JUL-31-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 6 download speeds.
Butler-Bremer Communications	Cable	Speed Only Update; Data Processing Complete	4/20/2010	[JUL-31-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 6 download speeds.
Butler-Bremer Communications	Fiber	Speed Only Update; Data Processing Complete	4/20/2010	[JUL-31-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 6 download speeds.
Colo Telephone Company	Fiber	Speed Only Update; Data Processing Complete	1/28/2010	[JUL-23-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 7 download and upload speeds.
Complete Communication Services	Cable	Speed Only Update; Data Processing Complete	6/17/2010	[AUG-06-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds.
Complete Communication Services	Fiber	Speed Only Update; Data Processing Complete	6/17/2010	[AUG-06-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds.
Grand River Mutual Telephone Corporation	DSL	Speed Only Update; Data Processing Complete	2/5/2010	[JUL-17-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 3 upload speeds.
Grand River Mutual Telephone Corporation	DSL	Speed Only Update; Data Processing Complete	2/5/2010	[JUL-17-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 3 upload speeds.
Grand River Mutual Telephone Corporation	Fiber	Speed Only Update; Data Processing Complete	2/5/2010	[JUL-17-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 3 upload speeds.
Griswold Cooperative Telephone Company	DSL	Speed Only Update; Data Processing Complete	4/21/2010	[JUN-21-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 5 download speeds.
ImOn Communications, LLC	Cable	Speed Only Update; Data Processing Complete	2/8/2012	[JUN-21-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 8 typical download speeds and tier 4 typical upload speeds.
La Motte Telephone Company, Inc.	DSL	Speed Only Update; Data Processing Complete	2/16/2010	[JUL-19-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now provide tier 7 download speeds.
Marne & Elk Horn Telephone Company	DSL	Speed Only Update; Data Processing Complete	2/11/2010	[JUL-27-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 7 download and upload speeds.
New Ulm Telecom, Inc.	DSL	Speed Only Update; Data Processing Complete	3/10/2010	[JUL-17-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds.
Osage Municipal Communications Utility	Cable	Speed Only Update; Data Processing Complete	5/18/2010	[JUL-19-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 8 download speeds and tier 7 upload speeds.
Palmer Mutual Telephone Company	DSL	Speed Only Update; Data Processing Complete	1/21/2010	[JUL-19-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds.
Prairieburg Telephone Company, Inc	DSL	Speed Only Update; Data Processing Complete	3/25/2010	[JUL-27-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 4 download and tier 3 upload speeds.
Preston Telephone Company	DSL	Speed Only Update; Data Processing Complete	2/5/2010	[JUL-19-12 Matthew Brunt] Correction: Provider made correction to download speed. Speed now set to tier 6 download.
Sac County Mutual Telephone Co.	DSL	Speed Only Update; Data Processing Complete	2/15/2010	[AUG-22-12 Matthew Brunt] Change: Provider now offers tier 3 upload speeds.
Springville Cooperative Telephone Association, Inc.	DSL	Speed Only Update; Data Processing Complete	2/15/2010	[JUL-19-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 3 upload speeds.
Sully Telephone Association Inc	DSL	Speed Only Update; Data Processing Complete	4/28/2010	[AUG-10-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 5 download speeds and tier 3 upload speeds.
Van Buren Telephone Co Inc	DSL	Speed Only Update; Data Processing Complete	1/26/2010	[JUL-19-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 6 download speeds.
RuralWaves Wireless Internet	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
Schaller Telephone Company	DSL	Partial Data Received		[SEP-17-12 Ashley Hitt] Provider supplied speed data, but not spatial coverage. Will work to obtain geographic service area for next submission.
Ace Telephone Association	Backhaul	No Update to Provide	3/8/2010	
Ace Telephone Association	DSL	No Update to Provide	3/8/2010	
Algona Municipal Utilities	Cable	No Update to Provide	2/9/2010	
Algona Municipal Utilities	Fiber	No Update to Provide	2/9/2010	
Alliance Communications Cooperative, Inc.	Backhaul	No Update to Provide	1/28/2010	
Alpine Communications, LC	DSL	No Update to Provide	2/24/2010	
Alpine Communications, LC	Fiber	No Update to Provide	2/24/2010	
Alta Municipal Utilities	Cable	No Update to Provide	5/18/2010	
Arcadia Telephone Cooperative	DSL	No Update to Provide	5/6/2010	
AT&T Inc.	Backhaul	No Update to Provide	12/16/2009	
Aventure Communications	Backhaul	No Update to Provide	4/8/2010	
Aventure Communications	Fixed Wireless	No Update to Provide	4/8/2010	
Ayrshire Farmers Mutual Telephone Company	DSL	No Update to Provide	2/17/2010	
Ayrshire Farmers Mutual Telephone Company	Fixed Wireless	No Update to Provide	2/17/2010	
Bellevue Municipal Utilities	Fiber	No Update to Provide	5/20/2010	
Bernard Telephone Company, Inc.	Backhaul	No Update to Provide	5/19/2010	
Bernard Telephone Company, Inc.	DSL	No Update to Provide	5/19/2010	
Bernard Telephone Company, Inc.	Fiber	No Update to Provide	5/19/2010	
BEVCOMM	DSL	No Update to Provide	6/16/2010	
BitWind Communications, LLC	Fixed Wireless	No Update to Provide		
Board of Water Electric & Communication Trustees of the City of Mus	Cable	No Update to Provide	5/14/2010	
Board of Water Electric & Communication Trustees of the City of Mus	DSL	No Update to Provide	5/14/2010	
Board of Water Electric & Communication Trustees of the City of Mus	Fiber	No Update to Provide	5/14/2010	
Board of Water Electric & Communication Trustees of the City of Mus	Fixed Wireless	No Update to Provide	5/14/2010	

Cable ONE Inc.	Cable	No Update to Provide	12/7/2009	
Cascade Communications Company	DSL	No Update to Provide	1/23/2010	
Cascade Communications Company	Fiber	No Update to Provide	1/23/2010	
Casey Mutual Telephone Company	Backhaul	No Update to Provide	5/3/2010	
Casey Mutual Telephone Company	DSL	No Update to Provide	5/3/2010	
Cedar Falls Utilities	Cable	No Update to Provide	6/16/2010	
Cedar Falls Utilities	Fiber	No Update to Provide	6/16/2010	
Center Junction Telephone Company	DSL	No Update to Provide	3/12/2010	
Central Scott Telephone Company, Inc.	DSL	No Update to Provide	4/22/2010	
Central Scott Telephone Company, Inc.	Fixed Wireless	No Update to Provide	4/22/2010	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Chat Mobility	Mobile Wireless	No Update to Provide	1/19/2010	
Circle Computer Resources	Fixed Wireless	No Update to Provide	7/6/2010	
Citizens Mutual Telephone Cooperative	DSL	No Update to Provide	2/26/2010	
Citizens Mutual Telephone Cooperative	Fiber	No Update to Provide	2/26/2010	
City of Hawarden	Cable	No Update to Provide	5/20/2010	
Clarence Telephone Company, Inc.	Fiber	No Update to Provide		
CML Telephone Cooperative Association of Meriden, Iowa	Fiber	No Update to Provide	1/25/2010	
Comelec Services, Inc.	Fixed Wireless	No Update to Provide	5/7/2010	
Community Cable Television Agency of O'Brien County	Cable	No Update to Provide	5/5/2010	
Community Cable Television Agency of O'Brien County	Fixed Wireless	No Update to Provide	5/5/2010	
Coon Creek Telecommunications Corp.	DSL	No Update to Provide	2/9/2012	
Coon Rapids Municipal Utilities	Cable	No Update to Provide	4/22/2010	
Coon Valley Co-op Telephone Association, Inc.	DSL	No Update to Provide		
Coon Valley Co-op Telephone Association, Inc.	Fixed Wireless	No Update to Provide		
Cooperative Telephone Company	DSL	No Update to Provide	2/2/2010	
Cooperative Telephone Company	Fixed Wireless	No Update to Provide	2/2/2010	
Cooperative Telephone Exchange	Backhaul	No Update to Provide	2/2/2010	
Cooperative Telephone Exchange	Fiber	No Update to Provide	2/2/2010	
Corn Belt Telephone Company	DSL	No Update to Provide	2/15/2010	
Corn Belt Telephone Company	Fiber	No Update to Provide	2/15/2010	
Cumberland Telephone Company	DSL	No Update to Provide	4/27/2010	
Cumberland Telephone Company	Fixed Wireless	No Update to Provide	4/27/2010	
Danville Mutual Telephone Company	DSL	No Update to Provide		
Dixon Telephone Company	Cable	No Update to Provide	5/5/2010	
Dumont Telephone Company	DSL	No Update to Provide	2/25/2010	
Dumont Telephone Company	Fiber	No Update to Provide	2/25/2010	
Dunkerton Telephone Cooperative	DSL	No Update to Provide	4/15/2010	
Ellsworth Cooperative Telephone Association	DSL	No Update to Provide	1/25/2010	
Evertek Enterprises	Cable	No Update to Provide	2/3/2010	
Evertek Enterprises	Fiber	No Update to Provide	2/3/2010	
Evertek Enterprises	Fixed Wireless	No Update to Provide	2/3/2010	
F&B Communications, Inc.	Fixed Wireless	No Update to Provide	2/19/2010	
Farmers & Merchants Mutual Telephone Company	Fiber	No Update to Provide	5/7/2010	
Farmers & Merchants Mutual Telephone Company	Fixed Wireless	No Update to Provide	5/7/2010	
Farmers Cooperative Telephone Company-Dysart	DSL	No Update to Provide	3/12/2010	
Farmers Mutual Cooperative Telephone Company - Harlan	Cable	No Update to Provide	2/5/2010	
Farmers Mutual Cooperative Telephone Company - Harlan	DSL	No Update to Provide	2/5/2010	
Farmers Mutual Cooperative Telephone Company - Harlan	Fiber	No Update to Provide	2/5/2010	
Farmers Mutual Cooperative Telephone Company - Harlan	Fixed Wireless	No Update to Provide	2/5/2010	
Farmers Mutual Cooperative Telephone Company-Moulton	Fiber	No Update to Provide	5/21/2010	
Farmers Mutual Telephone Company - Jesup	DSL	No Update to Provide	4/20/2010	
Farmers Mutual Telephone Company - Jesup	Fiber	No Update to Provide	4/20/2010	
Farmers Mutual Telephone Company - Nora Springs	Fixed Wireless	No Update to Provide	1/26/2010	
Farmers Mutual Telephone Company of Stanton, Iowa	Backhaul	No Update to Provide	4/9/2010	
Farmers Mutual Telephone Company of Stanton, Iowa	Cable	No Update to Provide	4/9/2010	
Farmers Mutual Telephone Company of Stanton, Iowa	DSL	No Update to Provide	4/9/2010	
Farmers Mutual Telephone Company of Stanton, Iowa	DSL	No Update to Provide	4/9/2010	
FiberComm L.C.	Backhaul	No Update to Provide	2/15/2010	
FiberComm L.C.	DSL	No Update to Provide	2/15/2010	
FiberComm L.C.	Fixed Wireless	No Update to Provide	2/15/2010	
Frontier Communications Corporation	Backhaul	No Update to Provide	1/22/2010	
Goldfield Access Network, L.C.	DSL	No Update to Provide	1/22/2010	
Grand Mound Cooperative Telephone Association	DSL	No Update to Provide		
Grand Mound Cooperative Telephone Association	Fixed Wireless	No Update to Provide		
Grand River Mutual Telephone Corporation	Fixed Wireless	No Update to Provide	2/5/2010	
Grundy Center Municipal Utilities	Cable	No Update to Provide		
Grundy Center Municipal Utilities	Fixed Wireless	No Update to Provide		
Harlan Municipal Utilities	Cable	No Update to Provide	5/5/2010	
Harmony Telephone Company	Fiber	No Update to Provide	1/12/2010	
Heart of Iowa Communications Cooperative	Backhaul	No Update to Provide	1/7/2010	
Heart of Iowa Communications Cooperative	DSL	No Update to Provide	1/7/2010	
Heart of Iowa Communications Cooperative	Fiber	No Update to Provide	1/7/2010	
HickoryTech Corporation	DSL	No Update to Provide	2/2/2010	
Hospers Telephone Exchange, Inc.	DSL	No Update to Provide	1/11/2010	
Hubbard Cooperative Telephone Association and Cable	DSL	No Update to Provide	5/14/2010	
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
Huxley Communications Cooperative	Backhaul	No Update to Provide	1/25/2010	
Huxley Communications Cooperative	DSL	No Update to Provide	1/25/2010	
Huxley Communications Cooperative	Fiber	No Update to Provide	1/25/2010	
I-35 Telephone Company	DSL	No Update to Provide	2/2/2010	
I-35 Telephone Company	Fiber	No Update to Provide	2/2/2010	
I-35 Telephone Company	Fixed Wireless	No Update to Provide	2/2/2010	
IAMO Telephone Company	DSL	No Update to Provide	1/25/2010	
IAMO Telephone Company	Fixed Wireless	No Update to Provide	1/25/2010	
IMU Network Services	Fiber	No Update to Provide	5/10/2010	
IMU Network Services	Fixed Wireless	No Update to Provide	5/10/2010	
Iowa Connect, Inc.	Fixed Wireless	No Update to Provide	5/12/2010	
Jab Wireless, Inc.	DSL	No Update to Provide	6/14/2010	[JUL-10-12 Dwayne Goodman] Jab Wireless acquired all KeyOn Communications, Inc. assets; now becoming a broadband provider for the state.
Jab Wireless, Inc.	Fixed Wireless	No Update to Provide	6/14/2010	[JUL-10-12 Dwayne Goodman] Jab Wireless acquired all KeyOn Communications, Inc. assets; now becoming a broadband provider for the state.
Jefferson Telephone Company	DSL	No Update to Provide	1/22/2010	
Jefferson Telephone Company	Fiber	No Update to Provide	1/22/2010	
Keystone Farmers Cooperative Telephone Company	DSL	No Update to Provide	4/12/2010	
La Motte Telephone Company, Inc.	Fixed Wireless	No Update to Provide	2/16/2010	
La Porte City Telephone Co	DSL	No Update to Provide	2/22/2010	
Laurens Municipal Communications Utility	Cable	No Update to Provide	6/2/2010	
Lehigh Valley Cooperative Telephone Association	Fiber	No Update to Provide	4/16/2010	
LISCO Wireless	Backhaul	No Update to Provide	1/28/2010	
LISCO Wireless	DSL	No Update to Provide	1/28/2010	
LISCO Wireless	Fiber	No Update to Provide	1/28/2010	
Lone Rock Cooperative Telephone Company	DSL	No Update to Provide	2/15/2010	

Mabel Cooperative Telephone Company	DSL	No Update to Provide	4/8/2010	
Manning Municipal Communication & Television System Utility	Cable	No Update to Provide	4/22/2010	
Manning Municipal Communication & Television System Utility	Fixed Wireless	No Update to Provide	4/22/2010	
Marne & Elk Horn Telephone Company	Backhaul	No Update to Provide	2/11/2010	
Marne & Elk Horn Telephone Company	Fixed Wireless	No Update to Provide	2/11/2010	
Martelle Cooperative Telephone Association	Cable	No Update to Provide	5/5/2010	
Martelle Cooperative Telephone Association	DSL	No Update to Provide	5/5/2010	
Massena Telephone Company	Backhaul	No Update to Provide	6/18/2010	
Massena Telephone Company	DSL	No Update to Provide	6/18/2010	
Mediacom Communications Corporation	Backhaul	No Update to Provide	1/12/2010	
Mediacom Communications Corporation	Cable	No Update to Provide	1/12/2010	
Mediapolis Telephone Company	DSL	No Update to Provide	4/14/2010	
MidIowa Net	Fixed Wireless	No Update to Provide		
Midwest Broadband LLC	Fixed Wireless	No Update to Provide	7/6/2010	
Miles Cooperative Telephone Association	DSL	No Update to Provide	5/17/2010	
Milford Cable TV Inc.	Cable	No Update to Provide	4/21/2010	
Minburn Communications	DSL	No Update to Provide	4/7/2010	
Minburn Communications	DSL	No Update to Provide	4/7/2010	
Minburn Communications	Fiber	No Update to Provide	4/7/2010	
Minburn Communications	Fiber	No Update to Provide	4/7/2010	
Minerva Valley Telephone Cablevision, Inc.	DSL	No Update to Provide	4/7/2010	
Modern Cooperative Telephone Company Inc.	DSL	No Update to Provide		
Mutual Telephone Company	Fiber	No Update to Provide	1/25/2010	
Mutual Telephone Company of Morning Sun, Iowa	DSL	No Update to Provide	5/5/2010	
Mutual Telephone Company of Morning Sun, Iowa	DSL	No Update to Provide	5/5/2010	
Mutual Telephone Company of Morning Sun, Iowa	Fixed Wireless	No Update to Provide	5/5/2010	
NetConX, Inc.	Fixed Wireless	No Update to Provide	4/6/2010	
Nexgen Integrated Communications, LLC	DSL	No Update to Provide		
Nexgen Integrated Communications, LLC	Fiber	No Update to Provide		
North English Cooperative Telephone Company	DSL	No Update to Provide	5/12/2010	
Northeast Iowa Telephone Company	Backhaul	No Update to Provide	4/13/2010	
Northeast Iowa Telephone Company	DSL	No Update to Provide	4/13/2010	
Northeast Iowa Telephone Company	Fiber	No Update to Provide	4/13/2010	
Northern Iowa Telephone Company	DSL	No Update to Provide	1/25/2010	
Northwest Telephone Cooperative Association	Backhaul	No Update to Provide	2/17/2010	
Northwest Telephone Cooperative Association	DSL	No Update to Provide	2/17/2010	
Northwest Telephone Cooperative Association	Fixed Wireless	No Update to Provide	2/17/2010	
Ogden Telephone Company	Backhaul	No Update to Provide	3/17/2010	
Ogden Telephone Company	DSL	No Update to Provide	3/17/2010	
Olin Telephone Company, Inc.	DSL	No Update to Provide	2/23/2010	
Onslow Cooperative Telephone Association	DSL	No Update to Provide	2/3/2010	
Oran Mutual Telephone Company	DSL	No Update to Provide	2/8/2010	
Osage Municipal Communications Utility	Fixed Wireless	No Update to Provide	5/18/2010	
Palo Cooperative Telephone Association	DSL	No Update to Provide	5/19/2010	
Panora Communications Cooperative	Cable	No Update to Provide	1/29/2010	
Panora Communications Cooperative	Cable	No Update to Provide	1/29/2010	
Panora Communications Cooperative	Fiber	No Update to Provide	1/29/2010	
Panora Communications Cooperative	Fiber	No Update to Provide	1/29/2010	
Panora Communications Cooperative	Fixed Wireless	No Update to Provide	1/29/2010	
Panora Communications Cooperative	Fixed Wireless	No Update to Provide	1/29/2010	
Partner Communications Cooperative	Cable	No Update to Provide	5/15/2010	
Partner Communications Cooperative	DSL	No Update to Provide	5/15/2010	
Partner Communications Cooperative	Fiber	No Update to Provide	5/15/2010	
Prairie iNet	Fixed Wireless	No Update to Provide	3/16/2010	
Prairieburg Telephone Company, Inc	Fixed Wireless	No Update to Provide	3/25/2010	
Premier Communications	Cable	No Update to Provide	1/25/2010	
Premier Communications	Fiber	No Update to Provide	1/25/2010	
Radcliffe Telephone Company, Inc.	Backhaul	No Update to Provide	4/26/2010	
Radcliffe Telephone Company, Inc.	Fiber	No Update to Provide	4/26/2010	
Readlyn Telephone Company	DSL	No Update to Provide	2/23/2010	
Readlyn Telephone Company	Fiber	No Update to Provide	2/23/2010	
River Valley Telecommunications Coop	DSL	No Update to Provide	3/23/2010	
River Valley Telecommunications Coop	Fiber	No Update to Provide	3/23/2010	
River Valley Telecommunications Coop	Fixed Wireless	No Update to Provide	3/23/2010	
Rockwell Cooperative Telephone Association	Backhaul	No Update to Provide	5/12/2010	
Rockwell Cooperative Telephone Association	DSL	No Update to Provide	5/12/2010	
Rockwell Cooperative Telephone Association	Fiber	No Update to Provide	5/12/2010	
Royal Telephone Company	Fiber	No Update to Provide	2/12/2010	
Sac County Mutual Telephone Co.	Backhaul	No Update to Provide	2/15/2010	
Scranton Telephone Company	Backhaul	No Update to Provide	2/1/2010	
Scranton Telephone Company	DSL	No Update to Provide	2/1/2010	
Sioux Valley Rural Television, Inc.	Fixed Wireless	No Update to Provide	6/7/2010	
South Slope Cooperative Telephone Company	DSL	No Update to Provide	2/2/2010	
South Slope Cooperative Telephone Company	Fiber	No Update to Provide	2/2/2010	
Spencer Municipal Utilities	Backhaul	No Update to Provide	2/18/2010	
Spencer Municipal Utilities	Cable	No Update to Provide	2/18/2010	
Spencer Municipal Utilities	Fiber	No Update to Provide	2/18/2010	
Spring Grove Cooperative Telephone Co	Fiber	No Update to Provide		
Sully Telephone Association Inc	Fiber	No Update to Provide	4/28/2010	
Superior Telephone Cooperative	DSL	No Update to Provide	5/24/2010	
Swisher Telephone Company	Fiber	No Update to Provide	2/2/2010	
Templeton Telephone Company	Backhaul	No Update to Provide	3/12/2010	
Templeton Telephone Company	DSL	No Update to Provide	3/12/2010	
Terril Telephone Cooperative	DSL	No Update to Provide	2/12/2010	
Titonka Telephone Company	Backhaul	No Update to Provide	5/4/2010	
Titonka Telephone Company	DSL	No Update to Provide	5/4/2010	
Traer Municipal Utilities	Fixed Wireless	No Update to Provide	4/14/2010	
USA Communications	DSL	No Update to Provide	1/27/2010	
Van Horne Cooperative Telephone Company	Backhaul	No Update to Provide	5/18/2010	
Van Horne Cooperative Telephone Company	DSL	No Update to Provide	5/18/2010	
Van Horne Cooperative Telephone Company	Fiber	No Update to Provide	5/18/2010	
Walnut Telephone Company	Backhaul	No Update to Provide	4/14/2010	
Walnut Telephone Company	Cable	No Update to Provide	4/14/2010	
Walnut Telephone Company	DSL	No Update to Provide	4/14/2010	
Walnut Telephone Company	Fiber	No Update to Provide	4/14/2010	
Walnut Telephone Company	Fixed Wireless	No Update to Provide	4/14/2010	
Webb-Dickens Telephone Corporation	Fiber	No Update to Provide	1/25/2010	
Webster-Calhoun Cooperative Telephone Association	Fiber	No Update to Provide	5/21/2010	
West Iowa Telephone Company	Cable	No Update to Provide	1/27/2010	
West Iowa Telephone Company	DSL	No Update to Provide	1/27/2010	
West Iowa Telephone Company	Fiber	No Update to Provide	1/27/2010	
West Liberty Telephone Company	Backhaul	No Update to Provide	1/25/2010	
West Liberty Telephone Company	DSL	No Update to Provide	1/25/2010	
West Liberty Telephone Company	Fiber	No Update to Provide	1/25/2010	
Western Iowa Networks	Fixed Wireless	No Update to Provide	2/22/2010	

Western Iowa Telephone Association	DSL	No Update to Provide	4/22/2010	
Winnebago Cooperative Telecom Association	Backhaul	No Update to Provide	1/22/2010	
Winnebago Cooperative Telecom Association	DSL	No Update to Provide	1/22/2010	
Winnebago Cooperative Telecom Association	Fiber	No Update to Provide	1/22/2010	
Winnebago Cooperative Telecom Association	Fixed Wireless	No Update to Provide	1/22/2010	
Woolstock Mutual Telephone	DSL	No Update to Provide	5/19/2010	
WTC Communications, Inc.	Cable	No Update to Provide	3/22/2010	
WTC Communications, Inc.	DSL	No Update to Provide	3/22/2010	
WTC Communications, Inc.	Fixed Wireless	No Update to Provide	3/22/2010	
Wyoming Mutual Telephone Company	DSL	No Update to Provide	2/19/2010	
Atkins Telephone Company	DSL	No Update Provided - Use Last Submission Data	5/14/2010	
Atkins Telephone Company	Fiber	No Update Provided - Use Last Submission Data	5/14/2010	
Baldwin Nashville Telephone Company, Inc.	DSL	No Update Provided - Use Last Submission Data	2/3/2010	
Baldwin Nashville Telephone Company, Inc.	Fiber	No Update Provided - Use Last Submission Data	2/3/2010	
Bernard Telephone Company, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	5/19/2010	
Brooklyn Mutual Telecommunications Cooperative	DSL	No Update Provided - Use Last Submission Data	4/21/2010	
Cogent Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data		
East Buchanan Telephone Cooperative	DSL	No Update Provided - Use Last Submission Data	4/30/2010	
East Buchanan Telephone Cooperative	Fixed Wireless	No Update Provided - Use Last Submission Data	4/30/2010	
Eastlight, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data		
Farmers Telephone Company-Essex	DSL	No Update Provided - Use Last Submission Data	1/27/2010	
Farmers Telephone Company-Essex	Fixed Wireless	No Update Provided - Use Last Submission Data	1/27/2010	
Fenton Co-Op Telephone Company	DSL	No Update Provided - Use Last Submission Data	4/16/2010	
Independence Telecommunications Utility	Cable	No Update Provided - Use Last Submission Data	4/9/2010	
Internet Consulting Services, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data	5/19/2010	
Iowa Network Services	Backhaul	No Update Provided - Use Last Submission Data	3/5/2010	
Kalnet	Fixed Wireless	No Update Provided - Use Last Submission Data	5/21/2010	
Killduff Telephone Company	DSL	No Update Provided - Use Last Submission Data		
Knology of the Plains, Inc.	Cable	No Update Provided - Use Last Submission Data	7/13/2011	
Level 3 Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
Loganet	Fixed Wireless	No Update Provided - Use Last Submission Data		
Long Lines	Backhaul	No Update Provided - Use Last Submission Data	5/4/2010	
Long Lines	Backhaul	No Update Provided - Use Last Submission Data	5/4/2010	
Long Lines	Backhaul	No Update Provided - Use Last Submission Data	5/4/2010	
Long Lines	Backhaul	No Update Provided - Use Last Submission Data	5/4/2010	
Long Lines	Backhaul	No Update Provided - Use Last Submission Data	5/4/2010	
Long Lines	Backhaul	No Update Provided - Use Last Submission Data	5/4/2010	
Long Lines	Cable	No Update Provided - Use Last Submission Data	5/4/2010	
Long Lines	DSL	No Update Provided - Use Last Submission Data	5/4/2010	
Lost Nation-Elwood Telephone Company	Fiber	No Update Provided - Use Last Submission Data	4/13/2010	
Lynnville Telephone Company, Inc.	DSL	No Update Provided - Use Last Submission Data		
Reasnor Telephone Company, LLC	DSL	No Update Provided - Use Last Submission Data		
RingTel Communications	DSL	No Update Provided - Use Last Submission Data	2/17/2010	
Searsboro Telephone Company	DSL	No Update Provided - Use Last Submission Data		
Sharon Telephone Company	Backhaul	No Update Provided - Use Last Submission Data	5/20/2010	
Sharon Telephone Company	DSL	No Update Provided - Use Last Submission Data	5/20/2010	
Sharon Telephone Company	Fiber	No Update Provided - Use Last Submission Data	5/20/2010	
Sharon Telephone Company	Fixed Wireless	No Update Provided - Use Last Submission Data	5/20/2010	
SpeedNet, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data		
Wellman Cooperative Telephone Association	DSL	No Update Provided - Use Last Submission Data	5/19/2010	
Wellman Cooperative Telephone Association	Fiber	No Update Provided - Use Last Submission Data	5/19/2010	
Wellman Cooperative Telephone Association	Fixed Wireless	No Update Provided - Use Last Submission Data	5/19/2010	
Windstream Communications	DSL	No Update Provided - Use Last Submission Data		
Zayo Group, LLC	Backhaul	No Update Provided - Use Last Submission Data		
Windstream Communications	DSL	Solicited Initial Data		
Netconnect	Fixed Wireless	Refused to Participate		[JUL-17-12 Joel Brick] Received e-mail from company representative refusing to participate.
Eastlight, LLC	Fiber	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 11 contact attempts were made this period.

Knology of the Plains, Inc.	Backhaul	Non-Responsive to Multiple Attempts	7/13/2011	In addition to numerous contact attempts made during past mapping submission periods, 5 contact attempts were made this period.
Mechanicsville Telephone Company	DSL	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 7 contact attempts were made this period.
Mechanicsville Telephone Company	Cable	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 7 contact attempts were made this period.

State Broadband Initiative Mapping Methodology

For the State of Idaho

Revised September 30, 2012

CostQuest Associates

LinkAMERICA Alliance

Contents

Overview

This document provides an overview of how the sixth required data set was collected and processed for the State Broadband Initiative (SBI) in the state of Idaho.

This submission builds upon prior efforts to increase in state broadband mapping and planning capacity. Although each state has taken a slightly different path to building in house capacity, this cross-state partnership helps the LinkAMERICA team focus on comparable outcomes across the four states, where appropriate and support each state based upon the State's elected transition path. Our intent is not to make the states look and be the same, rather it is to leverage economies of scope and scale among the business processes while at the same time pursuing the longer term goal of transitioning sustainable program leadership to the respective states.

As our team completes the third year of the SBI program, more work has shifted to in state partners. Much of this work focuses upon the capacity building, planning and technical assistance components of the program. One immediate result of this is that in some of our states in-State partners have taken direct responsibility for the survey, validation and development of Community Anchor Institution information. The methods by which CAI data were developed are included as Appendix One. During this third program year we also anticipate at least one in State partner taking over the state web presence, both in terms of content and hosting. We also have States hiring in dedicated resources to support the program.

As expected, this document rests heavily on the prior drafts but has also been updated and expanded.

Significant changes include additions covering:

1. Trends in provider inputs
2. Modification to internal provider tracking
3. Increases in the amount of WISP coverage using propagation estimates
4. Requested changes based upon NTIA guidance
    a. Review of submitted speed with respect to NTIA supplied frequency table
    b. Review of NTIA speed guidelines and provider documentation
    c. Inclusion of Provider Universe Table (Appendix 4)
    d. Expansion of verification methods summary table
5. Transition planning with respect to capacity building within the State for Broadband map development (even while the technical data development components of the program continue to rest with CostQuest and the LinkAMERICA Alliance).

Treatment of the following subjects has been expanded:

1. Verification and validation
2. Data production methods

3. Provider advertised speed and coverage validation

As anticipated, the SBI program continues to mature and evolve. Technical leadership and strong program office guidance has been appreciated. We continue to focus resources on establishing stable business processes to track submissions, verify received and processed data, test for temporal stability and provide reporting deliverables consistent with NTIA expectations.

In our view, the mapping deliverable reflects (1) a good faith effort, which results in a reasoned response to the NOFA, Technical Appendix A, as well as supplementary program office guidance and modifications offered in phone calls, emails, and webinars, (2) a stable foundation for improvement and prioritization of both NTIA and state needs and interests , (3) a valid data processing model to support online mapping, consumer feedback, provider verification and reporting, and finally, (4) a valid use of the evolving data transfer model and its intrinsic validation methods. More importantly, the resulting data and online coverage maps that follow from this work are providing good input and context for the Broadband planning teams working across the states we have the pleasure to serve.

We also note that the mapping deliverable is increasingly important to state policy makers as each of the states we work with continues to assess the policy ecosystem that supports the advancement of broadband access and adoption.

We close this methodology document with 4 appendices. Appendix 1 refers to efforts related to Community Anchor Institutions. Appendix 2 describes data collection challenges. This section describes some of the open issues, challenges and questions we are exploring. Our hope is to receive clarification and counsel from NTIA in how best to confront some of these issues, which are likely common across states. Appendix 3 describes the confidentiality framework explained by NTIA. Appendix 4 details the provider universe, those providers found to be non-NOFA compliant and those providing data.

Purpose of This Manual

This technical document was developed to provide transparency in our data production process.

Our goal is to illustrate a thoughtful process designed to meet the intent of the submission. Our hope is that we have developed a process that is reasonable, with respect to the data it deals with, as well as flexible enough to change with evolving NTIA requirements and lessons learned from the Broadband mapping community.

Data Sources

Developing the Provider List

Broadband provider lists for all states were developed from the following sources:

- Prior comparable mapping/research efforts
- State lists of regulated telecommunications, cable and wireless service providers
- State and national industry organizations (i.e. cable associations, wireless service provider organizations, telecommunications associations)
- FCC Form 477 respondents
- Third party data sources such as Warren Media, Media Prints, American Roamer Coverage Right, GeoResults Wirecenter Boundaries.
- Independent web searches
- Interviews with key state staff members and important community influencers

As one would expect in a dynamic marketplace, provider identification is an ongoing and important component of our work. Mergers and acquisitions, the use of multiple regional DBAs, the lack of any universal identity management attribute, and the generally complex parent-subsidiary structure of many telecommunications companies, make provider identification and tracking very challenging. Because of this dynamic environment, the Provider list is reviewed on an on-going basis and changes are made as necessary to ensure that the list remains current.

At the start of each round, email and telephone contact is made to all known providers. This time consuming, but necessary, process ensures that the list of contact persons remains current, and that providers are aware of data request changes and deadlines associated with each round. Where necessary, we execute new NDAs with providers. We maintain this communication with providers throughout the Data Collection period, providing multiple paths and opportunities for participation in the program. Providers that respond too late to be included in the final dataset are flagged for inclusion in the next submission. Unresolved data concerns are also flagged and tracked so that we can begin working on a plan for resolution prior to the next data collection round.

As contact is made in each round, we qualify each provider by asking a series of questions regarding the type of service and speeds offered. If the provider does not meet the minimum specifications for a

Broadband provider (as defined in the NOFA) we make a note of the change in status.[1] Providers remain on our list and are included in program communications so that in the event that their service is upgraded or expanded their status can be updated accordingly.

Provider Outreach

To meet the program's aggressive deadlines and participation goals, LinkAMERICA believes it is critical to maintain rapport with providers. To do this we reach out to providers with regular project communications, including a program newsletter and links to the various State mapping websites. In several states we have participated in trade association and policy summits.

As described above, individual e-mails and/or telephone calls are made to all providers explaining the status of the program and requesting their continued support. In some instances we've also had the opportunity to support providers in their BTOP / BIP applications. Through these collective outreach initiatives, and our engagement with various industry associations, we continue to enjoy a healthy and appropriate relationship with Broadband service providers.

NDA

To provide protection for all parties involved, LinkAMERICA continues to honor the terms of our NDA. If providers did not execute the NDA in previous rounds they were offered the opportunity to do so in this collection round. New providers were of course also supplied with a copy of the NDA.

To facilitate the execution of NDA's, LinkAMERICA continues to use the DocuSign online document management solution. This system allows providers to review and digitally sign the NDA in a legally binding manner, and has been instrumental in achieving rapid approval and execution of NDAs with the majority of providers. In some cases, NDA's were individually negotiated to address specific provider concerns. In all cases, minimum standards established by the NOFA are honored. In other cases, providers chose to submit data without executing an NDA.

Provider Survey

Since five prior rounds of data collection have been completed, the LinkAMERICA team has a solid base of coverage and speed information with which to begin Round 6. This allowed us to provide flexible response options to participating providers. One option allowed them to review check maps of their coverage and speed data – submitting only corrections and additions to the existing dataset. (For provider convenience the check maps were created in both PDF and Google Earth (.KMZ) formats.) The second option was to allow submittal of completely new datasets, either in tabular form or in multiple other digital formats. For those without CAD or GIS systems, we continued to allow the submittal of printed/scanned maps and other written materials.

[1] As with other Grantees, we struggle with appropriate and consistent classification for service providers who opportunistically provision Broadband services. In this submission we continue to bring them into the analysis as a provider type "other". As the inclusion of this category isn't our primary goal, we are working to process data as we can. We are similarly categorizing and retaining reseller information. Appendix 4 illustrates the categorization of non Broadband providers within our provider tracking and verification systems.

Survey Methods

Once again, we used a secure digital survey process (via our provider portal websites) to collect and display information for providers. The Round 6 survey process was designed to accommodate both new and returning providers, and the different types of information they would be submitting. The following is a summary of the process encountered by each group:

New providers: New providers were routed directly to our standard survey where they were provided with templates for uploading data in tabular NTIA-compliant formats. As in previous rounds, if providers could not supply information in the requested format, alternatives were offered. These alternatives included uploading service-area boundary maps, exchange area maps, CAD drawings or customer address lists. From that information, the LinkAMERICA team developed a geographic representation of coverage and was able to build coverage features for each provider.

Returning providers: For Round 6 we continued to work with participating providers to improve their datasets. Check maps continue to be a useful tool to show providers how their area would be displayed on the resulting interactive state map and to get constructive feedback regarding corrections and changes that need to be made to their coverage and speed data. Generating these customized documents in each round is an extremely time consuming verification process, but it allows us to close many of the gaps that might have otherwise persisted.

Follow Up

After the release of the Round 6 survey in early July 2012, LinkAMERICA launched an extensive effort to encourage responses. Every known provider was contacted at least twice during the months of July and August. The initial data submission deadline was set for mid-August, but we continued to accept "straggler" submissions into September.

No Response Policy

As mentioned above, every effort was made to contact each provider who appeared on our initial list. However, if no current information could be found on the company (i.e. no website, no valid phone number, and no contact person identified) they were removed from the list of "known providers". We believe the vast majority of those we were unable to reach were providers who have simply ceased to exist[2]. If we verify that a company is a broadband provider still doing business and are not able to get a response to our request for data, we make note of that in our datapackag.xls, and continue to reach out to encourage participation.

Summary

In summary, an intensive 45-60 day provider outreach and data collection process is initiated at the beginning of each round. In Round 6, given the data vintage of June 30, 2012, we began this process in June and the last submissions were accepted in September, 2012.

While we continue to successfully engage the majority of providers in each round, the amount of manpower required to solicit complete and timely responses should not be underestimated. This process is one of the most costly and complex within the entire SBI program.

[2]The list of known providers and important submission statistics are contained in the datapackage.xls file.

Third Party Data Used

We acquired the following commercial/restricted use data products:

- American Roamer, Coverage Right Advanced Services (tabular). This data served two purposes. The first was to verify the provider list and help find Broadband service providers not on other lists. The second was to verify the reasonableness of the Broadband service provider's submission.
- GeoResults Wirecenter Boundaries. This data was used in the verification of 'telephone' Broadband provider data. Where a public domain exchange boundary wasn't available, the boundary was used for coverage containment tests.
- Media Prints Cable boundaries. This data was used in the verification of Cable/HFC Broadband provider data. It was used to research valid providers and discover if that provider was offering Internet service. FCC 477 restricted use data were analyzed to find valid providers within a given area.
- Proprietary Provider Serving Areas. Since the first survey, a number of providers have supplied their engineering, serving area and/or franchise boundaries. We have maintained and enhanced these proprietary data sources.

We have included third party data sources which touch on each of the three major technologies analyzed within the SBI program. Each of these data sources tie back to a public domain data source, which provides a cross-verification mechanism for the commercial data product.

Although there are a large number of third party licensed data sources available, we remain conservative in our acquisition plans. From our limited analysis we are concerned about the ability to cross-verify additional third party licensed sources against public domain data. Further, we are unsure of how we may be able to integrate another data provider's view of valid Broadband providers within the definitions used by the NOFA (e.g. Are they using an FRN/DBA identity view or a marketing view? Can the provider supply in a 7-10 day window? Are they facilities based or not?). This leads us back to a statement we made in a 'lessons learned' Webinar (April 2010) about exploring a consortia to lower the cost of data acquisition and allow multiple entities to peer review the quality and methodologies behind licensed data products.[3]

Beyond these commercial data sources, we used a number of public domain sources. These included:

Geographic Data Files

- US Census TIGER data[4]

Sources that helped isolate providers, identity management or provider service areas

- NECA Tariff 4
- State produced exchange boundaries
- Carrier produced wirecenter boundaries (sometimes proprietary to provider)

---

[3] We also suggested forming a technical standards committee and a consistent system for confidence reporting.
[4] Census data were derived from < http://www.census.gov/cgi-bin/geo/shapefiles2010/main>, Census 2010 files. Roads were derived from the county faces and edges file downloaded at the same location and tiled for a full state.

- FCC Coals reports (321/325)
- FCC FRN API lookup tool
- FCC/FAA Antenna Registration System
- FCC FRN Lookup Tool (plain text search)
- USAC High Cost FCC Filing Appendices

Sources that helped isolate anchor institutions

- USAC Grant lookup tool
- USAC High-Cost FCC Filing Appendices
- HRSA data warehouse
- NCES data lookup
- State managed lists of schools (K-12), post-secondary institutions and libraries
- List of museums, conventions, and visitors bureaus from www.onlineatlas.us
- In state relationships to key stake holders.

Finally, challenges exist when dealing with the inevitable conflicts between provider-submitted data and third party sources (public or commercial). There is no guarantee third party sources are more accurate or timely than the providers' own reports. Indeed, some third party sources are based upon different standards than those specified in the NOFA, perhaps making them less reliable than information collected directly from providers. At the very minimum, provider data has a lineage and temporal status that we can identify. A concern we have with increasing use of third party data is that we have no way to verify its quality or development methodology. Particularly in rural areas we are concerned about what third party data may reflect based upon what we assume to be a small sample of information.

In other words, we may hit a wall in which we can't determine how the commercial source derived its coverage conclusion. To us this means that third party data sources are beneficial, but represent a supplementary view, not an authoritative one, of the NOFA defined Broadband market.

In short, we have chosen to use provider data as the baseline. We will challenge provider reports when third party data shows major anomalies, when submitted data conflict with prior submissions or when a consistent volume of consumer feedback points to a potential error.

Confidentiality and the Use of Licensed Materials

As a mapping vendor, we are reliant upon the cooperation of Broadband service providers. In large part, what underlies this cooperation is trust that we will not violate the proprietary and confidential nature of the data provided to us.

We are thankful for the confidentiality clarification that NTIA shared with us (included as Appendix 3). We use this as a guiding document to help us communicate with providers about what information NTIA considers to be confidential. Our suggestion is that NTIA publish this, or something comparable, to ensure a consistent interpretation of the NOFA and how it guides NDAs.

As some providers are non-responsive to requests for information, or lack resources necessary to put data into NTIA compliant formats, we have fallen back to the use of commercial data sources in several places.

For incumbent telephone providers we have used commercial wirecenter boundary products to filter Census Blocks and segments that are clearly out of their exchange areas. For cable providers we will use an estimate based upon Census Designated Places within MediaPrints named areas.

Public Engagement: Crowd Sourcing, Surveys and Social Media

Crowd sourcing (i.e., an intentional and carefully designed effort to tap into the collective intelligence of the public at large to expand our knowledge base) continues to be an important element of our data collection and validation process. An expanding use of social media is also an important strategy in our efforts to promote the state programs overall and engage more citizens in the work at hand. In addition to the various opportunities the public has to provide input via the online service coverage maps and the related 'Broadband story' process, our crowd sourcing efforts are grounded in a time tested telephone survey approach focused on the consumer market. In addition, we continue to advance our process to include certain initiatives centered in two social media outlets – Facebook and Twitter. These initiatives are discussed below.

Consumer Surveys

Working under contract for the state of Alabama in 2009, our initial consumer survey was performed before the NTIA SBI grant was in place. Subsequent consumer surveys funded by the SBI grant were hosted in 2010 for the states of Idaho, Wisconsin and Wyoming and then again in 2011 for Alabama (as noted below). These surveys will be repeated after two years to establish and evaluate trends. These primarily telephone based surveys include two distinct and carefully scripted tracks: one for Internet users and one for non-users. The telephone survey approach allows us to reach the non-Internet user group as well as the current Internet user. A secondary online approach is also used to augment input from current Internet users. In the most recent Alabama survey we added a third tier to our approach as we equipped local field survey teams with an iPad-based survey tool and targeted their time to reaching the younger market. For non-users, the surveys help determine why they don't have or don't use Broadband. For current Broadband users, the survey helps determine the nature of their Broadband access and how they use that connectivity in their daily lives. In addition to our state-specific surveys a nation-wide survey was also hosted to provide a broader view of consumer views for comparison purposes. State-specific surveys are, where possible, framed to match the state's regional Broadband planning structure (e.g., the updated consumer survey in Alabama was designed to produce results relevant to the state's twelve Broadband planning regions).

The resulting data is helpful on a number of fronts in the SBI's mission to advance the access and adoption to Broadband. Survey data provides an important, albeit broad, gauge for assessing coverage information obtained by providers. For example, areas with widely available coverage (according to provider information), but lower consumer subscription levels (according to survey results), or perhaps where survey results suggest Broadband is not available, can be examined in more detail. Survey results

are also very important to the broadband planning (and capacity building) components of the SBI program in that they help inform and formulate Broadband advancement priorities. Survey results also help inform Broadband policy discussions on both the local and state levels. Finally, survey results provide important information to the service provider community regarding market demand and specific Internet use in specific communities (i.e., regions).

Our ongoing consumer survey process adheres to a consistent process. For example, consistent with prior practice the 2011 Alabama survey was launched in June 2011 with a test number of survey calls to confirm (and adjust as needed) the structure of the survey and the underlying survey process. Our surveys typically run for three to four months. All telephone surveys are completely random beginning with the acquisition of a list of state-specific, randomly selected landline telephone numbers. Mobile phones are not typically included in the surveys. Upon evaluation of the survey statistics, auxiliary surveys are executed to ensure appropriate representation is achieved on both demographic and geographic fronts. For example and as noted above, the recent Alabama survey was augmented with a field effort to ensure the younger demographic (i.e., age 18 – 25) was adequately represented. This secondary step is required because of the continued migration (by younger markets) to non-landline based communications. This younger market is also surveyed by reaching out through social media outlets (primarily Facebook and Twitter) to encourage their participation in an online survey process.

As noted above, our telephone survey process is augmented by providing online access to the survey. Participation in the online survey is promoted on all of our state-specific public web sites and selected social media.

As a final relevant point with respect to the consumer survey process the length of the survey is noteworthy. By survey standards, these tend to be long surveys. The surveys typically average just over fifteen minutes. While this clearly contributes to the number of survey call attempts that were required to reach the level of statistical validity, it is not insurmountable.

Social Media

The phenomenon of social media is widely documented and yet still emerging as an effective access point for public engagement. We continue to explore appropriate ways to use a variety of social media venues in our SBI efforts. All of our efforts are informed by and consistent with relevant state statues and guidelines. Different states have different perspectives on if and how the state will participate in the use of social media. Some state requirements are well defined and some are still being formed. Where appropriate, we use LinkedIn, Facebook and Twitter to support our work. A central focus is on promoting awareness of the program and seeking to expand engagement. In some situations we find that sub-program initiatives (e.g., regional planning teams) are making very effective use of Facebook to help inform and engage citizens impacted by the SBI program. As noted above, we are able to promote additional input on the consumer surveys through a social media outreach program aimed at our younger market segments.

In addition, we continue to evaluate how Facebook and Twitter can be used to drive public input on two important crowd sourced issues: online speed tests and input on map accuracy. Based on data obtained

through our web site traffic monitoring process and readily available social media tracking processes, results are promising.

Capacity Building and Transitioning to State Partners

A fundamental goal of LinkAMERICA has always been to transfer knowledge and capacity to our in-State partners.

Within each State, transition planning and responsibility for specific activities is on a slightly different timeline. Much of this is driven by resource availability and partner identification within the State. For example we began transitioning the responsibility for Community Anchor Institution data to the State of Alabama in Round 3, starting with the use of interns to validate Community Anchor Institution data. In Round 4 the state's responsibility expanded to include collection of all CAI data, and in Round 5 the effort culminated with Alabama assuming responsibility for the CAI submission. LinkAMERICA supported this process with detailed transition documents and technical support.

Alabama plans to continue the transition process though the end of year 3 assuming more responsibility for the interactive State maps and website. In Idaho the SBI Framework Coordinator took on the responsibility of reaching out to CAIs in round 5. In round six the outreach became more relationship based and face to face. Other States are looking more towards program year 4 and/or the in-State hire of a Broadband Coordinator as the initiation point to support their transition efforts. Broadband Coordinators were brought on board in both Idaho and Wyoming in year three. An open position was recently filled in Wisconsin. Alabama has had a broadband coordinator in place for nearly two years.

Data Sharing With Other States

Where possible, LinkAMERICA works to share data with other state mapping entities. This data exchange tends to take two routes.

First for wireless providers if we find a fair amount of coverage that crossess into an adjacent state, we will ask the provider's permission to convey this information to the neighboring states. If the permission is received, we send the data to the mapping agency.

Second, in circumstances where we receive a speed that is outside of the technology speed 'norms' and this provider offers service in another state we try to check with other covered states to find out if the service is comparably marketed.

Trends in Submitted Data

Overall we note several important trends in this data submission. The list below represents general trends and not a scientific survey.

We note the following trends:

The coverage of advertised speeds is increasingly important. More and more providers are specifically concerned about where the submitted NTIA footprint shows available of 4 x 1 Mbps or 6 x 1 Mbps service.

Large national providers are beginning to submit block level speed information. In round 6 AT&T submitted block level coverage and speed. Other national Wireline providers, such as Frontier improved their submission based upon the completion of system conversion of acquired properties.

xDSL speeds are increasing. More and more xDSL is likely ADSL 2+, VDSL, shortened loops, pair bonded or some combination of these. As we talk to providers who trigger speed/technology tripwires, we receive more and more feedback about the presence of these new technologies to enable speeds comparable with DOCSIS systems.

DOCSIS 3 is becoming the norm. Most cable systems are becoming DOCSIS 3.0. Over time we are seeing the DOCSIS 2.0 areas diminish. In some DOCSIS 3 areas there tend to be pockets of non DOCSIS 3 in predominant DOCSIS 3.0 markets.

There seems to be an increase in acquisitions among fixed wireless providers. A large consolidation with respect to T6/Digis/Skybeam/JAB has changed the provider landscape in several of our states. As much of the system consolidation has not yet taken place our coverage remains largely in tact but we anticipate changes in the next submission.

Fixed wireless providers are offering broadband services approaching 1 Gbps. This is occurring both in terms of licensed and unlicensed spectrum. Part of this is driven by where a provider has fiber or high capacity wireless backhaul but we are receiving more and more information from providers and radio manufacturers specific to very high speed wireless services. Although the service can be deployed within the 7-10 day NOFA window, these higher speed services tend to be purchased by high capacity customers. It may be worth reconsidering the speed norms in this category as well as adding a field in the datatable to indicate when a speed value is geared toward a specific end-user class.

There is less and less of a distinction between fixed wireless and mobile wireless. As firms market LTE and/or WiMax as home DSL alternatives we are a bit unsure how these two classes are to be established-what is the operating distinction between Transtech 80 (mobile licensed) and Transtech 71 (fixed licensed) when both are used as in in-home Broadband service?

Satellite providers are advertising broadband services exceeding the speed ranges in the data model. Further the spectrum used isn't available in the NTIA data model.

We continue to see a number of national Broadband providers who do not show broadband coverage within pockets of otherwise covered areas. In the figure below, the orange represents Census blocks which are NOFA broadband covered. The transparent areas have no NOFA broadband coverage from the same provider.

Figure 1--Uncovered pockets within urban, covered areas

This coverage drop-out appears to be happening in urban Census blocks typically with schools, shopping malls, universities and large businesses. We don't know what his is happening, but it could be an impact of the NOFA restriction on 7-10 provisioning. This is a noticeable artifact in the data and does challenge the notion of some who see NOFA compliant Broadband coverage as a uniform surface across an area.

Data Production Process

To support our objective of transitioning the data development process to our State partners, we continue to model, refine and document our data production process. We find this to be a very beneficial step for two purposes.

First, it helps us understand why (and if) a task is being done, and if it is being done efficiently. Much of this program started so quickly that it was difficult to plan logical integration and hand off points among the various workgroups. Further, we are currently in the process of consolidating much of the process data (check-ins, check-outs, metadata) and we can use this process model to efficiently plan cohesive information architecture.

Second, our process documentation and modeling helps explain why resources are being consumed in a particular way. This helps our State partners plan for in-sourcing specific tasks as their time and

budgetary constraints allow.   It also helps our LinkAMERICA team better plan and cross-train members to deal with the work surge that occurs 30-45 days prior to submission.

Finally, documenting and modeling our process helps us to take advantage of increasing specialization and proficiency with certain types of data and management responsibilities.   In submission 3, we had identified data “czars” responsible for check-in and check-out of data. That data czar helped to bridge the gap among receipt functions, provider feedback, production and DBA. In round 5 the data czar was also tasked with alerting on speed/technology tripwires. This individual was responsible for taking the initial review of each submission and determining if an NTIA speed/technology warning would be triggered.

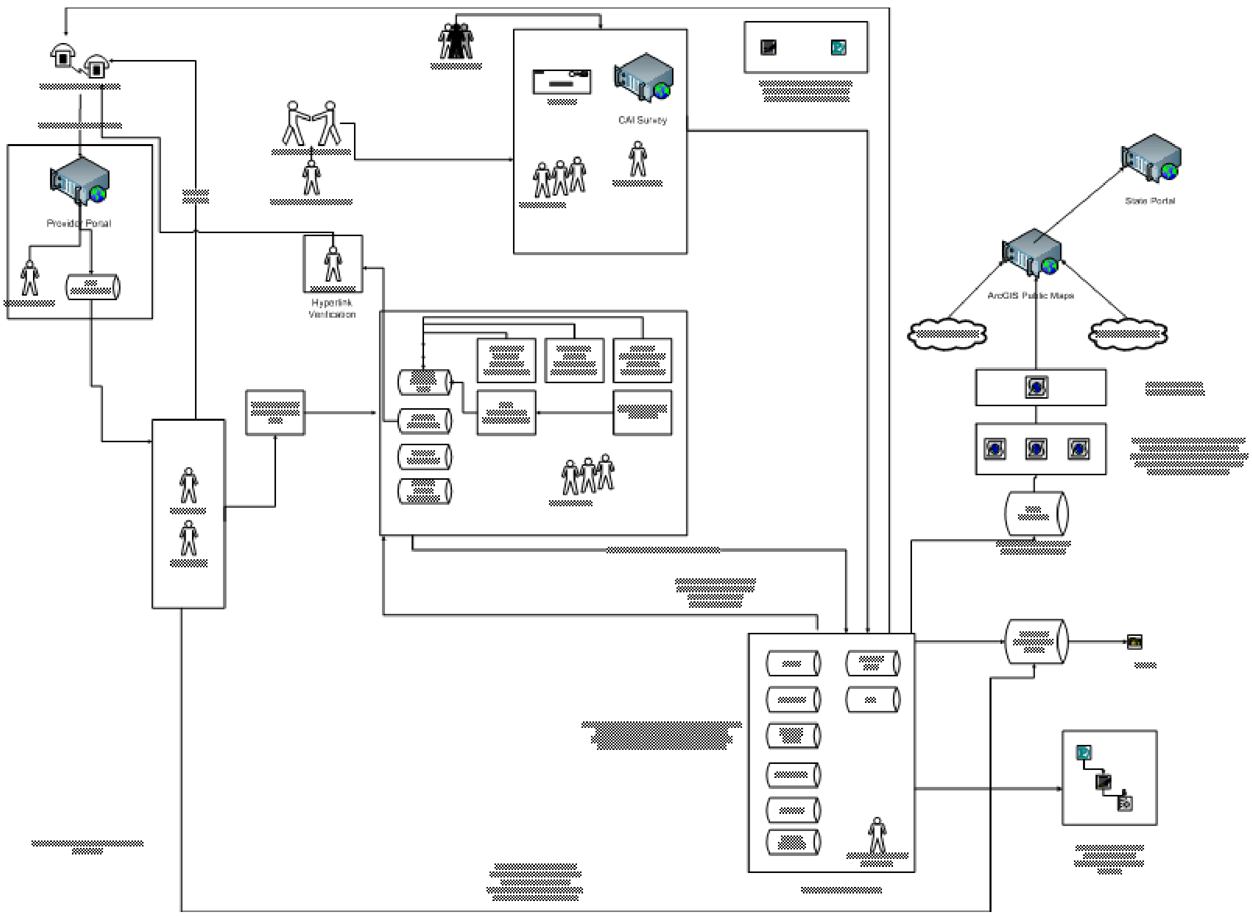


Figure 2—SBI Data Development Business Process Diagram

Provider Tracking In the Cloud

Prior to initiating the Round 5 survey, LinkAMERICA transitioned in house provider tracking systems to a Cloud based application, TrackVia.

The movement away from desktop solutions was based upon several factors. First, the architecture these systems were designed under no longer met the program realities. For example, deliverables like

Datapackage.xls were not contemplated when the original provider tracking system was developed. Second, the ability to share data across multiple geographic areas and organizations was becoming increasingly important as the program evolves and responsibility moves to in-State partners. Third, portions of this data need to securely transition back to State resources who may or may not be able to support a specific IT infrastructure. These factors combined to make the Cloud applications a valuable alternative.

As with any IT transition, the process has not been without challenges. Nonetheless the investment in time and resources has proven to be effective and worthwhile. We anticipate further movement away from desktop oriented architecture to a more open, Cloud type solution.

Data Production Methods

As raw data were received from the provider community, attention turned to normalizing the disparate submission formats[5]. The team considered each submission with respect to the following criteria. These criteria are important because they perform the basis for our verification and quality assurance process. In other words, we have to appropriately scale our data verification efforts to match the scale or ambiguity of the following:

- Locational certainty
- Speed certainty
- Temporal certainty
- Provider and network ownership certainty

The team's goal was NOT to quantify a particular degree of precision with respect to any of these criteria. Rather, we are working to attribute the above "certainty attributes" to each submission, and will continue to implement quality assurance and verification mechanisms that are resource-appropriate for each.

Deriving Broadband Coverage Information

Broadband Coverage[6] was normalized into four formats:

1. Coverage in Census Blocks (2010) of 2.00 or less square miles
2. Covered Street Segments (2010) in Census Blocks greater than 2 square miles[7]
3. Address Level Coverage (point data)
4. Wireless Service Areas (SHP file format)

[5] In line with NTIA Best Practices we continue to request and receive a large number of data input formats. This ranges from tabular Block lists to hand drawn maps.
[6] Speed, Anchor institutions and Middle Mile facilities are discussed in later sections.

[7] To help clarify issues relating to Census block area and vintages in use, our team published a technical paper to the Grantee workspace. Because we were unsure if this standard should be implemented uniformly, this document was never distributed to the provider community.

With each submission, the team went through a series of steps to normalize and categorize the data. Since data arrived in many different formats, and at many levels of granularity, the following normalization procedures were used:

- Determining the nature of service being provisioned (who is providing service and what technologies are in use)
- Planning an attack strategy for the submission –understanding the data and assigning team members to various tasks
- Alert provider relations staff if the received data trigger an NTIA speed/coverage tripwire.
- Geo-referencing the data; QA the geo-referenced data
- Geoprocessing the geo-referenced response
- Segregating the submission into the correct NOFA-compliant submission formats.
- Apply appropriate source metadata[8]

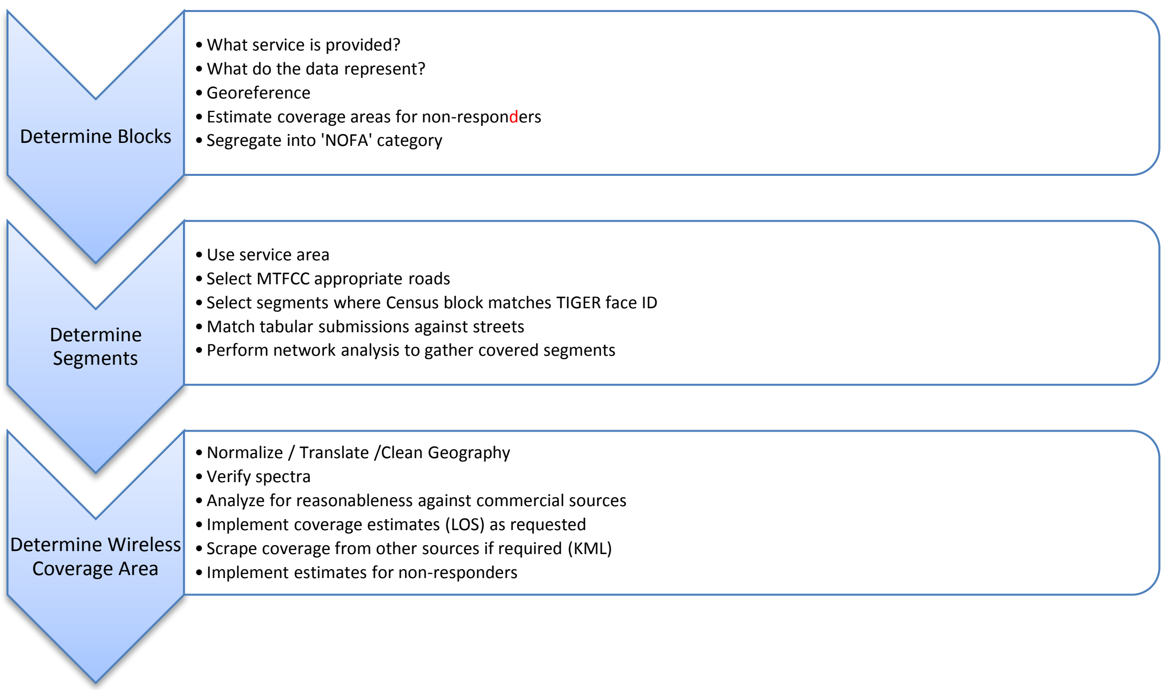


Figure 3-Components of Broadband Coverage Process

Impact of Program Change

There were several important program changes that impacted how Broadband coverage was developed and submitted to NTIA in Round 6.

[8] When our team logs a submission into the staging database we record at least two attributes. One records the method used to derive the coverage, the other records the method by which speed was attributed to that object. Other attributes carried to NTIA carry source meta values as well.

Speed Examination

Given recent concerns about the depiction of speed and what that mapped speed represents, LinkAMERICA invests considerable time requesting detailed information on speed which appeared to be beyond normal speeds for a given Technology of Transmission given the NTIA supplied frequency tables.

Based upon these conversations we learned

A) For incumbent telephone providers; the speeds beyond the normal xDSL range represent significantly shortened copper loops, as well as upgrading DSLAMs and modems to support ADSL2+ or VDSL.

B) For cable providers the intermixing of DOCSIS 3.0 and non 3.0 systems in a market area is typical and sometimes reflects a circumstance where segments of plant cannot be upgraded to DOCSIS 3.0. This variance can be at a level below the Census block. In these cases the maximum advertised speeds remain to represent the market area but the plant variance is typical. We also have one 'cable' provider who is delivering DOCSIS 2.0 over fiber plant.

C)There exists a fundamental disconnect between some providers reporting a service qualified speed--the maximum speed available at a structure versus other providers submitting their maximum speed at the market (MSA/RSA level). Both submission paths are available to providers but the likelihood of providing a speed incompatible with a technology is much greater for providers submitting market level speed.

D)Fixed wireless provides are using new radio technology to quickly deploy services which rival and sometimes exceed those of wireline service providers. These speeds are being advertised, sometimes on public facing websites as well as using direct field sales staff to target specific high demand customers. These services are actively marketed but they challenge the data model in that the speed is marketed and available within 7-10 days of request but the nature of the fixed wireless submission forces attribution of this speed within a potentially large geographic area.

E) There exists a minority of providers who submit a theoretical speed that is unmatched by their web advertising. In these cases we request clarification from the provider on the inconsistency. Our experience has been that providers will modify the speed to be consistent with their marketing and advertising.

F) The maximum advertised speed offered is not always clear. Sometimes the speed is described in advertisements in terms of a combination of video and data. Other times it is data not video. Some providers allow a customer to select how much bandwidth they want to allocate to their data stream versus video stream. In other words the bandwidth available to a household is constant but how it gets allocated among the data versus video becomes a customer or service directed choice. This makes getting Maximum Advertised Downstream speed very difficult because it is not just a product of the broadband network which we are mapping but also the customer's selected service package.

Provider Definitions

Within our provider verification process we work to derive a state level provider match against third party data sources. As discussed in the early pages of this manual, there is no guarantee that a third

party data source is any more accurate than submitted data, nor does it necessarily reflect the provider ecosystem specified in the NOFA, Technical Appendix A. We devote significant resources to matching our submitted data against outside data sources. In many cases this becomes a judgment call trying to match provider names across systems. It is a difficult and somewhat arbitrary process. Nonetheless we do believe it has value because it forces a re-examination of who we believe is an appropriate provider within a non-NOFA context[9].

The use of a provider match system, as well as the webinar comments (3/17/11)[10] directing grantees to estimate, wherever possible, non-participating providers have made us back away from one of our fundamental assumptions in data collection. As discussed in prior versions of this manual, we had developed a certain "hold-out" class of data when a provider's data wasn't of sufficient quality to verify, or we were unable to put it into the data model (e.g. address points submitted for fixed wireless). In submission four, much of this hold-out data was included[11]. In some cases this involved using simple polygons to capture a wireless ISPs serving area. Other times, if we are confident in the coverage, but can get little clarification on the submitted speeds or frequencies, we release the coverage and note in our internal metadata the source issues with the other attributes.

In the weeks leading to submission 5 we received a request from NTIA to clarify the presence of unusual shaped wireless polygons. Our interpretation of this was a request for information relating to the source of these data which do not appear as propagated coverage. Although the 'unusual shapes request' represents a very small portion of the submitted data, it begs an important question about the expectations with respect to wireless coverage patterns. We look forward to working with NTIA to address these issues in a fair way across States and providers. We would not want to create a coverage dichotomy where advertised coverage was disallowed from the NTIA submission because of an expectation about how advertised coverage should appear. One concern we have when we develop a coverage estimate which differs from a providers advertised coverage pattern, which should we submit?

Finally, we use the provider type classification of 'other' to bring specific aspects of certain provider's data into our submission. There still seems to be confusion on how to handle provider types where a provider offers multiple paths to provision Broadband for typically business customers. Rather than waiting for certainty on the answer, we bring the provider in and list them as provider Type "other". Our sense is provider Type "other" will continue to expand in subsequent submissions.

Clearly one challenge is the data, but an equally significant challenge is appropriate messaging around this "other" provider type category. We do not want to leave consumers with the impression that they

---

[9] We have requested from NTIA information on how provider matching is done within their QA process; beyond the relatively short whitepaper posted with the national map <http://www.broadbandmap.gov/blog/wp-content/uploads/2011/02/DataComparison_Methodology2.pdf>, we have not received any more detailed information on how providers are cross verified between submitted and third party sources at the national level. Our understanding is licensing concerns are holding the release of this information.

[10] Clarifying comments from Akins Lawl indicate the Program Office does not want Satellite providers estimated if the provider is non-responsive to data requests (email 9/12/12).

[11] We continue to process older submission data looking for information and methods by which we can estimate coverage information. This will be an ongoing process.

can get a high capacity fiber or microwave link despite the fact that the hospital next to them or in a nearby Census block can get this service.

After the April 2011 Grantee conference, LinkAMERICA submitted a paper describing our provider classification system[12]. It is our feeling that understanding the type of provider is essential to appropriate verification methods.

Coverage Geoprocessing Methods

The next section discusses how data were georeferenced and geoprocessed given a particular submission format. We have yet to find a particular method that works across all submissions. Rather we tend to tailor our geoprocessing to meet the specifics of the service provider and data submitted.

In most cases, in Round 6 we were not provided with street segment geographic objects for Blocks greater than two square miles (large Blocks). This necessitated subsidiary geoprocessing. As stated before, our first goal was to derive block level coverage. Then, for Blocks greater than 2.00 square miles, we moved to a segment gathering processing. The segment process will be described in the last section.[13]

Block Level Coverage Derivation Using Service Point Data

A number of providers submitted point level customer data.

In some cases the submissions themselves were not internally consistent. For example, in the image below, unprojected points are shown, while the Census block polygon to which the points are supposed to "belong" is highlighted. In this case, one of the following scenarios has occurred: block attribution is wrong, the points are not in the location to which they are attributed, or different block shapes were used than what is assumed.

[12] https://sbdd-granteeworkspace.pbworks.com/w/file/42309493/provider%20ClassificationFINAL.docx

[13] As has been discussed previously, we note inconsistency in how providers are supplying information at the block and segment level. Beyond the temporal differences, we see that providers are computing area differently, as well as including or excluding water areas. This provides an inconsistent measure across providers for the 2.00 sq mile cut off. Our preference would be to provide guidance to service providers within our states, but our concern is that we will inconsistently message this with grantees in other states. We would appreciate consistent guidance from FCC/NTIA on this topic.

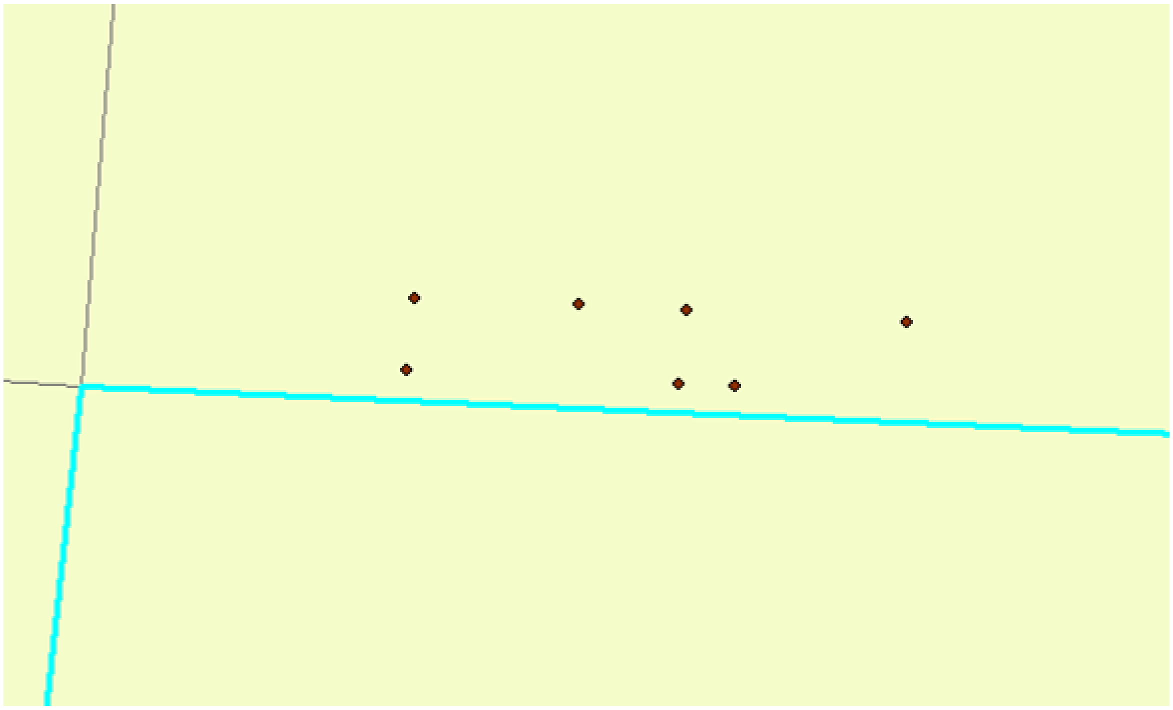


Figure 4-Internal inconsistency in submitted data

In other circumstances, we found that inconsistent geocoding standards may produce misleading results. The next image shows point level data, and the Blocks are colored based upon the counts of points intersecting Blocks. The challenge this presents is that if geocoding was performed on a different dataset than the block boundaries (the road traces are not coincident with block boundaries) and/or geocoding was done without an offset, it becomes problematic to assign coverage to a Census block based upon only the point locations.

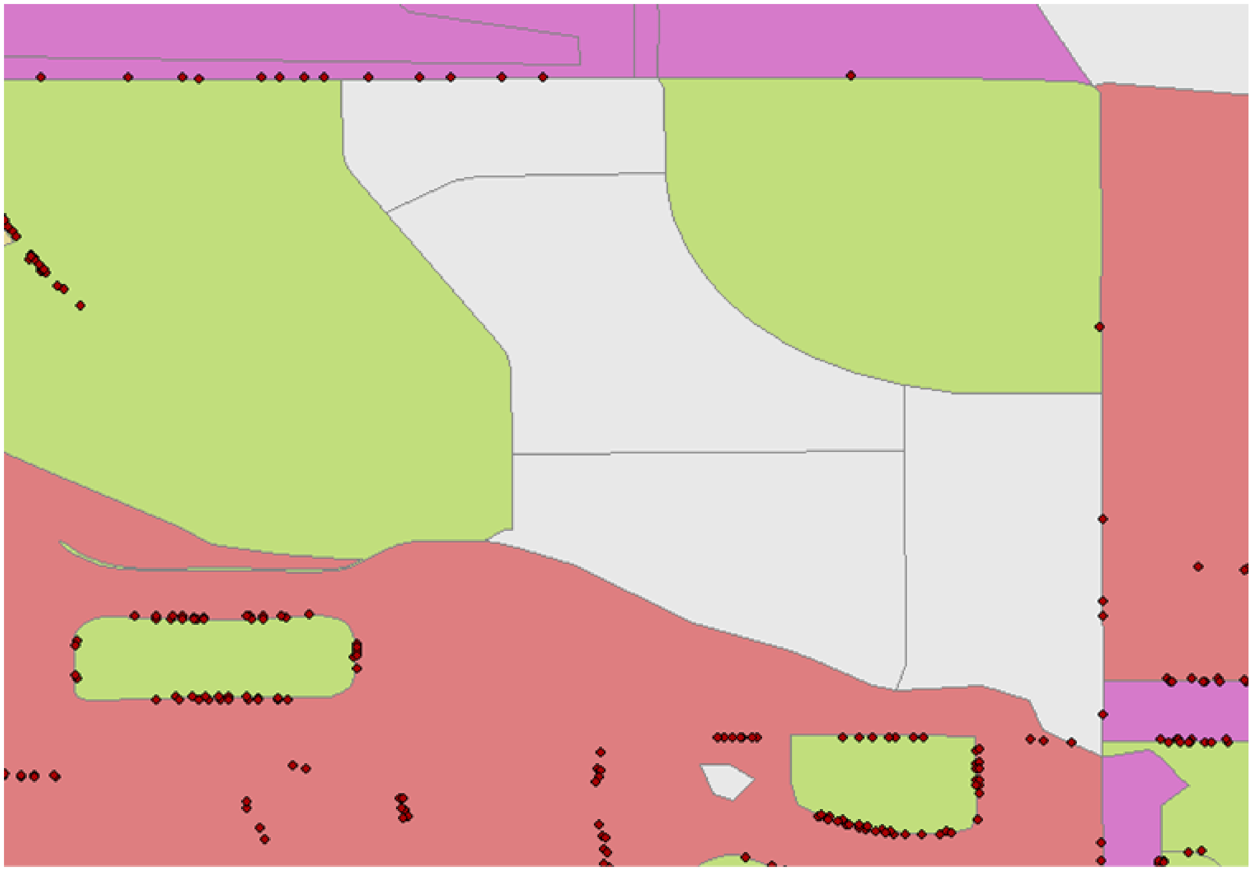


Figure 5-Block Coverage

For this reason, where we were provided address point data and asked to generate covered Census blocks, we elected to use a 200-foot buffer to select Census Blocks that intersect our points.

We also see a number of providers submit customer data and facility data. Their intent is to allow us to have two primary sources from which to derive the most accurate coverage. In these cases we tend to look for clusters of customers in areas where we see no facility based coverage.

With respect to deriving Block level speed from sub-Block data, we have instituted a business rule where the predominant speed in a Block is the speed we attribute to the Block.

Block Level Coverage Derivation Using Customer Facing Plant Level Point Data

In other circumstances, providers submitted point level plant data. From what we could gather, these points tended to be customer-dedicated terminals. Typically, these providers were high speed Broadband producers—which may somewhat strain the definition of Broadband as other providers supplying comparable services specifically disclaimed the ability to provide high-capacity Broadband services in the required 7-10 day interval. In these plant point data submissions, we had similar concerns to the point level customer data, but two factors tended to make us use a more conservative intersection buffer. First, we tended to have far fewer points to work from, so our concern was grabbing too many covered Blocks as the Blocks tended to be much smaller in these urban areas.

Second, these plant points tended to be dedicated to distinct customers, but it was difficult to know which element of the customer's campus to attach coverage to.

In the case of the image below, given a small shift to the left, it would be easily possible to gather 1 to 3 Census Blocks from this point. Although orthoimagery is helpful in a circumstance such as this, it is still indeterminate.

Thus, in the circumstance of plant level point data, we used a 100-foot intersection buffer.

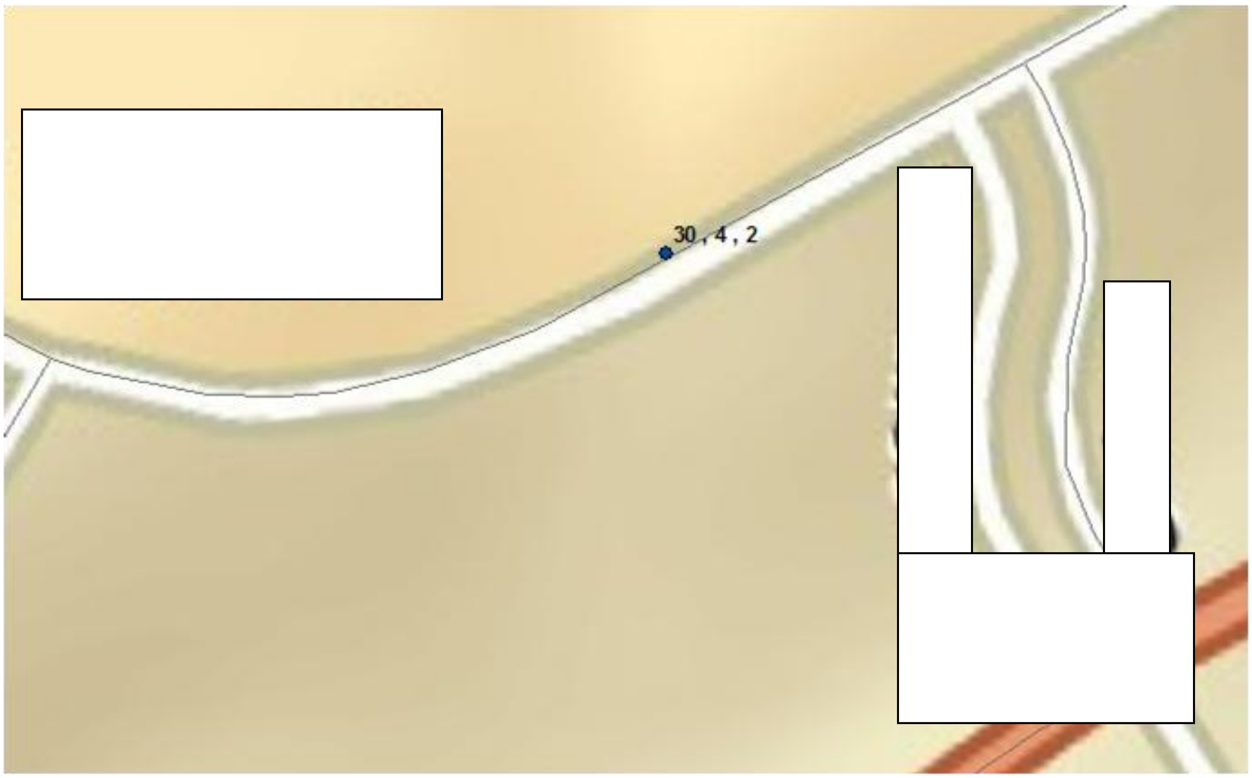


Figure 6-Plant Point level data

Coverage Derivation Using Linear Facilities Data

A number of providers submitted facilities data. We handled this data in different ways depending upon what we believed the facility data represented.

Most telecommunications networks are divided into two components. Feeder - supplies higher capacity nodes (eg. DSLAMs, Fiber Nodes). Distribution - usually supplies customer premises (NIDs, Pedestals, Taps, ONTs). Where we could discern what facilities we were provided, we used different methods.

The next image demonstrates a geo-referenced CAD image as given to us by a service provider. Note the light and dark green shading. We would infer that the lighter segments represent distribution and the dark green represents the feeder network.

In the case of a combined strand map, we used a relatively tight buffer of 200 feet to gather covered Census Blocks. Our intersection tolerance is based upon an assumption that our data likely represent a

situation comparable to customer point level submission in that we have most of the network footprint captured.

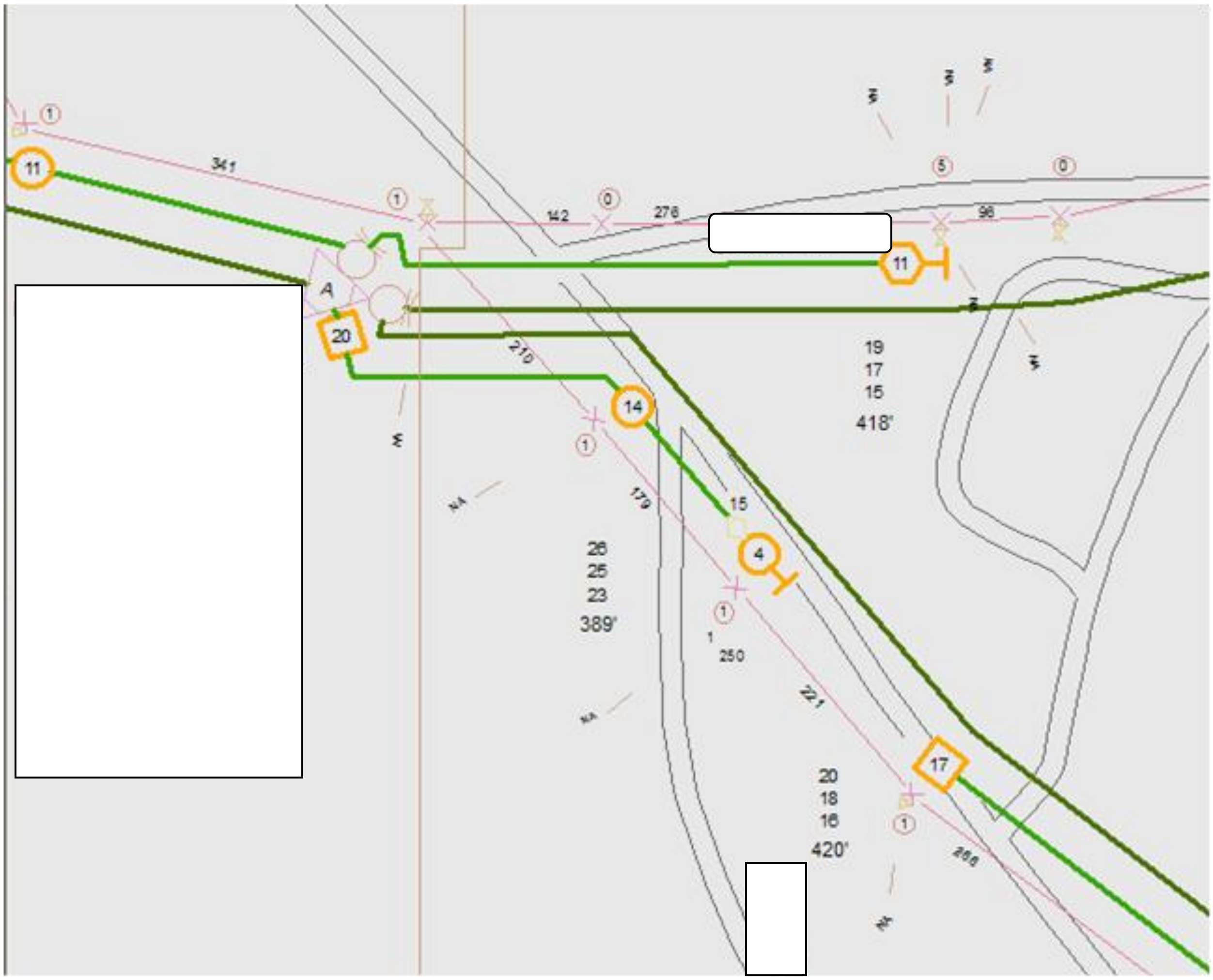


Figure 7-Georeferenced CAD information supplied by Broadband provider

In other circumstances, we were provided engineering information that we inferred to be feeder only. This inference was typically based upon the presence of fiber optic equipment only. In these cases, we used a more generous 2,000 meter Census block intersection. The 2,000 meter criteria was based upon an informal survey of population in proximity to the geo-referenced strand data, but it could be varied based upon a more complete survey.

Coverage Derivation Using Covered Street Segment Data

In some cases we were provided with covered street segment data. Covered segments tended to come from two sources.

In some circumstances, providers gave us CAD data, which was not drawn in a projected manner. This is relatively common for older engineering data derived from hand drawn records. This meant that our

team geo-registered the image into an approximate position. In this case, the boundary streets were selected, and an enclosing polygon was derived. The intersection of this polygon and the Blocks within became the geoprocessing method to derive Blocks.

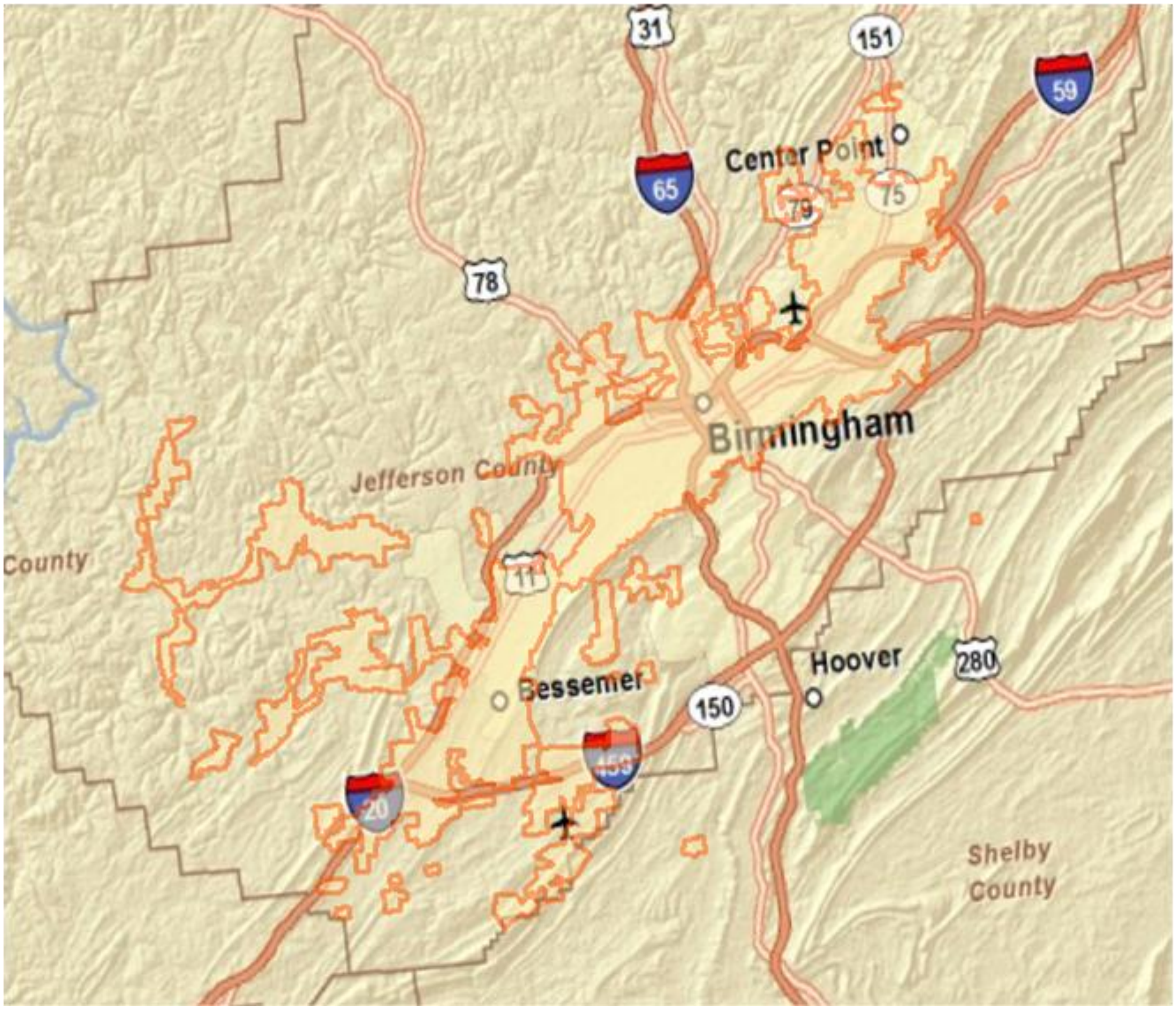


Figure 8-Coverage derived from street segments

In a second circumstance, street segment data was developed during coverage estimation. Handling the estimated data is discussed below.

Coverage Derivation Using Serving Area Point Submission Data

In other cases we worked with providers to derive service areas based upon point plant data. In these cases we were given a serving node and an appropriate road length service boundary. There is an important distinction from the plant data discussed above. In this specific case, the data submitted was a node that served many locations--such as a Central Office or DSLAM. This is contrasted with the earlier example in which the point represents a node serving only a few customers.

When trying to derive coverage from Central Office or DSLAM nodes, the team used ESRI Network Analyst to derive covered road segments honoring these road engineering parameters.

The figure below shows street level coverage derived from Central Office and remote DSLAM point data.

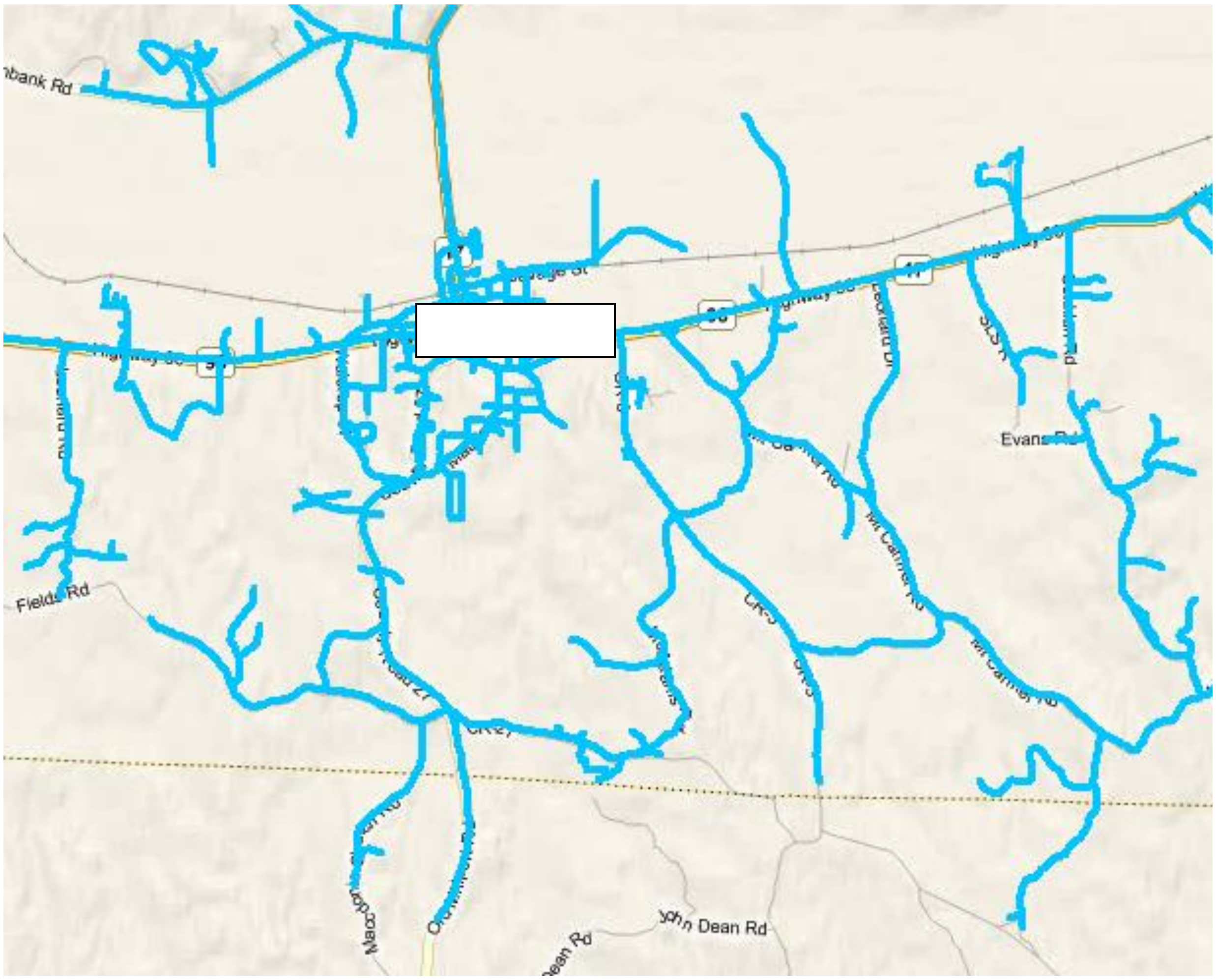


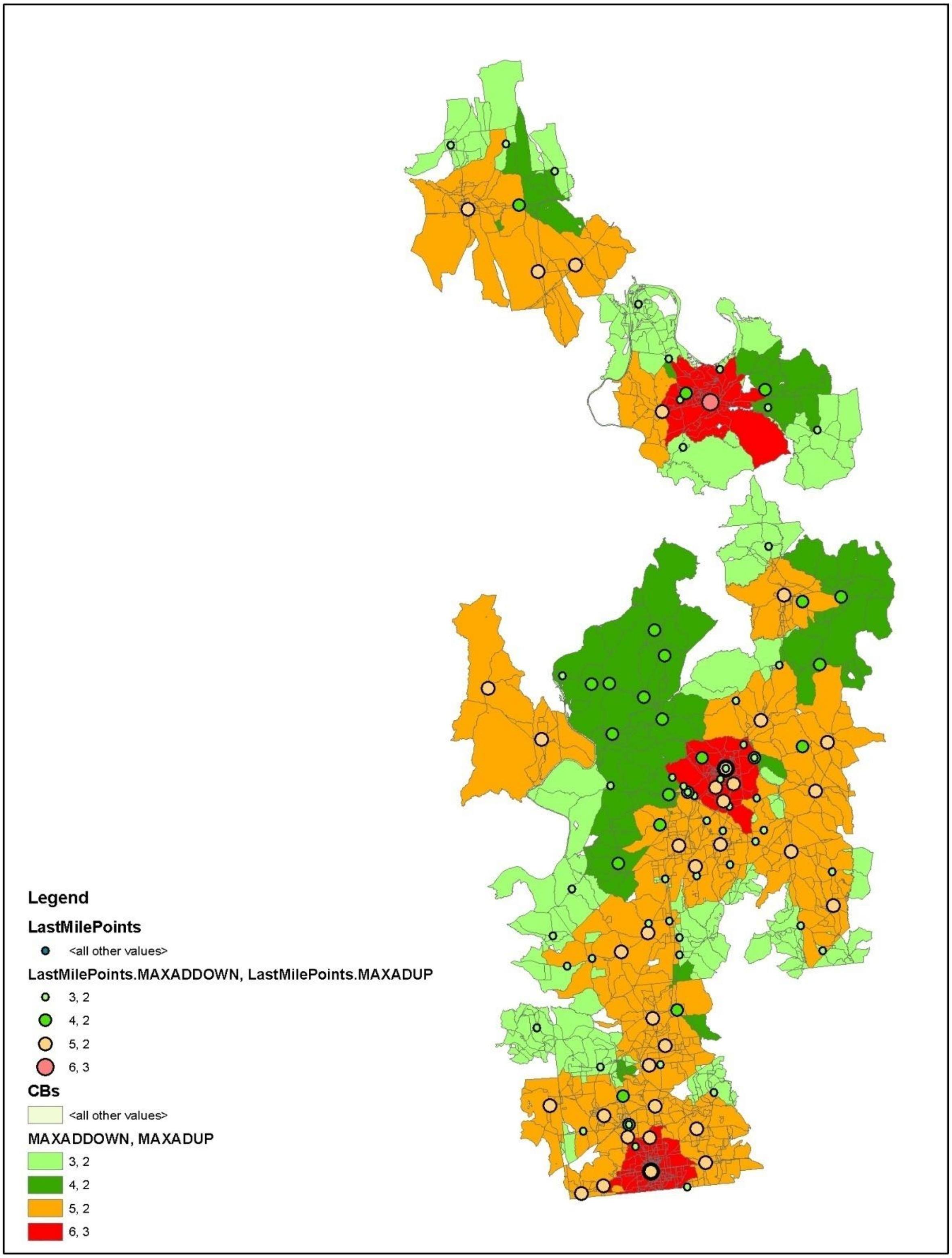
Figure 9-Coverage derived through road paths

In response to Provider feedback we revised this process to include a larger variety of TIGER road types. In Round 1, unimproved roads were not used. In the current submission -- particularly to improve estimates in areas bordering parks and public lands -- a wider class of TIGER roads was used.[14]

The segment level coverage is easily extendable to derivations of Census block level speed. The figure below shows the attributions of block level speed based upon the Maximum Advertised Speed available from a DSLAM. Although the methodology isn't perfect, it does provide insight into the value of granular infrastructure data.

[14] Only TIGER features of MTFCC type S1100 and S1200 were excluded from use.

Over time we have seen an increase in the number of providers submitting this type of data for our use. Our sense is some providers find plant level data easier to generate and are satisfied with the results of derived coverage.


Legend
LastMilePoints
<all other values>
LastMilePoints.MAXADDOWN, LastMilePoints.MAXADUP
3, 2
4, 2
5, 2
6, 3
CBs
<all other values>
MAXADDOWN, MAXADUP
3, 2
4, 2
5, 2
6, 3

Coverage Derivation Using Polygon/Polyline Serving Areas

Broadband service providers sometimes submitted coverage in terms of served areas. This was either in direct geospatial formats, CAD files, or paper maps. The image below reflects a carrier's service area. Within that service area, there are variations in technology of transmission and served speeds. When polygons with speed data and technology of transmission were available, we used a spatial intersection to gather covered Census Blocks. In many cases, using covered Census Blocks resulted in a loss of the speed variation (sometimes the speed variation was at a level smaller than a Block and did not get picked up within a spatial query).

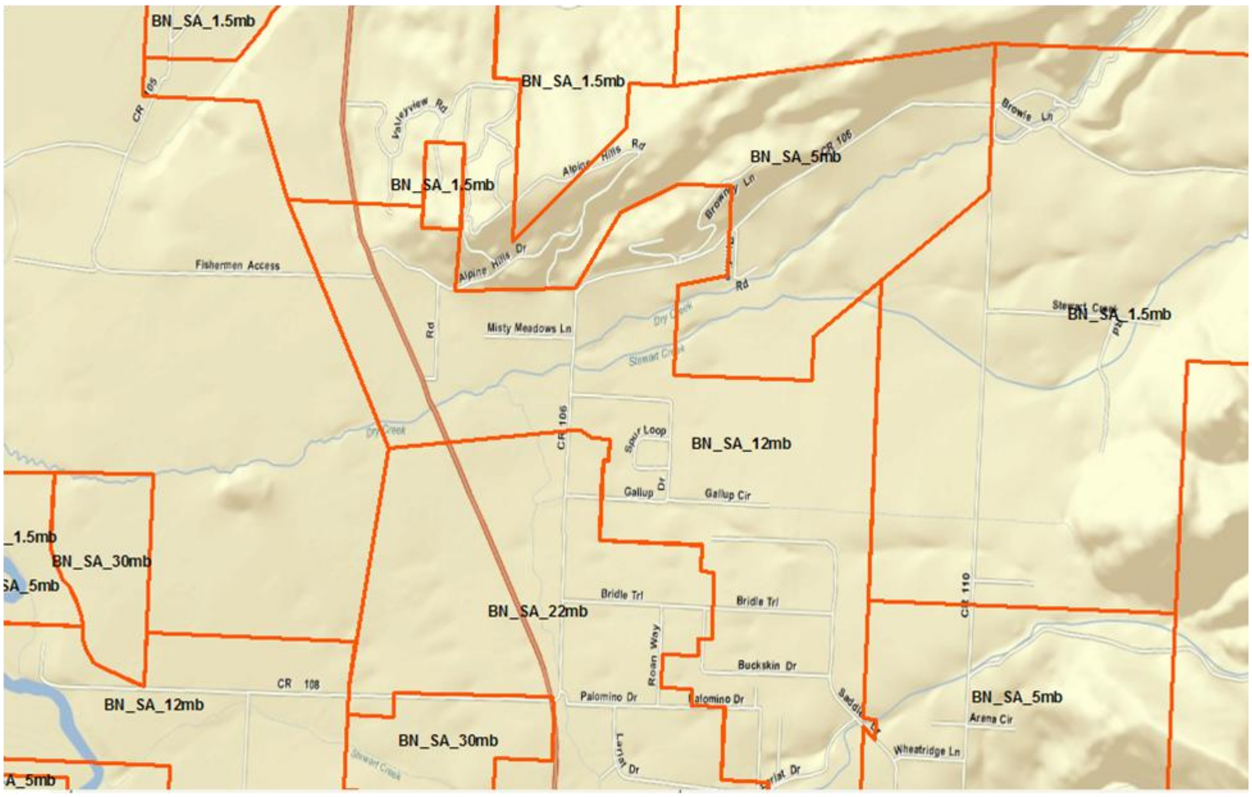


Figure 10-Coverage derived through serving area polygons

Although we cannot directly solve the loss of speed granularity due to Block shapes, we honor a business rule wherein we always select Blocks from the highest speed areas first, and then allow the lower speeds to select from the remaining Blocks. This is an arbitrary rule, but our feeling was that it should be a consistent selection, rather than an unordered selection.

Street Segment Derivation, Large Blocks

For those calculated Blocks greater than 2.00 square miles (large Blocks), we provided coverage in terms of covered street segments and corresponding geography.

With respect to segments we had four sources of data:

1. Covered large Blocks
2. Tabular street segments and address ranges for large Blocks

3. Geographic segments either with street attributes or without
4. Service area boundaries

A few providers only provided a list of covered large Blocks without corresponding segment information beneath the block. This provided the choice of either selecting all segments in the block, or none. Because we had little information from which to make the selection, we elected to be conservative and did NOT pass any covered segments to NTIA from this submission format.

Some Broadband providers submitted covered street names and street ranges. In these cases we performed a manual analysis trying to link to specific segment names and address ranges within covered Blocks. Sometimes this was a simple process because a provider used a TIGER derived street database. In other cases we could not determine the source of the provider's street data. Street and Address matching tended to yield a relatively good result (typically between 30% and 100% of possible segments in the Block), but was very time consuming. Where yield rates were low, our result was a shredded

segment coverage pattern, like the image shown below.[15]

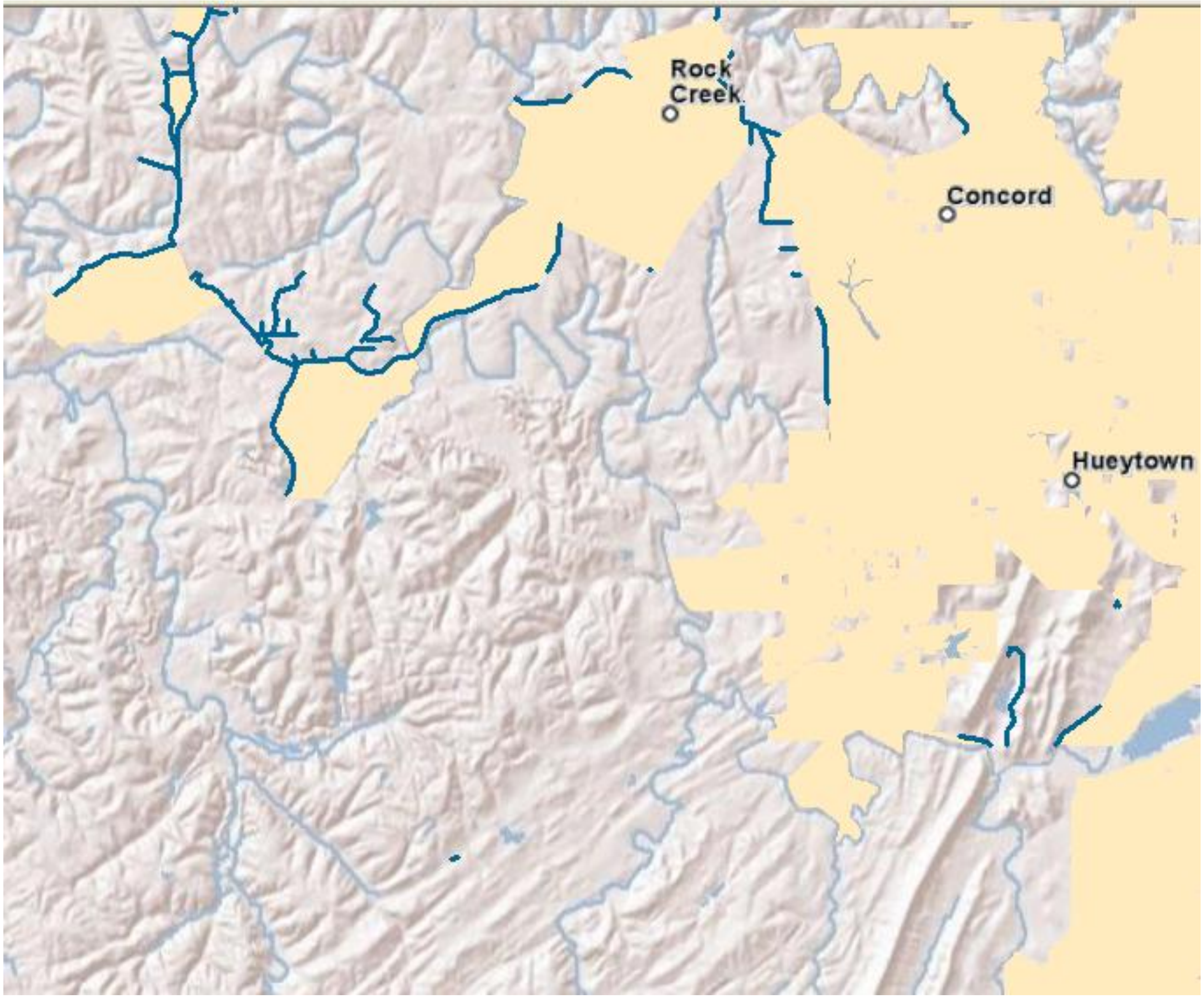


Figure 11-Blue road segments adjacent to peach covered small Blocks

A number of providers submitted geographic objects. In this case, our manual process was directed toward a conflation of data sources. The goal was to take provider submitted segments and put these segments in terms of our TIGER 2010 basemap. Although there is a trade-off in the accuracy using non-provider submitted segments, we felt it was more important to have a license-free road set that would edgematch our Block features, the TIGER state boundary and remain consistent with the block size standards we used for other providers. This is important for the appearance of the online maps, as well as potential verification work where we are attempting to judge a feature based upon its attachment to a covered small Census block. The figure below shows street segment input data.

[15] We continue to hear providers expressing concern that our request for either a geographic object or TIGER Line ID is beyond the scope of the NOFA clarification. Therefore, they cannot supply additional information to us.

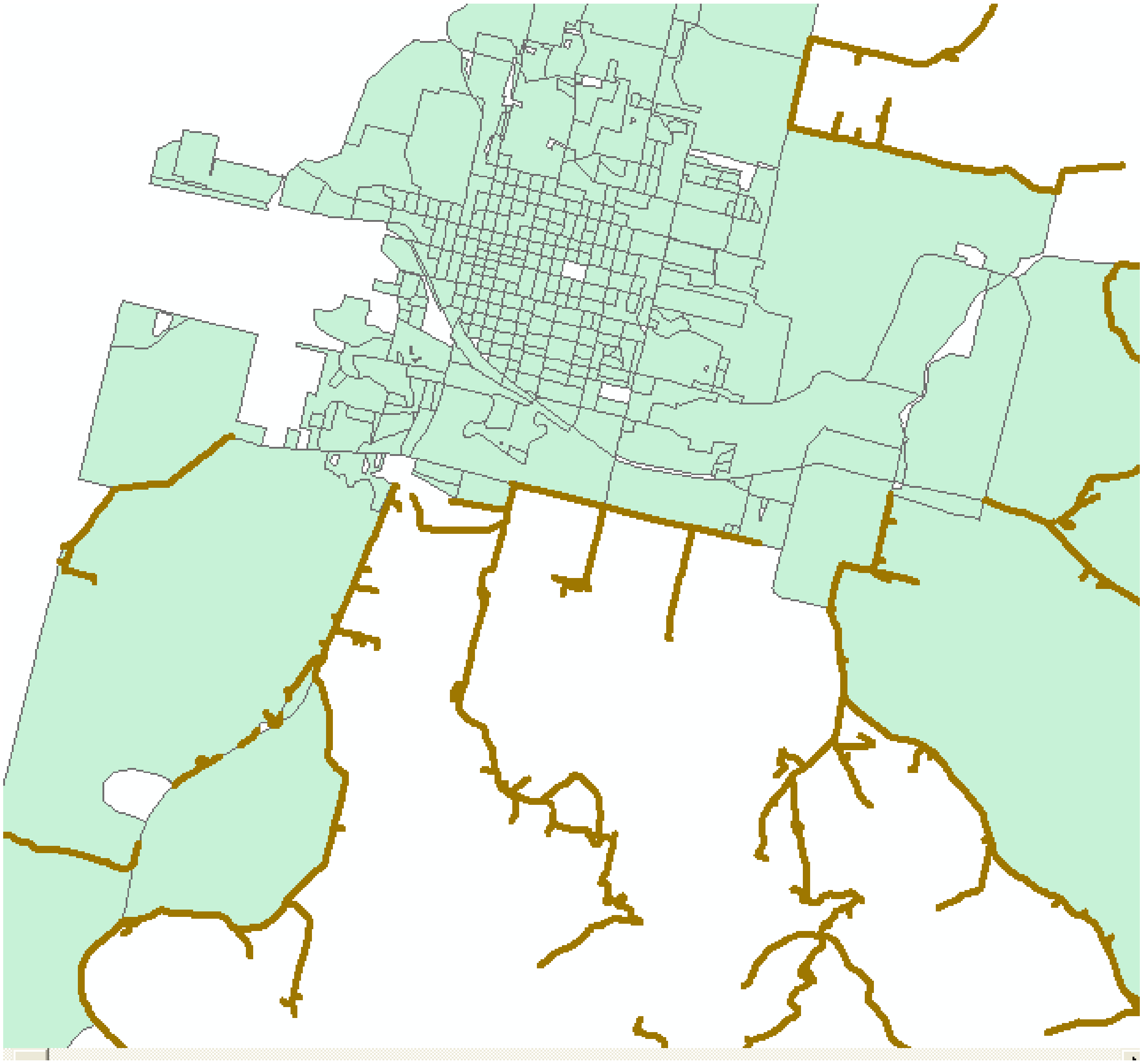


Figure 12-provider Submitted Street Segment Objects. The segments don't edge match the Blocks nor are they continuous.

The figure following demonstrates the same area after the conflation process. Blue segments are the conflated TIGER roads which will be passed to NTIA.

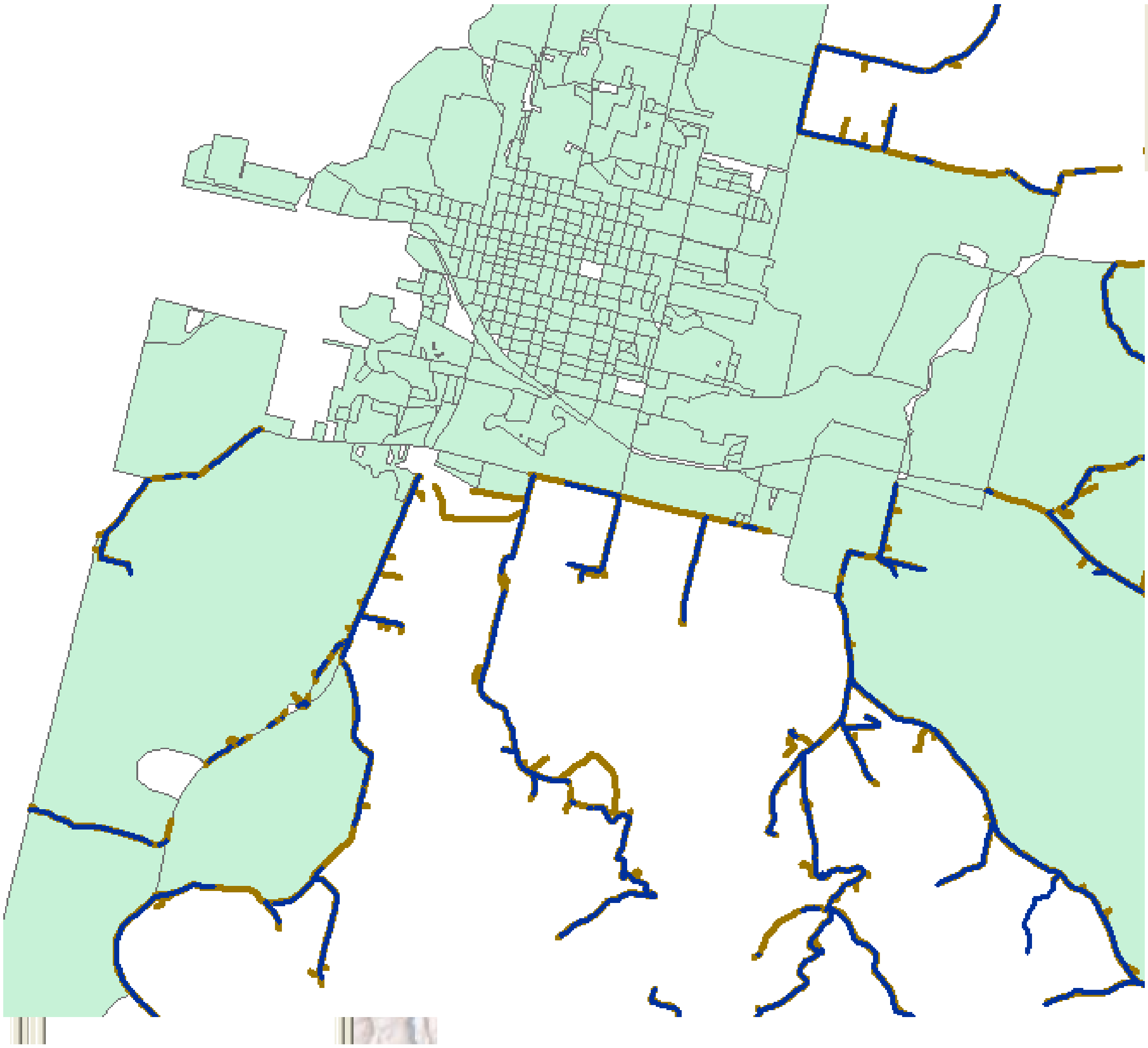


Figure 13-provider submitted segments in gold, selected TIGER in blue—Conflation result; in many cases what was a continuous segment is made discontinuous because even with a distance buffer the TIGER segment doesn't always intersect the provider segment

The final segment process was used when we were supplied with a Broadband covered area polygon. In this case, we found the segments within covered areas and eliminated those segments inside of Blocks less than or equal to 2.00 square miles.

Because there was more control over the format of the inputs (we knew we had a boundary and were working with TIGER segments), this was an automated process that followed this general format:

- Select large covered Blocks by provider ID (from updated Large Block table)
- Select TIGER 2010 road segments (MTFCC like 'S%') that face (CB = CBLeft2010 or CB = CBRight2010) covered large Blocks for provider

- Select segments as distinct records, max speed with corresponding technology, join in feature names, export selected records to temporary DBMS table
- Join TIGER roads feature class to temporary table on TLID
- Select covered segments (Python script)
- Select service area polygons for provider
- Clip selected facing segments with selected service area
- Export clipped segments to staging feature class, keyed by providerID

In this figure, orange represents covered small Blocks; black lines are covered segments in large Census Blocks (light blue). The service area boundary is shown in grey. Based upon feedback from providers, we have elected to clip segments at the end of a coverage boundary.[16]

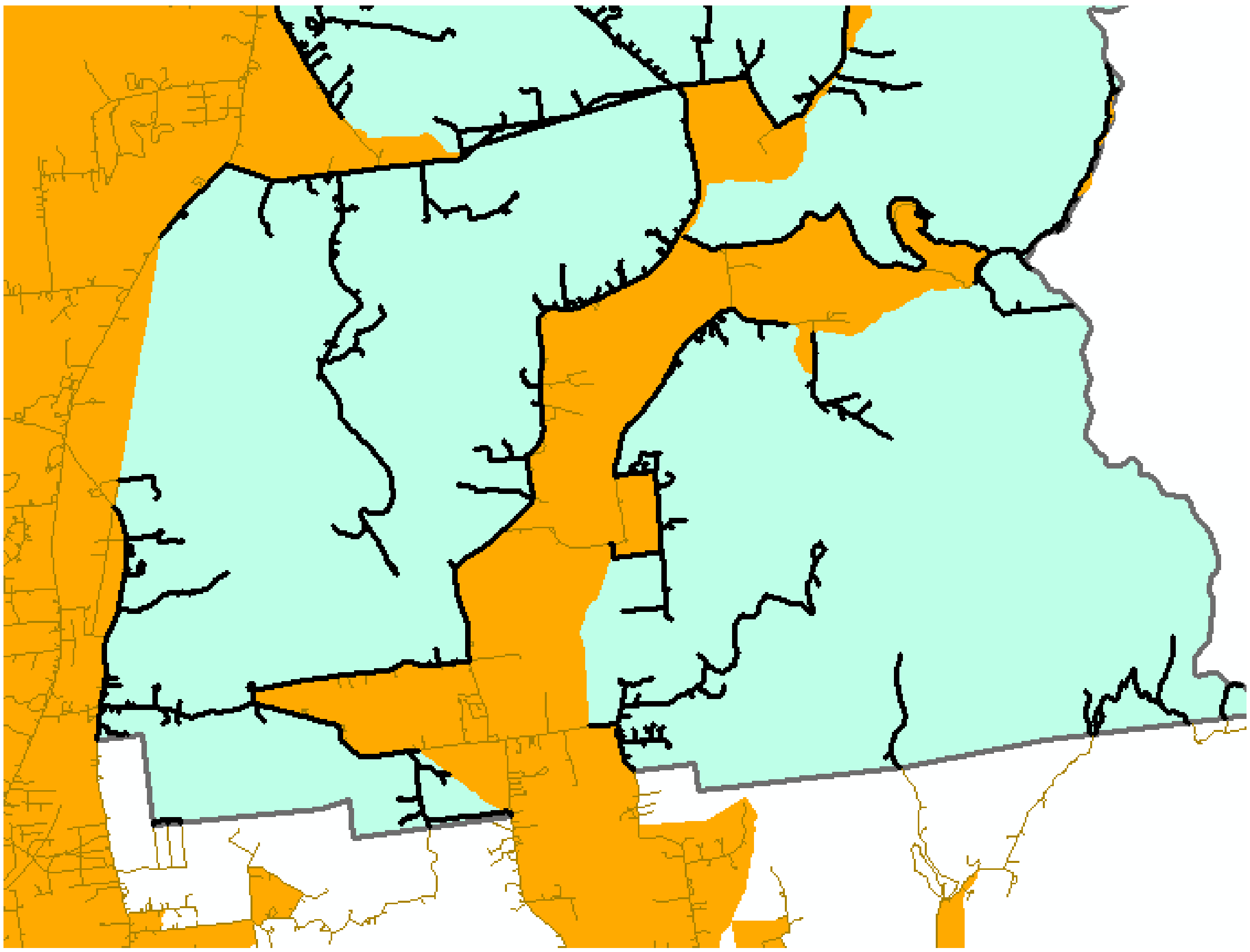


Figure 14-Output of the Segment Process

Wireless Coverage Process

In general, most providers of mobile Broadband submitted coverage information in a NOFA-compliant format. Other than attributions for spectrum and speed, little was done to this coverage.[17]

[16] An outcome not discussed here is how to handle address ranges on segments. As NTIA has asked for a Min and Max on the segment, deriving theses values for clipped segments is very problematic. Also the prevalence of alphabetic characters in addresses makes the min/max selections very arbitrary. We are grateful that addresses are nullable data elements.

Per Program Office direction, LinkAMERICA followed up with wireless providers where we determined that submitted data did not edgematch TIGER 2010 state boundaries. For the most part providers were unable to submit coverage data that edgedmatched as requested. In this case, we left the submitted data alone and did not perform any adjustments.

LinkAMERICA continues to make aggressive efforts to bring additional WISP coverage into the NTIA dataset. For the most part, our outreach was with providers who were unable to supply sufficiently granular data in the past or those that could only submit wireless address points which is no longer a valid submission format.

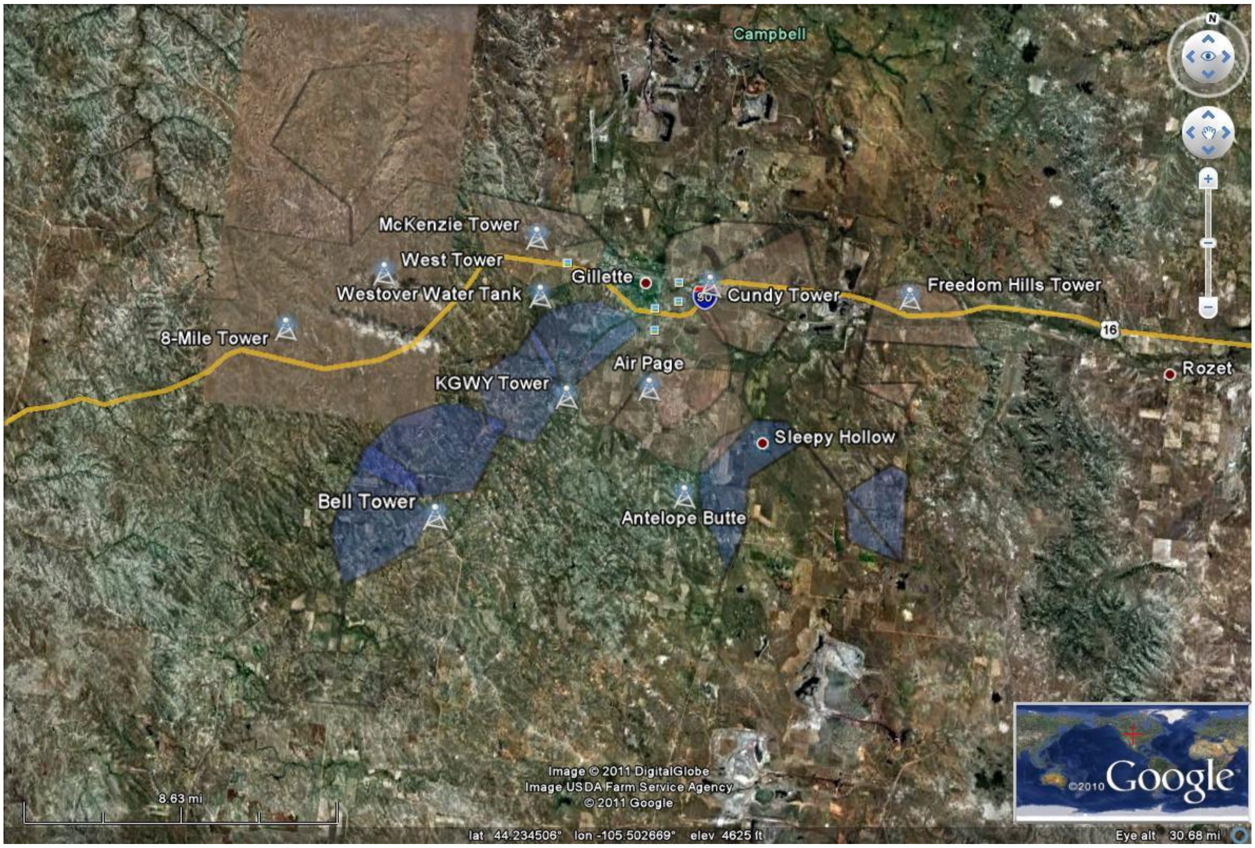
In Round 6 fixed wireless providers generally either supplied coverage information or infrastructure from which coverage estimates could be derived. Many allowed us to use their tower locations, antenna heights and direction/spread of coverage to derive a line of sight coverage estimate. In our experience, this is a conservative and reasonable derivation of coverage.

Some wireless providers submitted RF propagation studies. When this was done, there was a request that the signal strength be removed from coverage data. The request was honored. We note that some providers are very careful in that their coverage is an estimate of the probability of receiving an upstream link to their network. It is not intended as a depiction of any particular speed availability.

Other fixed providers were able to supply us with hand drawn maps or polygons/polylines drawn in Google Earth format. In these cases we did our best to georeference and verify the coverage areas with the WISP.

When we received coverage information in KML format, like the image below, we accepted the data as it was presented to us as the submitted coverage patterns were used in the provider advertising.

[17] Some polygon data did exceed the node count threshold. In these cases, data was rasterized to 100m cells and then converted back to polygons. The polygons were dissolved to multi-part geometry. This addressed the node count concern.



As the image above shows, in some cases we were provided hand-drawn coverage, as well as infrastructure. Instead of estimating their coverage using a line of sight or RF study, we elected to stick with the provider's supplied information. Our decision was guided by two primary factors:

If the provider is advertising using this coverage they must have specific confidence in its accuracy.
If the provider can supply coverage, as well as infrastructure that reasonably supports the coverage, there is a very high likelihood in the accuracy of the information.

The downside, of course, is the polygon shown on the map may not represent our notion of how wireless coverage should appear.

In general we note several interesting trends in the wireless data. First, we can be successful in increasing the amount of WISP coverage when we aggressively pursue WISPs. This means we have to be willing to accept data on their terms and convey it into SBI formats. Some of our WISP submissions have taken over 12 hours to normalize into SBI formats. Second, we have to accept that some WISPs will not be able to supply FRNs. Third, there appears to be some variation on how the NOFA coverage definition is met. In other words, there seems to be a disparity on the necessary link budget necessary (e.g. -80 dB, -98 db, -120 dB, etc) to provide the appropriate quality of service for data services to be provided at a location/inside a location.. Fourth it was very difficult getting providers to identify spectra used for

Broadband data services[18]. We are unsure if this is a competitive concern, or if the same coverage pattern is yielded for multiple frequencies. Typically, the spectra returned were those that a provider was licensed for. At this point, we have no reliable way to locally determine what set of frequencies are used to provide Broadband data services in a local area at a specific point in time.

Service Address Point Process

A handful of providers have requested that customer level, service address point data be submitted to NTIA. In these circumstances we have done minimal processing to preserve the provider's intent with this deliverable and not bias downstream NTIA use.

Our verification included checks against commercial or Public Utility/Public Service Commission exchange boundary maps. Points not contained within three miles of a boundary are not submitted to NTIA. The percentage of excluded data varies cross providers, but it tends to be under 1% of the total submission.

We retain from the provider the provided latitude and longitude, as well as Census block. For some coverage data, if a provider is unable to supply a longitude, latitude or Census block, we fill in these attributes. In those circumstances where we do not have a Census block, but we do have a longitude and latitude, we accept the given longitude and latitude and use that as the basis for our Census block assignment.

With point data we have tested for comparable geocoding success rates but do not overwrite provider information.[19] From this type of analysis we note the amount (usually little more than 10%) of addresses that seem to locate with less than street segment certainty. Deriving a thematic representation of the points on speed also illustrates some of the locational certainty issues in this point level data.

Coverage Estimation Process

Although the derivation of Broadband coverage into Census Blocks, street segments, or wireless coverage files is, in itself, a bit of an estimation process, there was an explicit estimation process required in cases where a Broadband provider either refused to participate in our survey, or provided such a threadbare submission that no carrier-based coverage information could be gleaned[20].

We typically resorted to three possible estimation paths.

[18] One provider responded by email, "This mapping program is to provide the coverage area for Broadband provided by a company. Not to keep a detailed account of every aspect of a companies (sic) network."

[19] We will make a second geocoding pass on locations with no longitude or latitude from provider. We typically pick up ~5% from our second geocoding pass. Typically the issue is address quality but also difficulties in geocoding in very rural areas.

[20] We report estimated submissions to NTIA as a non-responsive provider but we have data in the submission for them. This is the reason for datapackage.xls entries which are non responsive but contain submitted data.

For Cable (HFC) providers who did not provide any coverage information, we fell back to Media Prints data. Rather than using the entire Census Block Group gathered by Media Prints, we used only those Census Designated Places carrying the same or similar names to the Media Prints p_com field. Our reasoning was that Cable systems tend to be franchised on a municipal or at least administrative basis so the coverage will likely follow a governmental boundary. As a general rule, cable infrastructure is not available in the public domain[21] and what could be found was poor in quality and difficult to ascertain for validity.

For DSL providers who did not provide any coverage information, we estimated road-based coverage from their Central Offices[22]. We only used Central Offices that showed evidence of DSL or fiber-based services in the NECA 4 tariff. Road-based engineering areas were derived via ESRI Network Analyst to 18kft. These segments/boundaries were clipped to commercial wirecenter boundary edges.

For fixed wireless providers who provided no coverage information, we relied on their public websites to derive coverage maps. When these maps were available, we georeferenced them and tried to use the outer polygon boundary to represent their serving area. In other cases, when only a tower could be provided, we used a view shed analysis and estimated line of sight coverage at 10mi per tower[23]. Because much wireless propagation is driven far below the Census Block and much engineering information isn't known (frequency in use, polarization of the signal, coverage pattern of antenna(s), local terrain/land cover) this was the most complicated group to estimate.

Speed

Speed attributes are reported both at the block (typical) and higher levels (maximum advertised and subscriber weighted). We note that in many cases, providers did not supply typical or subscriber-weighted speeds. In some cases, it appears--although we cannot verify--that their maximum advertised speeds were used to populate typical speed columns.

We do have limited testing data on reported speeds, but we have been careful to not use our typical reported values with carrier-provided information. If we do not have a speed value from a provider, we report an empty value.

Several service providers claim they do not have data on typical speeds available, but estimate a 20% overhead factor between the advertised speed and what may be experienced by an end user.

We continue to request advertised speed at the block level. Nevertheless we appear to be getting speeds that do not vary over a large geographic area – leading us to believe that providers may still be submitting the maximum speed advertised in local media for the entire market. For the most part, we

[21] The team tried to use data from the FCC Coals system and 321/325 fillings but this seemed to be a bit non-uniform in quality.
[22] Central Office location was derived from GeoResults. Wirecenter boundaries also came from this commercial product.
[23] In some cases we had an approximate radius of coverage but no height. In this case we used a 50' height estimate and then clipped the coverage to the provided coverage range. We also clipped wireless coverage to honor state boundaries but did not look for providers serving coverage with out of study state facilities.

have been unsuccessful in messaging that advertised speed should not correspond to a market area, but instead, the maximum speed, which can be provided to a household—what some may describe as a 'qualified speed.'[24]

As a general rule, in circumstances where a provider supplies a range of speed attributes, we assign NTIA categories based upon the midpoint of the range. We follow this rule unless we can determine other grantees are handling the same submitted information differently.

To support NTIA program office requests, we have also modified the structure of the Service Overview table. Even if Maximum Advertised Speed is supplied at the market or county level, we push that speed down to the contained Blocks. The only records that remain in this table, will be those wireline records with either a non NULL nominal weighted speed or ARPU value.

Middle Mile

Middle Mile information was collected directly from providers via survey or interview. Middle Mile is a "chicken or egg" type of challenge in that it is possible to verify that the infrastructure exists, but extremely difficult to know what the site is doing without engineering level assistance. Although most providers submitted "something," there was a significant variance in what that "something" represented.

The purpose of this section is to record some of the comments and questions we have received about Middle Mile. We hope this provides better context for our data submission.

Within the NOFA, Middle Mile was defined as (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. (Collectively, (a) and (b) are "middle-mile and backbone interconnection points.")[25]

Given the existence of the "or" in this definition, providers submitted a variety of information. Based upon the NOFA example, several fixed wireless providers interpreted Middle Mile in terms of the connection points from their towers to their own serving backhaul location. The topology was commonly Microwave from their distribution towers to their NOC. The NOC and towers were listed as the Middle Mile points. This seems to be consistent with the first definition clause (a).

Telephone, Mobile Wireless, and Cable providers tended to remain either silent on the question, or would provide a single location in which Internet peering occurred (clause b). A number of participants explained that the NOFA was quite ambiguous with data traffic moving back and forth over both TDM

---

[24] As an example of a response to our request for Block level advertised speeds, we received the following comment from one anonymous provider, "This is and of itself does not require anything new of us – just states the NTIA supports efforts focused on getting that information on the CB level." It would be helpful to have broader messaging so that providers understand this new direction.

[25] From http://broadbandusa.gov/files/BroadbandMappingNOFA(FederalRegisterVersion).pdf at 54, visited March 28, 2010

and IP networks--it was unclear where the distinction should be drawn. As a general rule it seemed like many providers listed a single location where Internet Peering occurred.

A number of providers refused to answer the question on grounds of confidentiality[26]. Others would not disclose as their Middle Mile points are not owned--another company provides the physical and electronic connection to their network. In other words, the entity providing Broadband is not the entity providing Middle Mile.

Additionally, based upon the new Provider Type classification of “other,” we have started to integrate points provided by Broadband service providers not meeting the NOFA definition. This includes POP locations and aggregation points for public / private networks.[27] Within a given submission there were two final attributes that tended to concern respondents. First, speed should be measured in terms of only data capacity and what exactly is “data” (e.g., can/should you segregate out voice or video), and is the relevant capacity of the physical connection, channelized to a specific virtual circuit on their network.

Finally, a number of other providers were unsure of the height above grade measure (is this their floor, the street outside, etc). We seem to have a combination of height above or below grade, as well as heights above mean sea level (AMSL).

To the extent possible in our timeframe, we verified the location of a sample of Middle Mile points. Where we could see infrastructure that appeared to be consistent in location with other provider infrastructure, we felt that the location was accurate. In some cases, the point provided seems sensible (is on a road, near other equipment), but using imagery, we couldn’t find a place where this type of connection could occur. This wouldn’t be unforeseen, in that Middle Mile connectivity likely takes place in a protected environment much smaller than a standard Central Office installation.

Mobile Wireless Coverage

We have received mobile wireless coverage from most mobile Broadband providers in each state. At this point we have cleaned the geometry of the data and attributed it with spectra, NTIA speed categories and FRN as required.

Where possible, provider derived coverage has been reviewed for consistency against the commercial licensed product.. To a limited extent we also use licensing locations and tower infrastructure to spot-check supplied coverage. This mode of verification remains complex, given the lack of facility-based information with mobile wireless.

---

[26] As received in email 9/30/10, “Due to security concerns and the risk of public disclosure of highly sensitive data, whether inadvertent or otherwise, ***REDACT***response to the Middle Mile and backbone interconnection request is limited to publicly available information available on {remainder not included}”

[27] As discussed in our readme.txt file, a number of middle mile points were lost in validation due to their location in adjacent state. This will cause a decrease in some providers relative to prior submission.

Finally with respect to mobile Broadband services, we note several trends.

First LinkAMERICA used the NTIA supplied frequency tables to report speeds consistent with other grantees. In circumstances where a provider supplied a range of experienced speeds, we used the portion of the range consistent with the most frequently reported Grantee value.

Second where a provider reports multiple frequency bands in use but doesn't distinguish these bands by submitted SHP file, we submit identical geometries but attribute one geometry to each submitted spectrum value.

Third we are seeing a trend toward increasing Broadband speed. As of this writing, there is not consistency across providers in how they attribute the advertised 4G speed values. In other words, for some providers 4G means advertised speed categories increase. For other providers the speed value did not change.

Fourth, we have requested providers submit SHP files that are consistent with the TIGER 2010 boundaries. For the most part, providers have not done this. As the request came late in the round six submissions our hope is this request will be honored for round 7. We have not modified the submitted data to impose the TIGER 2010 state boundary.

Verification

Data verification is an ongoing and evolving process. Clearly, with each new data submission there will be a validation process at hand and at the same time, our team continues to expand and improve the efficiency and effectiveness of our data verification routines. Consistent with the movement toward an fGDB export database and use of a data receipt script, much of our validation effort is spent in supporting the ETL processes into the required formats. In future data submissions we will continue our work to stabilize and improve the business process that normalizes provider submissions into NOFA formats and expands in more depth on the confidence analysis within the data.

Verification Methods Summary

Our overall verification standard is focused on the level at which we supply processed data to NTIA. This means that the vast majority of our verification process and resources will be focused on verifying provider identity, coverage, advertised speed and appropriate metadata for Census block's less than or equal to 2 square miles.

We believe three broad verification themes are important to consider

a) The first step of broadband service verification is a consistently applied market definition—we call this provider identity verification.

b) There is probably not a single dispositive method of verification. Rather, a number of verification approaches are needed to appropriately classify confidence in data submitted to NTIA.

c) Verification approaches tend to meld together. As an example a web survey is complimented by a phone survey but expert review and external data may be necessary to reach a final informed judgment.

The table below demonstrates the various methods used across each feature class submitted to NTIA.

	Data Types			
Verification Method	**Census Block, Road segment or, address specific service availability**	**Mobile wireless service availability**	**Middle mile infrastructure locations**	**Community anchor institutions**
Provide/Subscriber Identity Verification	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Internal data consistency check	METHOD USED	METHOD USED	METHOD USED	METHOD USED
External data consistency checks	METHOD USED	METHOD USED		
Carrier confirmation	METHOD USED	METHOD USED	METHOD USED	
Public review	METHOD USED	METHOD USED		METHOD USED
Anchor institution review				METHOD USED
Expert review	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Telephone sampling	METHOD USED			METHOD USED
Purchased Datasets	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Developed Datasets	METHOD USED			
Web-based surveys	METHOD USED	METHOD USED		METHOD USED
Field Surveys	METHOD USED	METHOD USED		METHOD USED

The following table defines each of these methods and provides a summary of why this method is used, and the value we gain from it.

	Definition	Methodology	Purpose	Benefit
Provider Verification	Provider verification is the process of assembling a broadband provider database, determining which providers are properly classified into SBI eligible providers and developing contact information.	Provider verification involves combining multiple data sources, interviewing providers and classifying the broadband provider type.	Without a consistent understanding of the provider 'market' it is impossible to appropriately classify the coverage data. It is also impossible to explain to consumers of the data why a given provider is or isn't available in the submitted data.	The main benefit of this verification process is understanding who is providing broadband services, are the broadband services NTIA compliant and how do you 'contact' this provider (Name, DBA, FRN, Holding Company)
Internal data consistency check	An internal data consistency check is a validation measure across at least two dimensions. First is the provider data consistent with prior submissions. This would be an examination of this submission relative to a prior submission. Second is this submission	Most of this validation is performed using our spatial databases and running queries that compare submissions. We also use a similar set of queries to isolate transmission of technology outliers. These would be data sets which offer speed technology combinations	The purpose of this type of validation is to understand how things change over time and why. It also helps inform us for circumstances where we have data points which appear to be outside of the norm. If these outliers are	The main value is understanding why something changes and providing an opportunity to engage with the provider to understand why there has been a change.

	consistent with the technical specifications of the service offered.	which are unusual relative to other data received across all states.	detected, they can be pursued directly with the provider.	
External data consistency checks	An external data consistency check is a measure of the provider data against external sources (not from the Provider). The distinction between internal and external isn't pure, but our typical experience has been that External checks involve the acquisition of additional data sets and a comparison across multiple sets.	External validation can be performed by verifying supplied coverage against third party data sources. An example would be to test provider claimed DSL Census blocks against a commercial source of exchange boundaries. Wireless coverage is also compared to tower locations.	We don't believe a single, exhaustive third party data set is available for validation. We do believe a combination of external datasets can be used to inform and help filter out the false positive cases from provider data. We also note that the external data appears to diminish in accuracy as the area of analysis becomes less urban.	External validation provides an external measure of data quality assessment not influenced by internal data sources. It can be one of the more effective means of isolating false positives in submitted data.
Carrier confirmation	Carrier confirmation is the process of sending processed data back to the service provider	We use two techniques to accomplish this. First a provider's data is summarized in a tabular format. This lets the	One of the more critical steps in broadband mapping is translating carrier	Carrier confirmation gives the provider information on how their data will look when submitted to NTIA. It also helps short circuit complex problems like

	to ensure that translation into NTIA formats is fair and appropriately accurate.	provider quickly verify firm information (FRNs, DBAs, counties served). We also develop two sets of check maps. One is a PDF version and the second is a Google Earth (KMZ) version. Both versions display the NTIA reported coverage and speed. A different map is developed for each technology of transmission	supplied data into NTIA formats. Providing verification deliverables to the service provider (carrier) isan important external feedback process. Several providers also ask us to repeat this process before data are submitted to NTIA so they can see what will be submitted to NTIA.	online map display problems—which tend to come from FRN issues or incorrect data entry. This process also helps to strengthen the sense of ownership and participation with providers.
Public review	Public review is the process of collecting structured feedback from the general public in a manner which can be analyzed and used to improve/validate the submitted data.	Currently we use an online map 'layer' which provides consumers the ability to feedback about the coverage and provide in depth information about their concerns. The maps are also discussed within the context of planning teams within each state. We receive	As with other crowd-source approaches the intent is to allow the general public to feedback and improve the displayed and submitted data.	The benefit is to provide feedback and also display real time the comments of the general public. As a mechanism for validation the key is to develop feedback data which is structured in way that informs the mapping process.

		feedback from these meetings.		
Anchor institution review	Anchor institution review is targeted surveys intended to better understand the Anchor Institution broadband market.	We have used three methods to verify anchor institution data. The first is a targeted series of telephone calls. The second is specifically targeted mailers. The third is direct interviews with stakeholders. Schools for example, may have someone at the state level who maintains information about broadband connectivity.	As Anchor Institutions represent a different class of coverage information as well as a very different type of end user, a focused stakeholder management, data acquisition and data review process is advantageous.	Because CAIs represent a very distinct stakeholder community, building identifiable connections between the SBI program and the anchor institution community is important. Tailoring a specific data acquisition/ data review process helps Anchor Institutions establish a reliable set of infrastructure benchmarks which they can use to fulfill their mission.
Expert review	Expert review is the process of using subject matter experts to review submitted or processed provider data.	The method of subject matter review will be dependent upon the type of data in question. In the past this has taken the form of conversing with a wireless engineer to ensure that the coverage pattern appears plausible for a given technology. It may also involve a cross check on data from a second source—	The purpose of expert review is to get a second opinion regarding some aspect of submitted or processed data. Given the large number of submission formats and innovative ways to supply broadband, it is always	The most significant benefit is to have a secondary source for back checks and verification. For the most part expert review is from an engineering or deployment resource. Expert review also helps support process transparency so there isn't a closed GIS driven process making all the decisions.

		can this type of middle mile infrastructure support the maximum advertised speeds in this area? SME validation is also helpful trying to understand ambiguous information in submissions.	helpful to have multiple sets of eyes available to reduce errors from misunderstand ing.	
Telephone sampling	Telephone sampling is the process of using targeted phone calls to verify aspects of submitted or processed data.	Telephone methodology tends to be consistent across the type of data being verified. A subject location or individual is identified. The phone number for that location is identified and a call is placed. The person performing the survey asks a scripted set of questions and records the responses in a database. For example, our team produces a survey to develop and monitor access and use trends at a regional level.	The purpose of a telephone survey is to gather in depth information from a targeted respondent. We would likely use telephone survey for targeted purposes--either clarifying anchor institution data or randomly polling consumers to better understand attitudes.	The primary benefits are to develop in depth information as well as surveying a large number of respondents regarding opinions or behavior. Phone surveys tend to be more helpful to survey attitudes or to find out location specific information. Telephone sampling is used in our consumer surveys.

Purchased Datasets	See external data consistency checks.			Also note that not all external data checks must be purchased. For example Census data could be used for an external consistency check but it is freely available for download.
Web-based surveys	Web based surveys can involve three dimensions. First a web survey (a form available to be filled out on the Internet) can be used to supplement and better understand consumers. A web survey could be a compliment or a substitute for a telephone survey to target a specific demographic (a web survey can also be part of a social media campaign). Further web surveys can be used to verify provider information.	In the case where a web survey is a compliment to phone or in person, a survey,instrument is developed and then respondents are invited to complete the form. In the case where a survey is a mechanism to gather additional information from provider web sites, this could take the form of manual queries (looking for address listed in a Census block) or automated scraping where information is pulled from a website via a specific web application. We currently use both approaches depending on our goal.	The purpose in all cases is to gather additional information via the Web.	The benefits of web survey are its relatively low cost as well as the ability to gather specific information into a form that can be easily used by downstream work processes.

Field Surveys	A field survey is sending a team of skilled participants into the field to verify submitted data or sample some aspect of the environment in a given area.	Field survey methods involve assigning a field team, equipping them with data acquisition hardware, ensuring they have a consistent skill basis and recording observations. To date most of our field survey work has been in engaging CAIs into the process. We have performed limited wireless testing and infrastructure verification.	Although expensive, field surveys are sometimes the best way to verify information such as provider equipment presence or the strength of a wireless broadband signal.	The benefits to field work are significant. They can help us better understand the exact phenomenon in a particular area.

Verification Standard

Verification is a broad term, but in our definition it boils down to determining if broadband coverage is in the right place. For a given provider, the question is whether the coverage is assigned to appropriate Census Blocks, road segments or area features. Coverage verification can be further broken out into two distinct classes:

- Technology verification, which is determining if the provider is listed with a technology consistent with their marketing information.
- Speed verification, which is determining if the speed supplied for that block, road segment, point area file or market area is consistent with the technology and the marketing information received.

The final verification dimension is consumer feedback and crowd-source verification. This is a dynamic set of steps we are beginning to implement. One side of this is responding to consumer concerns. The second is using the crowd sourced data to validate provider claims and, if appropriate, update the map and the underlying data.

At this stage, our working hypothesis (confirmed by our experience) is that there will not be a single measure to indicate broadband coverage availability in a Census block or along a segment. From prior work, and examining our current provider submissions, we believe that there is too much variation below the submitted record to make a single binary yes/no indication. Rather, there will be a series of measures that combine to provide qualitative confidence (a classification scheme) in our indication of Broadband availability at the block, segment, or wireless polygon level. We believe such a qualitative classification scheme is both relevant to and supportive of NTIA interests, as well as the interests of our end-user community – that is, the states and citizens we serve through this program.

The intent of this section is to illustrate why our team is moving toward a particular verification methodology. Our team is learning as we go along, and will adjust and improve this thinking. But given our experience to date, this is our path. As stated above:

- First, coverage verification is at the level of data submitted to NTIA.
- Second, coverage verification is enhanced when there is a secondary measure of availability (such as infrastructure presence or serving area boundaries)
- Third, given the limited resources of this effort, the most important coverage verification process to implement is the erroneous dispersion of coverage. These are the “islands” of coverage isolated by significant distance from other covered areas. In other words, Broadband Internet likely doesn’t exist far away from other areas with Broadband Internet access supplied by the same provider.
- Next we present several examples which illustrate the complexity of coverage verification.

The first example is taken from a gentleman who requested a map change in Alabama. His home is near the yellow dot. The darker grey Blocks are covered Census Blocks. The black lines are covered road segments. He cannot receive DSL from his incumbent provider, although his neighbors can. The incumbent carrier does have at least one structure in that block from which Broadband services can be provided; unfortunately his home is not served.

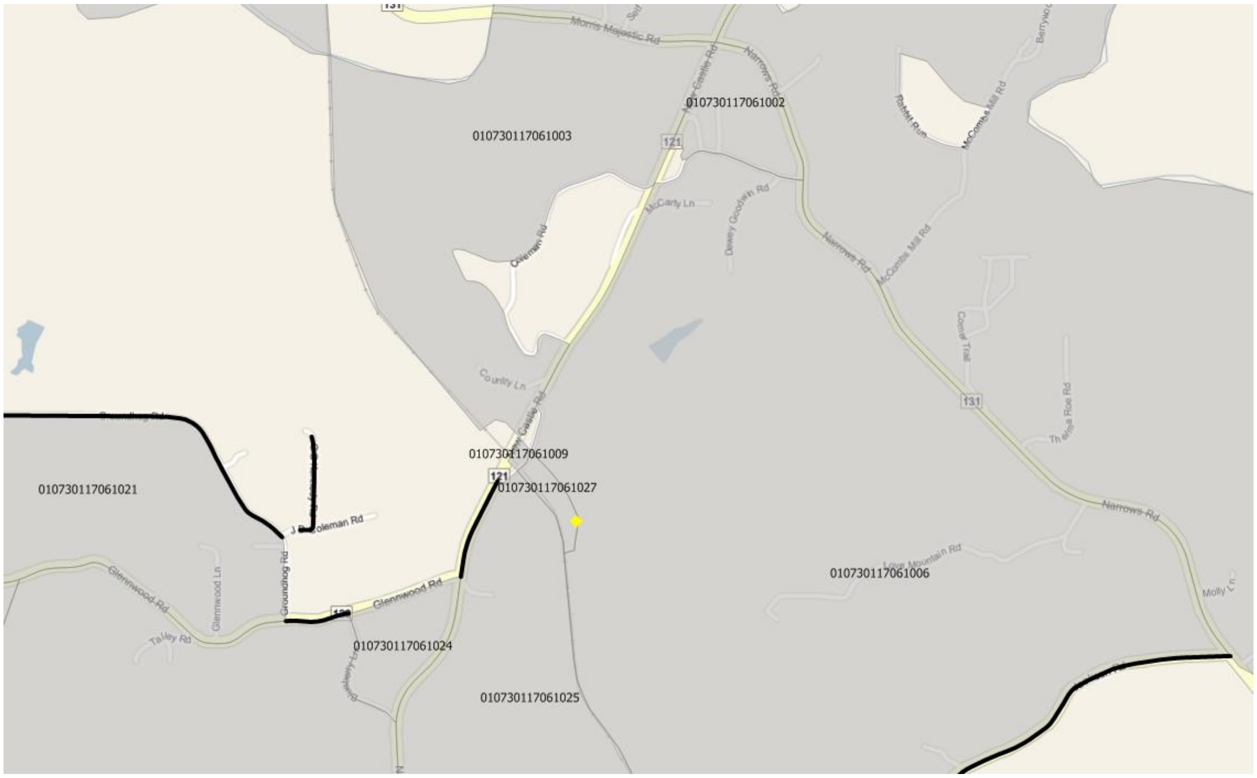


Figure 15--Sub block variation

Because the SBI program requires the depiction of coverage at the block level, the above map has been correctly generated. However, from the customer's point of view, the map is inaccurate. This requires us to explain that the maps are not intended to be a structure-level qualification, at which point some consumers question the value of the maps when seeking service information.

Beyond this type of one-off structure-level qualification, sometimes, as shown below, we have even larger gaps in provided coverage. The image here shows an "outlier" block that could be an error, or it could indicate missing Blocks along a major road that should have been filled in. In this figure, the outlier block is highlighted in turquoise.

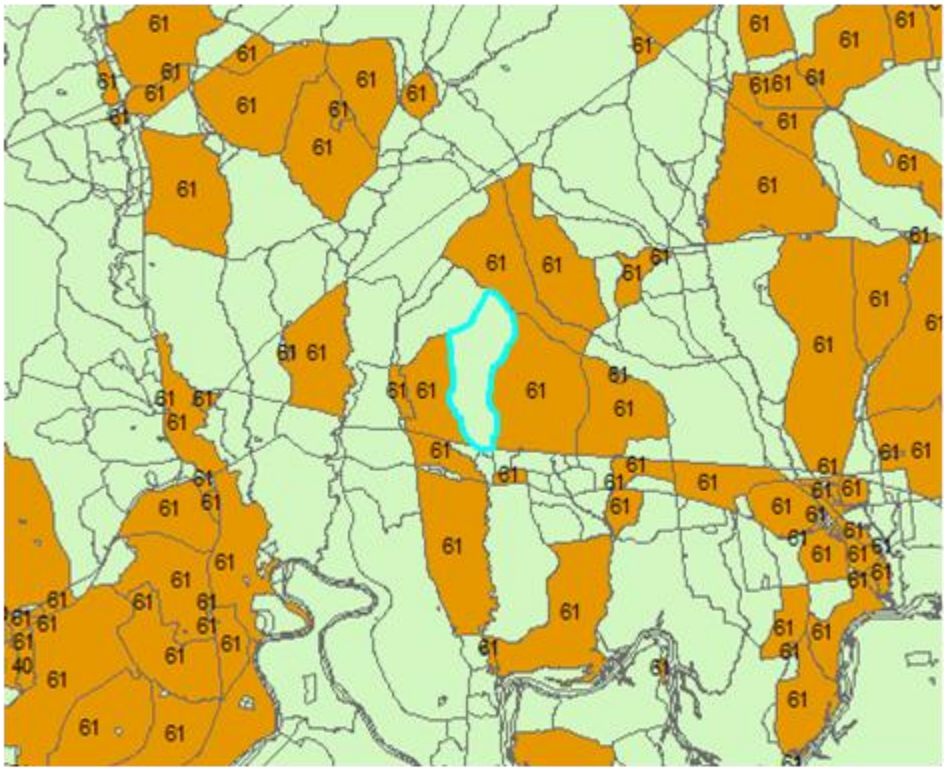


Figure 16--Dispersion in Submitted Data

In this particular case, we are faced with a different verification question. Based upon the properties of the neighbors, we believe this block should likely be covered (coverage interpolation,) but supplied data from the incumbent says otherwise. Although we don't have information to know how much of the data submitted to us is generated, our sense is that geocoded customers or plant are used. In this case the block dispersion could be the result of a side of the street assignment rather than an availability assignment. In other words the data may speak to where is working plant rather than where could service be provided in 7 to 10 days.

The next example shows where an interpolation process could require some adjustment. The figure below shows a town level view. There are some smaller Blocks that are likely covered by interpolation logic, but we also do not want to extend coverage beyond a franchise boundary as in the areas shown in a box on the bottom of the map.

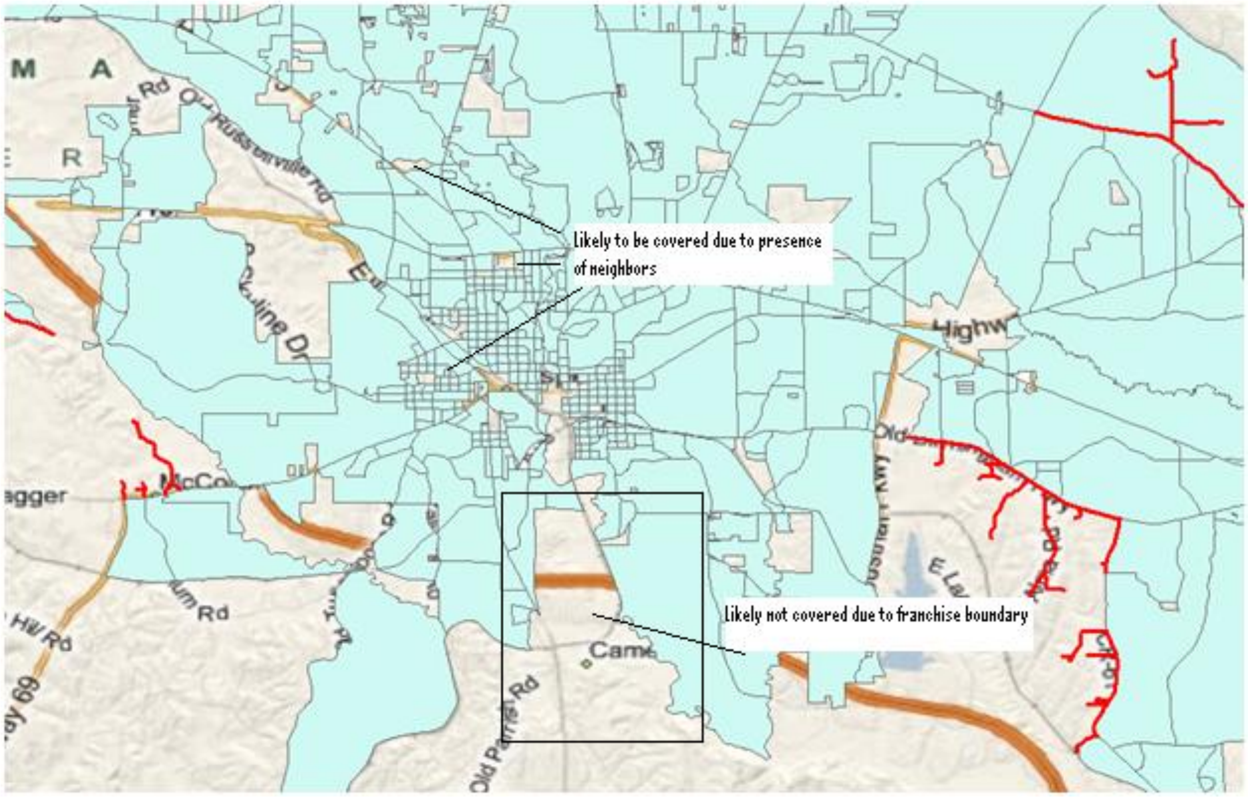


Figure 17-Where do you stop interpolating?

From what we can gather from some providers, the submitted data—data with consistently high degrees of dispersion or coverage holes—tends to come from geocoded billing records. In this paradigm, this means where there are no billing address points; service is not identified on a map. The interpolation verification question then takes on three dimensions.

First, if a provider has no customers in an area, how can we know if they would be able to provide service in a 7-10 day interval?

Second, if we use the properties of neighboring Blocks to interpolate coverage, when should we stop (e.g., at a franchise boundary, at a certain distance, etc.)?

Third, if we are comparing to a data source that examines coverage at a higher level (such as 477 Tract) do we use the Tract information to assign information block level coverage or do we use the tract coverage to filter out dispersions in coverage.

We continue to work with providers to get additional information to help us better understand and contend with this type of circumstance. However, we have not been entirely successful at getting franchise/service area boundaries that would address much of the issue.

The final map shows this dispersion problem, but to an even larger degree. This solitary large block is likely the result of a bad geocode, but we don't know, given the data that has been submitted by the provider and the "single customer in a block standard" set by the NOFA clarification.

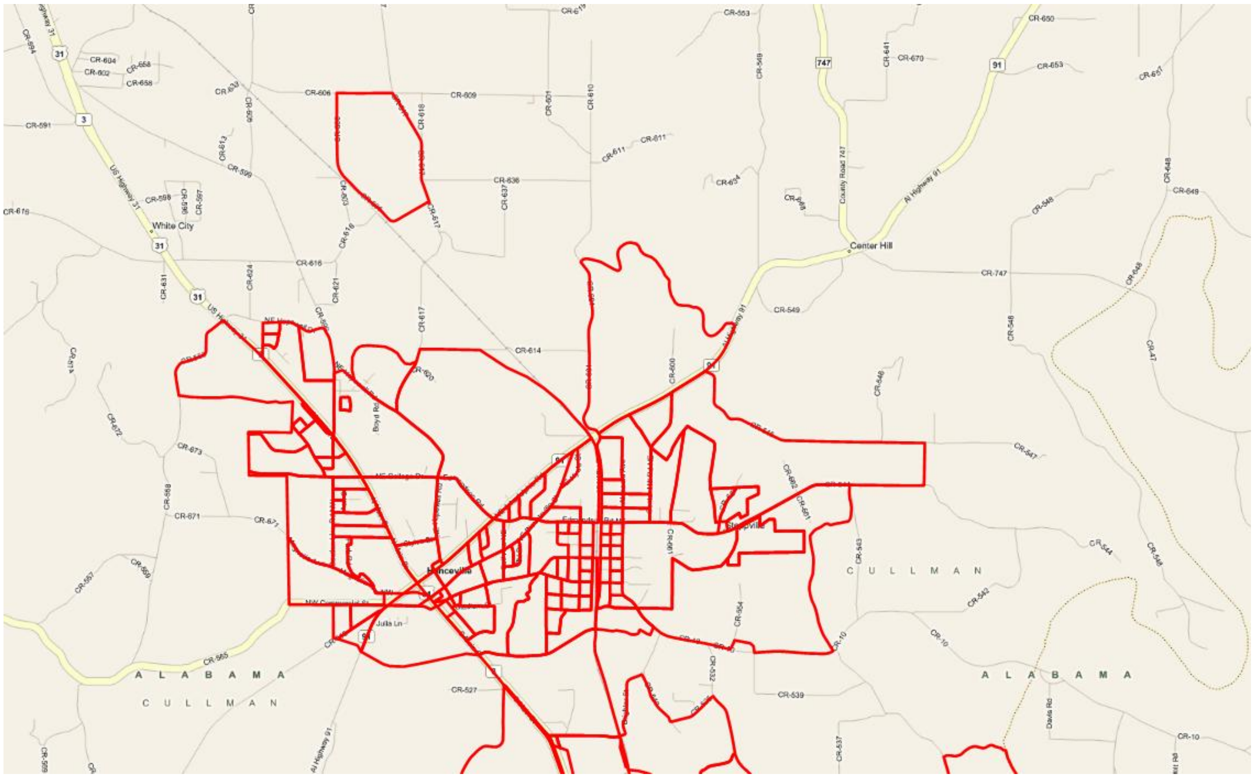


Figure 18-Dispersion in covered Blocks

Due to the fact that this situation is quite obvious in display, this type of problem is one that we are more aggressively trying to resolve. Where a single block has no neighbor offering comparable coverage and is a specified distance beyond an exchange boundary, our approach has been to filter these Blocks out. As of now, this filter is limited to incumbent xDSL providers because we have a good source of exchange boundaries.

The exchange boundary dispersion verification method breaks down when examining providers who are more likely to CLEC into neighboring territory. In the figure below, the black line represents the exchange boundary, while the continuity in the DSLAMs likely points to coverage extending along a road into another provider's territory.

Figure 19--DSL Coverage outside of exchange boundary

In sum, the variability in our source data continues to suggest that our dynamic verification process is relevant, appropriate and evolving in a manner consistent with the overall program. And, as noted above, we believe the more meaningful outcome of our verification processes will likely be a series of qualitative indicators or expressed confidence levels. Our concern, as with the development of any sort of classification process, is how rigid we should make this classification given the variation in our input data and the varied perceptions of service providers, map viewers and down-stream data consumers.

Verification Work Process

To support our dynamic multi-factor verification process, we have implemented the following steps.

Between submissions our provider relations team works to analyze our current broadband provider ecosystem and capture any changes such as acquisitions, mergers or cessation of operations. They also remain in touch with providers who have indicated when follow-up is necessary. The team confirms that the providers who submit data are NOFA compliant. Given these steps they begin a survey and awareness campaign to get data submitted for the program.

When data is received, an analyst reviews the submission and any immediate questions or concerns are sent back to the provider as quickly as possible. We have found this gatekeeping step very helpful in making sure we understand the intent of the submission.

For all providers who submitted data to us in the prior round, the provider received both a tabular data summary and mapped output[28]. Prior to releasing the “check maps” to providers, we inspected each provider’s coverage area. After this in-house review, we solicited a second level of feedback from providers and received a number of requested changes and corrections used in the development of the current dataset.

For those providers who submit only block or segment level coverage (i.e., in those cases where we have no infrastructure to test with) we test for coverage containment within known service boundaries. The intent of this validation step is to remove Blocks that are obviously erroneous.

We have also begun to perform a mechanical test against wireline providers. This is an examination to ensure that each feature submitted has some neighbor within 1 mile. We are testing this process to try to understand what the neighbor distance should be. This has proven to be a difficult process.

We also verify the submitted speeds against the typical speed ranges in the NTIA frequency tables. If we note a value outside of typical range, we ask the provider for clarification. These responses are recorded.

As mentioned in the sections above, we have implemented a check on dispersed Blocks, but we have implemented less with respect to coverage interpolation (holes in coverage). We continue to work on a

[28] For the verification of round 3 data, we submitted both PDF and KMZ (Google Earth) format check maps. Some providers prefer to work with the Google format as it supports easier modification. Others continue to submit marked up PDFs.

series of mechanical tools to assist with the inspection process but have run into challenges related to geographic basemap and timing.

As our submissions have moved online, we have also begun to benefit from crowd source feedback. In some cases this has helped us identify and fix errors in our underlying data. In other cases, as we have shared with NTIA, we have encountered some perceptual issues rooted in how the data are developed and modeled to comply with the NOFA. Depiction of uniform coverage in small Census Blocks continues to be a challenge. Despite our best efforts to explain the full block coverage requirement, we continue to receive complaints that the coverage shown on the map is not accurate for a particular location within that block.

Consumer and Provider Responses to Deliverables

Here, we segue from internal verification to external verification. We view responses to our work product as a form of validation and verification. On the one hand, this gives us the opportunity to fix mistakes and then generate QA steps to make sure that the problem does not reoccur. We also learn how to improve what we are doing or better explain what we are doing to a community not always familiar with the NOFA and program office framework. On the other hand, listening and learning from this feedback helps us better target our mapping deliverable to meet the needs of our external customers. In this second case, external feedback not only provides feedback on perceived qualities (or lack of quality) in the data, it helps us to learn if we are developing data that is truly helpful to downstream users across a wide range of usage and intent.

At this point, our external deliverables take three forms: State Broadband Maps, data transfer to NTIA used for the National Broadband Map, and text format data requested by outside parties.

Online Map Experiences

With our State maps online, we continue to harvest viewer feedback and comments. Because an online map allows someone to zoom in far below the scale of the data, a large number of comments reflect sub-Census block concerns. While important to the citizens reporting these issues and to our Broadband planning teams, this level of data is outside the scope of our core validation process, which as noted above, is focused on the level of data submitted to NTIA.

There are several other themes that our team believes are important to share. These comments are actually quite helpful because they also improve our data processes to better meet the needs of map viewers. For example, we have invested significant time in harvesting more segments from provider data. Because the appearance of segments is so important, we are putting time into ensuring a visually appropriate edge match between the roads we harvest and the Blocks/roads we will show online. On a technical level, we also believe that a good segment process will help us understand more about dispersion in the data, and what is valid versus what is not valid.

Online Display of Consumer Feedback

We have completed development of a consumer feedback layer for our online maps.

The intent of the new layer is to show viewers the feedback of other map viewers. This layer went live after the Round 4 data was posted.

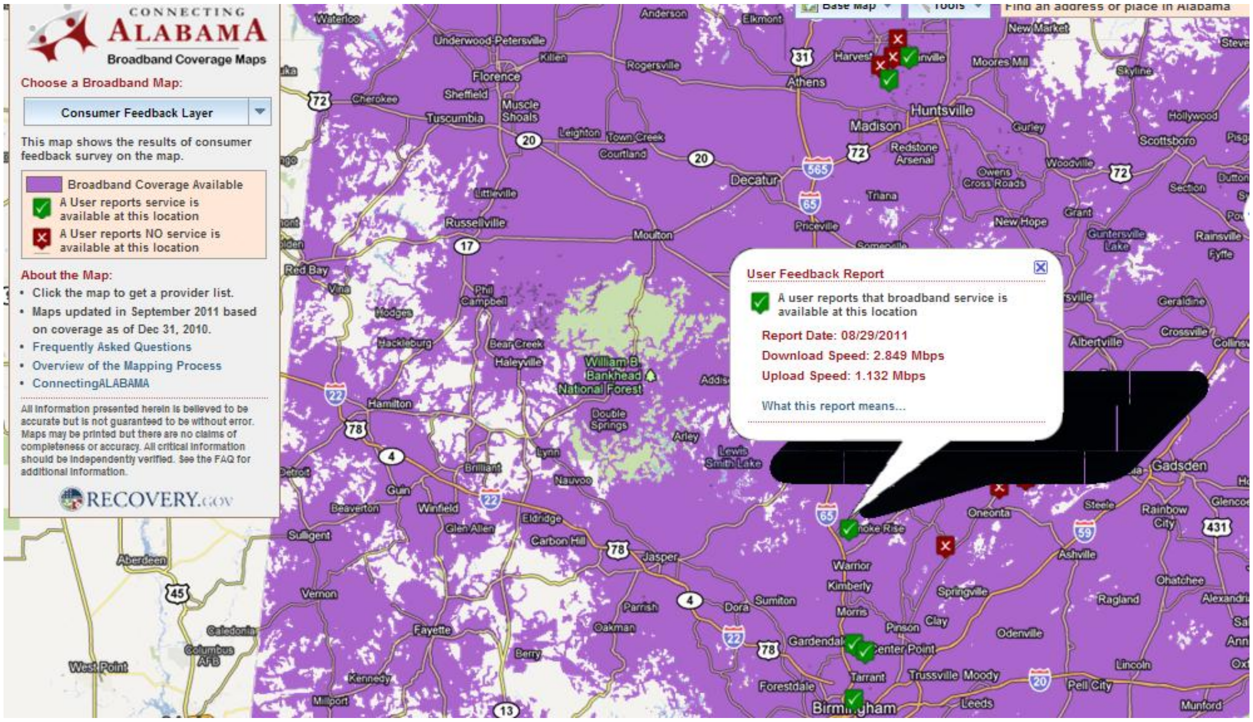
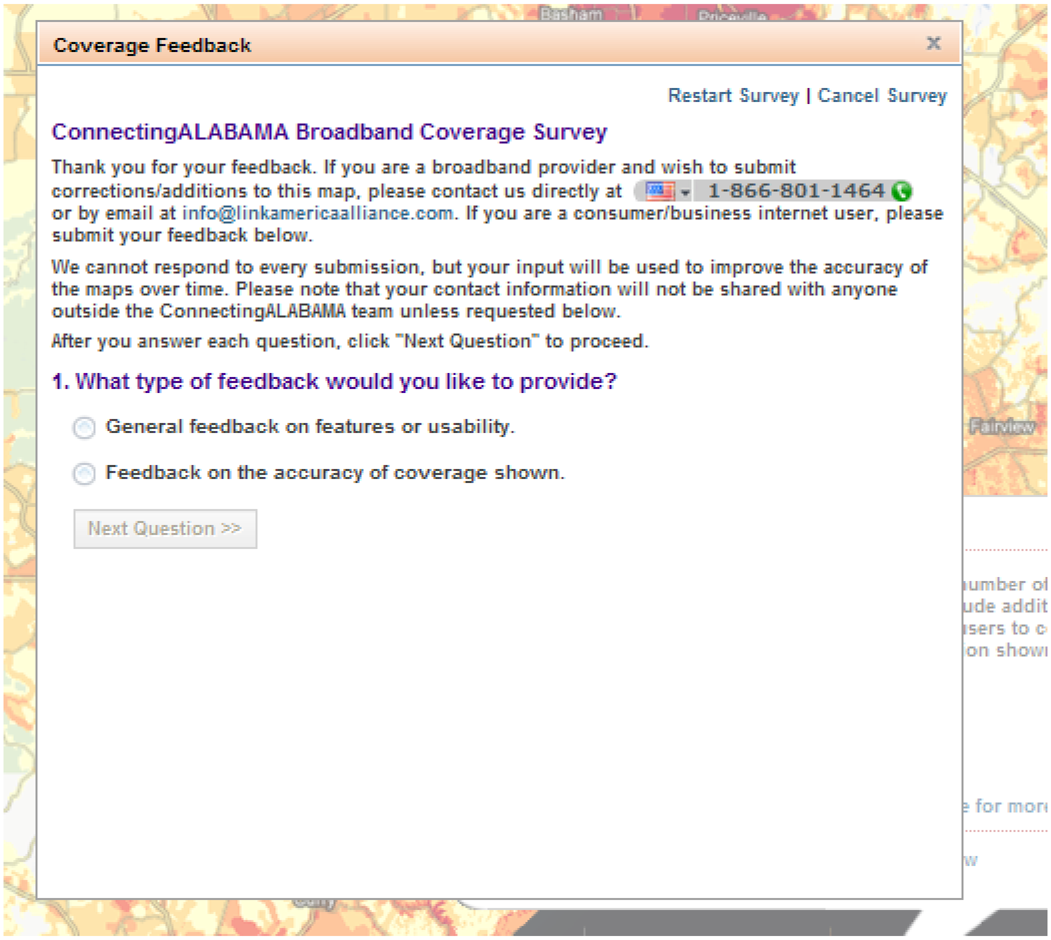


Figure 20--Consumer Feedback Layer

To gather feedback, we use a survey wizard which asks the end users to categorize their concerns. The survey went through several iterations of design and usability testing. Our experience has been unless we get a way to constrain the user feedback into manageable categories, it becomes very difficult to act upon.



As mentioned by other Grantees we struggle with how to use all of the feedback we receive. The qualified data points seem to fall below a volume in which we can infer significant modifications to the map data. Nevertheless, we believe it is important to gather structure and display the feedback to support project transparency.

Perception of Unfair Treatment Across Technologies

Several Broadband service providers have expressed strong concerns regarding how wireline services are displayed, as contrasted to how wireless coverage is displayed. This is an artifact of the SBI data model. As an example, consider the figure below.

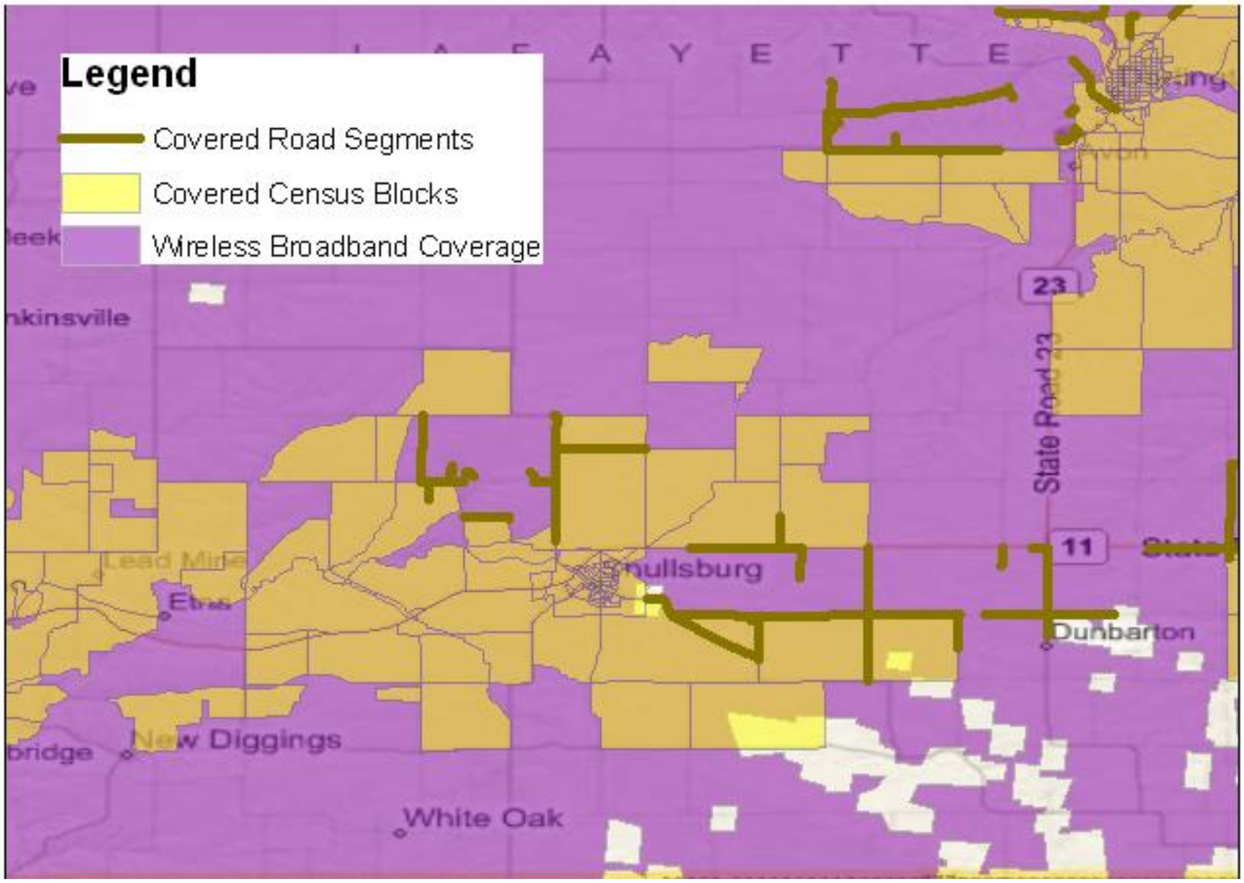


Figure 21--Multi Network Coverage portrayal

In this image, covered Census Blocks are light gold. Covered road segments are a darker gold and wireless coverage is purple. The concern seems to come down to how a wireline provider's coverage is shown in the large Census Blocks (greater than 2.0 sq mi). Some wireline providers have expressed dissatisfaction because their coverage is only tied to road geography, which leads to a visual "hole" in their coverage map. At the same time, they feel that it is unfair that the wireless provider's coverage is shown to be uniform in the same area. Put another way, if our maps show wireline in terms of Blocks and segments, why don't our maps show wireless the same way?

Loss of Geographic Granularity

Some providers particularly those who submitted facility level information are disappointed when we have to roll the derived data up to Census blocks or road segments as this changes the appearance of their service areas. This is especially important in rural areas where the larger blocks represent more of the service territory.

Perceptions of Carrier of Last Resort (COLR) Obligations

Some wireline providers have also expressed dissatisfaction because online maps limit the distance of coverage from a road segment. In our current online maps we buffer a wireline carrier's service 300' from road centerline. A number of providers have expressed that they are mandated to provide voice coverage (which Broadband will accompany) anywhere in the Exchange. There seems to be many

dimensions to this argument, but the basic concern comes down to not being able to accurately reflect the scope of their COLR obligation within the mixed block/segment view. Their ability (or lack thereof) to actually provision such services for new users within a 7-10 day period adds yet another level of complexity when attempting to fairly portray their coverage capabilities.

Intentions of Coverage Mapping

When a viewer of an online map clicks on the map (or zooms to an address), they are provided with a pop-up of service provider coverage in the area. The critical question is this: what is the area to which that pop-up window responds to? In the past, we reported back to the specific Census block, or buffered road segment intersected by the user click. As far as the map was concerned, once we move off of that road, or out of that segment, we have a new area to examine.

Our sense, given feedback received, is that our provider view should be a bit more tilted toward finding providers in a general area, rather than finding providers at a single-click location. If the goal of the map is to get someone to call a provider for service, our bias should be to include all of the potential providers in the general area, rather than giving potential customers a method to self-disqualify. That is, we want to cast a wider coverage net, rather than one too narrow. The problem with this approach is that it will create a number of false positive Broadband reports. As of this date we cannot determine if the claims of inaccurate coverage in online maps are due to the looser provider view standard or not. We keep this looser standard in place to minimize the likelihood of self-disqualifications.

Appendix One-Idaho

Community Anchor Institutions

Understanding the role that Community Anchor Institutions (CAIs) play in Idaho has demonstrated to be a complex process. In a state characterized by such a diverse geography and spread out rural communities it is challenging to identify a clear pattern that encompasses the workflows of each CAI in its community. The mapping team continues to focus on collecting CAIs' broadband access information with a targeted, flexible and creative approach that attempts to address the particular situations of CAIs. The team expects that this approach will lead to the establishment of sound communications with CAIs, improved responses and therefore higher quality data collections which will help inform policy makers and support the SBI planning process.

The work performed in the previous 5 submissions has yielded a comprehensive dataset of CAIs in Idaho. For Round 6 our efforts focused on a thorough review of the institutions on the list, including verification of address and correct contact person. The ongoing online survey continues to offer an efficient means for CAIs to provide broadband connectivity data. More specifically, as of the date of this report a little over a third of the data collected has been through survey responses. To build on this effort in the current submission our objectives were:

Verify the physical address and the currentness of CAIs against data sets provided by authoritative sources such as emergency management departments at counties across the state and regional resource centers.
Raise awareness of the broadband mapping initiative to relevant local and state government agencies and organizations associated with the CAI categories such as emergency management departments, Idaho Sheriff's Association, State Fire Marshal and Idaho Geospatial Council.
Collaborate with state and federal efforts to advance the development of authoritative statewide datasets representing parcels and structures. These datasets will support the broadband mapping initiative by providing an accurate and up-to-database to map broadband availability.

CAI Philosophy

The work performed for this submission was guided by three principles:

First, CAIs are important stakeholders within the planning process. CAIs are traditionally active participants of the community planning processes. The challenge of the team is to encourage CAIs to include broadband accessibility in their discussions as an instrumental tool to improve their services to the community. It also allows broadband planning to tie into existing organizational and planning networks.

Second, we believe that CAIs will likely be one of the primary beneficiaries of targeted broadband funding. Some CAIs categories are especially positioned to perform the dual functionality of 1) availing on the extended applications offered by broadband to improve the efficiency of the services they provide to the community (e.g., improved emergency planning, management and response, better medical services, etc.); and, 2) providing a portal for people to access the increasing number of applications available through broadband (e.g., online training; job postings, goods and services, etc).

Third, we continue to use a rational and targeted approach to derive information. This means we will utilize our planning teams for as much ground work as possible. This also means that a goal of our CAI process is not an exhaustive Census of anything that could be a CAI; rather, it is the discovery, inventory and integration of Broadband planning activities into those CAIs that stand to produce the greatest synergies with the SBI planning process.

Based on these principles, the team directs its efforts to integrate broadband mapping in the ongoing fabric of the communities. We want to reach out to CAIs and help them realize viable ways to harness the potential of broadband access. We want to support CAIs to be able to become active voices in their communities to continuously encourage the inclusion of broadband in the community planning processes.

Anchor Institution Outreach

As explained above, in Round 6 we mapped broadband availability at CAIs using an adaptative approach that consisted of a variety of methods. We focused our efforts in two fronts: 1) Clean up the ID CAI database by ensuring that the institutions listed are currently working and are accurately located; and 2) Maximize the results of our outreach by identifying and partnering with CAIs associations leaders.

The process of validating the CAI database is instrumental to achieve the goals of the program. However, this process has proven to be very intense and time consuming. We verified the existence and physical address of 745 public schools against the 2011 -2012 Public Schools Directory of Idaho. This document and the accompanying spreadsheet are maintained and were provided by the Idaho State Department of Education. If a school listed in the Community Anchor Verification System (CAVs) did not have a match in the Directory it was placed in a list for further research, which included looking online for the school website or information about the school in the respective school district website. Finally, the existence of the school was verified on the phone by calling the school district office. This method allowed us to identify 75 schools in our dataset that were closed or that have been consolidated and were accordingly flagged to be deleted. Additionally, this comparison allowed us to update the physical address of 62 schools. Although the Directory included information about private schools, it was stated that this list was not comprehensive. Therefore, verifying the currentness and physical addresses of private schools listed in our dataset required additional research including web searches, phone calls, and physical visits when appropriate. During this round we also worked closely with the Idaho Education Network (IEN). Their collaboration was instrumental to achieve the goals of SBI in several fronts: 1) IEN provided up-to-date broadband connectivity data for the collection points of all school districts; 2) IEN provided access to of the internal network of all school districts, which included detailed and accurate broadband connectivity information of each school in the district; 3) IEN provided a list of

IT personnel for each district including phone numbers and email addresses, this list was used to update the CAVs database contact information; 4) IEN provided a list of all school district offices which included physical addresses and superintendent contact information. The collaboration provided by IEN allowed us to add 105 records of school district offices to the CAVs database and complete or update connectivity information for 560 public schools.

In order to verify the physical addresses of public safety institutions such as fire stations and police departments we contacted the emergency management and/or GIS coordinators at 12 counties and the Eastern Idaho Regional Resource Center. We sent them a list of the institutions found in the CAI database that belonged to each of their jurisdictions and we asked them to check if these lists were accurate and current. We also reached out to the Idaho Bureau of Homeland Security hoping to find the most authoritative information regarding public safety institutions but unfortunately this type of information has federal use only restrictions and prohibits redistribution.

In addition to the physical address it was necessary to develop a comprehensive list of valid email addresses to invite CAIs to participate in the SBI. Although only few of the counties' emergency managers provided contact information of the people in charge of broadband in public safety institutions, most of them could not offer this information. Therefore we opted to do research online and we added 130 emails of potential contacts. Further work will be needed to assess the validity of these email addresses. However, for this round we used a third party email-marketing service to invite 60 previously verified contacts to fill out the on-line survey regarding broadband connectivity;

Another method used was the verification of the physical address of several public safety institutions against the list of state owned/leased buildings. This dataset is maintained by the Risk Assessment Unit within the Department of Administration and it includes the current physical address of all buildings that the state owns or leases. We mapped out this list based on geocoding their physical address and compared the location of the public safety institutions currently in CAVs. Additionally, this list can be used to verify addresses of other government agencies (CAI category 7) in the next data collection rounds.

We tested a new method to invite private schools to contribute their broadband connectivity information. We created groups of private schools based on their religious denomination and/or mission. For instance, we created groups of Catholic, Lutheran, Seventh Day Adventist, Methodists, and Montessori schools and contacted the organizations' head offices. We explained to them the objectives of SBI and asked them to reach out to their schools by using a communication that we drafted for them. Some groups were more receptive to this outreach than others.

We reached out to national organizations such as the National Association of State Technology Directors (NASTD) and the United States Unified Community Anchor Network (US UCAN) with the objective of defining a frame of reference that allows us to assess our outreach efforts to CAIs against similar endeavors in the nation. We presented an overview of SBI at the NASTD Conference in North Dakota in May and invited the Special Interest Group on Broadband to share their experiences and ideas as to how to improve the data collection process. We reviewed documentation that NASTD maintains in a virtual library relevant to SBI. On the other hand, through our conversations with US UCAN we have learned that most of the methods this organization uses to compile a dataset of Community Anchor Institutions at the national level are fairly similar to ours.

Additionally, we continue to use some of the methods from previous data collection rounds. That is, we contact CAIs directly (emails and follow up phone calls) which helped us to get to know individual CAIs briefly, explain the objectives of the program and answer questions and invite them to participate in the on-line survey. It also provides an opportunity for the individual institutions to become engaged in the broadband planning process. The on-line survey remains open between collection periods to provide opportunity for the Regional Planning Teams to update information as they engage with the community and to allow responding institutions to update their data as necessary.

We also continue to extend our network to a number of working groups at local, regional and state levels. We presented information about the SBI program at a variety of meetings such as public safety workgroups, Idaho Geospatial Council and GIS state agencies meetings. The attendants were encouraged to pass on this information to relevant contacts within their own groups. With this method we sought to efficiently raise awareness about SBI on different networks. For instance, by posting information about the program on the Geotech list, which is accessed by several public safety authorities, the program is introduced to a wide audience with the intent of making future outreach to these organizations easier. Our hope is that having knowledge about the program will make them more willing to participate in the survey.

Anchor Institution Trends

To date we have focused our efforts on identifying community anchor institutions, verifying physical address information for the institutions, assigning appropriate NTIA tracking codes to the institutions when appropriate and seeking connectivity data from the institutions. We have placed a priority on reaching out to schools (K-12), libraries, and hospitals. Moving forward we will continue to reach out to the above groups but will increase our efforts to collect better data for the remaining CAI groups with specific emphasis on higher education and public safety institutions.

We continue to foster partnerships with groups doing similar work for other agencies. In Round 5 an important relationship was established with Idaho Department of Water Resources. They house an effort -- in cooperation with the Federal Emergency Management Agency (FEMA) -- to model damage caused by natural disasters using GIS, and have developed a dataset of essential facilities in Idaho. Coordination of activities with IDWR continued throughout Round 6 with the objective of minimizing duplication of efforts.

Another avenue being pursued for CAI data is the “Parcels Project”. This ambitious effort seeks to compile a statewide dataset based on the contributions of authoritative parcels datasets from local governments. Led by Tax Commission and the Department of Administration this project will provide a base to further SBI objectives.

As a final verification step, the team is continuously striving to improve the CAIs positional accuracy. We continued to use GIS methods to plot CAIs as points in a map based on the listed longitude and latitude fields. The location of each point was then compared to the essential facilities dataset and CAI points were repositioned when necessary.

We are hopeful that pursuing these many avenues for data collection will prove to be useful over time for the overall program goals.

Appendix Two

Data Collection Challenges

This section summarizes some of the challenges we have experienced with data collection and processing. The team believes it is important to categorize these challenges as they help inform the geoprocessing and verification methods used. It is also our hope that some of the more global issues can be discussed and decided within the Grantee community.

We begin with several global issues and then continue toward more granular challenges.

Global Data Collection Issues

Maximum Advertised Speed is Not Reported Consistently

As has been discussed in webinars and also within the context of NTIA data assessments, much reported speed information continues to be reported at the market level (MSA/RSA) and then uniformly pushed down to the Census blocks. This has a tendency to create a problem with NTIA speed tripwires since the technology is reported by block but the maximum advertised speed is reported at a regional level.

This challenge gets further amplified at a block level when comparing to a third party data provider. It can create a mismatch between third party data generated at an area larger than block level versus block level generated speed and vice versa. To minimize the potential confusion, it might be helpful to be able to provide a flag at the submitted record level which indicates the geographic basis by which the Maximum Advertised Speed is reported.

Census Block and Road Standards are not clear

There seem to be several methods by which providers are calculating the Census block area. So the distinction at 2.00 square miles can be uniform, it would be ideal to articulate an operational area calculation definition.

Providers Not Wishing for Block Level Aggregation of Their Data

For providers who submit address point data, we do minimal additional processing. Our main test is to ensure that points are contained within 1 mile of exchange boundaries; the only other processing was normalization into NTIA formats.

Broadband providers not Meeting the NOFA "provider" Definition

Comments on PBWorks appear to reflect a concern among a number of grantees about what a Broadband provider is--and how that definition impacts mapping.

If the 7-10 day provisioning rule is to be strictly enforced, it could seem to eliminate a number of prominent Broadband providers[31]. Further, the need for clarification around a facilities-based provider,

[31] By email ***REDACT*** informed us they could not provision in 7-10 days, but they also supply information on qualified locations to the address point level. Therefore, we draw a distinction between an incumbent provider owning the facility--which terminates at a customer premise--who cannot turn up service at a qualified location, versus a provider not reporting any specific qualified locations in which they cannot turnup service in the 7-10 day

versus the reseller, has injected even more uncertainty. Right now we are unclear on how strictly to interpret either of these important distinctions, but we are concerned that we are beginning to create an NTIA exclusion criterion that is going to confuse downstream consumers of the data.

Given mergers and acquisitions in the CLEC space we are noticing a drop off in participation in this program by several national CLECs. We hope this is an artifact of the mergers and resource constraints rather than a long term trend.

Again, we do not want to exclude a service provider, but we believe there needs to be further clarification around the "7-10 day rule," the definition of a "reseller," and better interpretation of facility-based providers, versus equipping UNEs, SpA or leased lines.

We have used the provider Type of "Other" to classify a number of providers who offer Broadband services, but we do not offer them in a manner consistent with Technical Appendix A definitions.

To What Extent Should We Begin "Classifying" the Data and Maps?

The question immediately preceding gets to the intent of a Broadband provider. This question gets to the intent of the Data and Maps.

Earlier in this document we discussed the question of what type of bias we should introduce to our online map messaging. In an online environment, do we want to more likely create an overstatement of coverage for a provider than an understatement? In other words, is the larger problem allowing a consumer to self-disqualify, versus calling a number of neighboring providers? There is a related issue to this. Clearly in our maps there is a lot of scatter in data that we believe should be more continuous. These are the islands of coverage from an incumbent provider[32]. There are a number of processes that could be put in place to deal with this type of scatter, but without more information from the service provider-- essentially the last mile facilities-- it will be difficult to perform this clean up in an informed manner. On the one hand, we can aesthetically clean the maps up and reduce the scatter, but we have little sub-block engineering information upon which to make this decision. Right now our preference is to put out a somewhat aesthetically messier deliverable and work with providers to get better information to clarify their submission. If that isn't forthcoming, we are limited in what can be done given the lack of facility level information. In summary this yields two questions

In our online maps should we error on overstating coverage to prevent consumer self-disqualification? In our online maps should we work to clean up a lot of the scatter that we see without having facility-based evidence from which to remove it?

---

window. In the first case we have a sense of where service can be offered and verified. In the second, we have no evidence that a service could exist there until a specific location becomes a customer.

[32] For a provider who sells opportunistically (not within a franchise area) it becomes even more problematic to classify their coverage because the points are more related to the type of consumer purchasing the service than a bounded offering. In a matter of speaking, the ProviderType is more determined by the technology and/or location than a type of business. The core intent of the NOFA and our grant application was centered around the 7-10 day providers but we believe maintaining information on provider Type "Other" and "Reseller" is important to assist in validation and market segment analysis as resources are available.

As we examine results from third party data assessments, it appears that this scatter is something that is also problematic with the assessment results. It also appears to be evident that different third party data sources treat water areas differently. When we are developing data based upon Wireline facilities, we exclude water blocks. We do not filter out water blocks from provider submitted data. We are unsure if there is or should be a standard in how water covered blocks are treated for Wireline broadband providers.

Community Anchor Institution Surveys

Over time the base of participation in CAI surveys has broadened. Our teams are interacting with more organizations interested in broadband planning. This is a benefit because it helps integrate the importance of Broadband mapping, planning and capacity building within their organizational framework. But it also begins to create challenges in data collection. There are two noticeable trends in this area.

First, CAIs are organizationally diverse. For a school, you expect to have a centralized entity that can answer and support questions about Broadband services. For a rural, volunteer fire department answering questions about broadband may go to the Chief. The way that he/she answers about Broadband is probably specific to her experience and context.   The implication is two-fold. First saying that some percentage of CAIs in a state have access to broadband can be misleading because the formality of a school or government building is much different than the formality of a volunteer fire department. Second, that volunteer fire department may get broadband via a 3G mobile hotpsot when they need it…but the presence of *this* type of broadband is a very different thing than the presence of a responder who has mobile LTE broadband.

Second, technical knowledge of the survey respondent differs within each organization. This complicates our data collection. It is not uncommon for someone to say yes we have Broadband, I just don't know how we get it or how fast this is. So in response we report they are broadband served but unknown speed or technology. This doesn't mean they haven't been surveyed, it just means the response was unknown. As there are now a large number of people collecting this data, it would be helpful to have some consistent national business rules from which we can answer questions about the meaning of any particular data element. As an example, when should "no" be used versus when should "unknown "be used. In other words, what is the standard for the difference between never made contact with the CAI versus a respondent didn't know/couldn't answer. We have guidelines internally but are unsure if this is consistent across states.

Granular Data Collection Issues

Non-Uniform Submission Standards

It is clear among providers that there isn't a consistent method used to derive Broadband coverage. Some providers appear to be use a geocoding approach and then point in polygon or point on segment process. Others may be using GPS locations. In some cases, it is difficult to infer what reference data was used to georeference plant (is it the carrier's roadbase?). This leads to uncertainty regarding the input data scale or accuracy relative to other base layers. Although we may be trading off absolute accuracy, our standard has been to conflate submitted data to TIGER 2010 Blocks and TIGER 2010 roads. We perform our verification against this conflated data product.

Temporal

We are unsure of how well the data are temporally consistent. Some providers gave us their best effort to control to June 30, 2012. We note that some providers were clear that the submission was as of extract date without any way to move back in time. They have no means to control for time and cannot provide any audit support beyond when the data are released to us. Some data-especially loop qualification data-may change from day to day. It will be very difficult to clarify why something was changed from a given point in time.

Perceived Inaccuracy with Respect to Internal Standards

The NOFA is clear on submitting a list of Blocks in which a provider delivers Broadband service. This is a different objective than perfectly reflecting service territories. If a firm's accuracy standard is a reflection of their service area, then the data created under the NOFA will not meet their perception of accuracy. This leads to two other issues: First, using Census Blocks rather than serving area may overstate or understate a particular provider's Broadband serving area. This was a significant concern of ***REDACT*** who specifically required us to submit only address-level qualification data. The second issue this brings up is how or if, there should be some standard on how much of a Census Block needs to be covered to call it covered.

Confidentiality

Several providers have noted concerns with CPNI-related issues and have stated this as a reason for non-participation. We have also heard expressions of comparable concern regarding identifiable responses to Anchor Institution information.

Unclear on Definitions

As discussed earlier, several providers claimed confusion on several key terms involved in Middle Mile. We note a consistent stream of questions around the interpretation of Maximum Advertised Speed. Some providers understand this to be the most common speed package bought within the mass market, while others view this as a speed that can be purchased for an additional cost above a mass market offering (e.g. a Turbo option for an additional fee per month). Others interpret this as the fastest speed that is available for that particular location--in terms of xDSL, a structure qualified speed, for example.

Perception of Data Use

There seems to be some hesitancy releasing speed information because no one is sure of how the information will be used, or what the speed is intended to reflect. A number of providers have verbally indicated that typical speed will be about (on average) 80% of purchased speed due to overhead. But there are many other factors (such as a user's home network) that influence speeds measures. Providers are concerned about introducing statistics without a clear understanding of how those statistics are derived and will then be used. Also, as advertised speed is pushed down to a block level, we sense more trepidation to report speed values. This quickly begins to touch on parity across network types (why is wireline down at the block when wireless is half the state, etc.). Finally we note a

significant increase in speed values reported to us. This may be due to network upgrades or competitive concerns to match the theoretical network speed.

Location Uncertainty In Source Data

Within this document we have noted concerns about the impact of source data accuracy. Our geoprocessing methodology provided what we believe is a relatively conservative tolerance to account for the scale issue in the source data, but we are unsure of how this may impact downstream users. Clearly, it also impacts the verification process because we can't attempt to verify received data beyond a scale at which it was developed.

Covered Segment Process

Deriving Broadband covered segments in Census Blocks greater than 2 square miles has proved to be a challenge. Moving from a NOFA specified tabular deliverable to a requested geographic deliverable also increases the complexity of the effort.

Record Level Metadata

It would be helpful to have one or two additional fields in each feature class transmitted to NTIA. One User Defined field could be helpful as an expression of record level confidence. The second field could be used as a Key between the transfer geodatabase and our systems. Ideally, both fields could be large text fields (50 char) so the Grantee can use them to express a variety of attributes.

Miscellaneous Data Collection Notes

We note the following important observations regarding our data submission:

There are Middle Mile plant records for providers who are not present in the Census block, segment or wireless area feature classes. This is due to classification as non-NOFA Broadband providers.
In some cases, we have trimmed wireless coverage estimates to honor state boundaries.
We believe some providers are trimming their coverage to honor license area boundaries.
Where a provider submitted Middle Mile points out of state, we are no longer passing those points to NTIA as they fail the validation script.
In tables with mandatory Street and Zip5 attributes (Service Address), if the value is unavailable we fill the default value.
As before there remain some differences between the Data Model, Data Model Default Values and the Python Validation Script.
We have a significant amount of VDSL, ADSL 2 and ADSL 2+ coverage categorized into the xADSL category. This introduces large variance in speed availability as some providers are using VDSL, shortened loops and/or pair bonding to increase speed to levels nearly 30 Mbps.
We note a few providers who have speeds seemingly inconsistent with their technology of transmission. This is either very low speeds with optical fiber, or very high speeds with non DOCSIS 3.0 systems. We have verified on provider websites that the reported speeds are available in the area but these speeds will fall out of the NTIA frequency table analysis.
We have a small number of providers who serve an area with both a residential and business speed tier. In cases where we cannot distinguish which speed tier offering to use, we use the higher of the speed tiers.

Per NTIA request we have modified the manner in which we handle Wireless coverage polygons. If a Provider submits a single geometry but specifies multiple spectrum codes in use in that polygon, we duplicate the polygon for each spectrum code. In other words the geographic object is identical but the attribute data for the object is unique.

In point level data submissions (Service Address and CAI) we note points that are spatially coincident. With respect to Service Address points our thought is these represent multi-unit dwellings or businesses but we don't have enough address detail to determine if these are multi-unit structures or duplicated customers. Because we cannot determine the reason for the duplication we leave spatially coincident records in our submission. We also leave in our CAI submission points which may be the same physical structure but have slight variations in addressing.

In point level middle mile data, we are finding a variance in the quality of the geocoded longitude and latitude returned. Given the data received we are unsure if this is an issue where the plant address is difficult to geocode or if the longitude and latitude provided to us is different than what would be returned in geocoding.

For Block and Segment level data which we produce based upon provider facility or service area boundaries, we remove Census blocks which are entirely water covered. This results in a drop of Census block counts for a number of providers.

Appendix Three

This appendix contains the confidentiality clarification supplied in a series of emails between CostQuest and NTIA.

Feature Class	*Metadata*	*NOFA Confidential?*	*Online Map*	*Public Disclosure*	*Exemption*
Last Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Middle Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Service Address	Constraints on accessing and using the data	No	No	Yes	
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
CAI	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential

	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Census Block	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Service Overview	Constraints on accessing and using the data	No	Yes	Yes	The only provider who may not show up on this table is a provider who has provided only confidential data (last mile, Middle Mile,

					address point with provider name)
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Road Segment	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None.				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Wireless	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				

	There are no restrictions on distribution of the data by users

Appendix Four-Idaho

This appendix details our analysis of the potential and actual broadband provider market. We include both our internal tracking description document and then our categorization for each provider. As this extract was made prior to final submission, there may be differences between provider categorization and the attributes on the day of submission to NTIA.

Provider Categorization

Provider Type and Status Definitions

The Provider Type is based upon categories provided by NTIA, while the Provider Status is based upon categories developed internally for tracking purposes. It should be noted that the Provider Status discussed here relates to the provider's overall status within the program.

Provider Type Codes and Definitions:

NTIA code	Code	Name	Definition
1	P	Provider	This code applies to all confirmed providers of broadband service per the SBI program NOFA. A provider is given a "P" designation if we have determined that the company does indeed exist and appears to be providing broadband services.
2	R	Reseller	This code applies to all broadband entities that have been confirmed as pure resellers – meaning they do not own their own facility/equipment and simply resell services under their own brand name or the brand name of an actual Provider.

3	O	Other	The code applies to entities who were originally placed on the SBI provider list, but whose status is still in question or has been determined to be non-NOFA compliant.
4	N/A	Not applicable	This code applies to entities who appeared on the original state provider list or a third party list (such as the FCC 477, American Roamer, or Warren Media lists) but who have been confirmed as NOT providing broadband services.
	X	Inactive	This code applies to entities that may have appeared on an early provider list but whose identity and existence we subsequently have been unable to verify. This code may also apply to providers who have since been acquired or simple gone out of business and for which no FRN appears on the FCC list – These no longer need to be reported to NTIA. This is an INTERNAL category used to remove entities completely from the list of entities submitted to NTIA.

Once the proper Provider Type has been assigned to an entity, an overall Provider Status must be established. The Provider Status codes are specific to the Provider Types, and are not interchangeable. The following table lists the status codes associated with each Provider Type.

Provider Status Definitions

Provider Type Code	Provider Status Code	Name	Definition
P	D	Declined	A provider is given a Status of "D" if they have officially stated verbally or in writing that they will not participate in the SBI program.
	P	Participating	A provider is considered to be "Participating" if they have submitted USABLE data in at least one data submission round. The data does not need to be 100% complete for a provider to be assigned a "P" code – they simply have to have provided a level of data that is sufficient to submit to NTIA.
	NR	Non Responsive	A provider is considered "Non Responsive" if they have either failed to respond to any of our correspondence, or they have submitted insufficient data that makes inclusion of their data in the NTIA submission impossible.
	V	Submitted under other ID	A provider whose data is submitted under another Provider ID, but is operating under their own FRN.
	E	Estimated	A provider is marked as "Estimated" if they have not submitted usable data, and would otherwise be considered non-responsive, BUT for whom we are able to submit data by using estimation techniques and/or third party sources. This designation applies only to providers whose data is 100% estimated.
R	R	Reseller	"R" is the only status code for Resellers and it simply reconfirms their status as a reseller –data may not be submitted but name of provider is included in NTIA data package.
O	U	Unknown	The status of Unknown is assigned to an entity whose name has appeared on a list (or been submitted as a new possible provider) and is currently under investigation. It has not been determined yet if this entity is indeed offering broadband services or not.
	NC	Non-Compliant	This status is assigned to entities who appear to be in the broadband industry, but who do not meet the formal definition of a BB provider under NOFA requirements. Examples may be entities who cannot provision service within 7-10 days.

	P	Participating	These are providers who do not meet the formal definition of a BB provider under NOFA requirements, but are participating in the program and submitting data.
	NP	Not a Provider	This status applies to entities who may appear on a third partly list of valid providers, but who have been proven to either no longer exist, or simply no longer provides broadband services.
N/A			No status codes associated with this Provider Type
X			

Provider Disposition

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
679	ID	360 Networks	360 Networks	n/a	O	NC
148	ID	A & W Satellite	A & W Satellite	n/a	R	R
120033	ID	Access Spectrum	Access Spectrum	Access Spectrum	N/A	NP
120027	ID	Advanced Cable Technology	Advanced Cable Technology	n/a	N/A	NP
152	ID	Wired Or Wireless, Inc.	AIR-PIPE	Wired or Wireless, Inc.	P	P
115	ID	ATC Communications	Albion Telephone Company	Albion Telephone Company, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
153	ID	All Idaho Internet	All Idaho Internet	n/a	R	R
802	ID	Atlantic Tele-Network	Allied Wireless Communications Corporation	Atlantic Tele-Network	P	NR
678	ID	American Fiber Systems, Inc.	American Fiber Systems	Zayo Group, LLC	O	P
661	ID	AT&T Mobility LLC	AT&T Mobility LLC	AT&T Mobility	P	P
120038	ID	Atlantic Wireless LP	Atlantic Wireless LP	Atlantic Wireless LP	O	U
154	ID	Big Sky Telecom	Big Sky Telecom	n/a	R	R
155	ID	BitSmart	BitSmart	n/a	P	P
120034	ID	Blackfoot Telephone Cooperative Inc	Blackfoot Telephone Cooperative Inc	Blackfoot Telephone Cooperative Inc	N/A	NP
135	ID	Bresnan Internet	Bresnan Internet	n/a	N/A	NP
686	ID	DigitalBridge Communications	Bridgemaxx	DigitalBridge Communications Corp.	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
120010	ID	Level 3 Communications, LLC	Broadwing Communications, LLC	n/a	P	V
136	ID	Cable One	Cable One	Cable One, Inc.	P	P
120029	ID	Cache Broadband	Cache Broadband	n/a	N/A	NP
120049	ID	Cache Valley Wireless	Cache Valley Wireless	Cache Valley Wireless	N/A	NP
120002	ID	Cactus International, Inc.	Cactus Computer	n/a	P	D
638	ID	Cambridge Telephone Company, Inc.	Cambridge Telephone Company, Inc.	Cambridge Telephone Company, Inc.	P	P
120035	ID	Cavalier Wireless, LLC	Cavalier Wireless, LLC	Cavalier Wireless LLC	N/A	NP
131	ID	CenturyTel, Inc.	CenturyLink	CenturyTel, Inc.	P	P
129	ID	CenturyTel, Inc.	CenturyLink	Qwest Communications International, Inc.	P	V
829	ID	Chickadee Wireless	Chickadee Wireless	n/a	P	D

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
804	ID	GreenFly	Clearfly	Greenfly Networks, Inc.	R	R
120036	ID	Cleartalk	Cleartalk	Cleartalk	N/A	NP
189	ID	Clearwire	Clearwire	Clearwire Corporation	P	P
527	ID	Comcast of California Idaho, Inc.	Comcast	Comcast Corporation	P	P
120003	ID	CommWorld	CommWorld	n/a	P	NR
830	ID	Concept Cable TV	Concept Cable TV	n/a	P	P
120037	ID	Continuum 700 LLC	Continuum 700 LLC	Continuum 700 LLC	N/A	NP
156	ID	Convertec Internet Services	Convertec Internet Services	n/a	N/A	NP
754	ID	Country Cable	Country Cable	Country Cable	P	NR
137	ID	CoxCom, Inc.	Cox Communications	Cox Communications, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
803	ID	Craner Technology Services	Craner Technology Services	Craner Technology Services	P	P
729	ID	Leap Wireless International, Inc.	Cricket Communications, Inc.	Leap Wireless International, Inc.	P	P
116	ID	CTC Telecom	CTC	CTC Telecom	P	P
671	ID	Custer Telephone Broadband Services LLC.	Custer Telephone Broadband Services	Custer Telephone	P	P
117	ID	Custer Telephone Cooperative, Inc.	Custer Telephone Cooperative, Inc.	Custer Telephone Cooperative Inc.	P	P
157	ID	Datawav-is	Datawav-is	n/a	X	
158	ID	Digi-Comm	Digi-Comm	n/a	X	
159	ID	Direct Communications - wireless	Direct Communication	n/a	P	V
138	ID	Direct Communications Cable	Direct Communications	Direct Communications Rockland, Inc.	P	P
118	ID	Direct Communications	Direct Communications	Direct Communications Rockland, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
139	ID	Dish Network	Dish Network	Dish Network	R	R
645	ID	Megapath, Inc.	DSLNet Communications, LLC	n/a	N/A	NP
716	ID	Elk River TV Cable Company	Elk River TV Cable Company	Elk River Cable TV Inc.	N/A	NP
769	ID	Fretel	FairPoint Communications	FairPoint Communications, Inc.	P	P
119	ID	FairPoint Communications	FairPoint Communications	FairPoint Communications, Inc.	P	P
171	ID	LTLink	Family Friendly Internet Service	n/a	P	NR
120	ID	Farmers Mutual Telephone Company	Farmers Mutual Telephone Company	Farmers Mutual Telephone Company (ID)	P	P
121	ID	Filer Mutual Telephone Company	Filer Mutual Telephone Company	Filer Mutual Telephone Company	P	P
162	ID	First Step Internet, LLC	First Step Internet	First Step Internet, LLC	P	P
132	ID	Citizens Telecommunications Company of Idaho	Frontier Communications of Idaho	Frontier Communications Corporation	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
130	ID	Frontier Communications	Frontier Communications of Northwest Inc.	Frontier Communications Corporation	P	P
120005	ID	First Step Internet, LLC	GLOBAL CROSSING TELECOMMUNICATIONS, INC.	n/a	R	R
164	ID	Gem State Communications	GSC Wireless	n/a	P	P
805	ID	Hughes Communications, Inc.	HNS License Sub, LLC	Hughes Communications, Inc.	P	P
166	ID	Imbris, INc.	Imbris, Inc.	n/a	N/A	NP
832	ID	MediaG3, Inc.	Imperial Wireless	n/a	P	NR
167	ID	Inland Internet	Inland Internet	n/a	P	V
122	ID	Inland Telephone Company	Inland Telephone Company	Western Elite Incorporated Services	P	P
695	ID	Electic Lightwave, LLC	Integra Telecom	Integra Telecom Holdings, Inc.	P	P
168	ID	Intermax Networks	Intermax Networks	Newmax, LLC	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
740	ID	Idaho Regional Optical Network	IRON	n/a	O	P
169	ID	Ispeed Wireless	ISpeed Wireless	n/a	P	NR
687	ID	JAB Broadband - DIGIS	JAB Broadband - DIGIS	JAB Wireless, Inc.	P	P
165	ID	JAB Broadband - DIGIS	JAB Broadband - DIGIS	n/a	P	V
120023	ID	JAB Broadband	Jab-Skybeam	n/a	N/A	NP
120009	ID	KeyOn Communications Holdings, Inc.	KeyON Communications Holdings, Inc.	n/a	X	
120031	ID	Laser Image Inc	laser Image Inc	n/a	N/A	NP
170	ID	DIGIS	Last Mile Wireless	n/a	P	V
151	ID	Leader Communications Services (St. Maries Wireless)	Leader Communications Services (St. Maries Wireless)	n/a	P	NR
660	ID	Level 3 Communications, LLC	Level 3 Communications, LLC	Level 3 Communications, LLC	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
120039	ID	Manti Telephone Company	Manti Telephone Company	Manti Telephone Company	N/A	NP
737	ID	PAETEC Holding Corp	McLeodUSA Telecommunications Services, Inc.	PaeTec Corporation	N/A	NP
172	ID	Meadow Creek Computer Works	Meadow Creek Computer Works	n/a	R	R
120042	ID	Qualcomm	MediaFLO	Qualcomm	N/A	NP
120040	ID	Metro PCS	Metro PCS	Metro PCS	O	U
120011	ID	Metropolitan Telecommunications Holding Co	Metropolitan Telecommunications Holding Co	n/a	R	R
173	ID	Microserv	Microserv	n/a	P	NR
174	ID	MicroWave DSL (HIBEK.Net)	MicroWave DSL	n/a	P	D
123	ID	Midvale Telephone Exchange, Inc.	MTE Communications	Midvale Telephone Exchange	P	P
120041	ID	MTPCS LLC	MTPCS LLC	MTPCS LLC	O	U

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
124	ID	Mud Lake Telephone Cooperative Association, Inc.	Mud Lake Telephone Cooperative Association, Inc.	Mud Lake Telephone Cooperative Assn., Inc.	P	E
145	ID	Mullan Cable	Mullan Cable	Mullan Cable TV Inc.	P	P
120000	ID	AT&T Inc.	New Cingular Wireless Services, Inc.	n/a	P	V
674	ID	New Edge Holding Company - Earthlink	New Edge Network, Inc.	New Edge Holding Company	O	NC
768	ID	Nez Perce Tribe	Nez Perce Tribe	n/a	P	P
175	ID	NIDAHO.NET	North Idaho Connection	n/a	P	NR
146	ID	Northland Cable Television	Northland Cable Television	Northland Communications Corp.	P	P
690	ID	OneEighty Networks	OrbitCom, Inc.	OrbitCom, Inc	P	NR
125	ID	Oregon-Idaho Utilities, Inc.	Oregon-Idaho Utilities, Inc.	Robinson Communications Corporation	P	P
176	ID	Overarch Broadband	Overarch Broadband	n/a	P	NR

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
161	ID	Pass Word PKA - Fastlane-i.com	Pass Word, Inc.	n/a	N/A	NP
126	ID	Project Mutual Telephone Cooperative Association, Inc.	Project Mutual Telephone Cooperative Association, Inc.	Project Mutual Telephone	P	P
178	ID	Ptera Wireless Inc.	Ptera	n/a	P	P
179	ID	QROIdaho	QRO High-Speed Internet of Idaho	n/a	P	P
149	ID	Coeur d`Alene Tribe	Red Spectrum Communication	n/a	P	E
806	ID	Rural Network Services (Owned by Midvale Tel)	Rural Network Services	Rural Network Services	P	NR
120012	ID	Rural Network Services (Owned by Midvale Tel)	Rural Network Services	n/a	N/A	NP
127	ID	Martell Enterprises, Inc.	Rural Telephone Company	Martell Enterprises, Inc.	P	P
180	ID	SafeLink Internet	Safelink Internet	Safelink Internet	P	P
779	ID	Millennium Networks	Silver Star Broadband	Silver Star Telephone	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
141	ID	Silver Star Broadband	Silver Star Broadband	Silver Star Telephone	P	P
722	ID	Columbine Telephone Company, Inc.	Silver Star Communications	ATC Communications	P	P
128	ID	Silver Star Telephone Company, Inc.	Silver Star Communications	Silver Star Telephone	P	P
723	ID	Gold Star Communications LLC	Silver Star Wireless	Silver Star Telephone	P	P
181	ID	SISNA (dialup)	SISNA	n/a	N/A	NP
188	ID	Sky Blue	Sky Blue	n/a	O	S
838	ID	Skycasters, LLC	Skycasters, LLC	n/a	P	P
120048	ID	SpectrumCo	SpectrumCo	SpectrumCo	N/A	NP
836	ID	Speed Connect	Speed Connect	n/a	P	P
182	ID	SpeedyQuick Networks	SpeedyQuick Networks	n/a	P	NR

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
183	ID	Spokane Skynet	Spokane Skynet	n/a	O	S
651	ID	Sprint Nextel Corporation	Sprint	Sprint Nextel Corporation	P	P
191	ID	St. Maries Gazette Record	St. Maries Gazette Record	n/a	P	P
163	ID	St. Maries Gazette Wireless	St. Maries Gazette Record	n/a	P	V
807	ID	StarBand Communications Inc.	StarBand Communications Inc.	StarBand Communications Inc.	P	P
120014	ID	Stat Network Solutions	Stat Network Solutions	n/a	N/A	NP
120015	ID	Stratos Global Corporation	Stratos Offshore Services Company	n/a	O	S
142	ID	Suddenlink Communications	Suddenlink Communications	Cequel Communications, LLC	P	E
143	ID	Superior Satellite	Superior Satellite	n/a	R	R
184	ID	Surf1	Surf1	n/a	P	NR

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
696	ID	Syringa Networks, LLC	Syringa Networks, LLC	Syringa Networks, LLC	P	P
845	ID	Syringa Wireless	Syringa Wireless	n/a	P	NR
705	ID	Potlatch Telephone Company	TDS	Telephone and Data Systems, Inc.	P	P
704	ID	Asotin Telephone Company	TDS	n/a	N/A	NP
133	ID	Telephone and Data Systems, Inc.	TDS TELECOMMUNICATIONS CORPORATION	n/a	P	V
185	ID	Teton Wireless	Teton Wireless	n/a	N/A	NP
653	ID	Time Warner Cable LLC	Time Warner Cable	Time Warner Cable Inc.	P	P
134	ID	T-Mobile USA, Inc.	T-Mobile	Deutsche Telekom AG	P	P
120043	ID	Toba Inlet PCS, LLC	Toba Inlet PCS, LLC	Toba Inlet PCS, LLC	N/A	NP
144	ID	Troy Cable	Troy Cable	n/a	P	NR

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
759	ID	tw telecom of Idaho llc	tw telecom	tw telecom inc.	P	P
120045	ID	U. S. Cellular	U. S. Cellular	United States Cellular	N/A	NP
120044	ID	Union Telephone Company	Union Telephone Company	Union Telephone Company	N/A	NP
120017	ID	Verizon Business Global LLC	Verizon Business	n/a	O	NC
713	ID	Verizon Wireless	Verizon Wireless	Verizon Communications Inc.	P	P
666	ID	ViaSat, Inc.	ViaSat, Inc.	WildBlue Communications, Inc.	P	P
120008	ID	Inland Cellular Telephone Company	Washington RSA No 8 Limited Partnership	n/a	P	V
766	ID	Westcom LLC	Westel Fiber	WestCom LLC	P	P
120046	ID	Western Communications Inc.	Western Communications Inc.	Western Communications Inc.	N/A	NP
120047	ID	Whidbey Telephone Company	Whidbey Telephone Company	Whidbey Telephone Company	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
186	ID	Wilderness Wireless	Wilderness Wireless	n/a	P	P
147	ID	Windjammer Cable	Windjammer Cable	Windjammer Communications LLC	P	P
808	ID	XO Holdings, Inc.	XO Communications, LLC	XO Holdings, Inc.	R	R
120020	ID	Zayo Bandwidth Northwest, Inc.	Zayo Group, LLC (FiberNet)	n/a	O	NC

OFFICIAL OCTOBER 2012 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE STATE OF ILLINOIS

Partnership for a Connected Illinois

broadbandillinois.org

October 2012

Table of Contents

COVER LETTER

October 2012

Ms. Anne W. Neville
SBDD Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
1401 Constitution Avenue, NW Room 4716
Washington, DC 20230

Dear Ms. Neville:

Please accept this submission from the Partnership for a Connected Illinois (PCI), the Designated Entity for Illinois.

These artifacts should be found to be compliant with the October 1, 2012, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications.

This cycle, PCI continued its full responsibility for the data-collection activities from broadband providers in the State. Assuming this role is vital to achieve the State's goals with regard to improving broadband access and adoption – and which are in turn central objectives of the Partnership for a Connected Illinois. All facets of this data-collection transition, and the activities that flowed from it, are included in the narrative that follows.

If you have any questions about this Data Narrative, please do not hesitate to contact me, at 217-816-4151.

Respectfully submitted,

Drew Clark
Executive Director
Partnership for a Connected Illinois, Inc.

INTRODUCTION

The data submission cycle ending on October 1, 2012 marks the third round that PCI has held the full responsibility of data collection and publishing for the entirety of the six months. In this round, PCI used creative new strategies in its outreach to the carriers. PCI continued to establish Non-Disclosure Agreements (NDAs) with broadband providers for confidential information. The data that accompanies this narrative contains edited data for 69 out of the 138 carriers included in the submission. This round PCI continued to refine its data verification process through the use of GeoPDF maps and third party data sources. PCI also continued to make improvements to its Community Anchor Institution database through telephone verification of data and a focus on library public Wi-Fi and URL variables.

In the spirit of cooperation with the other 55 State Broadband Initiatives (SBIs), PCI was in contact with other states to help its outreach for this cycle. PCI used the National Broadband Map to find if other states had been able to contact and map providers that have never participated in Illinois. Specifically, PCI made contact with CostQuest Associates (AL, WI, ID, and WY), Sanborn (OK), and the SBI in Georgia. PCI also tried to help other states by working with them on providers that cross Illinois' boarder, posting on the SBDD wiki forum website, and participating in webinars held by the NTIA. PCI aspires to be a leader in the SBI world, and to make the National Broadband Map as accurate as possible.

In this round, the Partnership for a Connected Illinois (PCI) took major steps in its three-fold mission to collect and publish broadband data, to ensure broadband access throughout the State, and to maximize broadband's impact. Assuming this data collection role is vital to achieve the State's goals with regard to improving broadband access and adoption. PCI appreciates the assistance provided by NTIA as PCI improved its collection, processing, and verification of broadband data for submission according to NTIA standards.

PCI has continued to refine the Broadband Illinois web site. This consumer-friendly interface allows residents of the State to intuitively access the information collected by PCI – it is a portal to actual speed data, and a tool that consumers can use to verify the data provided by broadband providers. Since the last submission cycle that ended on April 1, 2012, PCI has included a range of maps not previously available. The Broadband Illinois website contains county-level GeoPDFs for each of Illinois's 102 counties, as well as pages for each broadband provider in the State of Illinois. These maps can be downloaded and edited using the TerraGo Technologies toolbar, which will be explained in great depth in various parts of this narrative.

This narrative will summarize the carrier outreach, the data production methods, carrier data verification, and the community anchor institution data. It will conclude with an examination of the Broadband Illinois website and the ways in which PCI is publishing carrier data in a user-friendly manner that allows for feedback from the consumer.

Carrier Outreach

From July 16- through July 20, 2012, all providers currently in the PCI census block and wireless layers were sent GeoPDFs that displayed their coverage area in the State of Illinois. The GeoPDFs were fully editable by the provider using the TerraGo technologies' toolbar. As part of this e-mail, PCI requested that updated data be submitted to PCI for its Cycle 6 submission to the NTIA and for the update to the Illinois Broadband map. For those providers who had not previously established a Non-Disclosure Agreement with PCI, a copy of PCI's draft version accompanied these maps.

This entire outreach process was tracked on Salesforce, PCI's contact management tool. As maps were created, distributed, and verified, fields were populated in Salesforce to denote that a map that met the approval of the provider had been created. For those providers who did not respond to their initial map request, multiple follow-up e-mail and phone call attempts were made. PCI also tracked whether there would be an update to the data for this submission, what version number of the data PCI would be submitting, and the dates in which an NDA had been established.

This section will explain the way in which PCI conducted its outreach to the carriers and the different ways in which it received data. It will outline some of the major updates that were received in this round as well as describe both quantitatively and qualitatively the extent to which data was updated in this round.

NDA

PCI continues to offer and abide by the terms of our NDA. If providers did not establish an NDA in a previous round, they were given the opportunity to do so in this round. In other instances, NDA's were individually negotiated to address specific provider concerns.

When an NDA was established with a provider, the date that the NDA was established was recorded in Salesforce. A field in Salesforce was also populated as to whether or not the provider would be submitting new data for this Cycle 6 submission. If a provider responded with no change to the data, PCI removed priority from that provider and refocused attention on those providers who reported that there was a change to their data up to June 30, 2012. PCI wanted to establish the NDAs by focusing on those providers with new data to submit.

Updates to Data

Of these 138 providers submitted as part of the data package in this round, edited data has been submitted for 69 of them. This data comes in the form of new infrastructure, speed changes, and corrections from PCI's previously submitted data. In this round, the Partnership for a Connected Illinois added 14 new carriers: Shelby Electric Cooperative, Network Business Systems, StarBand, Ag Prospects, Metro Service Center, S&B Technologies, XL Internet, Netoption, Maxwire, SkyCasters, Cygnus, Sharon, Rural Comm and Illinois Valley Cellular.

Broadband service providers submitted coverage in terms of the areas that they served, either in edited GeoPDFs, direct geospatial formats, CAD files, Excel databases, Google Earth files, or as paper maps. The submitted polygons were overlaid on the census block polygons and those blocks touching were selected and used. The proper speed tier categories were assigned as necessary.

Throughout August and early September, the PCI data team formatted data as it was received. A cutoff date of September 21, 2012 was established for the acquisition of new data to include in this submission. However, PCI continued to accept data well after that date, and all providers who submitted updated coverage in this round are included in this submission.

The table below summarizes the status of data among providers.

No update to coverage area/ verified previous data/previous data submitted	69
Previous provider provided an update to coverage area that was included in this cycle.	55
New provider for this round	14
Total number of providers included in this submission	**138**

Total number of providers included in this submission	138
Identified Illinois providers that have never participated in mapping project	41
Total number of providers identified in the State of Illinois	**179**

Changes and Corrections

On August 19, 2011, PCI along with the other SBDD's designated entities submitted a changes and corrections document to the NTIA for the data that was submitted in Round 3. PCI felt this was a very useful document, and would like to incorporate it into this narrative to demonstrate the extent to which PCI updated its data in this round. While the last section quantitatively expressed how data was changed, this section qualitatively explains each of the updates that were made. Some of the more extensive changes and corrections will be described in later sections.

Provider	Change	Correction	Description
Kraus Electronics		x	Speed Increase to Speed Tier 7 across entire coverage, No change in footprint
Telecommunications Management, LLC	x	x	Corrected Missing Cable in Richland County and Vermillion County, Added Coverage and Infrastructure Improvements, speed increases in the north, added towns in Vermillion County. TT40 now in Perry and Franklin Counties.
Adams Networks		x	Speed Increase in local towns, adjusted DSL and Fiber coverage
MidCentury		x	Speed Increase in local towns, adjusted coverage to fill in gaps
Mediacom		x	Table contained FIPS codes for census 2000 blocks, but had to be built. Also removed records from the raw table that did not have bb_aval with a "Y"

NOW Wireless, LLC		x	Increased Speed in areas that were speed tier 3 in Round 5
Joink		x	Claimed PCI Overstated Coverage in R5, Changed to KML Overlays Provided by Joink
Qwest		x	Change DBA to Century Link, Ownership Change
Zayo Broadband		x	Acquired 360Networks, Ownership Change
US Cellular	x		Added 4G Coverage, 3G Unchanged
Leap Wireless/Cricket Communications	x		Smaller Footprint, Full Dataset submitted
Wabash		x	Expanded coverage to show full footprint
Zito Media		x	Was called GalaxyCablevision, Provider and dba name change, speed increase
Verizon Wireless	x		Expanded 4g footprint
T-Mobile	x		Expanded 4g and 3g footprint, better data quality in Rockford, IL area
Cass Telephone Company		x	Properly formatted Provider Name/DBA Name, corrected missing coverage
Cass Cable TV, Inc.	x	x	Properly formatted Provider Name/DBA Name, corrected missing cable towns, added FTTH coverage
Green County Partners, Inc.	x	x	Properly formatted Provider Name/DBA Name, corrected missing cable towns, added FTTH coverage
Frontier	x		Added More DSL coverage
T6	x		Acquired KeyOn and CTI
Royell	x		Acquired Corn Belt, Added several Towers, added VDB network.
Highland Communications	x	x	Data Refinement using online household map. Added some Census blocks to fill in holes, deleted some census blocks as well. First time Provider has approved.

AT&T	x	x	Provided Higher Quality Data, Speeds now associated at Block Level instead of the CBSA level, Also provided 4G Coverage
Sprint	x		Full New Dataset
Montrose	x	x	Speed Increase, filled in some coverage gaps.
Harrisonville/HTC	x	x	Increased Speed in TT10 and TT20, Increased ADSL Footprint near Columbia, Added to FTTH coverage in Red Bud, Added DSL Central Offices Fixed TT70 Speed
Charter	x		Filled in the holes mostly, did reduce coverage in some areas.
Clearwire	x		New and Complete Dataset, No noticeable changes
HughesNet		x	Have always claimed to cover entire state. Changed date to reflect this.
MegaPath	x		Name Change from Covad, Increase in Coverage and Speed
RCN Regulatory	x	x	Data Refinement. Reduced TT40 but added coverage TT41. Also included TT30 for the first time. Also corrected Middle Mile Data and Updated Service Addresses
Century Link	x		Increased coverage and speeds in some areas, removed coverage in other.
Tw Telecom of Illinois LLC		x	Middle Mile Only, Updated FRN number. No other changes
Sidera Networks	x		Middle Mile Only, Added 6 Middle Miles Points
Cequel	x		Full New Dataset., Added and removed coverage
Flat Rock	x	x	Increased Speed Across the board, Increased upload speed.
Barbeck	x		Increase in Coverage and Speed
Jo-Carroll	x		Increase in Coverage
Computer Dynamics	x		Increase in Coverage
Park TV & Electronics	x	x	Corrected Coverage to include unincorporated town of Armstrong, Speed Increase,

			Added one wireless tower.
Sonic	x		Increase in Coverage and Speed
Rural Comm		x	New Provider
Egyptian	x		Increase in coverage, increased speed for Fixed Wireless
Oneida	x	x	Oneida wire center now 100% FTTH, removed DSL coverage in the Oneida wire center. Increased speed in the FTTH and the Rio DSL footprints.
Comcast	x		Increase Speeds in Metropolis, IL. Comcast is now 100% DOCSIS 3.0 in IL
ViaSat	x		Name Change from WildBlue, Increased Speed to Speed Tier 7
SkyCasters		x	New Provider, Satellite
Cygnus	x	x	New Provider, TT20 and TT 70
Sharon	x	x	New Provider, TT10
Bergen	x		Added Coverage, Speed Increase
Illinois Rural Electric Coop	x		Increased Speed, slight increase in coverage. Upgraded infrastructure
Ag Prospects		x	New Provider
Metro Service Center		x	New Provider
S&B Technologies		x	New Provider
XL Internet		x	New Provider
Netoption		x	New Provider
Maxwire		x	New Provider
StarBand		x	New Provider, Satellite
New Wave Net Corp	x	x	True Propagation ran this round from Round 5 data, add towers as well.
MTCO		x	Had coverage in many small towns around Peoria, and was missing coverage around Peru area. Added FTTH
Network Business Systems		x	New Provider
Shelby Electric Cooperative		x	New Provider
Leaf River/LC Communications	x		Added Fixed Wireless Coverage
Illinois Valley Cellular		x	New Provider

Wisper ISP	x		Increased Speed and slight Coverage expansion
Grafton	x	x	Added the Jerseyville
A-G Long Distance	x		Added FTTH Coverage, Increased DSL Speed
Hofnet Communications	x		Increased Speed and Added Coverage
One-Eleven	x		Increase Speed and added coverage
New Windsor Telephone	x		Added FTTH Coverage to the North
Shawnee	x	x	Added FTTH and DSL Coverage, Increased DSL Speed

SBDD Data Transfer Model Methodology

The submission of the broadband dataset for October 1, 2012 is contained within the SBDD Data Transfer Model. PCI has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the State, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.

In addition to the narratives and methodologies contained herein, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBDD Data Transfer Model for the state of Illinois.

Inventory of Deliverables, Partnership for a Connected Illinois: October 1, 2012:

NOFA Requirement	Data Transfer Model	Data Description
AppendixA: 1(a)	BB_Service_Address	List of addresses at which broadband service is available to end users in the provider's service area.
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census blocks of No Greater Than Two Square Miles in Area
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census blocks Larger in Area Than Two Square Miles
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing

The provider data collected by PCI on behalf of the State of Illinois have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBDD Data Transfer Model. Wireline availability is contained within census blocks and road segments. Wireless availability is contained as polygons of coverage areas. Middle-mile connections and community anchor institutions are contained as point data. The subscriber weighted nominal speed (if available) is contained within the overview feature class. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

In this round, we are again including the state boundary. Commenting on previous round of data submission, NTIA cited issues with data gaps near the borders of the state and recommended using the U.S. Census Bureau state boundary data. Thus, in this round of data submission, we are including the U.S. Census Bureau 2010 Census Illinois state boundary in GCS_WGS_1984 coordinate system.

DATA PRODUCTION METHODS

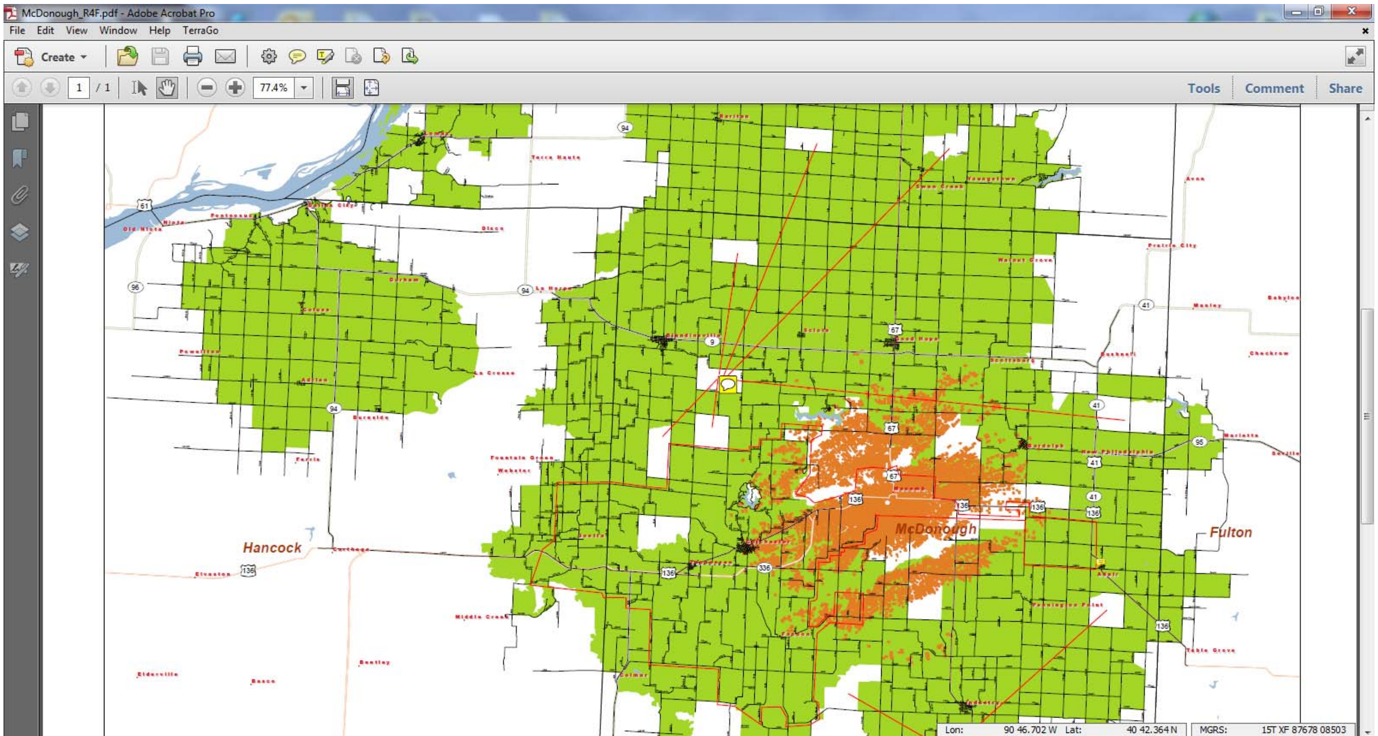
As mentioned, data was received in a number of formats that required processing in order to prepare the data for submission in accordance with NTIA requirements. This section discusses how PCI processed provider data, as well as how PCI assisted the provider in making the update process as easy as possible. It examines each layer and the steps PCI took in making the updates.

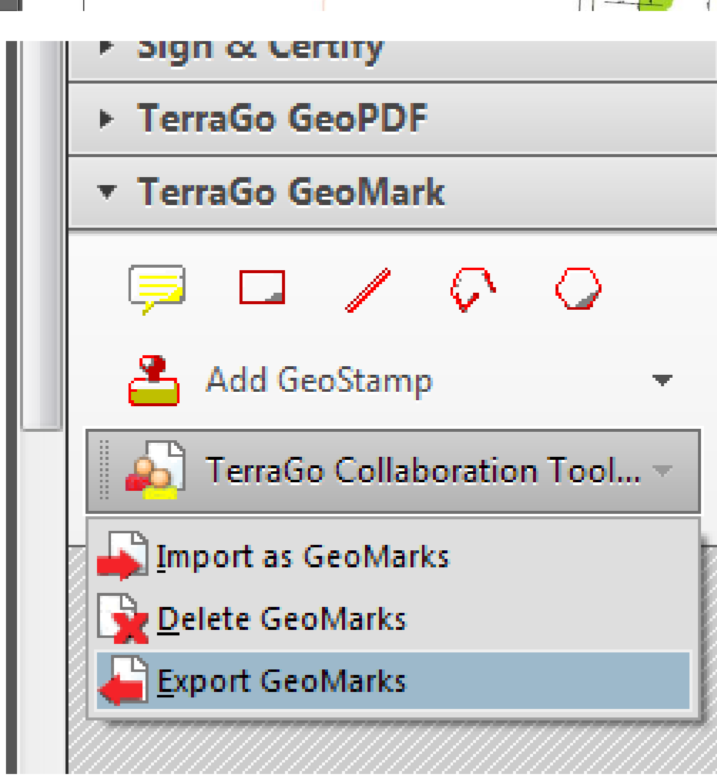
GeoPDF and TerraGo Technologies Toolbar (DSL & FTTH)

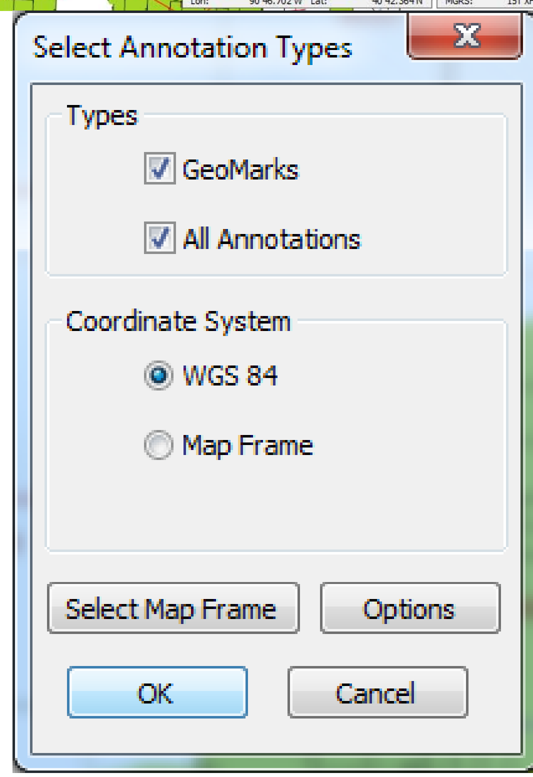
In the initial outreach made to the providers from July 16- through July 20, 2012, they received a map of their existing coverage area. These maps are in the TerraGo Technologies GeoPDF format. This allows the provider to mark up the map with corrections and allows PCI to bring those corrections into ArcGIS. Instructions on how to install and use TerraGo GeoPDF were made available here: http://broadbandillinois.org/maps/Carrier-Maps/About-GeoPDF-Maps.html .

This toolbar created several opportunities for the provider to really zoom in and edit their coverage area. When it comes to verifying carrier level data, PCI felt the GeoPDF and the virtual meetings where PCI and the provider started carving up the data were extremely useful. The images on the next several pages demonstrate how DSL and FTTH providers were able to use the toolbar to carve up coverage areas to update their data.

The provider, upon opening the map was instructed to use the  icon to turn layers on and off, and follow the instructions to mark up the map. The image below is a marked up GeoPDF of McDonough Telephone Cooperative in which they indicate where they have had FTTH deployment since their previous submission.

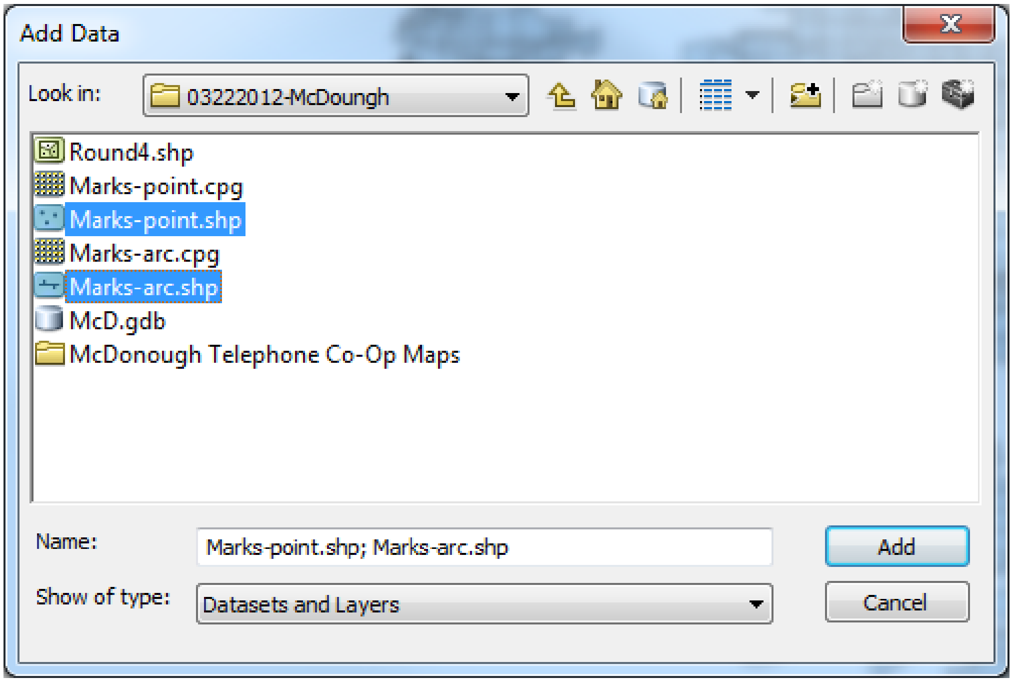


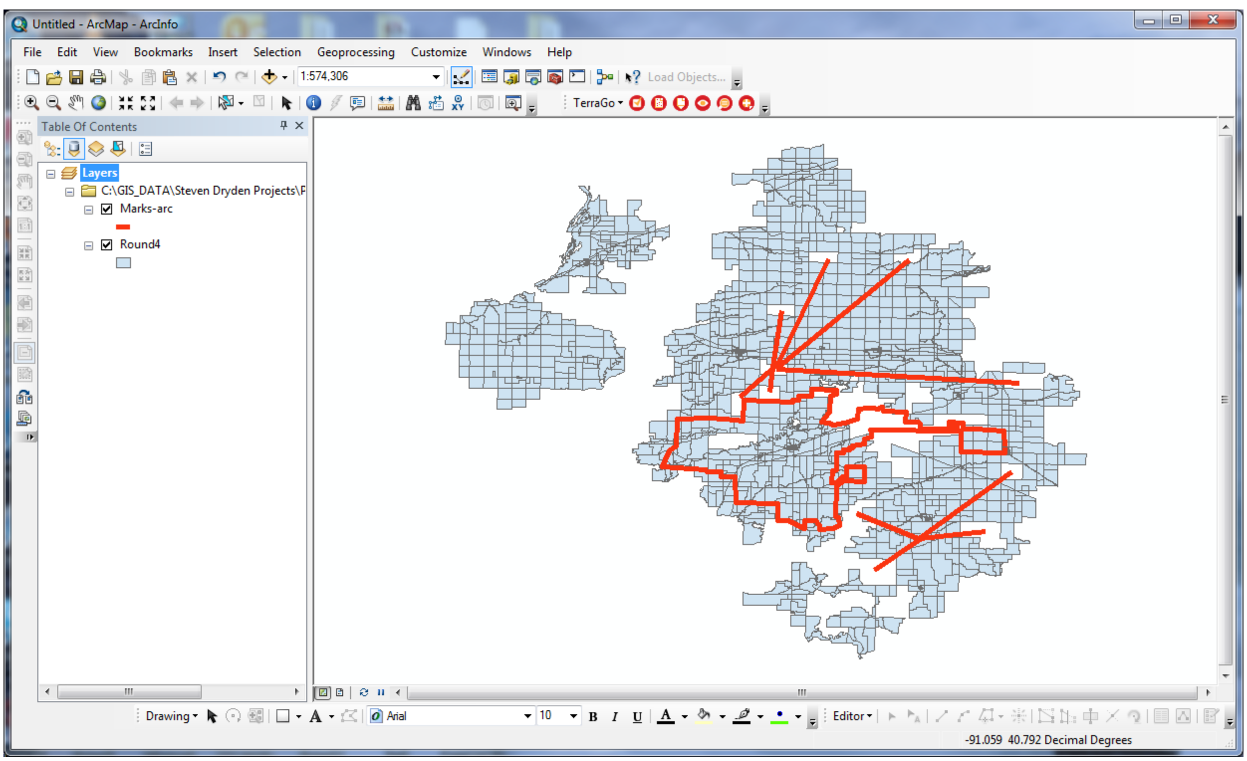




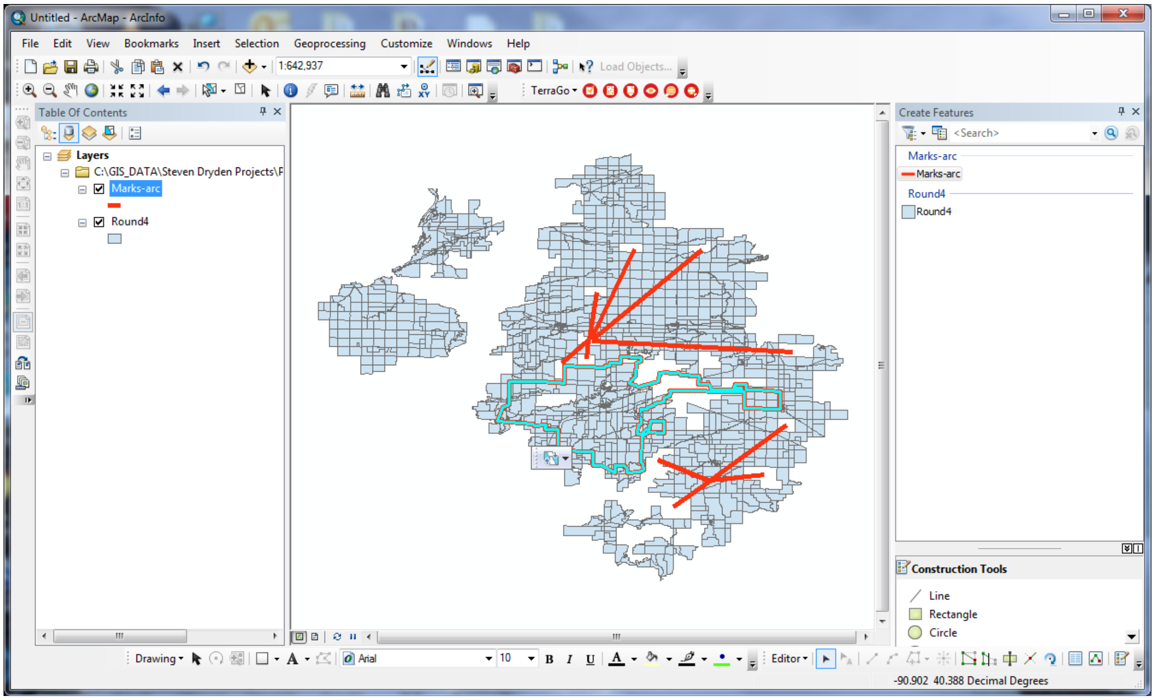
With this tool, providers can draw lines, comments, polygons, and points as indicated in the image to the top-left. From here we can export comments and geomarks as an ESRI Shapefile as demonstrated by the images above.

After exporting the geomarks from the GeoPDF, we can now import them into ArcGIS. This provider has drawn lines to show where they have added FTTH and where they want us to fill in holes in their other census block coverage. The geomarks are indicated by the red lines on the bottom image.

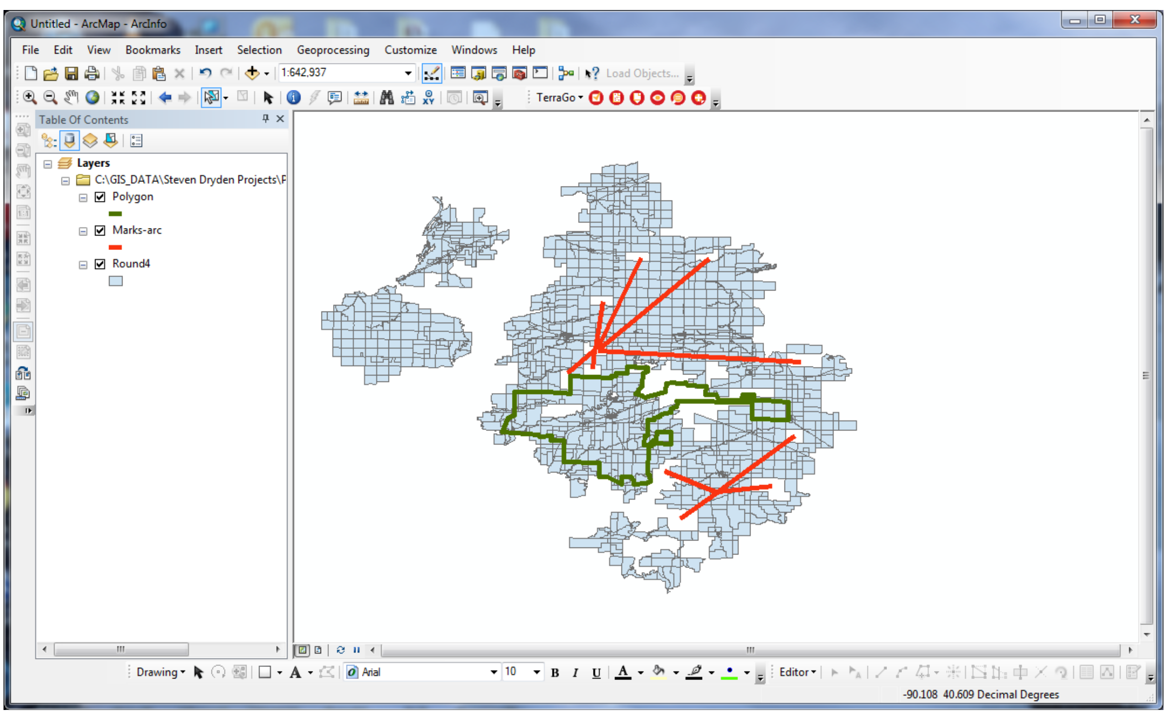




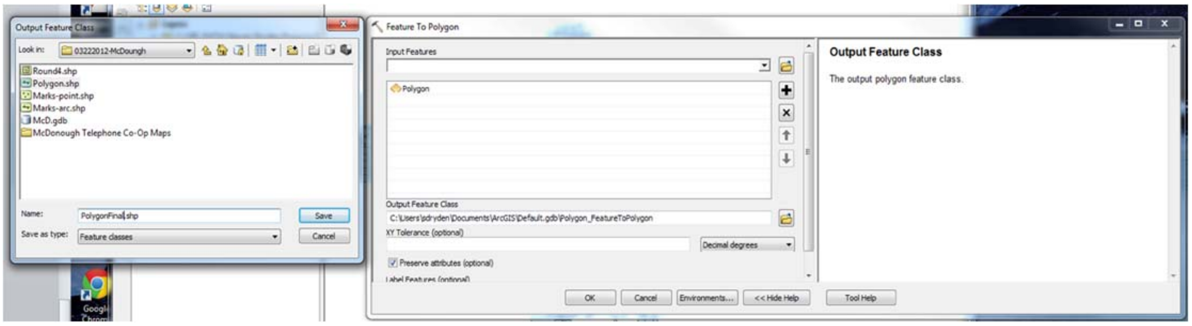
From here, we add Census Blocks as needed. For lines that represent an area, we can convert to a polygon so we can easily select Census Blocks. First we select the lines that need to be converted into a polygon (highlighted in Blue), we will export the selected.



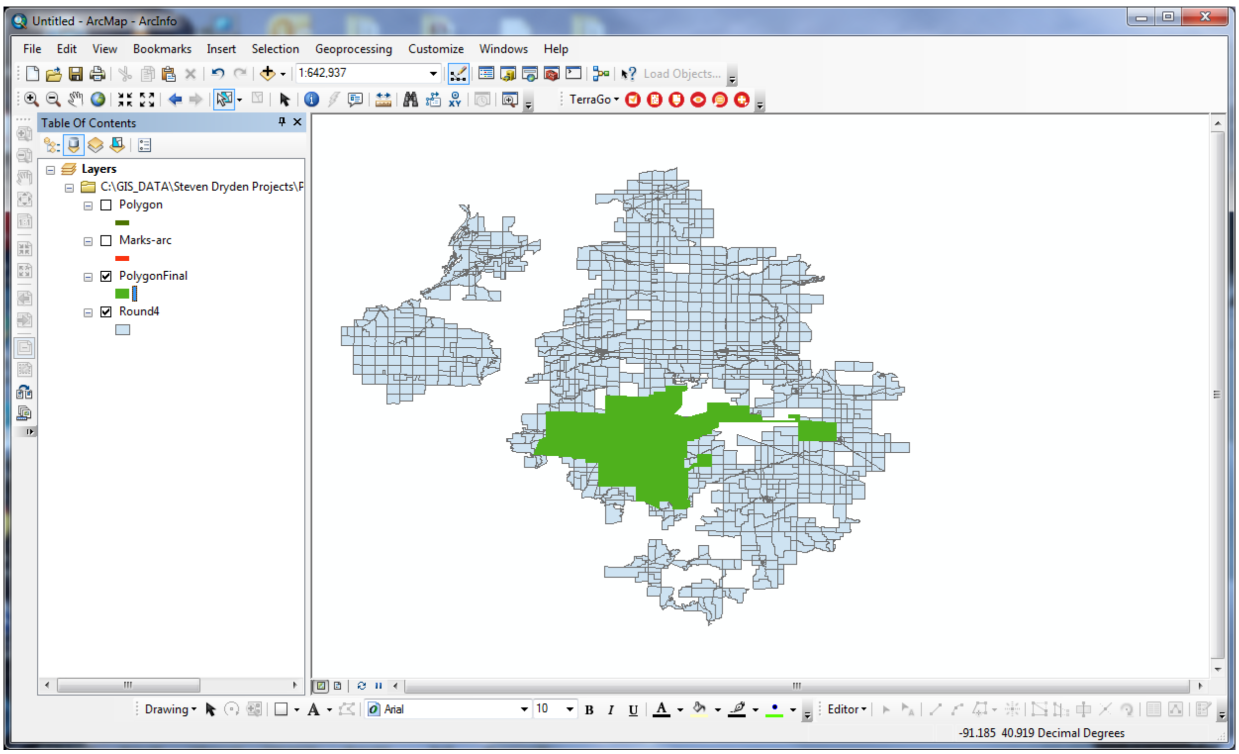
Here you can see we now have separated the polygon line we need. Now we can convert this to a true polygon.



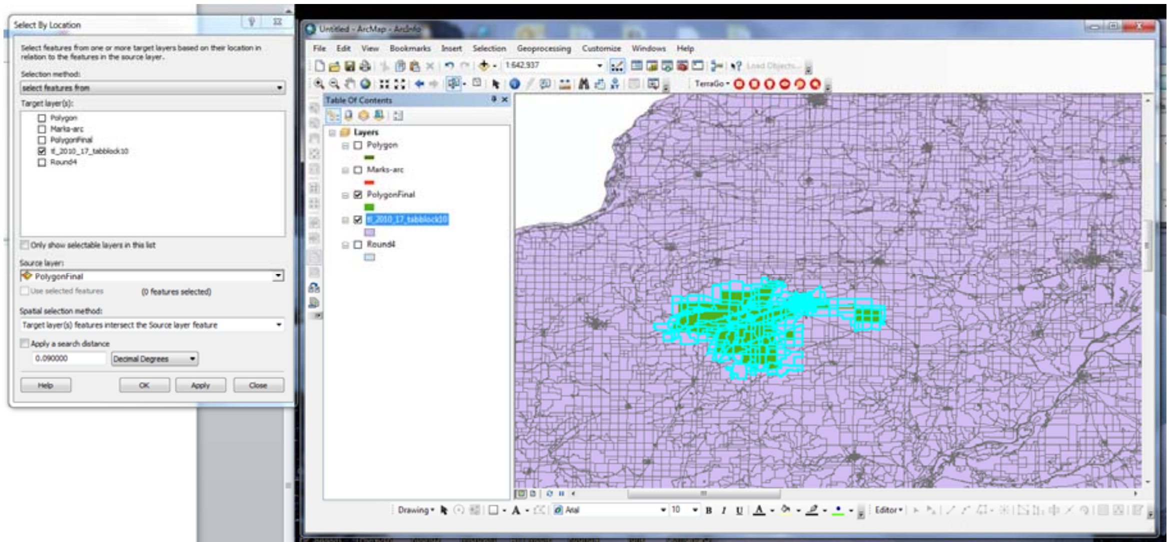
To convert a line to a Polygon, we used the Feature To Polygon tool in ArcGIS

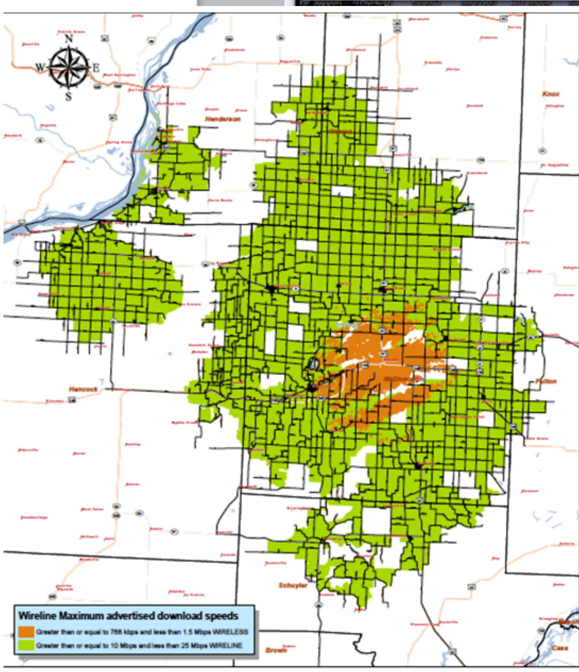


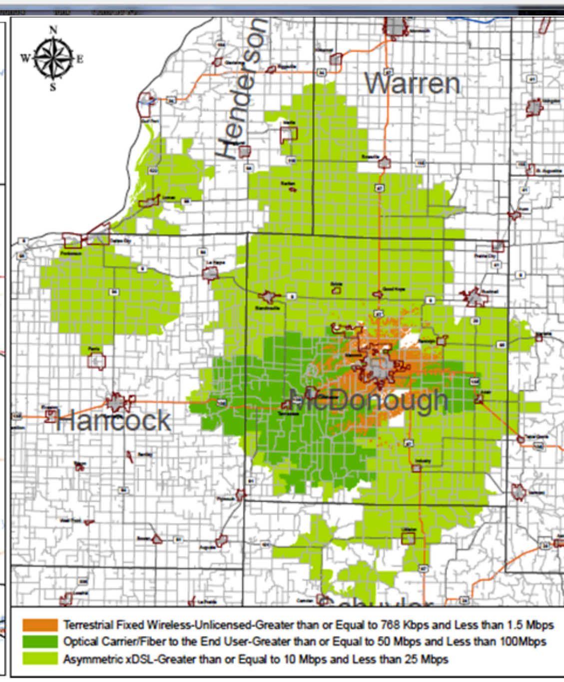
The end result is a polygon that will be used to select census blocks that are inside or touch the boundary of the polygon.



To obtain the Census Blocks needed, we used Select By Location process. As you can see, the census blocks are now selected. All that is needed now is to export the specified census blocks out, and provide the data with attributes as indicated by the provider. The maps below show the initial data and the data after the updates are made through the GeoPDF software.

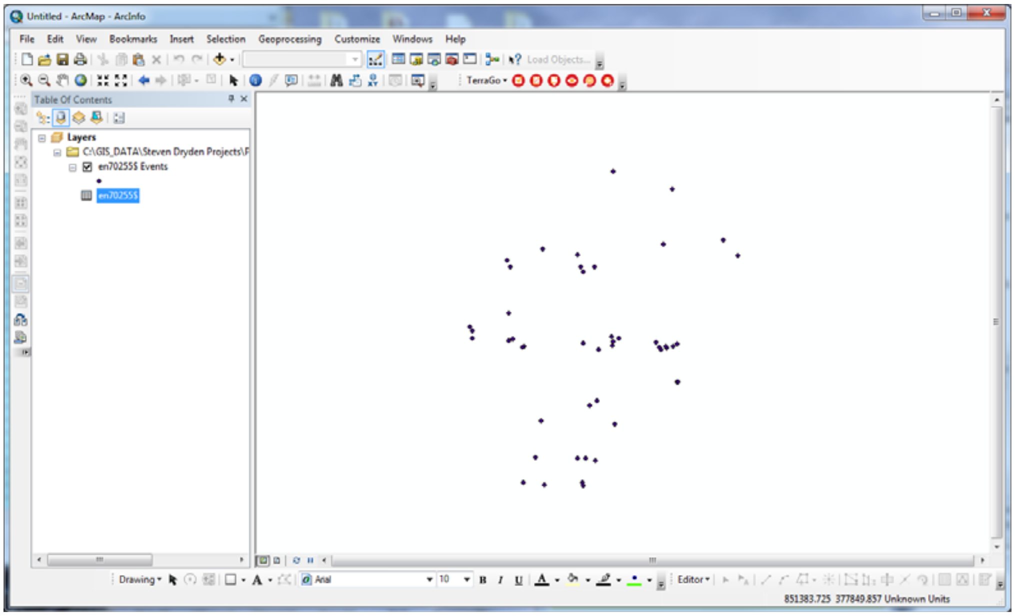




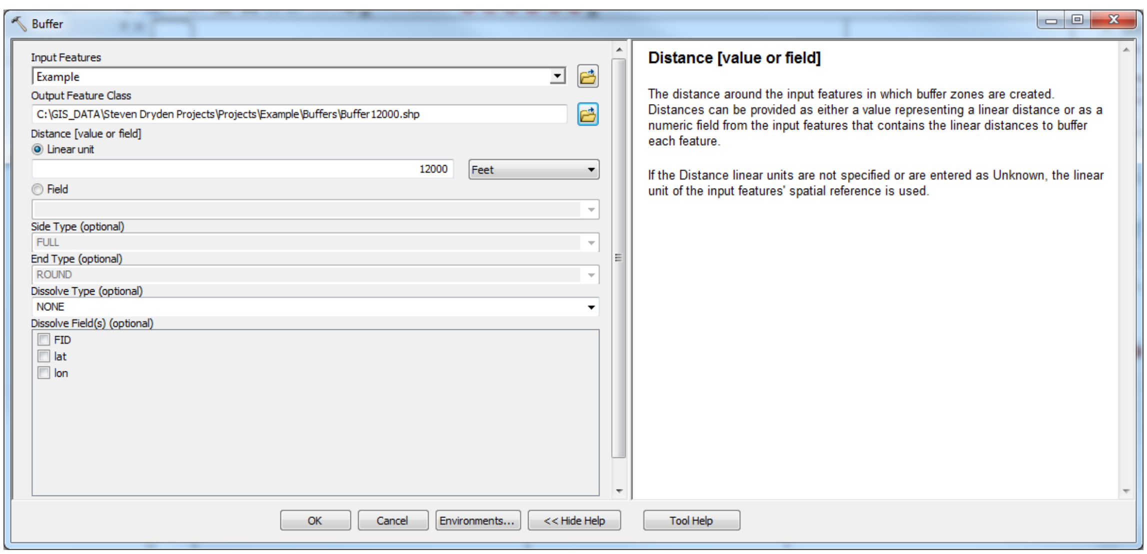


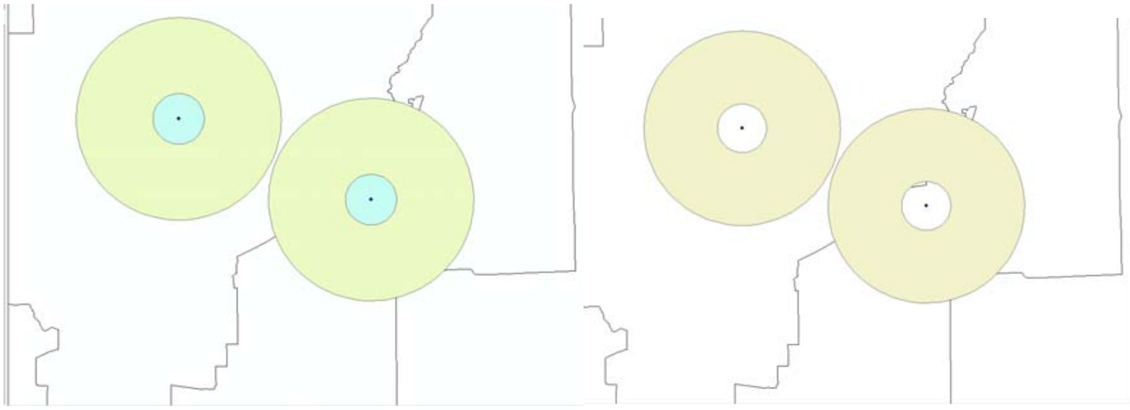
Wire Center Boundary Clipping

Some DSL providers sent an Excel table that displays latitude and longitude for central office and remote terminal locations. This creates a special challenge for us because DSL service extends 12,000 feet from the center, but is not allowed to cross the wire center boundaries. Also, we must factor in that at 3000 feet from the wire center, speed decreases from speed tier 5 to speed tier 4. First, we load the Excel table into ESRI ArcGIS. In ArcGIS, we can use latitude and longitude information to display data on a map using the Display XY Data function. We use this here to get a working shapefile.



With a working shapefile, we next buffer around each point for speed and coverage. We use two buffers of 3000ft and 12000ft.

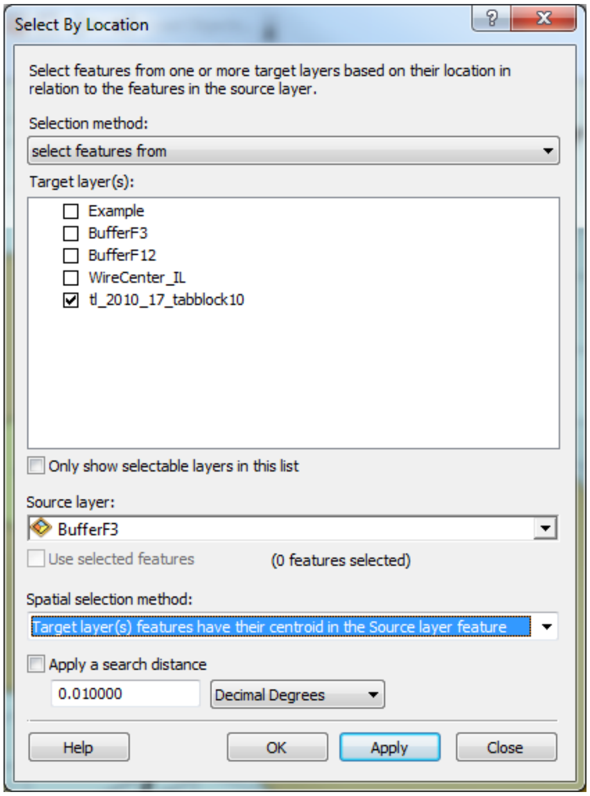


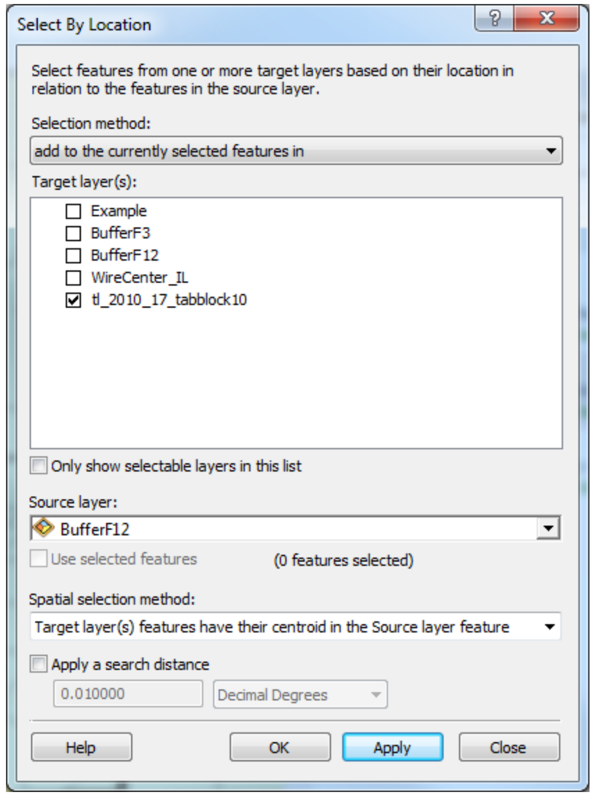


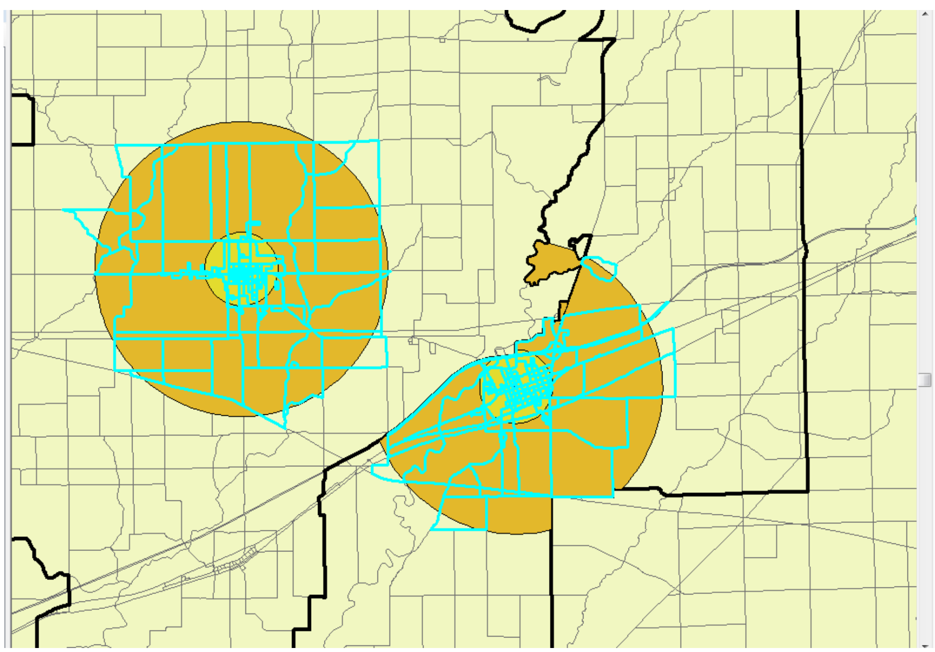
The resulting buffers are found in the above image to the left. We next clip the innermost 3000 feet from the 12,000 foot buffer. In the image on the right, we have turned off the 3000ft Buffer to show that there is nothing under them now. Coverage for wire centers can not cross wire center boundaries, so we now need to trim the buffers so that they remain inside the boundary where they are located. We next use the Intersect tool to break apart the coverages based on the wire center boundaries.

As you can see, the polygon is now broken apart by the wire center lines. From here, we next start an editing session and delete those areas that fall outside the wire centers boundary. Select the area outside the boundary and press “delete” to remove those census blocks.

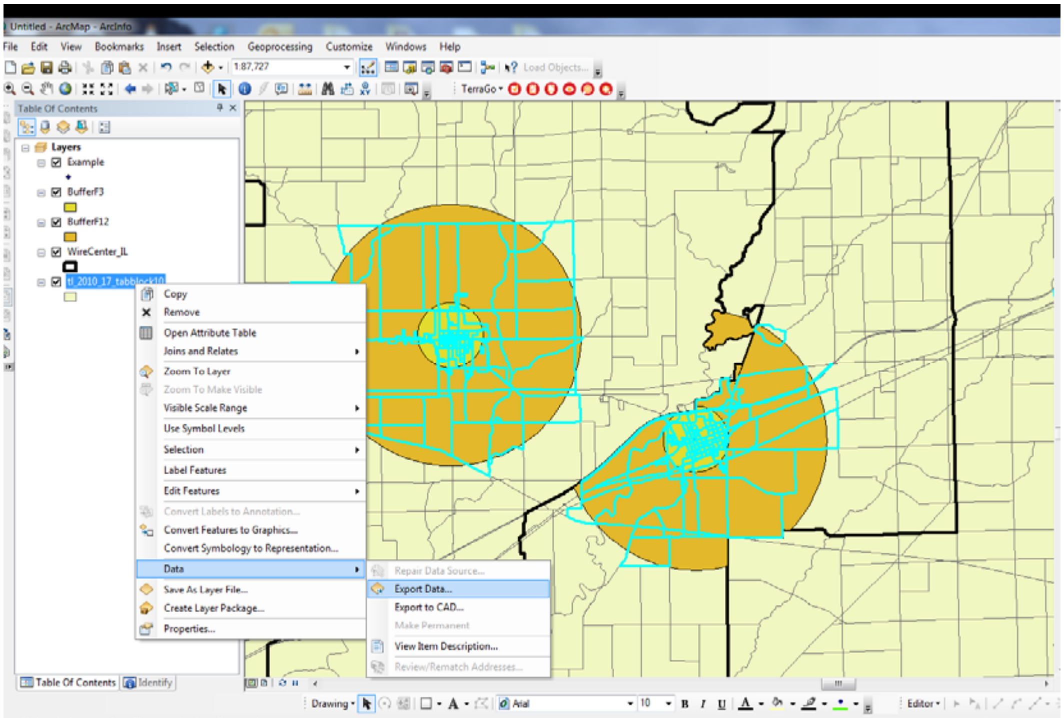
We do this for all wire centers, and then save our edits. After we are through with this, we next use these buffers to select census blocks by location. In this case we specify that a census block centroid be within either the 3000ft buffer or the 12000ft buffer in order to count.

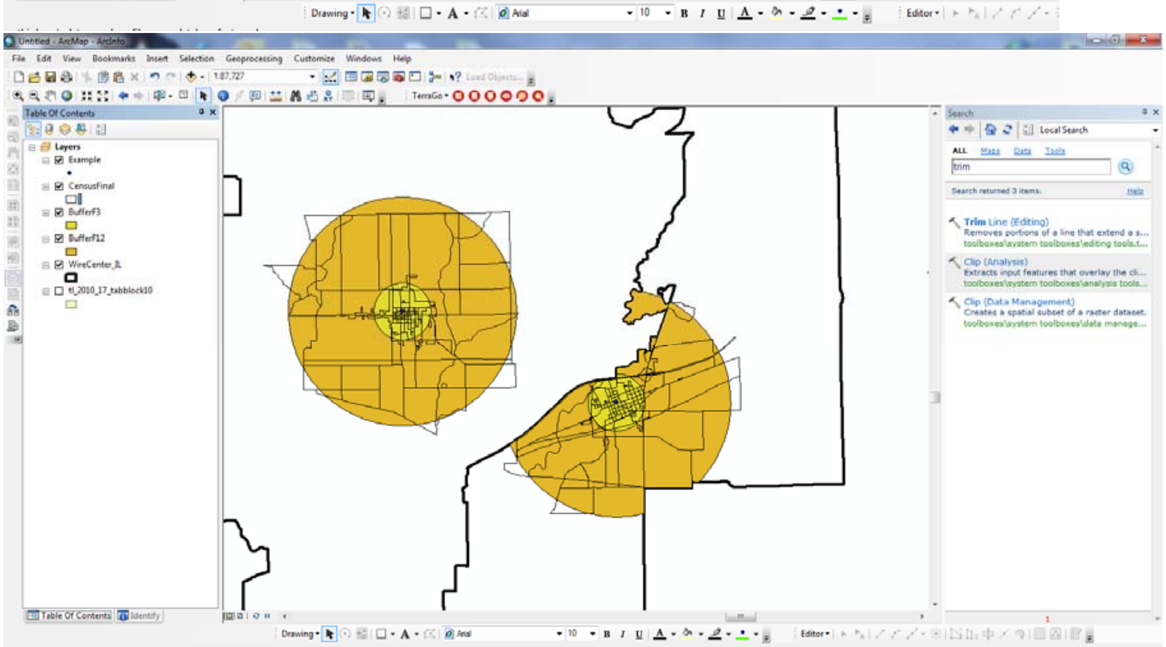






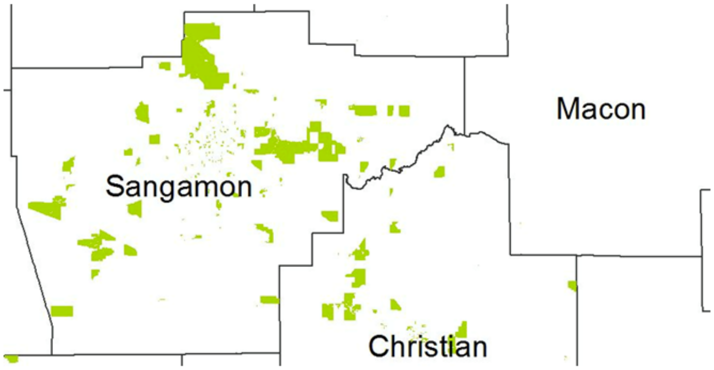
At this point we are ready to export the selected Census blocks, and assign speeds based on which buffer the census blocks fall within.

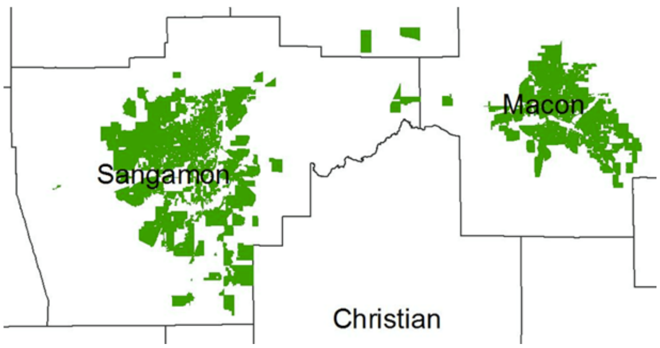




After we provide the census blocks with attribute information, we next send a GeoPDF to the carrier for approval, and then load it into the master geodatabase.

CABLE COVERAGE





Some cable carriers submitted their service area coverage data in the form of a spreadsheet citing customer addresses. These addresses were converted to a point layer via a geocoding process. These points were then superimposed on top of a 2010 census block layer, and all of the census blocks that had one or more address-derived points associated with them were selected. The selected blocks were then converted into a polygon layer which was attributed with appropriate broadband provider information such as provider name, technology of transmission, maximum advertised downstream speed and so on. A portion of the Mediacom map above indicates an example of this in the above map.

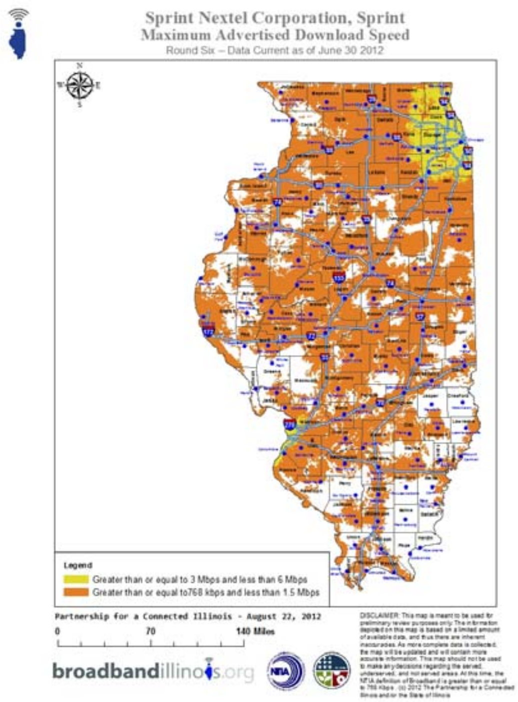
Other cable carriers including Comcast submitted a series of spreadsheet records which were matched with the corresponding Illinois 2010 census blocks polygon layer. The matching polygons were then superimposed on the Census CBSA layer which was joined with the provided maximum advertised (MAXAD) speeds spreadsheet. This way each individual census block was attributed with the corresponding MAXADDOWN and MAXADUP value.

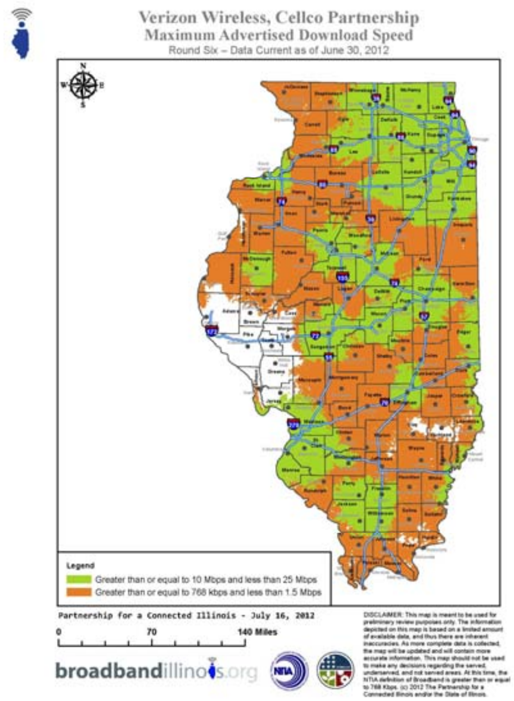
Street segment spreadsheet data records were geocoded based on mid-point value of the reported street segment address range. A point layer thus derived was next overlaid with the 2010 census street layer. Census street layer segments that were associated with the geocoded points were then examined, one-at-a-time, to make sure that they matched the reported street, city and census block information. Some of the reported records had to be discarded as they could not be located via the above process.

A GeoPDF map depicting both, census block and road segment data, was reviewed by Comcast and a number of census block records were deleted as a result of Comcast feedback.

MOBILE WIRELESS COVERAGE

PCI has collected mobile wireless coverage from most providers in the State. These shapefiles were imported into the database and assigned attributes. All but two wireless providers submitted updated data in this round. Thirteen new wireless providers were added in this cycle. An example of this data is below.

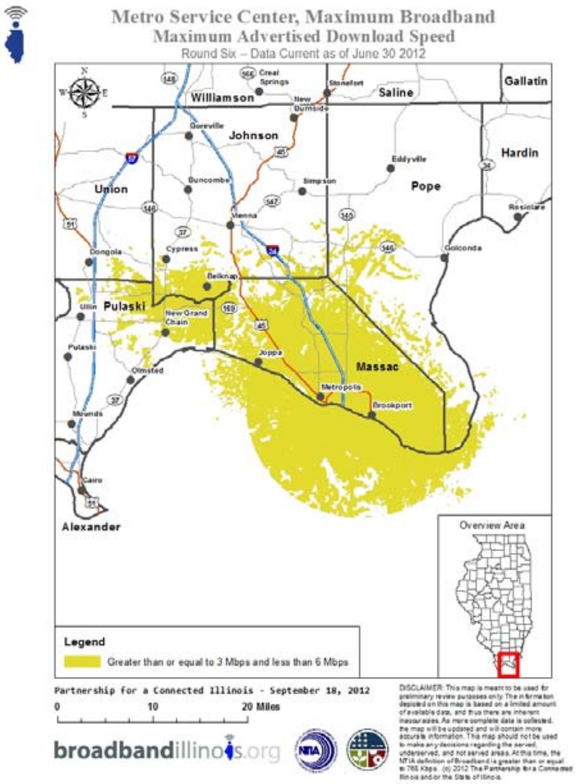


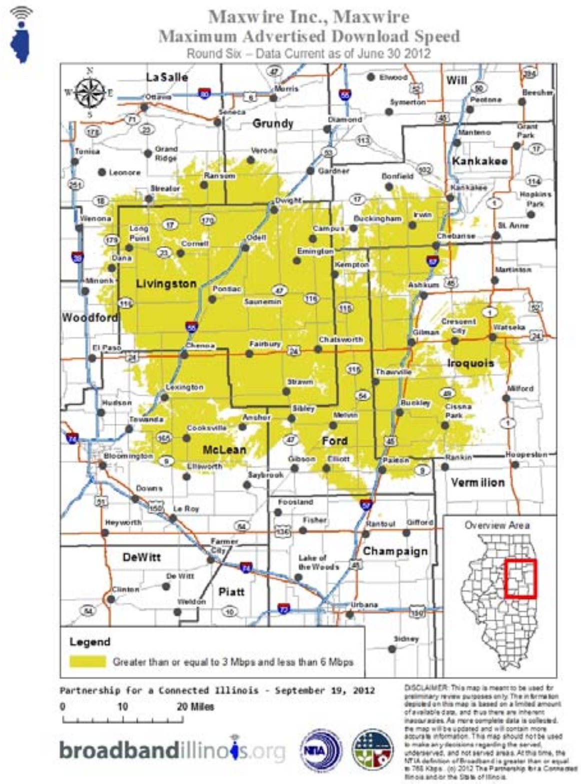


WIRELESS METHODOLOGY

Once again, almost every fixed wireless provider allowed us to use their tower locations, antenna heights, equipment selection and direction/spread of coverage to derive coverage areas. With the provided tower information, professionally prepared radio frequency coverage studies were conducted and converted to shape file format. These studies have proven to be very accurate and represent service areas where the maximum advertised speeds can be delivered. These studies take into account full consideration for terrain and tree clutter data. For any carriers who could not provide their own RF propagation coverage polygon, RF propagation studies were done in house. The Longley-Rice propagation model was used. Studies were conducted using 10 meter resolution terrain data. Tree and vegetation clutter data resolution is 30 meters. All propagation results had a minimum of a 10 dB signal fade margin built into the results in addition to losses calculated for clutter. Signal level minimum thresholds were set on the study maps to a level that each carrier deems reliable and serviceable at those speed tiers, not just the minimum to establish a connection. These maps are not based on the manufacturers best case scenario radio capabilities in a lab environment. These coverage polygons represent what can be delivered in the face of interference in the shared spectrum used for those with transtech codes of 70 and spectrum code 6.

There appears to be some variation on how the NOFA coverage definition is met. In other words, there seems to be a disparity on the necessary strength (e.g. -80 dB, -98 dB, -120 dB, etc.) to provide the appropriate quality of service for data services and still be able to deliver the maximum advertised speeds. While we took these issues into account for our internally generated RF propagation studies, we do not have specific details for carrier provided polygons such as cellular mobile data and 4G service footprints.





SATELLITE

This round of data updates includes two old broadband satellite service providers – ViaSat (formerly, WildBlue Communications) and HughesNet, as well as two new satellite service providers – Skycasters and StarBand. All of these providers communicated that their service area encompasses the full extent of the state of Illinois.

Apart from the name change, during the first quarter of 2012, ViaSat has launched two new services named Exede 5 and Exede 12. Exede 5 has a maximum advertised upload speed of 1 Mbps and a maximum advertised download speed of 5 Mbps. Exede 12 has a maximum advertised upload speed of 3 Mbps and a maximum advertised download speed of 12 Mbps. ViaSat's legacy WildBlue service has a maximum advertised upload speed of 256 Kbps and a maximum advertised download speed of 1.5 Mbps.

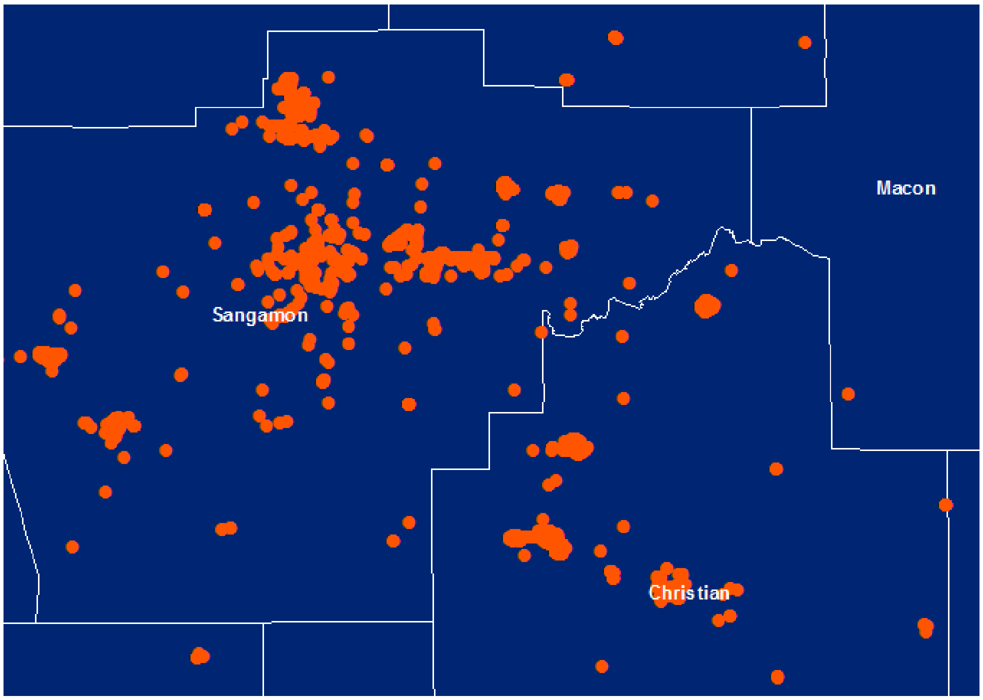
MIDDLE MILE

Middle-Mile (MM) data is acquired via either a direct carrier submission in the form of a spreadsheet or a text document citing specific MM hub coordinate pair values, or by obtaining the general MM hub location from the carrier's web site.

In the case where specific coordinate pair values are available, a point layer is generated using ArcGIS software. This process entails bringing tabular XY coordinate pair values into ArcGIS, and creating an "event theme". The "event theme" is then exported into a stand-alone point layer which is then attributed with the necessary information.

General, web-derived locations are converted to a point layer by citing towns where the MM hub presence is identified by the carrier. Town point locations are next attributed with relevant data.

Address Layer Data



Service address information in this round was provided by the same three carriers that provided it in the last round - Mediacom Illinois LLC, FairPoint Communications and RCN Telecom Services of Illinois, Inc. Mediacom and RCN reported new data in this round; FairPoint data did not change.

Supplied address data was geocoded. Great care was taken to successfully rematch addresses that were not matched during the initial geocoding run. Spelling errors were the most common reason an address failed to geocode correctly. Such errors were resolved via web or Google Earth searches. The resulting point layer was used to derive the missing LATITUDE and LONGITUDE coordinate pair values which were then added to the Service Address layer attribute table. The geocoded results were also used to generate data for the census block layer. Above map illustrates the service address layer.

Metadata

Metadata, which literally means data about data, represent PCI's attempt to document procedures, coding, and overall methodology used in managing broadband supply data. Both short and long terms goals of developing PCI's metadata are to improve communication on Geographic Information Systems (GIS) data management issues for both internal and external partners. PCI's metadata is organized and structured around Federal Geographic Data Committee (FGDC) standards associated with key information impacting the following issues:

- What GIS data layers are managed by an organization?
- How is data coded or classified in assisting outside partners or organization use of the GIS data developed?
- When was the data developed and how often is it updated?
- Who developed the data layers and who should be contacted if anyone has questions?

The net result of developing PCI's metadata connects to the idea of communication and standards. When applied correctly over time PCI's metadata will assist in educating other users on essential questions needed when applying

GIS data. In addition, it will assist PCI internally as metadata will help the organization identify and document critical developing issues shaping data development. Any new employee or organization will be pointed to metadata files when asking questions relating to methodology, attribute codes, dates of data edits or updates, and follow-up contact information within PCI's data team.

DATA VERIFICATION

Verification has become an evolving and ongoing process at PCI. The continued evolution of the Broadband Illinois website, along with the use of the GeoPDF process has created a feedback loop between provider and consumer and PCI that allows PCI to verify the carrier level data that it submits semi-annually to the NTIA.
PCI continues to cultivate eTeams throughout the state that are able to take county and provider level maps and visualize the data and begin indicating areas where the data may not be accurate. PCI has also published a Supply Side Inventory in which PCI developed a system to rank Illinois's counties by broadband connectivity and looked at two major sets of third-party data to verify the data it had collected. The following sections go in to greater detail on the verification process but the outline below shows the basis for the verification process:

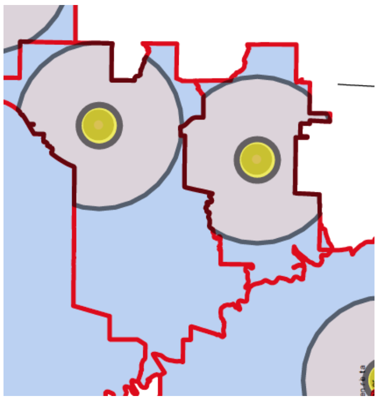
- Provider verification through extensive mapping GeoPDF process
- User verification through online web tools
- Trusted user verification through eTeam groups
- Third Party verification using third party data sets (ex. Gadberry, FCC Speed Test)

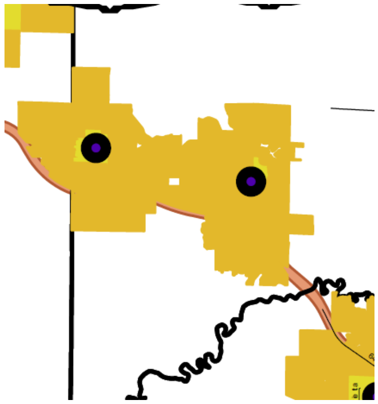
PROVIDER

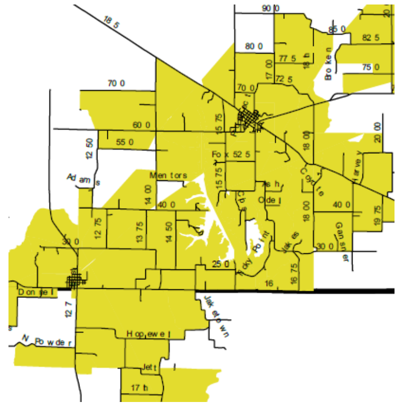
In this Round, PCI worked very closely with the provider sending back versions of the GeoPDF until the data was represented according to the provider. PCI considers this process to be the first of five forms of verification PCI has and will continue to carry out to ensure the data that is submitted to the National Broadband Map is as accurate as possible.

Previously, PCI purchased a set of wire center boundaries, which PCI used to map out DSL coverage for a couple of providers. Knowing that a DSL provider's Central Office or Remote Terminal that fell in a certain wire boundary could not extend service outside that boundary allowed PCI to map out these locations and create buffers around these locations based upon the speed. PCI recognized that locations 7500 feet from a DSL C.O. or R.T. would not receive the same speeds as locations only 1000 feet from that location. These buffers allowed PCI to make these changes. Due to confidentiality of these locations, maps that contain these locations with these buffers and boundaries are protected under the NDAs that have been established.

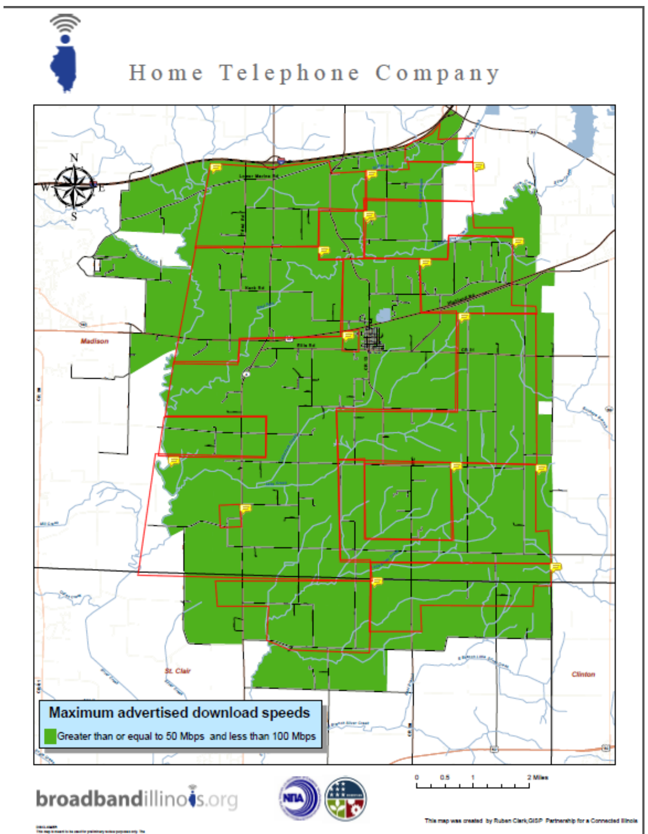
However, the images below provide an example of how PCI would use a C.O. or R.T. location to map out the coverage that a provider is able to provide in that wire center boundary. The image on the left shows two wire center boundaries that contain a C.O. The buffers are indicating that the areas closest to the C.O. receive speeds that are in Tier 5 while areas outside that initial ring receive download speeds in Tier 4. The second image shows how the data beneath these buffers looks when the wire boundaries and buffers are removed. The third image shows how the previous mapping contractor would have submitted this data in a previous round. As you can see, the same flat speed is dispersed across the entire region surrounding C.O. and R.T. locations. This is undoubtedly a form of verification.

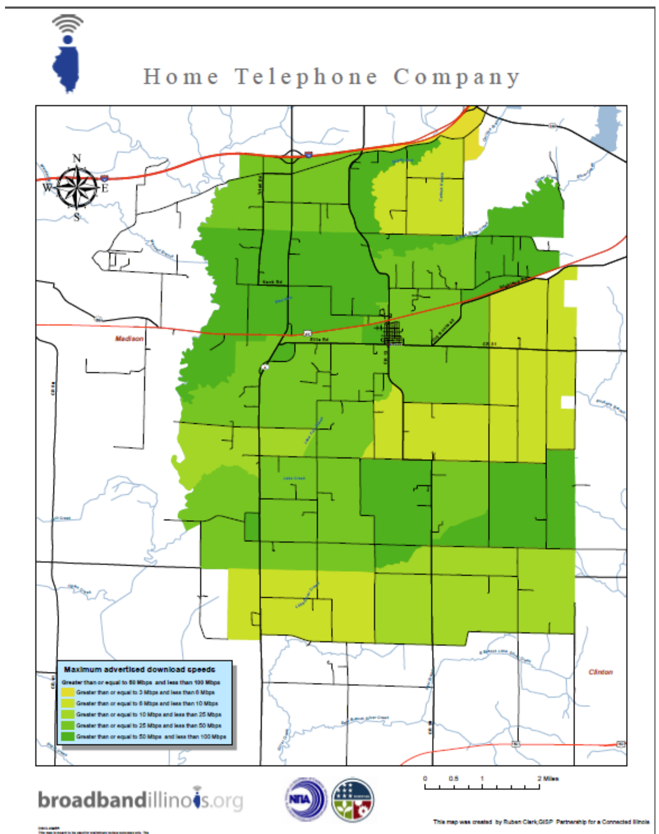






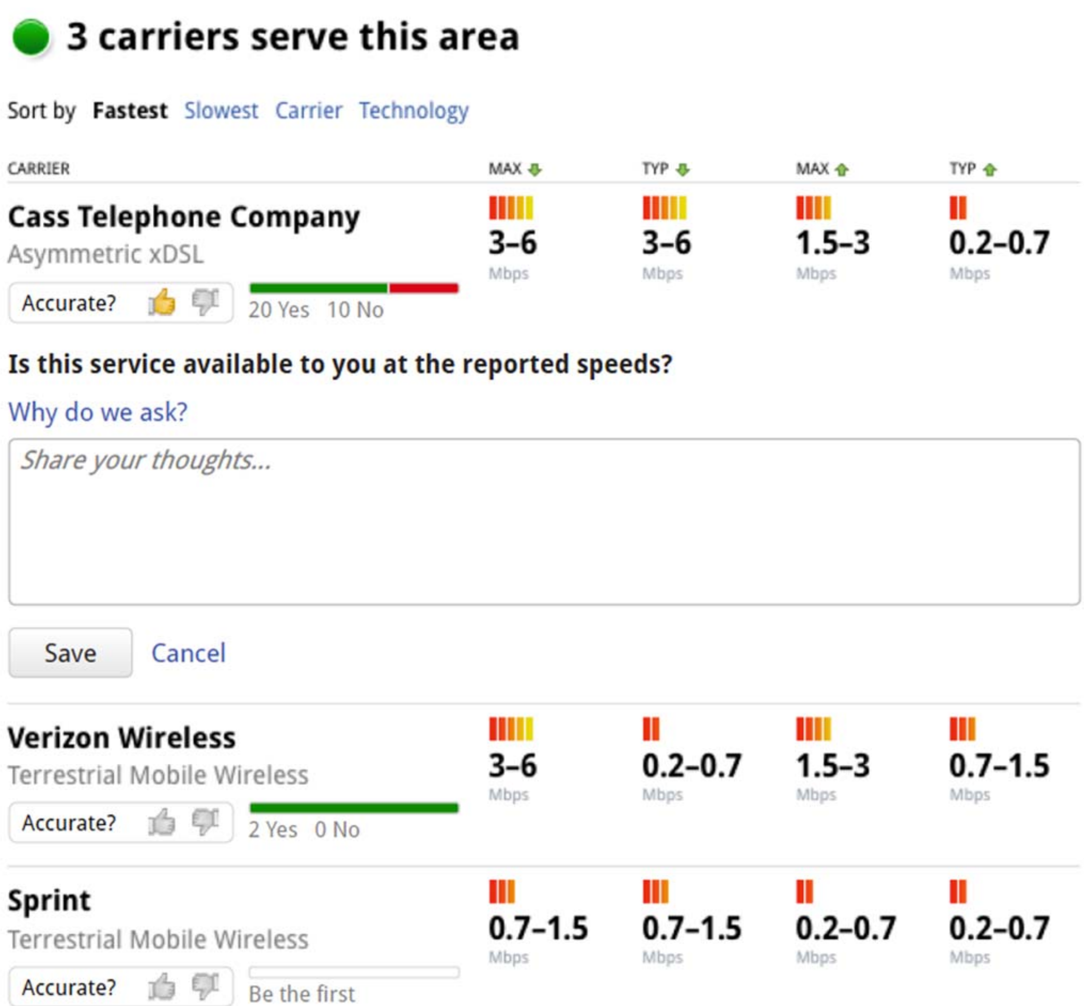
PCI has worked through this process for one of the two largest DSL providers in Illinois as well as a handful of small telephone companies throughout the State. In some instances, small telephone companies admittingly provided this data without sharing the locations and the GeoPDFs made this possible. The images of Home Telephone Company on the next page demonstrate how they used the TerraGo toolbar to reel back the previous data that was incorrectly submitted as DSL data with speeds across the region in Tier 9.





USER

PCI views the user as the second form of verification and has developed a tool to allow feedback on the data that is on the Illinois Broadband Map and in the semi-annual submission to the NTIA. When a consumer clicks on Broadband Illinois's search map they see the carriers that service that census block. The widget below allows the consumer to give PCI feedback on the providers that service that location.



TRUSTED USER

The third form of verification comes from the Trusted User. PCI has created GeoPDFs of all 102 of Illinois's counties that are available on the Broadband Illinois website. In this round, the Partnership for a Connected Illinois made great progress with its regional outreach strategy. PCI now has ten functional eTeam groups in ten regions throughout the State. The purpose of the groups are to aggregate demand for broadband, work with providers to fill gaps in access, find creative applications for the maps and data, and to educate consumers and businesses on the benefits of a high speed Internet connection. Over the last six months, each regional eTeam group has hosted at least one, in some cases as many as four regional meetings where area stakeholders are invited to come and talk about using broadband as an economic development deliverable. While some eTeam groups are certainly further along than others, projects exist in each region to help utilize broadband to bring the region to the next level. Among these projects are working with providers on eRate in underserved regions, hosting an agriculture technology summit to talk to local farmers about the benefits of a broadband connection, and bringing together healthcare professionals to talk about needs with Health Information Exchanges.

Since the last round of data collection, the www.broadbandillinois.org has uploaded a multitude of new features and content with several other structural changes planned for this upcoming round. PCI has made available several of the maps they have created through analysis of the data. Among these maps are broadband competition maps and regional, educational, and county ranking maps. Also at http://www.broadbandillinois.org/maps/Carrier-Maps.html, there are individual pages for each carrier in the State of Illinois. Contact information, mapping data, and any news stories that have been published about that provider are available on these pages. These provider pages are also geotagged so that they are available as providers are referenced throughout the rest of the website. As per the previous two rounds, geotagged county map pages also exist at http://www.broadbandillinois.org/maps/County-Data-Maps.html. The raw data that PCI provides to the NTIA semi-annually has also been made available.

The website also has an events section, where regional eTeam meetings, other broadband interest events, and computer training opportunities have been made available to website visitors. In this round, PCI has also developed a newsletter that serves as regular communication to upwards of 1,500 stakeholders in Illinois. These newsletters and other special interest news stories are available in the news section of the website. Finally, in the eTeams section, eTeam groups are able to have a repository for mapping data, events, and news most relevant to their region.

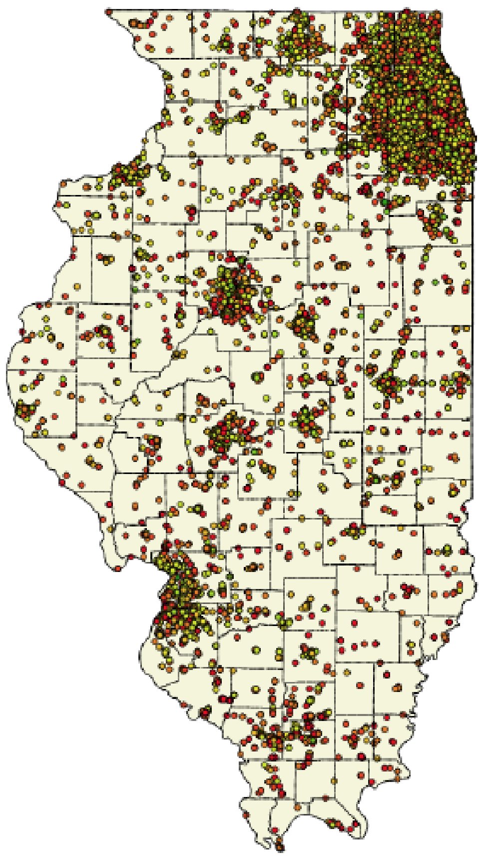
Third Party Data Sources

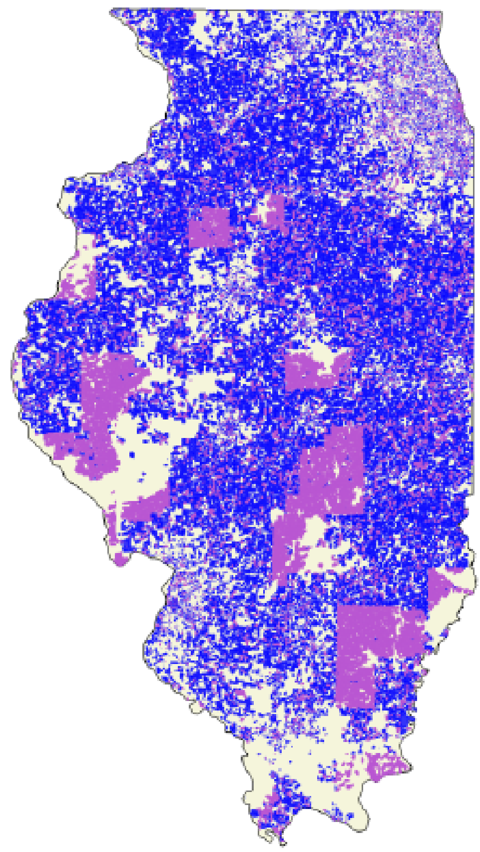
PCI published Supply Baseline Study, "Broadband Access in Illinois: A Baseline Snapshot", that summarized the state of broadband supply in Illinois. The report, a product of data analysis by the PCI data team, aims to quantify what is known about broadband data in Illinois and publish it along with an analysis of Third-Party data sources. An update of this report is under way.

The first method of third-party verification used in this examination was user speed test data through the broadbad.gov website. Through this website, the NTIA and the FCC solicited street address information with each speed test. They provided PCI with speed test data gathered over a 12 month period. This has been mapped and some limited studies have been conducted. These speed tests were accompanied by mini surveys which allowed for some analysis. The users were asked to input their street address and the type of internet connection they were using.

The second set of third-party data used for verification in this study was gathered by the Gadberry Company. The Gadberry data is a combination of various user/crowd sourced data sets. They indicate if there is broadband activity at the street address level and they then incorporate that information at the census block level. We have compared blocks showing coverage as stated by the carriers against the user reported information. There are some areas of the state where there are low or no user reported information.

The maps below show these third party data sources projected on a map of Illinois. The map on the left shows the location and results of the FCC speed tests, while the image on the right shows census blocks where the Gadberry dataset did not provide enough results for a significant analysis. On the Gadberry map, census blocks in blue indicate where there is a low sample rate, and census blocks in pink show where no samples were obtained. For more information on these third party data analyses, the Supply Side Baseline report is available on the following PCI website: http://www.broadbandillinois.org/Research/Infrastructure.html





ILLINOIS COMMUNITY ANCHOR INSTITUTIONS

PCI has established an ongoing procedure for gathering data on the physical location and broadband connectivity of Community Anchor Institutions (CAIs) in accordance with the data requirements of the SBDD NOFA Technical Appendix.

The table below summarizes the set of data that PCI will be submitting in this round. As one can tell, over the last three rounds of data submission, the total number of anchor institutions with connectivity data has continued to increase. The total number of anchor institutions stands at 12,383 – 115 records have been deleted since the last submission cycle as a thorough examination of the database netted a number of duplicate records. This culling out of records has improved the overall quality of the database.

	Oct 2012			April 2012			Oct 2011		
Cat	Total	Connected Points	% with connectivity data	Total	Connected Points	% with connectivity data	Total	Connected Points	% with connectivity data
1	5,302	3,258	61.45%	5,331	3,278	61.49%	5,314	3236	60.90%
2	1,321	703	53.22%	1,338	710	53.06%	1,422	721	50.70%
3	1,336	191	14.30%	1,373	200	14.57%	1,327	138	10.40%
4	2,302	492	21.37%	2,314	496	21.43%	2,319	449	19.36%
5	285	143	50.18%	294	146	49.66%	271	115	42.44%
6	1,520	1,519	99.93%	1,527	1,526	99.93%	1,446	1445	99.93%
7	317	134	42.27%	321	135	42.06%	235	37	15.74%
Totals	12,383	6,440	52.01%	12,498	6,491	51.94%	12,334	6,141	49.79%

In Round 4 PCI made some of the greatest data improvements to the K-12 and library datasets. In Round 5, some of the most substantial increases have occurred within the healthcare, public safety, higher education, and other non-governmental categories. In this submission cycle, PCI focused on updating the library records in our CAI database. Starting out with 1338 records, 17 library records have been deleted as duplicates or as inappropriate records, such as those associated with law firms and private businesses. PublicWifi and URL fields were updated through individually contacting each library. The following table summarizes vast improvements brought about by this effort:

Library Records Update Summary

	R5		R6	
Total Libraries	1338	100%	1321	100%
Public Wifi Yes	96	7.2%	1053	79.7%
Public Wifi No	2	0.1%	133	10.1%
Public Wifi Unknown	1240	92.7%	135	10.2%
Libraries with Websites	80	6%	1050	79.5%

In the next submission cycle, PCI plans to expand our public Wi-Fi dataset, as we are developing a Wi-Fi locator mobile application. The application's dataset is almost identical in structure to that of the CAI database for ease of import.

In the past, the non-governmental anchor institution category included only workforce development centers and other computer training centers. The anchor institutions that are now in category 7 include economic development centers, park districts, farm bureaus, and other community hubs.

Previous Rounds

Outreach in Round 1 focused on collecting the point and address data while subsequent submissions in Rounds 2 & 3 focused heavily on survey development, web site database research and teleconferences. Together with the Illinois Department of Commerce and Economic Opportunity (DCEO), PCI engaged in a process of working with CAIs on an organized basis. Other state agencies and organizations have included the Illinois Commerce Commission, Illinois Board of Education, and the Illinois State Police.

PCI created a survey using Survey Monkey and both carrier and price information were requested, and the speed test became a required item for completion of the survey. The speed test(s) that was administered was the one on the Federal Communications Commission web site.

PCI worked with a number of organizations in gathering data for these submissions. We are encouraged that the relationships with these organizations have continued to develop and facilitate other facets of our organization. These organizations are listed below:

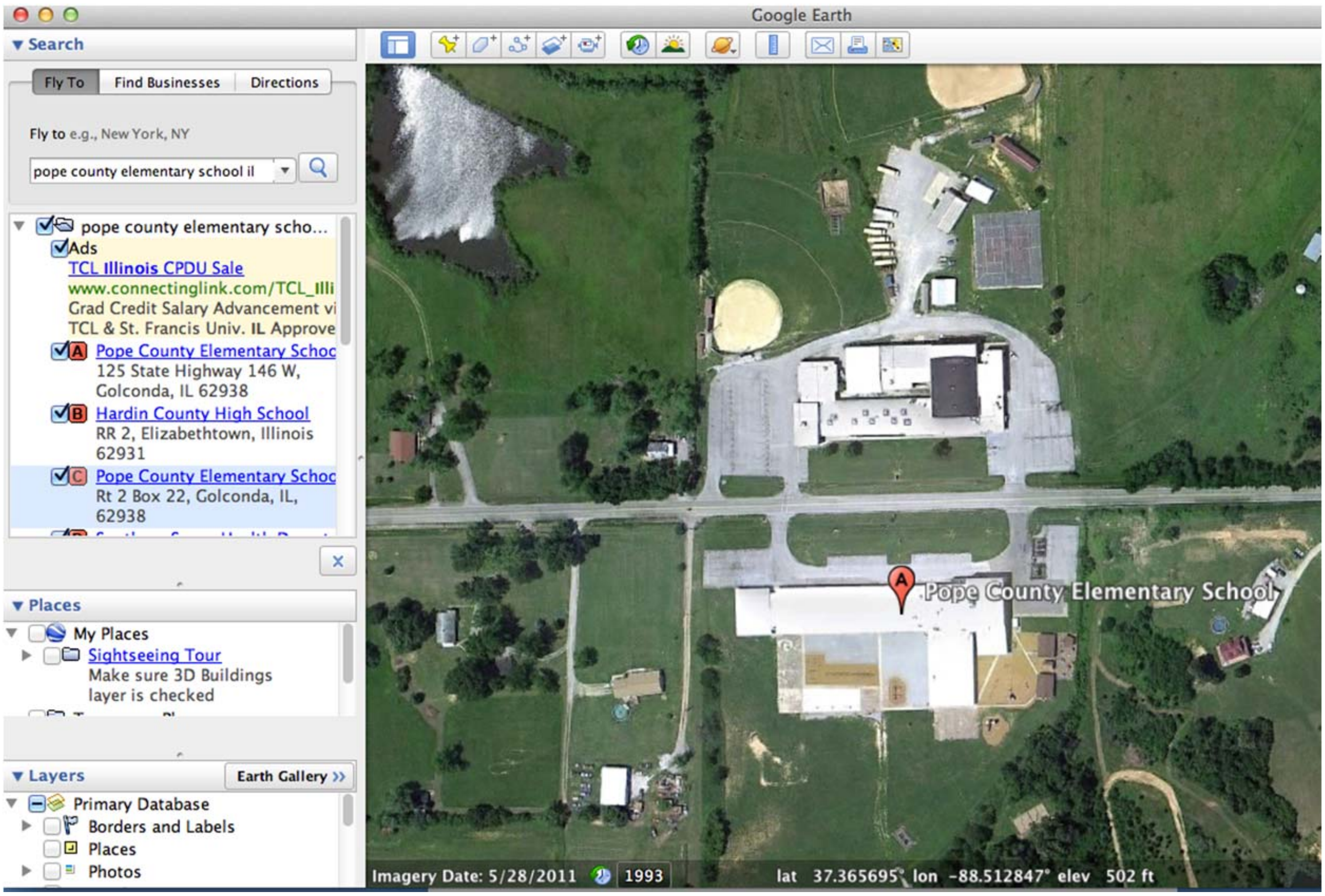
K-12	Illinois Association of Regional School Superintendents, Illinois State Board of Education
Libraries	Illinois Library Association
Healthcare	Illinois Critical Access Hospital Network, Illinois Rural HealthNet, Illinois Healthcare Association
Public Safety	Existing Database
Colleges & Universities	Illinois Community Colleges Board
Other Government	Existing Database
Other Non-Government	Illinois Workforce Development

In Round 4, as opposed to previous rounds where PCI submitted secondary CAI's that did not fit perfectly into NTIA parameters, PCI decided to submit only those CAI's that clearly fell into the seven categories laid forth by the NTIA. This led to a significant decrease in the total number of CAI's submitted, but a significant increase in the quality of the data that was submitted.

For example, of the 26,599 locations submitted in April 2011, there were 14,000 Category 3 Healthcare locations which were geocoded, yet had no connectivity data. Many of these were for actual practitioners as opposed to clinics, or what might be considered institutions. PCI elected to remove this larger number for the October filing. PCI also removed duplicates where they existed in the other categories. For instance, the previous mapping contractor included a record for each individual college and university in both the K-12 and Higher Education categories. PCI felt it made sense to include only one record of this category in only the Category 5 Higher Education category.

Also, in Round 4, PCI enhanced the quality of the data in the K-12 category through the use of an eRate database that showed what schools had applied for the eRate and what providers were servicing their location. This allowed PCI to populate the BBService and TransTech fields for those CAI's.

In Round 5, a total of 787 anchor institutions geocoded to the center of the city due to rural route addresses, PO Box addresses, slight misspellings, and/or incomplete addresses. All 787 of the anchor institutions were individually mapped using Google Earth software. The mage below shows a county elementary school with a rural route address. In previous rounds, the anchor institution geocoded to a location within the county but 15 miles away from the actual anchor institution. In round 5, the latitude and longitude that was indicated in Google Earth was captured.

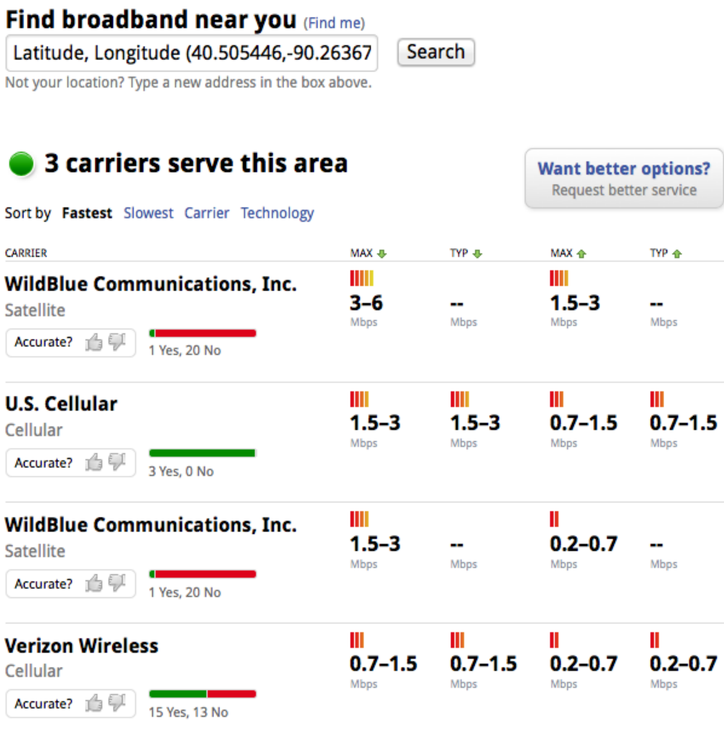


Since this process resulted in moving the geometry of the issue CAI points, the associated attribute table XY coordinate pair values were recalculated to accurately reflect the new point locations. Corresponding census block code (FULLFIPSID column) values were likewise recalculated via a spatial join between the CAI points and the 2010 census block layer.

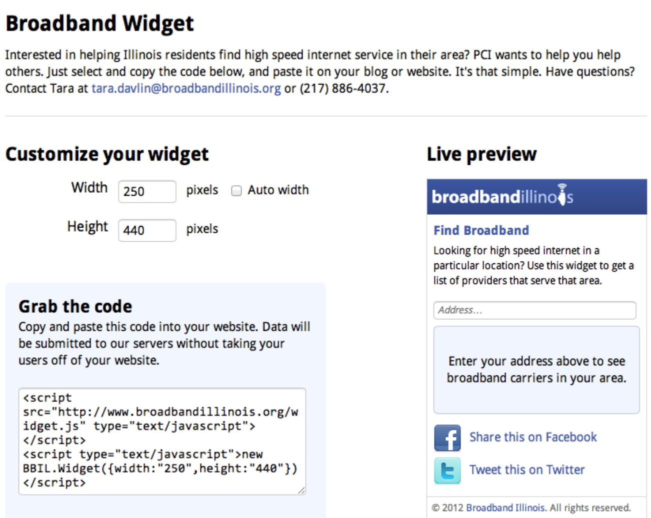
Broadband Illinois Website

The Partnership for a Connected Illinois is constantly expanding and improving our website. Since April of 2012, our additions and improvements include:

- **Coverage crowd sourcing** – When a user searches for available broadband on broadbandillinois.org, carrier information is displayed. Users can now vote with a “thumbs up” or “thumbs down” on the validity of the carrier reported speeds and availability.



- **Embeddable Widget** - The addition of an embeddable widget to be placed on any website or blog, and allows anyone to find broadband by entering an address



- **Newsletter Pages:** PCI has a weekly newsletter that is sent to a group of broadband enthusiasts and stakeholders. We have devoted a section of our website to these newsletters so that they may be accessible anytime.
- **County Pages:** We have created a page for each and every county in Illinois. These pages contain the latest coverage maps, as well as a link to each carrier page available in that county.

- **Carrier Pages:** We have created a page for each carrier in Illinois. Each carrier page contains the latest coverage maps as well as contact information for each carrier.
- **Maps:** We continue to make more and more of our maps available online. We have added all previous rounds' raw data files and shape files, as well as broadband competition maps, and area ranking maps.
- **Events Page:** Our "Events" page technology has been upgraded to allow for easier downloads through iCal and Google Calendar. Users can also subscribe to specific categories through our RSS feeds.
- **Videos**: We have added multiple videos to our site to allow this additional medium to relay our messages regarding grant opportunities, broadband adoption, and carrier relationships.

Upcoming Additions

- "**Census Block Concept"** - We are currently working on a major upgrade to our website that will allow users to easily search all available data (news, events, training, coverage maps, carrier information, grant and employment opportunities) by region, county, zip code, address or even census block.

  Due to the size of Cook County, with this addition each of the 77 Chicago neighborhoods will have their own broadbandillinois.org page where users can find pertinent information for their local area., and not just Chicago-wide data.

- **Blogs** - Each region will have it's own blog, where eTeam coordinators can communicate publicly and private with their volunteers and members.

- **Public Wi-Fi Locations -** PCI has recently been awarded the Institute for Emerging Issues' Rural Digital Advocacy Grant to build a Wi-Fi locator mobile application. We will be collecting data on all public Wi-Fi locations throughout Illinois for the application. This will include private businesses as well as community anchor institutions. Data collected through this effort will also be made available on our website.

- **Raw Data –** The web site provides access to raw, non-confidential data submitted to NTIA as well as analysis data produced in-house.

PCI's web site is built around an open source Application Program Interface. This free tool allows software developers to build upon, and add to, the data on the Broadband Illinois website. Documentation for the PCI's API is available at http://developer.broadbandillinois.org.

CONCLUSION

The data submission cycle ending on October 1, 2012, has been the third round that the Partnership for a Connected Illinois has conducted every facet of the data collection process. PCI has become much more comfortable in this round, with a new and improved mapping team. Likewise, PCI is confident many of the issues that were found in previous PCI submittals have been resolved thanks in large part to the experience of previous rounds. Now that PCI has assumed full control over this process, it has brought the data "closer to home" for Illinois. PCI has taken major steps in its three-fold mission to collect and publish broadband data, to ensure broadband access throughout the State, and to maximize broadband's impact, and the data has helped drive each of these steps.

STATE OF INDIANA

Mitchell E. Daniels Jr., Governor

OFFICE OF TECHNOLOGY
Jim Sparks
Geological Information Officer

Indiana Government Center North
100 N. Senate Ave., Room N551
Indianapolis, IN 46204
(317) 234 - 5889

Round 6 (Fall 2012)
Data Submission to NTIA
October 1, 2012

Data Description

File Name	Contents	Description
IN_SBDD_20121001.ZIP	This Delivery Package	A zip file containing all of the files described below
IN_SBDD_2012_10_01.gdb	Data Transfer Model	Current NTIA approved data model with the assembled data properly loaded into the data transfer model
IN_DataPackage. 2012_10_01.xls	Data Package	A formatted file containing associated documentation about Indiana's submission
IN_2012_10_01.txt	Data Submission Receipt	File containing the results of the submission check tool
IN_ Methodology _2012_10_01.pdf	Methodology White Paper	Documentation about our process
IN_ Readme_2012_10_01.pdf	Readme Doc	A document that contains added notes about the delivery

Provider Participation

121 Internet Providers

- 66 Wireline Providers
- 55 Wireless Providers

51 Data Sets Received

- 26 Wireline Providers
- 25 Wireless Providers

STATE OF INDIANA

Mitchell E. Daniels Jr., Governor

OFFICE OF TECHNOLOGY
Jim Sparks
Geological Information Officer

Indiana Government Center North
100 N. Senate Ave., Room N551
Indianapolis, IN 46204
(317) 234 - 5889

About this Submission

106 Broadband Providers in State of Indiana

- Some organizations have more than one name (for a total of):
    - 121 Internet Providers
        - 66 Wireline Providers
          55 Wireless Providers

Provided New Data:

- Accelplus
- AT&T, Inc.
- Blueriver Networking Services
- CenturyTel, Inc./CenturyLink/Embarq
- Cequel Communications, LLC/Suddenlink
- Clay County Rural Telephone Cooperative, Inc./Endeavor Communications
- Comcast Cable Communications Management
- Covad Communications Group, LLC/DIECA Communications/MegaPath
- Enhanced Telecommunications Corporation/ETC Communications
- Foundation Communications
- Fourway Computer Products, Inc.
- Frontier Communications
- Frontier Communications of Indiana, Inc. (Frontier North, Inc).
- Frontier Communications of Thorntown, Inc.
- FULLnet
- Hancock Rural Telephone Corporation/Nine Star Connect
- Leap Wireless International, Inc./Cricket Communications/
- Level 3 Communications, LLC (Global Crossing North America, Inc.)
- Lightbound
- MetaLINK Technologies, Inc.
- Metro FastNet
- MidwayNet.net
- Mulberry Cooperative Telephone Co. Inc.
- New Lisbon Telephone Co., Inc.
- NewWays Networking, LLC
- NITCO Holding Corporation/FBN Indiana, Inc.

OFFICE OF TECHNOLOGY
Jim Sparks
Geological Information Officer

Indiana Government Center North
100 N. Senate Ave., Room N551
Indianapolis, IN 46204
(317) 234 - 5889

- On-Ramp Indiana (ORI Net)
- Parallax Systems (RMC)?
- PCS-WIN/ RC-WiFi
- Performance PC / Performance WISP
- Perry-Spencer Rural Telephone Coop (Communications)/PSC
- Rochester Telephone Co./RTC Communications
- Skycasters Satellite Internet
- Smithville Telephone Company, Inc.
- Sprint-Nextel Communications
- StarBand
- Telephone and Data Systems, Inc. (TDS)
- Time Warner Cable LLC
- T-Mobile
- TransWorld Network, Corp./Wi-Power
- Verizon Wireless
- Washington County Rural Telephone Cooperative/Tele-Media Solutions
- WildBlue Communications, Inc.
- Yeoman Telephone Co.
- Zayo Enterprise Networks

Data Still Current:

- ABC Hi-DEF Communications/Broadway Broadband
- Benton Ridge Telephone Company/Watchtv.net
- Bloomingdale Home Telephone Company
- Bright House Networks, LLC
- Citizens Communications
- Citizens Telephone/City of Scottsburg
- Community Wireless
- Comteck
- Craigville Telephone Company, Inc./AdamsWells Telecom
- CSInet Internet Access
- Daviess-Martin County RTC/RTC Communications
- East Allen High Speed Internet, LLC/ Eastern Indiana WIFI, Inc.
- Full Choice Communications, Inc./Indiana Communications

OFFICE OF TECHNOLOGY
Jim Sparks
Geological Information Officer

Indiana Government Center North
100 N. Senate Ave., Room N551
Indianapolis, IN 46204
(317) 234 - 5889

- Geetingsville Telephone Company, Inc. (part of IFN)
- Great American Broadband /Only Internet.net
- Helix Technologies Incorporated/NetSurfUSA, Inc.
- Hoosier Broadband
- Internet Communications Inc
- Joink, LLC/XSNet
- KC Online, Inc./U4
- Kendallville Internet
- Ligtel Communications (IFN Ligtel/Ligonier)
- Mediacom Communications Corp.
- Microdome Wireless
- Monon Telephone
- New Paris Telephone Co., Inc./Brightnet of Indiana
- NITLine (Northern Indiana Technologies, Inc.)
- Node 1 Technology/Wireless Internet for Illiana
- Ohio Valley Wireless/Sit-Co.net
- Omnicity
- PDS Wireless/Precision Data Solutions
- Portative Technologies, LLC
- Pulaski White Rural Telephone Coop., Inc.
- Southeastern Indiana Rural Telephone Coop.
- Swayzee Telephone Company
- TV Cable of Rensselaer & Winamac
- Wabash Mutual Telephone Company (Part of Brightnet)
- WideOpenWest
- Windstream Communications
- Wintek
- Zig Wireless

Awaiting Data

- AirHOP Wireless
- Broadband Blue
- DC Tech Solutions, LLC
- Indiana Data Center/Metrolan

- LightningNet
- Locl.Net
- Metronet
- Michiana Wireless
- New Wave Communication
- OINC Wireless
- Pavlov Media, Inc.,
- SpeedNet/Keyon
- Total Logic Systems (TLS.net)
- True 802 Wireless
- YDial LLC

Will Not Provide Data:

- Airbaud (Magnum Wireless)
- Midwest Telecom of America, Inc.
- One Communications Corporation (Now EarthLink Business)
- Broadband Indiana
- Midwest Telecom of America

Updated Information:

- ENA Services (previously listed as non-responsive) – do not provide service in the state of Indiana.
- Insight Communications (previously listed as non-responsive) – purchased by Time Warner Cable (data included in this submission).

Data Collection

We continue to collect and compare data from these sources, including:

- The Indiana Utility Regulatory Commission (comparison broadband data)
- Office of Utility Consumer Counselor (comparison broadband data)
- The Indiana Business Research Center (demographic data)
- Indiana Department of Local Government Finance (residential versus commercial status by address)

OFFICE OF TECHNOLOGY
Jim Sparks
Geological Information Officer

Indiana Government Center North
100 N. Senate Ave., Room N551
Indianapolis, IN 46204
(317) 234 - 5889

- Indiana Counties (point addresses, land parcels, road centerlines with address ranges, and administrative boundaries, aggregated and integrated into the IndianaMap)
- Indiana Department of Natural Resources (state forests and parks)
- Indiana Department of Homeland Security (locations of emergency medical service (EMS) stations, fire stations, and hospitals)
- Department of Education (school locations)
- Indiana Libraries (point of connectivity for low income/unemployed consumers—provide vital speed information for respective geographical locations)
- Commission for Higher Education (locations of colleges and universities)
- Reference USA /Infogroup (community anchors)
- **Broadband service providers, and others**

This information is processed according to the current data submission model offered by the National States Geographic Information Council and to be able to perform spatial comparisons, logic rules and other checks.

We also add emphasis to the collection of speed information using the “crowd sourcing” web-based application already implemented.

Integration and Verification Processes Used in the Mapping Indiana Broadband Project Data Integration

When data is received from a service provider, it is loaded into either Excel or Access depending on the number of records and file size. This table is then joined with a copy of the Census Block *.dbf file from our census block shapefile. After the data has been joined, it is exported as a new *.dbf. The original Census block *.dbf is renamed to preserve the original integrity and the newly exported *.dbf is renamed to the same name as the shapefile. The shapefile is then loaded into ArcMap and a Feature Class is generated. The number of records is then validated against the number of records that were originally imported into either Excel or Access.

Data Loading: A final integration check occurs when the data is loaded into the data model. This includes the logic checks for values.

Validation Processes:

• ***Comparing source documents that duplicate geographies or content.*** We have public domain data that covers most of the state. We compare this data to that provided by the Internet Service Providers. We note areas of discrepancy for follow-up using other verification methods listed here.

OFFICE OF TECHNOLOGY
Jim Sparks
Geological Information Officer

Indiana Government Center North
100 N. Senate Ave., Room N551
Indianapolis, IN 46204
(317) 234 - 5889

• ***Collecting end-user data.*** We are working with The Polis Center at Indiana University Purdue University Indianapolis and have created a Google Map-based, user-friendly web application hosted on the IndianaMap portal to collect information from end-users about their location, broadband service provider, and speed (as captured from a speed test). The information collected from this website is valuable for data verification as the database grows. T

• ***Using service providers' websites***, especially those that contain service area information. Many service providers have websites that give service area information (often address by address) to assist consumers. These sites are useful for spot checking.

• ***Inspection of high-resolution orthophotography.*** High-resolution orthophotography has been used to verify the existence and location of wireless towers. Where recent six-inch resolution orthophotography exists (cities and counties), it can also be used to verify the existence of residence connection boxes.

•***"Boots on the ground"*** inspection. We visually inspect the existence of physical features, where feasible, when we have a question or conflict that can be resolved by an on-site inspection.

Indiana Broadband Providers Website

A URL is available http://www.in.gov/gis/Broadband.htm to communicate and distribute NTIA NOFA requirements to providers along with outreach and data submittal materials including:

- NTIA NOFA and subsequent clarification
- Outreach letter to providers
- Non-Disclosure Agreement
- Data Submission Guidelines
- Broadband Data Submittal Templates (Spreadsheets)
- Data Submittal Assistance Contact Information

STATE OF INDIANA

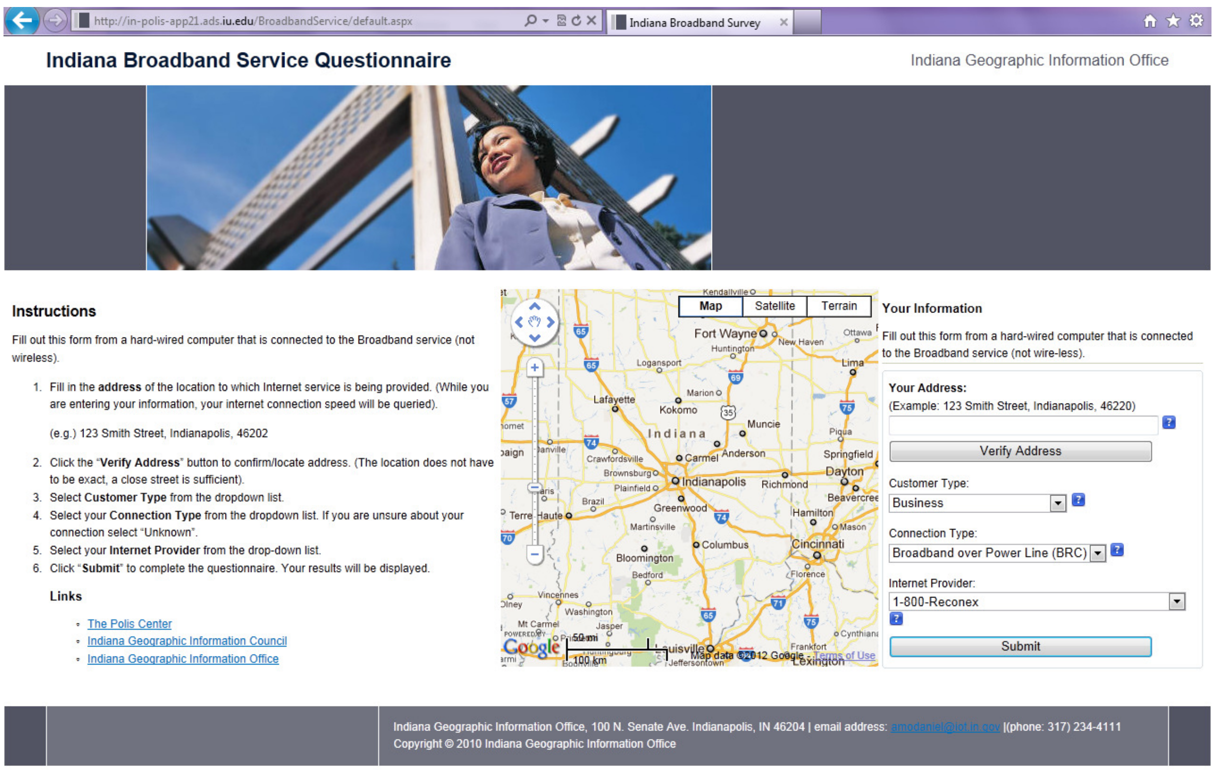
Mitchell E. Daniels Jr., Governor

OFFICE OF TECHNOLOGY
Jim Sparks
Geological Information Officer

Indiana Government Center North
100 N. Senate Ave., Room N551
Indianapolis, IN 46204
(317) 234 - 5889

Indiana Broadband Service Questionnaire

http://www.in.gov/gis/BroadbandQuestionnaire.htm
http://in-polis-app21.ads.iu.edu/BroadbandService/default.aspx
www.in.gov/survey



The information collected from this website is valuable for data verification. The Polis Center works with communities in Indiana and beyond to develop and apply knowledge, to build collaborations and to find innovative solutions to common problems. The center excels in community-based research and advanced information technologies, especially geographic information systems (GIS).

Small Service Provider Support

We also support small service providers (and those with smaller information technology teams) in the area of data submission. We recognize the challenge that some providers have in submitting data in the formats and specifications required.

We have entered into a contract with AfterImage GIS to provide support to these providers in the area of data submission and assist with the challenges that some providers have in

STATE OF INDIANA

Mitchell E. Daniels Jr., Governor

OFFICE OF TECHNOLOGY
Jim Sparks
Geological Information Officer

Indiana Government Center North
100 N. Senate Ave., Room N551
Indianapolis, IN 46204
(317) 234 - 5889

submitting data in the formats and specifications required by National Telecommunications and Information Administration (NTIA) for the National Broadband Map. Since we have engaged in this contract, we have been to acquire 10 new provider data sets.

Data Display

Indiana Map

We are currently displaying the mapping results as additional geospatial layers added to the 220-plus layers already on the IndianaMap (www.indianamap.org)

STATE OF INDIANA

Mitchell E. Daniels Jr., Governor

OFFICE OF TECHNOLOGY
Jim Sparks
Geological Information Officer

Indiana Government Center North
100 N. Senate Ave., Room N551
Indianapolis, IN 46204
(317) 234 - 5889

Indiana Business Research Center (IBRC)

We have integrated the broadband map data with economic data available from IBRC
www.stats.indiana.edu/broadband/

STATS Indiana
data everyone can use

Google™ Custom Search go

What's New? | Suggestions | Contact Us

Home | Data By Topic | Profiles | Maps & Tools | Data Calendar | Hoosiers by the Numbers • in.gov

Broadband

Broadband provides high-speed Internet connections to businesses and consumers. While in past decades, access to interstates and railroads played a crucial role in economic development, the knowledge-based economy is experiencing a similar reliance on broadband connectivity.

Indiana Broadband Demographics

View a report of broadband coverage with associated economic and demographics for neighborhoods and custom regions.

- About the Data

National Broadband Map

Indiana Broadband Map

Related Links

- Internet Adoption by County and Census Tract (Federal Communications Commission)
- Innovation Index: Includes data on broadband density
- Indiana Geographic Information Office
- Broadband: Federal Communications Commission
- National Broadband Plan
- IndianaMap: Download broadband shapefiles

Maps

Broadband Map Gallery

Publications

Find out what local analysts are saying:

- Broadband Adoption in Indiana
May-June 2011
- Measuring Regional Capacity for Innovation
Jan-Feb 2010

In the News

Articles compiled daily from newspapers across the state:

- NWI economic development district can't get guidance from feds
- New law signed by Daniels aims to stop 'bleeding' of 911 fees in Hoosier counties

-more-

STATE OF INDIANA

Mitchell E. Daniels Jr., Governor

OFFICE OF TECHNOLOGY
Jim Sparks
Geological Information Officer

Indiana Government Center North
100 N. Senate Ave., Room N551
Indianapolis, IN 46204
(317) 234 - 5889

Indiana Broadband Map

We have developed a web-based information tool that will provide information about broadband service availability at a user-specified location.

www.indianabroadbandmap.com

This application is provides tools for searching and displaying broadband availability information anywhere in Indiana.

Public Use

- Zoom to County
- Zoom to Address and retrieve Broadband Information for that address
- Buffer Address for additional Broadband Information in the area
- View Provider Results
- Filter Broadband Information by Speed
- Filter Broadband Information by Technology (i.e. Wireless, Wireline)
- Filter Broadband Information by Service Provider
- Query Census Blocks

Provider Use

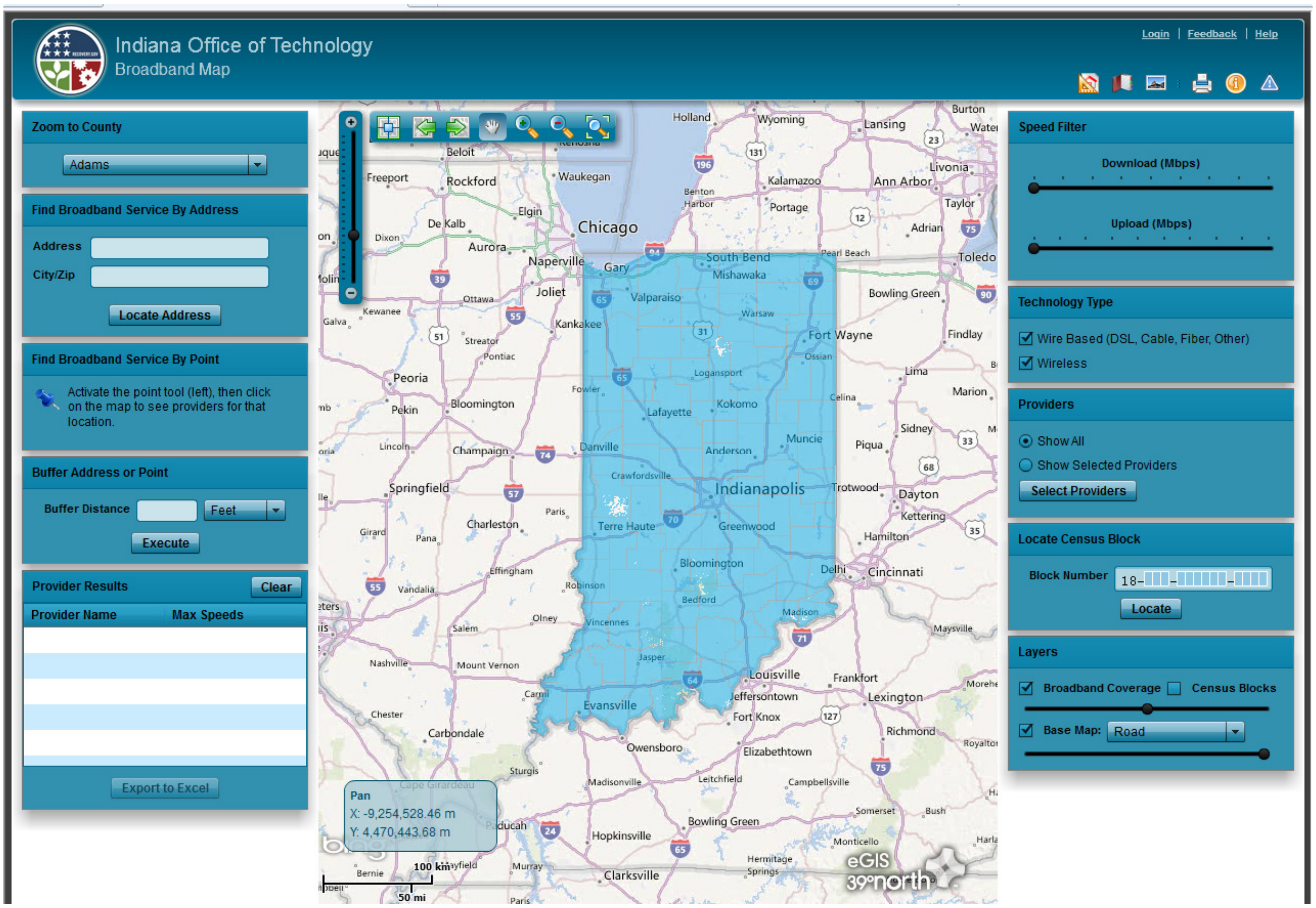
- All of the above
- Edit Broadband Information via Secure Login
    - Multiple webinars were hosted by IOT and our web developer 39°north to train the broadband providers how to update their data. Each broadband provider was given their own unique login information. The website was then released to the public so that they can view the available provider information for their area.
    - Through this secure login, the original provider data may be modified to more accurately reflect the various broadband providers' territories.

STATE OF INDIANA

Mitchell E. Daniels Jr., Governor

OFFICE OF TECHNOLOGY
Jim Sparks
Geological Information Officer

Indiana Government Center North
100 N. Senate Ave., Room N551
Indianapolis, IN 46204
(317) 234 - 5889



Address Level Data Collection

We continue to collect address level data. Indeed, as described above, Indiana is well on the way to creating address level reference data to facilitate the collection of address level broadband service availability, not just in census blocks larger than two square miles, but statewide. These data will be invaluable as the lowest common denominator to allow the construction of any geography in support of broadband map display and analysis. This expands the options for how to depict speed across multiple geographies, and facilitates the inquiry of service data at a given x,y.

We have 56 counties who are providing address data as a result of the BB map funding, with more signing up each week.

We are a over a third of the way in our acquisition of new orthophotography imagery to serve as the foundation for all other geospatial data, including centerlines and address level data.

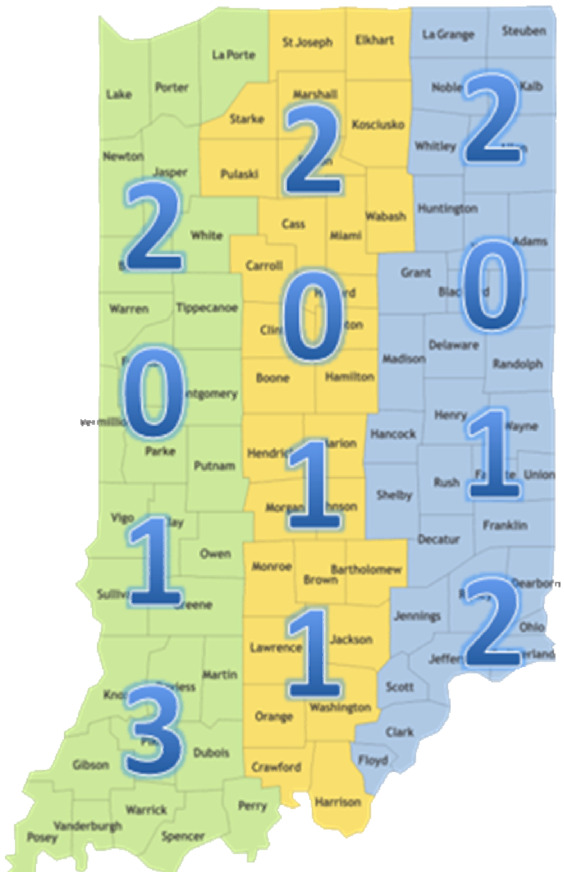
STATE OF INDIANA

Mitchell E. Daniels Jr., Governor

OFFICE OF TECHNOLOGY
Jim Sparks
Geological Information Officer

Indiana Government Center North
100 N. Senate Ave., Room N551
Indianapolis, IN 46204
(317) 234 - 5889

Here is a graphic showing our orthophotography flight schedule.



Community Anchor Institutions

We identified community anchor institutions by cross referencing a statewide land parcel dataset with a data set from the Indiana Local Government Finance office containing, among other information, institution name, location by address, and use category. The results of this analysis have been included in previous deliveries for records containing name, location, and category at a minimum. These data, however, did not have sufficient broadband service information. Therefore, we have engaged a third party to survey the institutions to complete the attributes defined in the NOFA for these institutions. We have included this additional data in our submission.

The Indiana Office of Technology has engaged Infogroup to identify and contact all anchor institutions in the State of Indiana. The goal was to determine broadband service and internet service providers that meet the definitions of “broadband” as outlined in the broadband

OFFICE OF TECHNOLOGY
Jim Sparks
Geological Information Officer

Indiana Government Center North
100 N. Senate Ave., Room N551
Indianapolis, IN 46204
(317) 234 - 5889

mapping Notice of Funds Availability. The definition is inclusive of two-way data transmission with advertised speeds of 768 kbps downstream and 200 kbps upstream.

Infogroup had the ability to identify state anchor institutions and developed a script designed to gather the information required to answer to the requirements of the NTIA.

There data compilation process telephone verified all businesses, including those identified as anchor institutes, to ensure the highest level of accuracy with business name, business type and contact information. After compiling the list, Infogroup prepared a script and software to assist in capturing the necessary information. They then begin the telephone survey and data collection process and created a report in the tab-delimited text file format of the required information. This survey included institution name, complete address, latitude/longitude, category of institution, broadband service, technology of transmission and advertised downstream/upstream service speed where they are collected in a tab-delimited text file.

The Indiana Office of Technology has included the results in our submission.

Data Submission Report

Broadband Service Provider Data as of June 30, 2012

Report date: October 1, 2012

Submitted to:
National Telecommunications and Information Administration
United States Department of Commerce

Submitted by:
Kansas Statewide Broadband Initiative
State of Kansas Department of Commerce

and

Kansas Data Access & Support Center (DASC)

Table of Contents

1000 S.W. Jackson St., Suite 100
Topeka, KS 66612-1354

Kansas

Phone: (785) 296-3481
Fax: (785) 296-5055 TTY: 711
admin@kansascommerce.com
KansasCommerce.com

Pat George, Secretary

Department of Commerce

Sam Brownback, Governor

September 28, 2012

Ms. Anne W. Neville
SBDD Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
1401 Constitution Avenue, NW Room 4716
Washington, DC 20230

Dear Ms. Neville,

Please accept this semi-annual broadband service provider data submission from the State of Kansas Department of Commerce, the Designated Entity for the State Broadband Initiative. As with the 12/31/11 data set submission, we have contracted with our partnering organization, the State of Kansas Data Access and Support Center (DASC) located in Lawrence, KS to collect and integrate service provider data.

This submittal provides details and methodologies for Kansas broadband service as of June 30, 2012 for inclusion in the National Broadband map and in accordance with requirements set forth under terms of our SBI grant. The report provides an overview of processes used to verify the data set and describes how DASC collects and validates Kansas availability information for the submittal.

We continue to work to make improvements in our processes and, in coordination with our service provider community, make the map as accurate and useful as possible in support of our goal of maximizing engagement in the rapidly emerging digital economy.

During this six month reporting period, we have made refinements to our service provider list to ensure it is the most up to date and reflective of availability across the state. The level and quality of provider engagement improved from the previous submission. Moving forward, we will work to engage service providers not currently participating in the initiative and continue building relationships with the provider community, leading to a more comprehensive understanding of broadband service in Kansas.

Respectfully,

Stanley Adams
Program Director, Kansas Statewide Broadband Initiative

Cc:
Pat George, Secretary of Commerce
Steve Kelly, Deputy Secretary of Commerce – Business & Community Development
Anthony Schlinsog, Chief Information Technology Officer, Executive Branch
Mark Sievers, Kansas Corporation Commission
Jo Budler, State of Kansas Librarian
Stan Ahlerich, Executive Director, Governor's Economic Development Council, KS Dept. of Commerce
Representative Carl Holmes, Chairman Kansas House of Representatives Energy and Utilities Committee
Senator Pat Apple, Chairman Kansas Senate Utilities Committee

Provider Outreach & Communication Activities

Over the past several months, the Kansas Statewide Broadband Initiative (KSBI) team has worked to establish relationships with the Kansas broadband provider industry to increase provider participation and improve the overall quality of the statewide broadband geodatabase. Initially, much of the provider outreach was conducted via phone and email, and centered on the April, 2012 data submission. Upon completing the data submission, the KSBI team focused on activities to further engage broadband providers and increase participation in the statewide initiative.

In May, the KSBI team hosted an industry roundtable planning meeting to provide background on state and national broadband mapping initiatives, meet members of the provider community, and receive feedback from providers regarding these initiatives. The objective of this meeting was to develop a model for future roundtables and workgroups to improve data quality, increase participation rates, and address provider concerns regarding uses of the data. The next roundtable is scheduled for November, in association with the Governor's Rural Opportunities Conference.

In July, two data submission webinars offered an opportunity for providers to learn more about the data-collection effort to support the October NTIA data submission. The webinar included an overview of state and national broadband mapping initiatives, commonly-used terms and definitions, a description of census block and road segment geography, and a demonstration of the new Provider Feedback & Verification Portal (provider portal). Invitations to both webinar events were sent to all known and potential providers. A total of 18 providers participated in the webinars, and the KSBI team plans to make this part of the standard request for participation workflow.

The request for participation in the October, 2012 data submission was distributed via email to all known and potential providers during the first week of July. The email included the provider name, FRN, NDA status, data submission deadline, information about the new provider portal, and an invitation to the data submission webinars. A unique hyperlink was embedded into the email that allowed each provider to access the portal and view their data. A technical overview of the provider portal is included later in this report. All providers that did not meet the initial data submission deadline were contacted repeatedly via phone and email in order to ensure maximum participation. This escalation was handled both directly through the DASC office, and through the KDoC with support from the State Independent Telephone Association (SITA) and the Kansas Telecommunications Industry Association (KTIA).

The KSBI team has taken a hands-on approach towards building long-term relationships with the provider industry. Conference calls, webinars, roundtables, and web meetings have allowed the team to better understand the landscape of broadband service in Kansas. As a result, the provider industry has become increasingly receptive to extending the working relationship with the KSBI team, and particularly the DASC office.

<u>October, 2012 Data Collection Summary</u>

- As of this submission, there are 105 actual Kansas broadband service providers
- As of this submission, 110 potential Kansas broadband service providers have been identified (105 actual + 5 potential = 110 total providers)
- 92 of the 105 actual service providers submitted data or confirmed no changes to their previous submission during this reporting period
    - 53 database updates processed for existing service providers
    - 39 confirmed 'no changes' for existing service providers
- 4 new service providers were added to the statewide geodatabase
- 75 agreements reached for data sharing
- 20 providers participated in interactive data review sessions (web meetings)
- 18 providers participated in data submission webinars
- 31 providers responded to the October, 2012 Data Submission Survey component of the *provider portal*
- 2 service providers declined participation

October, 2012 Data Submission Survey respondents via the *provider portal* (31):
Benkelman Telephone Company, Carson Communications, Columbus Telephone Company, DIECA Communications, Inc., Elkhart Telephone Company, Inc., GBT Communications, Gorham Telephone Company, Inc., H&B Cable Service, Inc., Haug Communications, Inc., Home Communications, Inc., Ideatek Systems Inc., Knology of Kansas, Inc., Mediacom, Mercury Wireless, LLC, North Central Kansas Community Network, Peoples Telecommunications, LLC, Rainbow Telecommunications Association, Inc., Rebeltec Communications LLC, S&A Telephone Company, Inc., S&T Communications LLC, S&T Telephone Cooperative Association, SWKO, Inc., Southeast Nebraska Communications, Inc., St. Joe Wireless, Totah Communications, Inc., United Communications Association, Inc., United Wireless Communications, Inc., Valnet Holdings, LLC, Wheatland Electric Cooperative, Inc., Wilson Telephone Company, Inc., Windjammer Communications LLC.

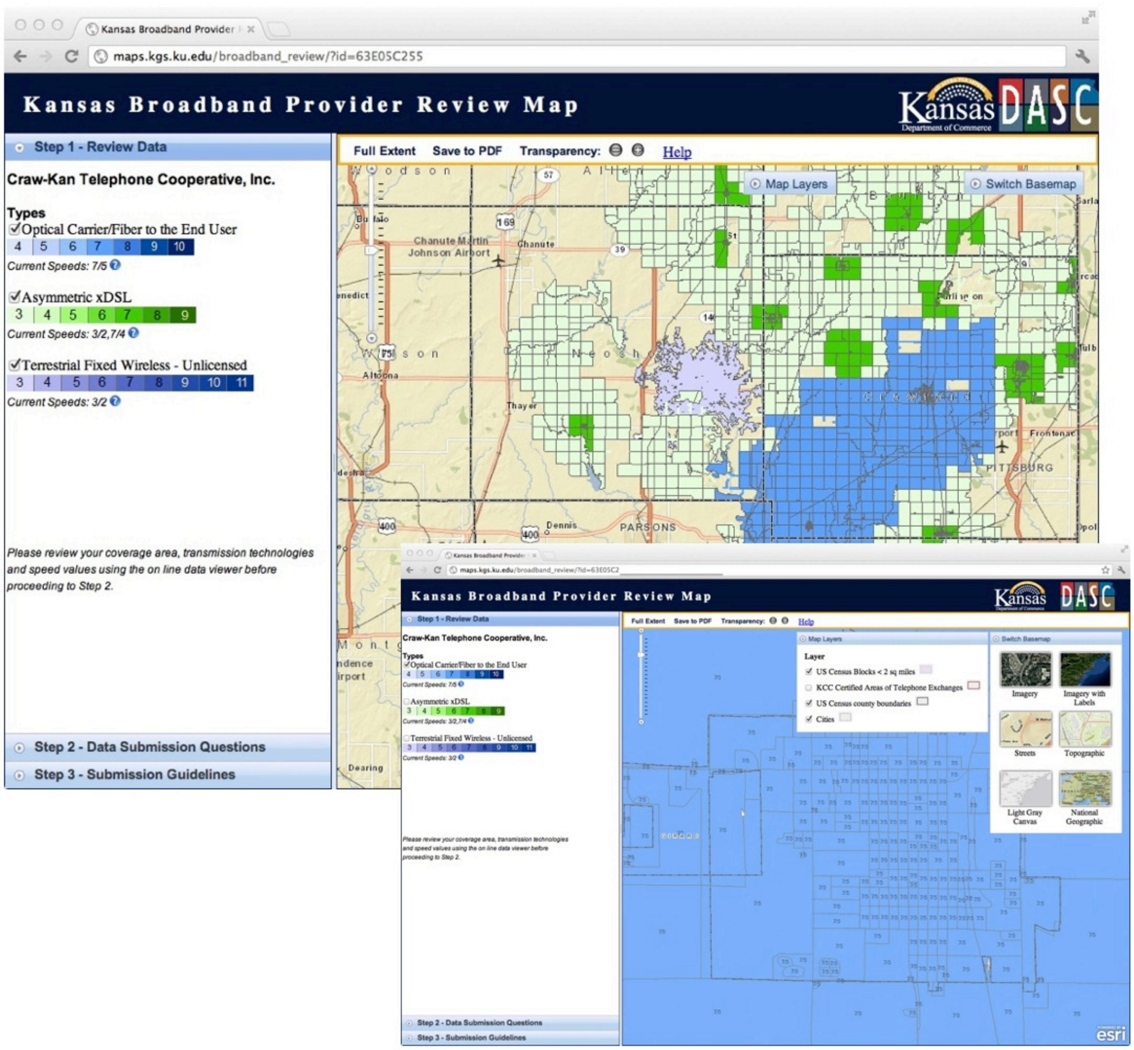
Providers that participated in the Data Submission Webinars (18):
AT&T, CenturyLink, Diller Telephone, GoldenBelt Telephone, LaHarpe Telephone Co, Madison Telephone, NCKCN, Peoples Telecommunications, S&A Telephone Company, Inc., S&T Communications, S&T Telephone Cooperative Association, Tri County Telephone, Twin Valley Communications, Twin Valley Telephone, United Telephone Association, Wamego Telephone, Wheatland Electric Cooperative, Inc., Wilson Telephone Co.

Providers that participated in data review sessions (web meetings) (20):
Blue Valley Tele-Communications, Inc., Bluestem Telephone Company, Craw-Kan Telephone Cooperative, Inc., Eagle Communications, Inc., H&B Cable Service, Inc., H&B Communications, Inc., Home Communications, Inc., Home Telephone Company, Inc., LR Communications, Inc., S&A Communications, Inc., S&A Telephone Company, Inc., S&T Communications LLC, S&T Telephone Cooperative Association, South Central Telephone Assn., Inc., South Central Wireless, Inc., Southern Kansas Telephone Company, Inc., Sunflower Telephone Co., Inc., Twin Valley Communications, Inc., Twin Valley Telephone, Inc., Wamego Telecommunications Company, Inc.

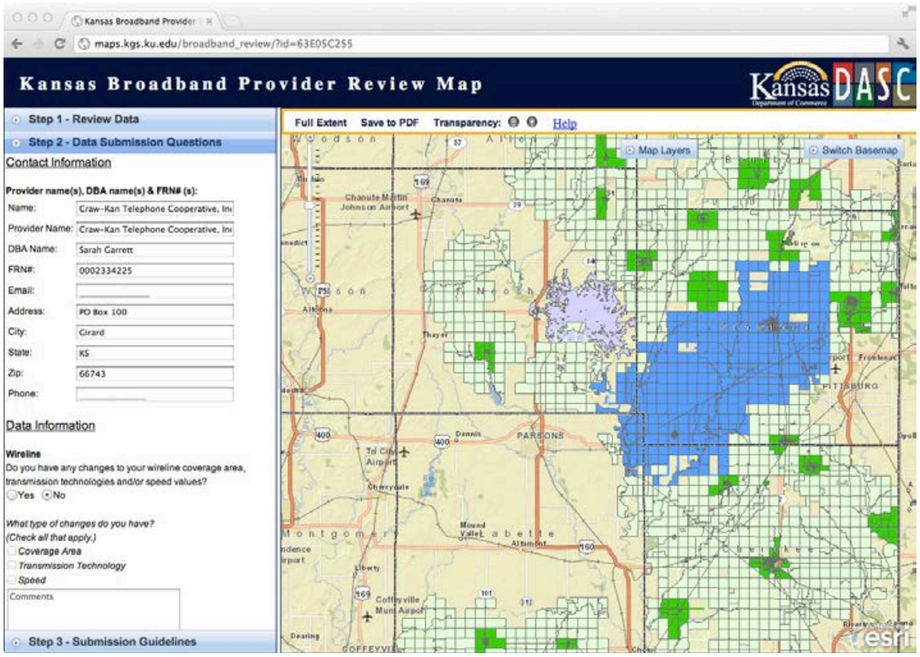
Provider Feedback & Verification Portal

The provider portal was developed to offer a convenient way for providers to review their data and provide feedback to DASC. The portal includes three primary components; an interactive mapping application, a provider survey form, and a web site for posting documents and announcements. The first version of the portal was launched on July 1, 2012 and has become an integral mechanism for communication with broadband providers.

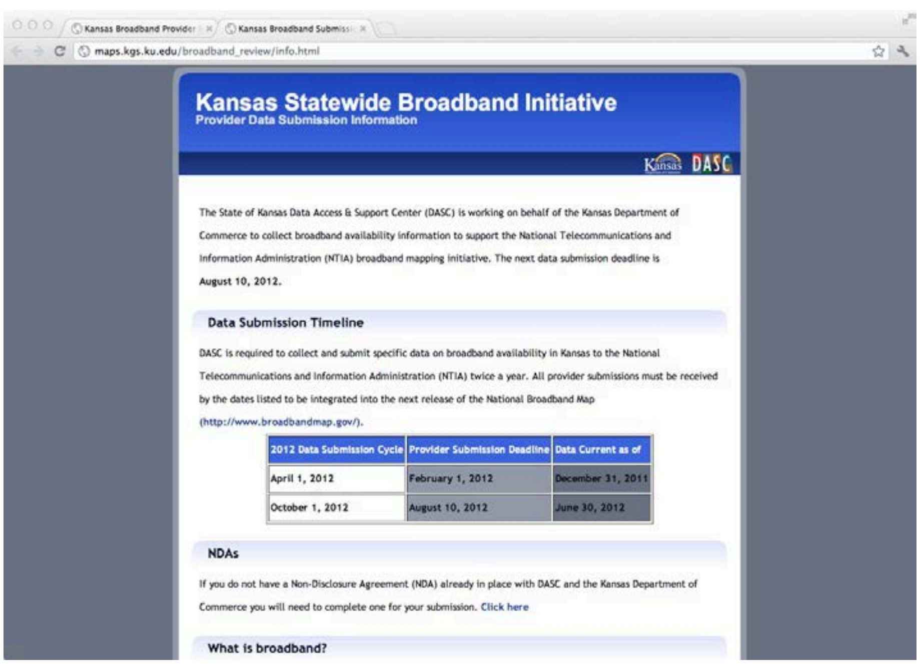
1. The interactive mapping component allows providers to quickly view the data from their previous submission and determine if updates are needed. The map is rendered by transmission technology and speed. Each company received a unique URL that displays only their data, eliminating the need for usernames and passwords.



2. Survey component - upon reviewing the data from the previous submission, each provider is asked to confirm or edit their Provider Name/FRN, contact information, and indicate whether they will be providing updates for the upcoming submission.

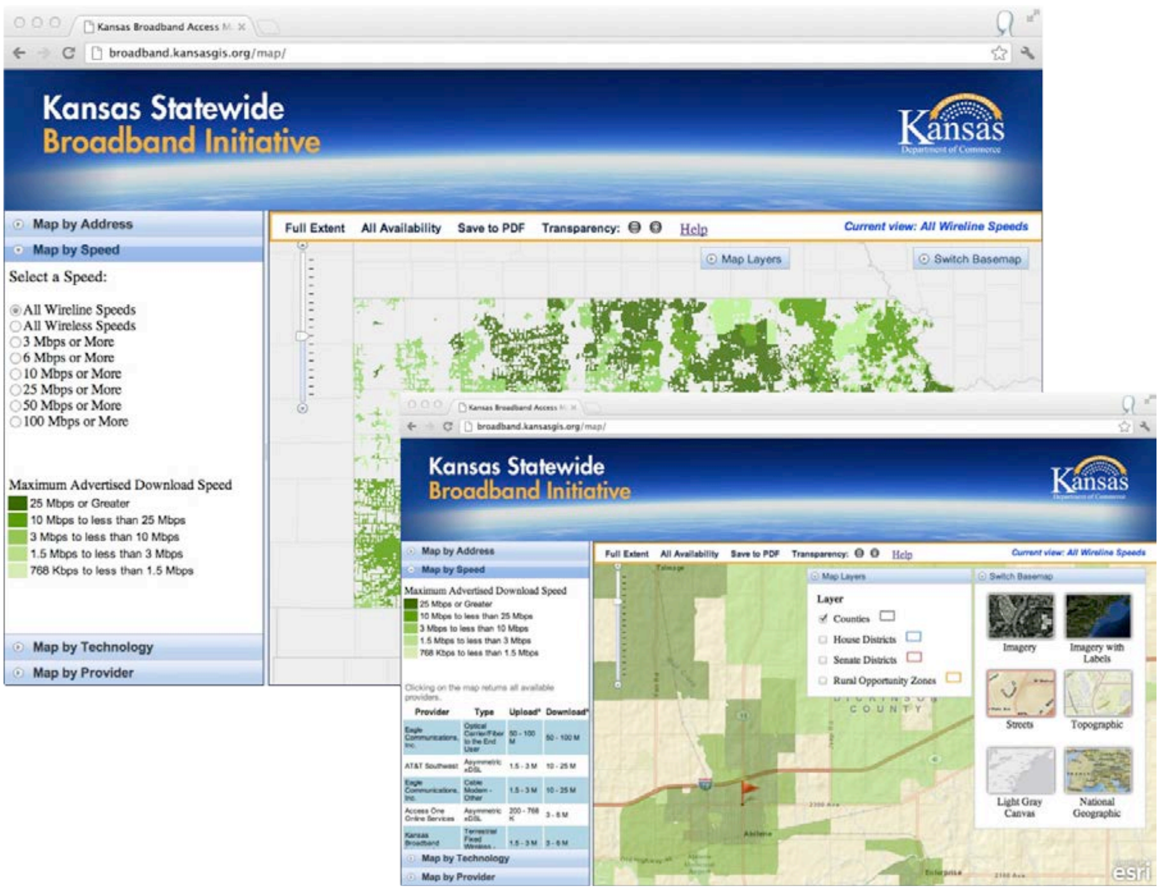


3. Web site - the provider web site includes information and documents about state and national broadband mapping initiatives, including data submission timelines, geodatabase standards and mapping techniques, and links to data submission spreadsheets. This site will continue to grow in the future.



Public Interactive Web-Mapping Application

In addition to the provider portal, a revised version of the public web-mapping application was released in August. The application utilizes the current public release of the Kansas broadband mapping geodatabase, and provides a series of map themes, including *map by address*, *map by speed*, *map by technology*, and *map by provider*. Additional functionality includes a map query tool, administrative boundary overlay widget, base map selector, and print-to-pdf. User feedback meetings are planned for later this fall and will help direct future application enhancements. Site usage is currently being tracked with Google Analytics.



Data Processing & Validation

Information was collected from Kansas broadband service providers in a variety of formats including GIS data files, database tables and spreadsheets, CAD files, and paper maps. As files were received, they were reviewed to determine if they contained the required spatial and/or attribute information, and if there was a need for further communication with the provider. In many cases, DASC staff made follow-up phone calls, sent emails, or held Adobe Connect sessions in order to ensure that the information given by the provider was accurately reflected in the database.

All data submissions to the DASC office were processed according to the following steps:

1. Initial data review to determine quality and fitness for processing. Follow-up with broadband provider if necessary.
2. Creation of provider-specific “staging” geodatabase
3. Process edits according to information and materials submitted by provider
4. Review by editing technician
5. Quality Assurance/Quality Control (QA/QC) review
6. Integration into statewide geodatabase model

The following describes the general steps taken to integrate information provided in the various submission formats.

GIS Data (Shapefile/Geodatabase)
Service area descriptions submitted in a GIS data file format are loaded into a provider-specific staging geodatabase where they are used to determine their intersection with census block and road segment geometry. If a census block is less than two square miles, it is added to the *CensusBlock* feature class. If a census block is larger than two square miles, the corresponding road segments are added to the *RoadSegment* feature class. All required attribute information is then calculated for each feature class.

Database Tables/Spreadsheets/Text-file (Census Block ID/TIGER-Line ID)
It is common for providers to supply information regarding their service availability in a tabular format including a list of Census Block ID and/or TIGER-Line ID numbers. In these cases, the tabular data is joined to the Census geography to select *CensusBlock* and/or *RoadSegment* features. If a census block is larger than two square miles, the corresponding road segments are added to the *RoadSegment* feature class. Attribute items are then calculated for each feature class in the staging geodatabase.

Database Tables/Spreadsheets/Text-file (Address List)
In cases where service providers submit a table of customer addresses, this information is geocoded (sometimes referred to as address matching) to determine a location for each address in the table. This process results in a point data layer that is used to determine the corresponding census block and road segment assignment. If a point falls within a block that is less than two square miles, the block is added to the *CensusBlock* feature class. If a point falls within a block that is larger than two square miles, it is assigned to the nearest road segment and that feature is added to the *RoadSegment* feature class. Attribute items are then calculated for each feature class in the staging geodatabase.

CAD Files/Paper Maps
Some providers submit their service area descriptions as paper map, PDF maps, or CAD drawings. In these cases, this information is interpreted to determine the intersection with census block and road segment geometry. Again, the two square mile threshold is observed for determining census block and road segment assignments, and the necessary attribute information is encoded into the database.

Wireless Service Area
Mobile wireless service providers typically supply a GIS data file (polygon feature class) describing their service area, or a spreadsheet/text-file containing tower locations and characteristics. Service area polygon features are loaded into the provider-specific staging geodatabase and processed into the NTIA geodatabase model. Fixed wireless service providers typically supply tower locations and characteristics in a standardized spreadsheet template. This information is used to calculate signal propagation models.

Middle Mile/Last Mile Infrastructure
A limited number of middle mile/last mile points were provided during this data submission cycle. This information, however, was provided in either Shapefile or text-file format, containing the necessary location and attribute information.

Community Anchor Institutions (CAI)
The CAI data was updated and enhanced through the integration of authoritative datasets from the Kansas Adjutant General's Department and the State Library of Kansas. The Adjutant General's Department is the recognized steward of the state's structures geodatabase and routinely maintains and updates features such as schools (K-12 & Higher Education), Law Enforcement Buildings, Fire Stations, and EMS Stations. The State Library works with its constituents to build and maintain an exhaustive database of public library locations. Together these information resources were used to verify and update the existing CAI data layer. In addition to adding new records and refining point locations, the database table was also cleaned up and standardized to improve usability. Updates from these authoritative datasets will be incorporated into the CAI layer with each broadband data submission.

Data Review

In order to ensure that information supplied by the providers was correctly interpreted and incorporated into the database, DASC employed a variety of quality assurance techniques.

1. Comparison of revised/updated boundary delineation or provider information with previous submissions (change detection) – all service area updates are compared to the previous submission to determine if the change in geographic extent or attribute information is reasonable. While major revisions to a service area or technology may be accurate, it is also reasonable to follow-up with the provider to ensure that the submission materials have been provided and/or interpreted correctly.

2. Conference calls – As necessary, follow-up phone calls were made to providers to resolve issues related to submission materials. While this process was time consuming, it was also viewed as part of the relationship building process. It helped to ensure that database edits followed the intent of the provider. Additionally, the GIS technical staff had the opportunity to provide additional background on how the data is collected, aggregated, and used.

3. Interactive Web meetings – using Adobe Connect, interactive desktop GIS sessions were held with 20 providers to verify service area definitions, transmission technology, and required edits. This was the most effective communication tool used in the data collection and editing phase of the project. DASC will continue to encourage providers to participate in these sessions. It is very efficient, allows both parties to see the map and discuss necessary edits, answer questions in real time, and most importantly, build a relationship that leads to continued participation.

Provider Web Site Research

Information including maximum advertised download and upload speed, transmission technology, and service area was harvested from provider web sites and stored in a database. This information was used as a cross-reference for the broadband mapping geodatabase. Of the provider web sites researched, 64% contained speed information, 35% contained transmission technology, and 89% contained a location reference. Some provider web sites published a map of their service areas, while others simply listed the cities or regions that they served. The information posted to the provider web sites serves as a valuable resource for validating the broadband mapping geodatabase. DASC plans to refresh this information prior to each submission cycle.

Future Direction

Continued improvement of the statewide geodatabase is a top priority. Data quality can be directly linked to the ability of the KSBI team to engage the broadband provider industry and build long-lasting relationships. The following provider outreach activities are therefore planned for the coming months:

- Provider feedback package - upon acceptance of the October, 2012 data submission by the NTIA, the revised data will be made accessible via the interactive mapping component of the provider portal. This provides a great mechanism for maintaining communication between data submission cycles, offering an easy way for providers to review the information submitted on their behalf.
- MATSS Conference - DASC staff will present a booth display at the upcoming Mid-America Telecom Showcase & Seminar to be held October 22-24 in Kansas City, MO. Broadband service providers and industry suppliers attend this conference. The booth display will feature information on the KSBI, provide information on data collection and mapping efforts, and demonstrate the provider portal and public web mapping applications.
- Industry Roundtable Meeting/ROC Conference - the next industry roundtable meeting will be held in association with Governor’s Rural Opportunities Conference in November. Two breakout sessions dedicated to the KSBI, and an interactive booth display, are also on the agenda.
- Data Submission Webinars - In preparation for the April, 2013 data submission, the KSBI team will hold webinars to review data requirements, discuss technical issues, and answer questions regarding the data-collection process.

The following enhancements are planned for the public web-mapping application:

- Integration of demographic map views
- Development of a light version of the public web mapping application
- Integration of broadband maps into ArcGIS Online
- User feedback meetings, planned for later this fall, will also help direct future application enhancements

CAI Data Enhancements - the CAI data layer will be maintained and improved through the integration of authoritative datasets from state agencies. DASC also plans to work with the State Librarian, Kansas State Hospital Association, KanEd, and other groups to acquire additional contextual information regarding broadband service for CAI locations.

Data Validation:

- Research utility of third party datasets, particularly those used in the National Broadband Map Data Quality Assessment, as a validation mechanism
- Maintain provider web site harvesting activity
- Comparison of consumer speed test results against current broadband geodatabase

The KSBI team has established solid working relationships with many providers across the state and will to continue to develop these relationships through upcoming outreach activities.

Appendix A – Service Provider Status Table

Provider	DBA Name	FRN	NDA	State Database Status	Reporting Period Status
TC Wireless, Inc.	Advantage Plus	0018587469	Yes	Data Included in KS State Submission	No updates this reporting period
Allegiance Communications, LLC	Allegiance CATV	0010267862	No	Data Included in KS State Submission	No response to recent data request
AT&T Mobility LLC	AT&T Mobility LLC	0004979233	Yes	Data Included in KS State Submission	Updates included this reporting period
AT&T Communications of Texas, Inc	AT&T Southwest	0016657918	Yes	Data Included in KS State Submission	Updates included this reporting period
Atwood Cable Systems, Inc.	Atwood Cable Systems, Inc.	0003789765	No	Data Included in KS State Submission	No response to recent data request
Blue Valley Tele-Communications, Inc.	Blue Valley Tele-Communications, Inc.	0002331262	Yes	Data Included in KS State Submission	Updates included this reporting period
Haug Communications, Inc.	BroadBand Wireless Internet	0005600242	Yes	Data Included in KS State Submission	No updates this reporting period
Benson Tel Service Inc.	Btsskynet.net	0018562207	No	Data Included in KS State Submission	No response to recent data request
Benkelman Telephone Company	BWTelcom	0002387264	Yes	Data Included in KS State Submission	No updates this reporting period
Cable ONE	Cable ONE	0003474327	Yes	Data Included in KS State Submission	No response to recent data request
CenturyTel, Inc.	CenturyLink	0018626853	Yes	Data Included in KS State Submission	Updates included this reporting period
City of Chanute	City of Chanute	0002295400	Yes	Data Included in KS State Submission	No updates this reporting period
City of Coffeyville	City of Coffeyville	0018535427	No	Data Included in KS State Submission	No response to recent data request
Clearwire Corporation	Clear	0017775628	No	Data Included in KS State Submission	Updates included this reporting period
	Cogent Communications, Inc.	0019066034	No	Non-Responsive	No response to recent data request
Columbus Telephone Company	Columbus Telephone Company	0003734167	Yes	Data Included in KS State Submission	No updates this reporting period
Comcast Cable Communications, LLC.	Comcast	0004441663	Yes	Data Included in KS State Submission	No updates this reporting period
Conterra Telecom Services	Conterra Ultra	0009750324	No	Data Included in KS State Submission	No updates this reporting period
DIECA Communications, Inc.	Covad Communications Company	0003753753	Yes	Data Included in KS State Submission	Updates included this reporting period
CoxCom Inc.	Cox Communications	0001524461	Yes	Data Included in KS State Submission	No updates this reporting period
Craw-Kan Telephone Cooperative, Inc.	Craw-Kan Telephone Cooperative, Inc.	0002334225	Yes	Data Included in KS State Submission	Updates included this reporting period
Leap Wireless International, Inc.	Cricket Communications, Inc.	0002963528	Yes	Data Included in KS State Submission	Updates included this reporting period
Cunningham Communications, Inc.	Cunningham Telephone & Cable	0004985818	Yes	Data Included in KS State Submission	No updates this reporting period
Diller Telephone Company	Diller Telephone Company	0002393379	Yes	Data Included in KS State Submission	Updates included this reporting period
DISH Network Corporation	DISH Network Corporation	0010500338	No	Data Included in KS State Submission	No updates this reporting period
Eagle Communications, Inc.	Eagle Communications, Inc.	0013339973	Yes	Data Included in KS State Submission	Updates included this reporting period

Elkhart Telephone Company, Inc.	Epic Touch Company, Inc.	0002330843	Yes	Data Included in KS State Submission	Updates included this reporting period
FairPoint Missouri, Inc.	FairPoint Communications	0014710388	Yes	Data Included in KS State Submission	No updates this reporting period
Rural Link	FairPoint Communications	0014710388	Yes	Data Included in KS State Submission	No updates this reporting period
Sunflower Telephone Co., Inc.	FairPoint Communications	0003723236	Yes	Data Included in KS State Submission	No updates this reporting period
Bluestem Telephone Company	FairPoint Communications	0003723491	Yes	Data Included in KS State Submission	Updates included this reporting period
GBT Communications	GBT Communications	0012141842	No	Data Included in KS State Submission	Updates included this reporting period
Giant Communications, Inc.	Giant Communications	0008830846	No	Data Included in KS State Submission	No response to recent data request
Gorham Telephone Company, Inc.	Gorham Telephone Company	0004322889	Yes	Data Included in KS State Submission	Updates included this reporting period
H&B Cable Service, Inc.	H&B Communications, Inc.	0002331601	Yes	Data Included in KS State Submission	Updates included this reporting period
H&B Cable Service, Inc.	H&B Communications, Inc.	0003764545	Yes	Data Included in KS State Submission	Updates included this reporting period
Haviland Telephone Company, Inc.	Haviland Telephone Company, Inc.	0005081567	Yes	Data Included in KS State Submission	No updates this reporting period
Home Communications, Inc.	Home Telephone Company, Inc.	0010627446	Yes	Data Included in KS State Submission	Updates included this reporting period
Hughes Network Systems, LLC	Hughes Network Systems, LLC	0017434911	No	Data Included in KS State Submission	No updates this reporting period
JBN Telephone Company, Inc.	JBN Telephone Company, Inc.	0004340410	No	Data Included in KS State Submission	No response to recent data request
KanOkla Communications, Inc.	KanOkla Networks	0002323731	Yes	Data Included in KS State Submission	No updates this reporting period
The KanOkla Telephone Association, Inc.	KanOkla Networks	0004362364	Yes	Data Included in KS State Submission	No updates this reporting period
Kansas Broadband Internet, Inc.	Kansas Broadband Internet, Inc.	0016893455	No	Data Included in KS State Submission	No response to recent data request
Kansas Data Internet, Inc.	KASINET	9999	No	Data Included in KS State Submission	No updates this reporting period
Knology of Kansas, Inc.	Knology of Kansas, Inc.	0020113197	No	Data Included in KS State Submission	No updates this reporting period
LaHarpe Telephone Company, Inc.	LaHarpe Telephone Company, Inc.	0004322053	No	Data Included in KS State Submission	Updates included this reporting period
Lawrence Freenet	Lawrence Freenet	0014524193	No	Data Included in KS State Submission	Will Not Provide Data
Madison Telephone LLC	Madison Telephone LLC	0004322079	No	Data Included in KS State Submission	Updates included this reporting period
Mediacom	MCC Missouri LLC	0005184247	Yes	Data Included in KS State Submission	No updates this reporting period
Mercury Wireless, LLC	Mercury Wireless, LLC	0018603027	Yes	Data Included in KS State Submission	Updates included this reporting period
St. Joe Wireless	Midwest Mobile Radio Service, Inc.	0002545929	Yes	Data Included in KS State Submission	Updates included this reporting period
	MOBIL1.NET	9999	No	Will Not Provide Data	Will Not Provide Data
Moundridge Telephone Company, Inc.	Moundridge Telephone Company, Inc.	0002339976	Yes	Data Included in KS State Submission	Updates included this reporting period
LR Communications, Inc.	Mutual Telecommunications	0014024640	Yes	Data Included in KS State Submission	Updates included this reporting period

Nautilus Net	Nautilus Net	9999	No	Data Included in KS State Submission	No updates this reporting period
North Central Kansas Community Network	NCKCN	9999	Yes	Data Included in KS State Submission	Updates included this reporting period
Nex-Tech, Inc.	Nex-Tech, Inc.	0017125808	Yes	Data Included in KS State Submission	Updates included this reporting period
	PAETEC Communications, Inc.	0003744869	No	Non-responsive	No response to recent data request
Peoples Telecommunications, LLC	Peoples Telecommunications, LLC	0004310694	Yes	Data Included in KS State Submission	No updates this reporting period
Pioneer Telephone Association, Inc.	Pioneer Communications	0002334795	Yes	Data Included in KS State Submission	Updates included this reporting period
Pixius Communications LLC	Pixius Communications	0019389949	No	Data Included in KS State Submission	Updates included this reporting period
Carson Communications	Rainbow Communications	0000013722	Yes	Data Included in KS State Submission	No updates this reporting period
Rainbow Telecommunications Association, Inc.	Rainbow Communications	0002333649	Yes	Data Included in KS State Submission	No updates this reporting period
Rebeltec Communications LLC	Rebeltec Communications LLC	0016084675	Yes	Data Included in KS State Submission	No updates this reporting period
Rural Telephone Service Company, Inc.	Rural Telephone	0002336105	Yes	Data Included in KS State Submission	Updates included this reporting period
Nex-Tech, Inc.	Rural Telephone	0006192041	Yes	Data Included in KS State Submission	Updates included this reporting period
S&A Telephone Company, Inc.	S&A Telephone Company, Inc.	0002329662	Yes	Data Included in KS State Submission	Updates included this reporting period
S&T Communications LLC	S&T Communications	0002285260	Yes	Data Included in KS State Submission	Updates included this reporting period
S&T Communications LLC	S&T Communications	0008460081	Yes	Data Included in KS State Submission	Updates included this reporting period
South Central Wireless, Inc.	SCTelcom	0003771169	Yes	Data Included in KS State Submission	Updates included this reporting period
South Central Telephone Assn., Inc.	SCTelcom	0003771235	Yes	Data Included in KS State Submission	Updates included this reporting period
Skycasters	Skycasters	0018756155	Yes	Data Included in KS State Submission	Updates included this reporting period
Southeast Nebraska Communications, Inc.	Southeast Nebraska Telephone Company	0006764948	Yes	Data Included in KS State Submission	No updates this reporting period
Southern Kansas Telephone Company, Inc.	Southern Kansas Telephone Company, Inc.	0002333888	Yes	Data Included in KS State Submission	No updates this reporting period
SWKO, Inc.	SouthWest Kansas Online	0020608121	No	Data Included in KS State Submission	No updates this reporting period
KeyOn Communications, Inc.	SpeedNet	0015082621	No	Data Included in KS State Submission	No response to recent data request
Sprint Nextel Corporation	Sprint	0003774593	Yes	Data Included in KS State Submission	Updates included this reporting period
Spacenet, Inc.	Starband Communications, Inc.	0005087457	No	Data Included in KS State Submission	Updates included this reporting period
Stelera Wireless, LLC	Stelera Broadband	0015021066	No	Data Included in KS State Submission	No updates this reporting period
Stouffer Communications, Inc.	Stouffer Communications	0006716666	No	Data Included in KS State Submission	No response to recent data request
NPG Cable, LLC	Suddenlink Communications	0200399200	Yes	Data Included in KS State Submission	Updates included this reporting period
Friendship Cable of Arkansas, Inc.	Suddenlink Communications	0004999025	Yes	Data Included in KS State Submission	Updates included this reporting period

W.K. Communications, Inc.	Suddenlink Communications	0004999736	Yes	Data Included in KS State Submission	Updates included this reporting period
Sumner Cable TV, Inc.	Sumner Communications	0007631187	Yes	Data Included in KS State Submission	Updates included this reporting period
	SureWest Kansas Operations, LLC	0143027194	Yes	Will Provide Data	Data expected next reporting period
SwiftLink Communications	SwiftLink Communications	0018595439	No	Data Included in KS State Submission	No response to recent data request
The Tri-County Telephone Association	The Tri-County Telephone Association	0001630433	Yes	Data Included in KS State Submission	No updates this reporting period
Time Warner Cable LLC	Time Warner Cable	0013430244	Yes	Data Included in KS State Submission	No updates this reporting period
T-Mobile USA, Inc.	T-Mobile	0006945950	Yes	Data Included in KS State Submission	Updates included this reporting period
Totah Communications, Inc.	Totah Communications, Inc.	0005010996	Yes	Data Included in KS State Submission	Updates included this reporting period
Mokan Dial, Inc.	Townes Telecommunications Services Company	0004928750	Yes	Data Included in KS State Submission	No updates this reporting period
Twin Valley Communications, Inc.	Twin Valley Communications, Inc.	0010059640	Yes	Data Included in KS State Submission	Updates included this reporting period
Twin Valley Telephone, Inc.	Twin Valley Telephone, Inc.	0002334407	Yes	Data Included in KS State Submission	No updates this reporting period
Twinmounds.com	Twinmounds.com	0018333211	No	Data Included in KS State Submission	No updates this reporting period
United States Cellular Corporation	U.S. Cellular	0004372322	Yes	Data Included in KS State Submission	No updates this reporting period
United Communications Association, Inc.	United Communications Association	0002327153	Yes	Data Included in KS State Submission	Updates included this reporting period
United Wireless Communications, Inc.	United Wireless	0012662698	Yes	Data Included in KS State Submission	Updates included this reporting period
Valnet	Valnet	0018198572	Yes	Data Included in KS State Submission	Updates included this reporting period
Cellco Partnership and its Affiliated Entities	Verizon Wireless	0003290673	Yes	Data Included in KS State Submission	Updates included this reporting period
ViaSat, Inc.	ViaSat Communications, Inc.	0007843766	No	Data Included in KS State Submission	Updates included this reporting period
Wamego Telecommunications Company, Inc.	Wamego Telecommunications Company, Inc.	0003746088	Yes	Data Included in KS State Submission	Updates included this reporting period
Wave Wireless LLC	Wave Wireless LLC	0018057257	No	Data Included in KS State Submission	No updates this reporting period
Wheat State Telephone, Inc.	Wheat State Telephone, Inc.	0002333672	No	Data Included in KS State Submission	No updates this reporting period
Wheatland Broadband Services	Wheatland Broadband	0006121354	Yes	Data Included in KS State Submission	Updates included this reporting period
Ideatek Systems Inc.	Wildflower Internet	0016098857	No	Data Included in KS State Submission	Updates included this reporting period
Wilson Telephone Company, Inc.	Wilson Telephone Company, Inc.	0003722444	Yes	Data Included in KS State Submission	No updates this reporting period
Windjammer Communications LLC	Windjammer Cable	0017915182	No	Data Included in KS State Submission	No updates this reporting period
WISP-Router, Inc	WISP-Router, Inc	0016099509	Yes	Data Included in KS State Submission	Updates included this reporting period
	Zayo Group, LLC	0019133826	No	Non-Responsive	No response to recent data request
Zito Midwest, LLC	Zito Media	0020111225	No	Data Included in KS State Submission	No response to recent data request

DATA DEVELOPMENT & VALIDATION METHODOLOGIES WHITE PAPER

Commonwealth of Kentucky
State Broadband Initiative (SBI)
Broadband Mapping Project

COMMONWEALTH OFFICE OF BROADBAND OUTREACH AND DEVELOPMENT
Promoting a 21st century economy

NTIA Data Submittal
October 1, 2012

Baker

Table of Contents

Table of Figures

Appendices

Introduction

The following sections of this document provide an overview of the process used for the SBI Broadband Mapping data development for the Commonwealth of Kentucky. The following narrative is depicted in Appendix A, Commonwealth of Kentucky SBI Process Workflow, and Appendix B, State Broadband Data Validation Workflow, included at the end of this document.

Broadband Provider Outreach Results

As a result of the outreach to broadband providers and investigating whether an internet service provider (ISP) meets the definition of a broadband provider as per the NOFA, the following is a summary of our findings:

- 215 Total Investigated ISPs
- 112 Total Confirmed Broadband Service Providers (unique Provider/DBA combinations)
- 120 Broadband Service Providers who Supplied Data (unique Provider/DBA combinations)
- 10 Total Confirmed Broadband Service Resellers (unique Provider/DBA combinations)
- 2 Broadband Service Resellers who Supplied Data (unique Provider/DBA combinations)

Attachment C, Master Outreach List, contains additional provider information.

Broadband Provider Outreach Procedure

The following outreach procedure provides the framework for communicating with Broadband Service Providers (Providers). The primary goals of the outreach approach documented herein are to:

- Promote Provider understanding and acceptance of the Broadband Mapping process, results and benefits
- Clarify NTIA Broadband Mapping requirements
- Facilitate data confidentiality agreements as required
- Minimize the submittal of invalid data
- Enhance provider understanding of the semi-annual update process
- Work with Providers to evaluate submittal options to facilitate data submittals

Data Submission Guidelines

Guidelines for the providers' submission of Broadband Mapping Data are documented in the "Data Submission Guidelines". These Guidelines define technical requirements, submission specifications, and coordination and documentation activities.

Kentucky Broadband Providers Website

A URL was deployed (http://www.bakergis.com/kyBroadbandProvider/) to communicate and distribute NTIA NOFA requirements to providers along with outreach and data submittal materials including:

- NTIA NOFA and subsequent clarification
- Outreach letters to providers
- Non-Disclosure Agreement

- Quick Start Guides
- Data Submission Guidelines
- Data Transmittal Letter
- Broadband Data Submittal Templates
- Census TIGER Data
- Data Submittal Assistance Contact Information

Outreach Delivery Vehicles

- A State Broadband Mapping Initiative Call for Data letter from the Kentucky Commonwealth Office of Technology (COT) was emailed to all Broadband Service Providers in the Commonwealth. This initial provider contact letter described the program and the role of Michael baker Jr., Inc. (Baker) acting on behalf of the COT for Broadband Data Collection and Mapping.
- Baker distributed a follow-up letter to all Providers describing the data submittal requirements and material and help available to aid with the data submittals.
- Submittal assistance was provided to providers that needed help with data submittals.
- Presentations were conducted with various broadband provider associations to present the data submittal requirements and answer questions.
- Email communication and electronic transfer of data was encouraged to facilitate a faster delivery of data and information.
- A URL was deployed and promoted to distribute outreach material and information concerning the Broadband Mapping Project.
- A secure FTP URL was provided for submittal of broadband data by providers.
- A secure Broadband Provider Data Update Webportal was deployed for providers to redline/update their service coverage, rather than supply their updated coverage for the semi-annual data updates.

Inclusion of Resellers

With the request for data current as of December 31, 2011, resellers are being included in all of the outreach, data collection, data aggregation, and verification tasks. The following reseller outreach form has been developed to secure the proper information and to minimize the resource commitment required by the reseller.

Reseller Information

R4- 07/25

Reseller Name:

D/B/A Name (If applicable) :

FCC Registration Number ("FRN") (If applicable) :

Web Site Address:

Reselling Broadband Service for the following Organization(s):
(List all carriers you represent)

Do you resell services for the entire area of each carrier above? ☐ Yes ☐ No

If no, indicate what area(s) you resell broadband services (List counties or Cities):

Technology of Transmission (Check all that apply):

☐ Assymmetric xDSL (ADSL)	☐ Symmetric xDSL (SDSL)
☐ Cable Modem – DOCSIS 3.0	☐ Other Copper Wire
☐ Cable Modem - Other	☐ Optical Carrier/Fiber to End User
☐ Terrestrial Fixed Wireless – Unlicensed	☐ Satellite
☐ Terrestrial Fixed Wireless - Licensed	☐ Terrestrial Mobile Wireless
☐ Electric Power Line	☐ Other

Speed Tiers (See info on next page) :

What is the fastest Broadband service plan ("Max") you offer, and what service plan ("Typical") do customers normally buy each month. To see the speed categories, turn to page 2 of this form.

Max Adv Down: ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10 ☐11

Max Adv Up: ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10 ☐11

Typical Adv Down: ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10 ☐11

Typical Adv Up: ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10 ☐11

Middle Mile Equipment (for each Carrier): ☐ Owned ☐ Leased

Does your company own or lease any equipment related to the Broadband service for the Carriers you sell?

Latitude/Longitude or Location Address:

Facility Type: ☐Fiber ☐Copper ☐Hybrid Fiber Coax ☐ Wireless

Facility Capacity (see page 2 of this form): ☐1 ☐2 ☐3 ☐4 ☐5 ☐6

Elevation: ____ Feet above or below grade (nearest foot)

Speed Tier Codes:

Upload Speed Tier Code	Download Speed Tier Code	Description
1	--	Less than or equal to 200 kbps
2	--	Greater than 200 kbps and less than 768 kbps
3	3	Greater than 768 kbps and less than 1.5 mbps
4	4	Greater than 1.5 mbps and less than 3 mbps
5	5	Greater than 3 mbps and less than 6 mbps
6	6	Greater than 6 mbps and less than 10mbps
7	7	Greater than 10 mbps and less than 25 mbps
8	8	Greater than 25 mbps and less than 50 mbps
9	9	Greater than 50 mbps and less than 100 mbps
10	10	Greater than 100 mbps and less than 1 gbps
11	11	Greater than or equal to 1gbps

Middle Mile Serving Facility Codes:

Data Rates Code	Interconnection Point Data Rate
1	Multiple T1s and less than 40 mbps
2	Greater than 40 mbps and less than 150 mbps
3	Greater than 150 kbps and less than 600 mbps
4	Greater than 600 mbps and less than 2.4 gbps
5	Greater than 2.4 gbps and less than 10 gbps
6	Greater than or equal to 10 gbps

Figure 1 Reseller Outreach/Interview Form

Secure Broadband Provider Data Update Webportal

A secure web-based application for broadband service providers has been deployed to simplify and automate the semi-annual process for collecting and verifying data. The webportal provides an easy-to-use map redlining tool for updating a provider broadband service area and attributes. It is expected that the simplification and automation of the data collection process will increase participation and improve the timeliness of provider response, data accuracy and consistency. Providers are being encouraged to utilize this tool but data is still being accepted through other means and formats.

Figure 2 Provider Data Update Webportal Entry Page

The View/Edit Coverage Map functions via secure login/password and secured map services limit broadband providers to see and edit only their own data. Picklists of valid database attributes eliminate entry errors and create consistency. It also contains a workflow from initial provider input, saving of a provider's work-in-progress, provider formally submitting edits, aggregation into the master geodatabase, soliciting provider approval of aggregated data, and final approval of the edit.

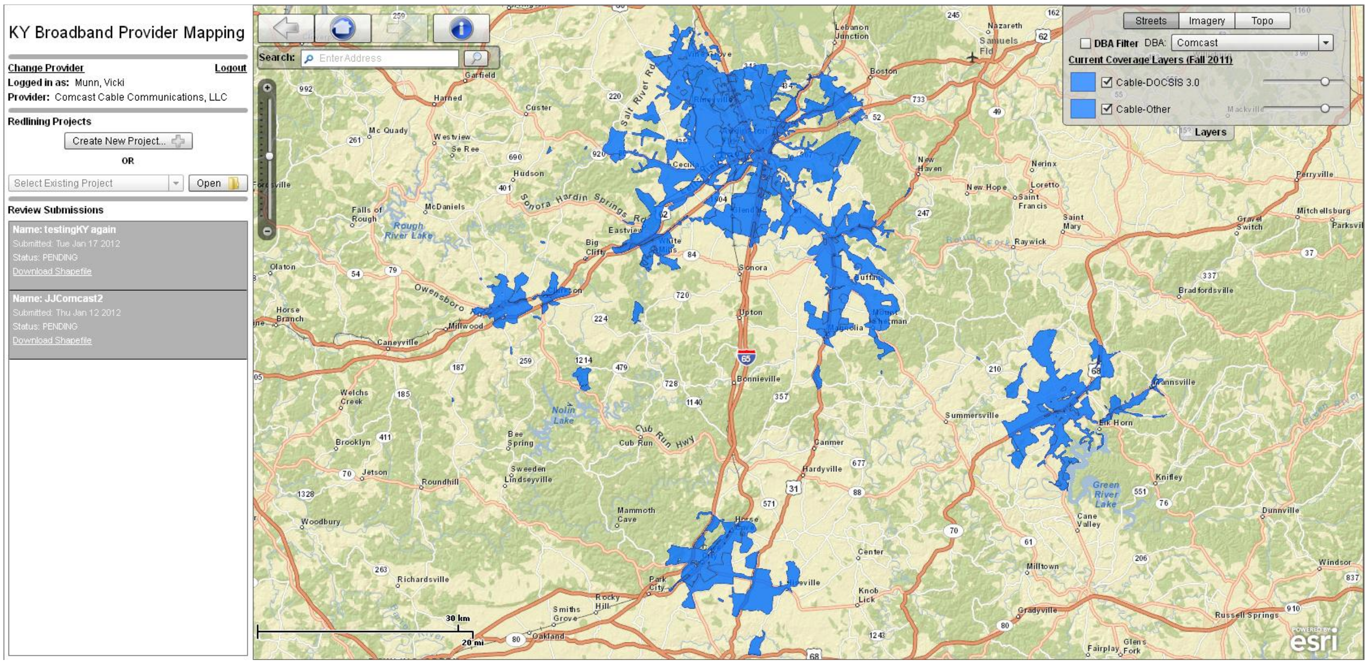


Figure 3 Provider Data Update Webportal –View/Edit Coverage Map Environment

Broadband Outreach Tracker

The Tracker application (
Figure 4) is utilized to collect all correspondence with Providers and feedback on the effectiveness of the outreach activities by tracking items such as:

- The number and content of incoming e-mails and letters submitted from the Providers
- The number and source of comments, questions, and suggestions made by Providers
- The number and source of comments, questions, and suggestions made by attendees at Provider meetings and conference calls
- Provider contact information and data submittal status.

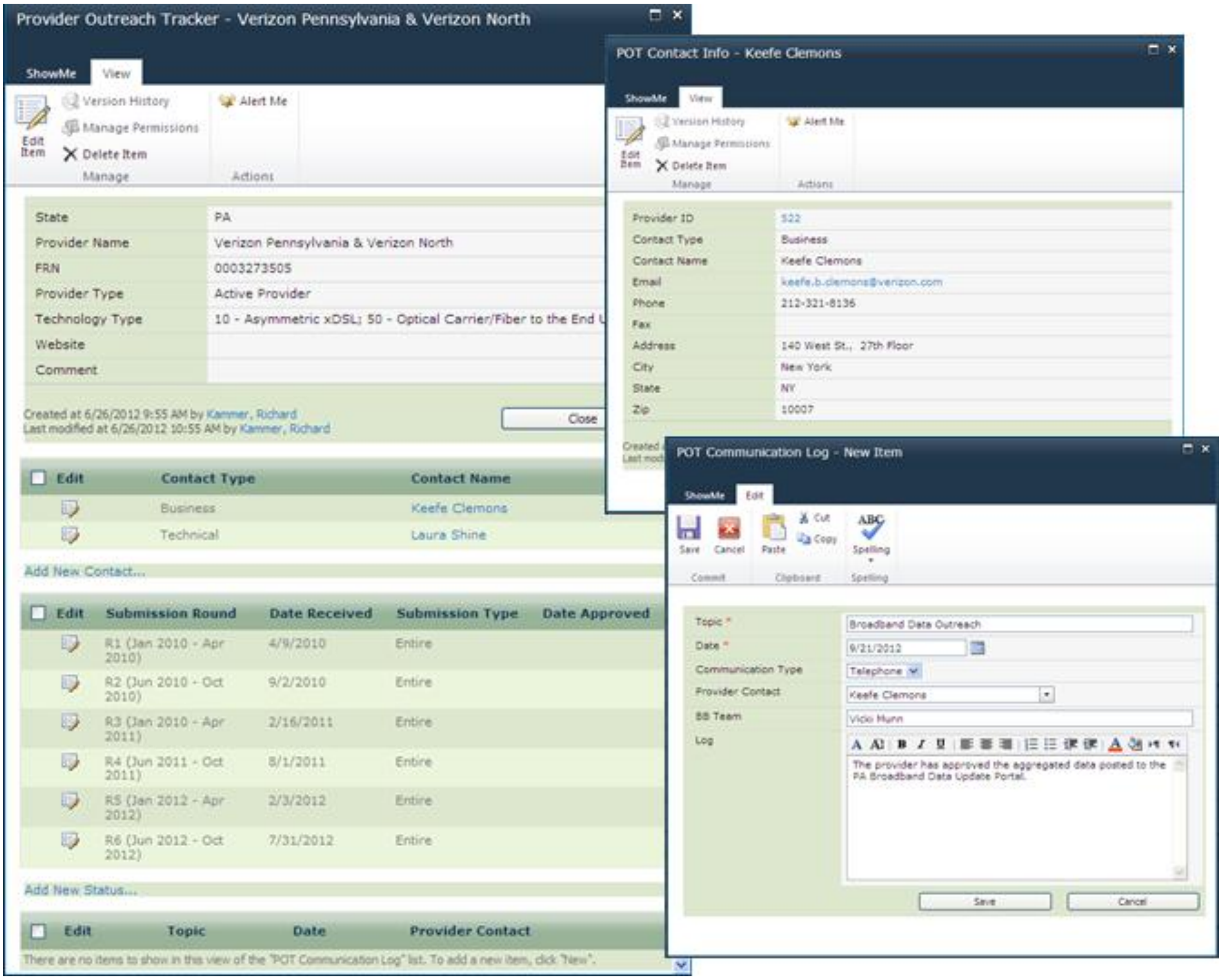


Figure 4 Broadband Outreach Tracker

Provider Submittal Validation

When a data submittal is received from a broadband service provider it is updated in the Broadband Outreach Tracker and run through an initial validation process to assure that it meets the submittal guidelines.

Validation Checklist

The following items are part of this initial data validation process:

- Verify the provider Transmittal Letter is complete and matches submitted data
- Verify the file naming conventions
- Verify each file is machine readable
- Verify data is in the correct GIS or Tabular format/file type
- Verify each field is populated and no empty or NULL values are present for mandatory fields
- Verify all ID (record number points) are unique within the submittal
- Verify all attribute data is formatted according to the submittal guidelines

- Verify topology for all geospatial submissions
- Verify Metadata for all submissions
- Verify the required contact information is included
- Verify adherence to Data Submittal Guidelines (see http://www.bakergis.com/kyBroadbandProvider/ to access Data Submittal Guidelines)
  Broadband Service Availability (at least one)
  - Individual Street Addresses (Sec 3.1 & 4.1)
  - Census Blocks < 2 sq mi (3.3 & 4.3)
  - Street Segments for Census Blocks > 2 sq mi (3.2 & 4.2)
  - Service Overview (Sec 3.4 & 4.4)
  - Polygonal Boundary Area(s) (Sec 3.8 & 4.8)

  Middle-mile Points (Sec 3.5 & 4.5)
  Community Anchor Institutions (Sec 3.7 & 4.7)
  Last Mile Connection Points (Sec 3.6 & 4.6)
  WISP Antennas (Sec 4.9)

Data Usability Determination

The validation results are evaluated by the outreach and aggregation persons to determine the usability of the data. If the data meets the submission specifications, it is forwarded on for data aggregation. If it is determined to be unusable, it is returned to the provider for resolution. If the data can be manipulated to get it into a usable format, it is manipulated as required, and then forwarded on for data aggregation.

SBI Data Development

Data from the providers may be submitted in various formats as defined in the Data Submittal Guidelines, or in some cases unspecified formats may be accepted to help facilitate provider participation. Depending on the format of the submitted data, it is processed through one of the following processes to upgrade it to the NTIA SBI data standards.

Spatial Data

After validation and any required manipulation of any spatial data submitted by the providers, it is georeferenced and simply loaded into the appropriate NTIA geodatabase feature class.

Address Data Geocoding

If not already in the standard address point template, the provider tabular address data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. ArcGIS geocoding tools are then utilized geospatially locate the address points for the tabular records. Interactive address rematching is performed against two additional street centerline datasets as needed to increase geocoding matching results. The NTIA deliverable is the geocoded address point geodatabase table. The geocoded address points are also subsequently aggregated to the census block or road segment feature class for public web map display.

Census Block Aggregation

If not already in the standard census block template, the provider tabular census block data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The provider tabular census block records are then joined to the geodatabase 2010 U.S. Census Block. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination. The NTIA deliverable is the census block geodatabase table.

If the list of census blocks contains blocks > 2 sq. miles then these blocks are used to select all the 2010 U.S. Census TIGER centerlines that intersect those blocks. The Census Block record data is aggregated to each Road Segment within the Census Block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination.

Road Segment Aggregation

If not already in the standard road segment template, the provider road segment data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. If the provider submittal included graphic centerline segments, these are migrated into the delivery geodatabase along with the linked attribute records. If the provider submittal was tabular road segment records only, they are then joined to the geodatabase 2010 U.S. Census TIGER centerline feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

If the provider road segment data lie within census blocks <= 2 sq. miles then the road segment data is aggregated to the census block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

Overview Data Aggregation

Provider Service Availability Areas submitted for entire county areas are loaded into the NTIA geodatabase Overview table. If not already in the standard template, the provider data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The Provider Overview records are then joined to the geodatabase 2010 U.S. Census County feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination.

Polygonal Boundary Aggregation/Integration

Providers submitting polygonal service area data are handled in two ways. Wireline Provider data is aggregated to the census block feature class for areas where census blocks <= 2 sq. mi., or road segment feature class for areas where census blocks > 2 sq. mi. Wireless Provider Service Availability Areas submitted by polygonal area are simply loaded into the NTIA geodatabase Poly_Bndry feature class.

Wireline Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Depending on the area, census blocks < or => 2 sq. mi., a selection set of either census blocks or road segments that intersect the polygon boundary is created. The attributed polygon boundary is then joined with census blocks or road segments table to attribute accordingly. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination. The NTIA deliverable is the census block or road segment geodatabase table.

Wireless Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Multiple Poly_Bndry records are created for multiple Trans Tech values for each Provider. The NTIA deliverable is the polygon boundary geodatabase table.

Middle/Last Mile Data Integration

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. The NTIA deliverable is the middle or last mile geodatabase table.

Community Anchor Institution Integration

Providers supplied some Community Anchor Institution (CAI) data with the data submittals. But the majority of the data was collected from existing GIS Layers maintained by the COT on their KYGEONET public website. Some of the data was collected by outreaching to CAIs through state agencies and their contacts, and having CAIs complete an online survey at http://www.bakerbb.com/ky_institution_survey/.

Provider CAIs

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. Address data is used to geocode locations only when Lat/Long data is not provided.

Commonwealth CAIs

CAI shapefiles were downloaded from the KYGEONET website. The shapefiles were then exported to the NTIA geodatabase CAI feature class. Various sources for obtaining broadband information for the CAIs were utilized. Various state agencies provided some of the information, i.e.; Council on Post Secondary Education (CPE) provided tabular broadband information for schools and libraries and COT provided tabular broadband information for health departments. A CAI data survey website was also deployed and the URL distributed by various state agencies to the CAI contacts. Data from all of these sources were then aggregated into the CAI geodatabase table for the NTIA deliverable.

Typical Speeds from Other Sources

Because not all providers are submitting the typical speed attribution with their data, a method to fill in the missing information has been developed using other sources. The method utilizes speed test data supplied through the FCC speed test information as well as from other speed test data that we are independently collecting. Business rules have been established so quality and realistic typical speeds are produced. The end result is a more complete data submittal to NTIA.

Propagation Modeling

Fixed wireless broadband transmission is a diverse technology. Service may be transmitted over licensed and unlicensed spectrum, and delivered by larger corporate or smaller LLC business entities, many of which serve rural areas of the State. This diversity has resulted in varying levels of SBI participation including Providers that have:

- participated,
- refused to participate,
- wished to participate but lack adequate capabilities and/or tools, or
- supplied data of marginal accuracy

The NTIA's supplemental grant funding has provided the means to generate propagation models to supplement and validate the above scenarios. In addition, the NTIA has identified fixed wireless service coverages with unusual shapes for state grantee analysis.

To facilitate development of propagation mapping, additional tower/antenna information is being requested from fixed wireless broadband providers. For those providers not responding to requests for required tower/antenna information, an attempt is made to gather the information through 3^{rd} party sources and field investigation. The Provider, 3^{rd} party and/or field data is processed using Terrain Analysis Package (TAP) software to develop propagation models. Maps of the resultant propagation study are sent to the fixed wireless providers for their feedback on the propagation model produced for their company.

Data Verification Summary

Kentucky's broadband mapping project employs a multi-prong approach to ensure the provider data is accurate and complete.

In summary, the project employs the following validation methodologies and resources:

- Provider Validation
- Data Validation via Market Intelligence Sources
- Data Validation Using State Supplied Data Points
- Field Validation
- Wireless Coverage Analysis
- Topology Validation
- Automated Validation Processing
- Confidence Level/Statistical Modeling
- SBDD Check Submission
- Stakeholder Validation

The remainder of this verification section describes the various methods in greater detail.

Provider Validation

After data development, service availability maps are generated and submitted to the providers to validate their mapping results. This provides a "sign off" on the interpretation of the submitted data and extends the outreach efforts by providing a visual representation of the data to be delivered to the State and the NTIA.

Types of Provider Maps

Provider maps generally consist of the following types.

Outreach Maps

Often, providers will send data which does not contain all the information needed for a NTIA compliant dataset. In such cases, as an aid to the outreach communication, it may be necessary to produce a map to help the provider locate their service area or verify data they have provided. These maps may take many forms, but generally are of two types:

- General Location Maps – these maps are often produced when the provider does not have a list of address or other standard submittal data and needs help defining their service area. A typical map will show counties, major roads, and towns of the general area the provider has stated as their service area. The intent of the map is to give the provider a way to markup or delineate their service area. If a provider has not provided required attribute information such as Technology of Transmission, Speed Data, etc. then it may be necessary to add a visual clue to this data like an information stamp on the map that they can easily fill out. If the provider sends the map back with a service area boundary, this can then be digitized and sent back to the provider for verification.
- Verification of Provider Supplied Boundaries – these maps are produced when the provider has sent service area boundary information which is confusing or otherwise unclear. Often these are produced when providers send CAD maps, hand drawn maps that need digitization, or lists of zip codes or counties served. A typical map will place the interpreted boundary over a location map so the provider can verify the service area. As with the General Location Map, information stamps or other visual clues may be placed on the map.

Initial Verification Maps

Once the provider data has been processed and the census block and road segment feature classes created, an Initial Verification Map (Figure 5) is produced to give the provider a visual representation of their service area by census block. These maps enable the provider to verify their service area and make changes if necessary. Initial Verification Maps are produced using a set of standards and produced at the highest resolution necessary to convey the map information to the provider. Initial Verification Maps are also produced for Wireless Polygon areas.

Detailed Verification Maps

Providers who have questions about their service areas may request additional information to help clarify issues. In these cases it may be necessary to create a Detailed Verification Map to highlight the areas in question. Detailed Verification Maps provide the same information as Initial Verification Maps only at a higher resolution. Several maps may be needed to accurately portray an area in question.

Revised Maps

Revised maps take two forms:

- Initial or Detailed Verification Maps which have been annotated or marked-up by the provider
- Outreach produced Initial or Detailed Verification Maps incorporating provider changes

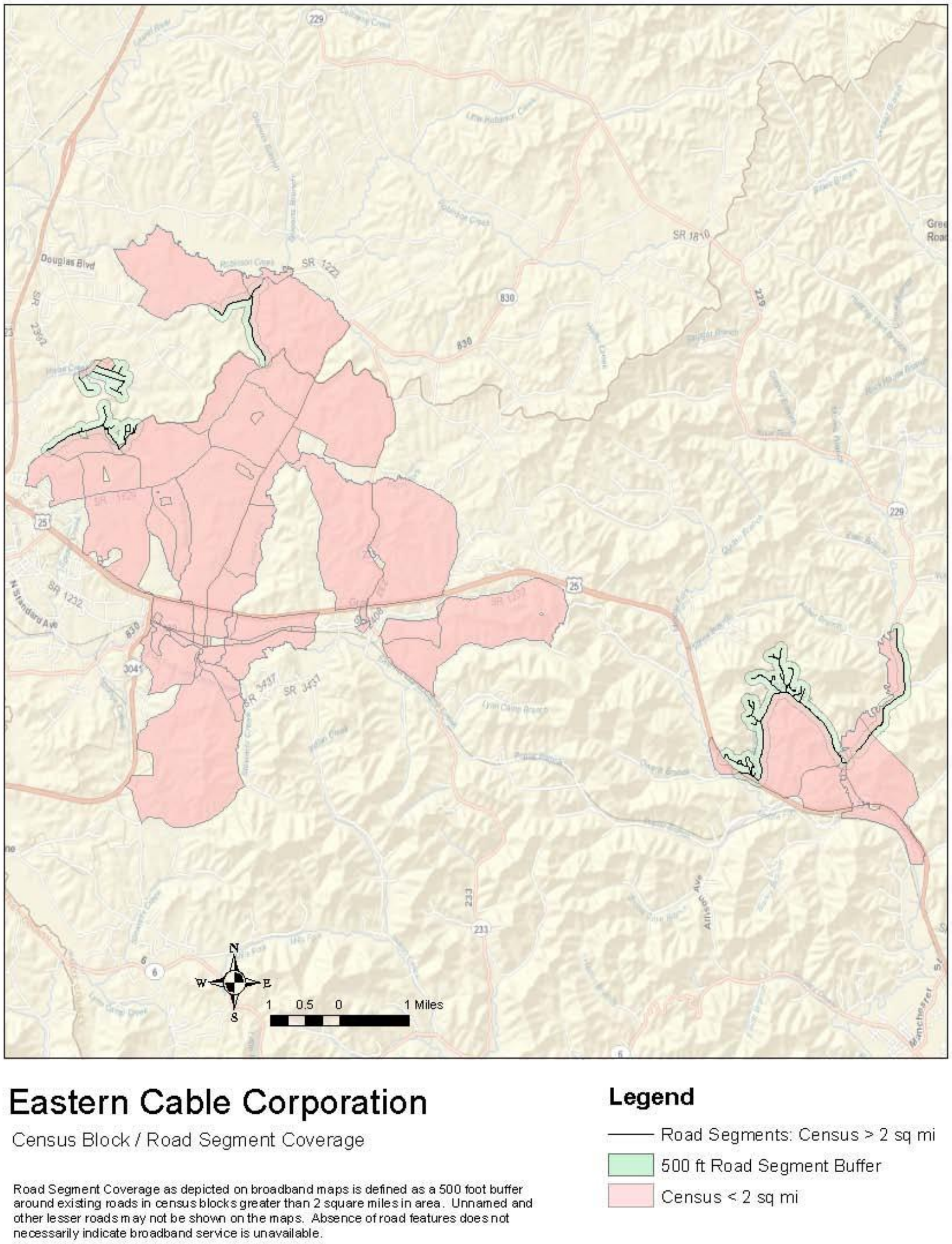


Figure 5 Provider Map

Data Validation

A critical component of the project is the validation of the data submitted by the broadband service providers. Data from various sources, as described in more detail in the following sections, is utilized to develop a level of confidence in the data received from the broadband providers.

Validation Data Set Collection and Development

This validation process employs data sets developed or acquired from different sources as described in the following sections.

Provider Feedback Loop: Maps of completed provider service areas and data are furnished back to the providers for confirmation of the processed/aggregated information. Feedback is integrated into the each Provider's dataset.

Broadband Market Analysis (BMA) Wireline Market Intelligence Data: Data is extracted from internal and commercial databases defining geographic service areas of telephone and cable companies and locations of central office (CO) switches and areas upgraded with fiber. The geographic areas are overlaid with Census demographic data on housing unit counts and density. The areas are then modified based on standard business practices for conducting service build-out and offering broadband service relative to housing density and other variables, such as distance from CO and other infrastructure elements, type of cable franchise (e.g., Census Place vs. Unincorporated County) This represents the first pass conservative estimate of coverage.

The above methods and data sources are supplemented by other data sources and methodologies, including: 1) connectivity data points acquired from InfoUSA that include ISP and type of connection (e.g., DSL, cable modem, dial-up, wireless, fiber) providing Internet service to specific geo-coded (i.e., by Latitude and Longitude) residential addresses; 2) web-based and telephone research, including address-level service-availability queries of web sites operated by service providers and independent entities. This multi-sourced MBA dataset is used as a validation source for provider service area coverage, Technology of Transmission, and Speed.

American Roamer Wireless Market Intelligence Data: Commercially available dataset used as an independent source to verify information submitted by Providers of wireless broadband service. This dataset is used as a validation source for provider service area coverage.

Online Public Survey and Speed Test: A Broadband Mapping Public Survey Site is deployed. Site visitors are requested to provide data on broadband availability, technology, service type (e.g., speed tier) service provider name; monthly prices paid and measured downstream and upstream speeds. In addition to State promotion via press releases to the general public, the State Council on Post Secondary Education (CPE) also promoting participation on this survey to the faculty and student population. This dataset is used as a validation source for provider service area coverage, Technology of Transmission, and Speed.

Prior Broadband Mapping: Statewide coverage areas for Cable, DSL, and Fixed Wireless providers that were aggregated as part of a previous broadband mapping effort for the Commonwealth of Kentucky are used to validate against Provider submitted data. In addition to the service areas, the DSL and Fixed Wireless layers contain general speed information that can be compared against Provider submitted data.

FCC Speed Test: The FCC speed test data includes the IP addresses for each specific speed test conducted. This IP address is queried against a web search engine to determine the Provider assigned to that address and is used as a validation source for provider service coverage and typical speeds.

Field Data Acquisition: Broadband technicians visited a sampling of census block locations to gather broadband data to be used for validation. The following criteria were taken into account when developing the census block sampling dataset:

- urban vs. rural census block characteristic
- censes block grouping
- land vs. water census block characteristic

The overarching mission of the Federal broadband stimulus program is to expand Broadband service to areas that are currently unserved and underserved. Also, the market intelligence validation sources typically represent some rural, but more urban areas. Thus, our field data collection efforts were targeted more towards the rural areas; split 90% rural, 10% urban.

Additionally, a study by Penn State University (Glasmeier 2002) notes that a large number of census block groups typically fit within any given cable or telephone company service areas. Therefore, our field sample was also based on selection of one census block per block group. The selected census block also had greater than 50% land area, versus water. There are a total of 3, 158 census block groups statewide. Using a statistical sample size calculator based upon the number of block groups in the state and +/- 4% margin of error at a 95% confidence level, the sample size is 529 census block locations (Figure 6).

For the 529 census blocks that were visited, 2455 individual wired/wireless data elements were recorded and 3024 pictures were taken at those locations. This field collected dataset is used as a validation source primarily for wireline and wireless technology of transmission and middle mile, and for wireless speed.

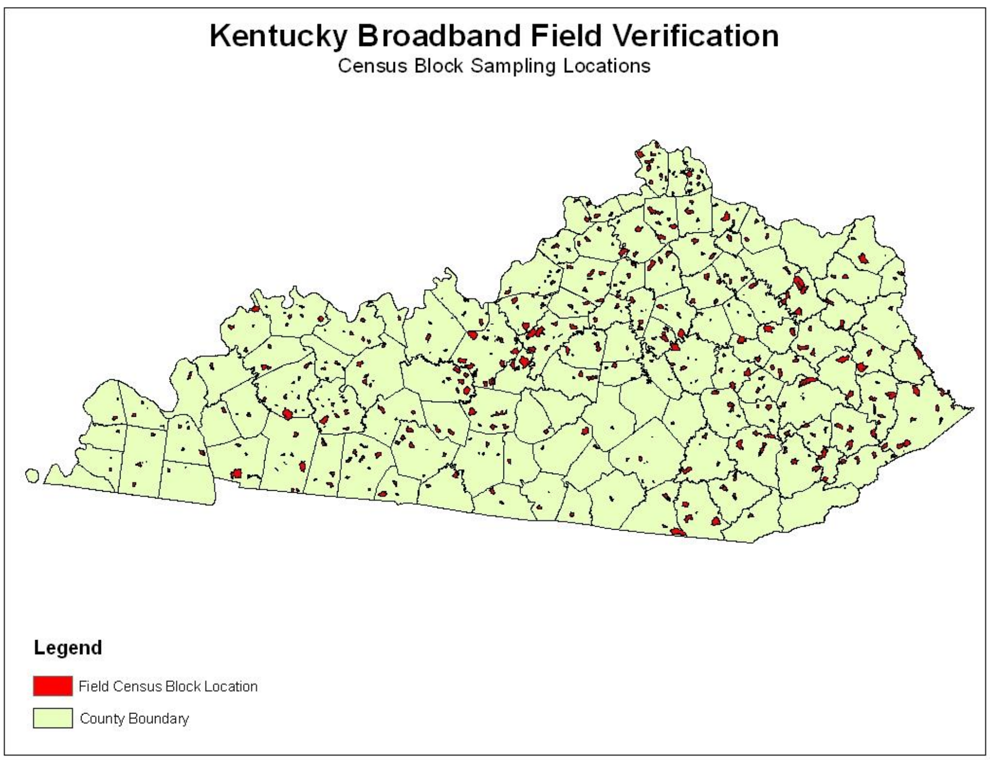


Figure 6 Field Verification Sampling Locations

For each census block in the sample set, broadband technicians collected data using Panasonic Toughbook computers, loaded with MapPoint mapping software, and a customized Microsoft Access data collection form with the ability to automatically import GPS coordinates. The sample census blocks were pre-loaded and directly accessible from MapPoint. Two types of data collection were conducted; infrastructure observation and wireless speed testing; and the results were recorded and linked to the corresponding field location coordinates within the designated sample census block. The information collected by the field broadband technicians includes:

Wireline:

- GPS coordinates
- circuit infrastructure feeding the area (copper, fiber, cable)
- collect site pictures

Wireless:

- GPS coordinates
- internet speed test

This field collected dataset is used as a validation source primarily for wireline and wireless technology of transmission and middle mile, and for wireless speed.

Independent 3rd Party Validation: Murray State University coordinated the efforts of resources at the University of Louisville and the Kentucky Community and Technical College System (validation team) to validate the collection methods and collected data associated with the collection of broadband availability data. This validation data developed from this effort was subsequently integrated into the Statistical Evaluation and Assessment System (SEAS) to verify the data submitted by the broadband providers.

The validation team review included:

a. Validating the list of providers being used by the mapping vendor to make sure all providers are included.
b. Validating the list of state-provided and Census Tiger Data to identify the location of health facilities, schools, libraries, hospitals, universities, public buildings, etc.
c. Reviewing provider outreach methodology being used by the mapping vendor.
d. Reviewing submission options, the Non-Disclosure Agreement and the timeframe for submission.
e. Identifying Business Intelligence data sources to validate provider information.
f. Reviewing mapping vendor's website used to collect comment/survey forms from visitors to validate the broadband coverage in their area.
g. Observing the data collection and data entry process and the ongoing steps in the development of the final products.

Once data was collected, the validation team provided a review that included:

a. Cross checking of data for accuracy
b. Statistically representative and significant samples to validate data, especially in rural and potentially underserved.

Limited field census and telephone surveys were also used to validate data in situations where the data cross checks and statistical samples are not able to validate data provided by the mapping vendor. Faculty and students from campuses of the Kentucky Community and Technical and College System (KCTCS) conducted the field census work to validate local adoption rates. KCTCS has 16 colleges and over 60 campuses to provide state-wide coverage for field census work.

The work performed, and being performed by the validation team can be summarized in four areas: (1) Audit, (2) Selective Surveys, (3) Reconcile Survey and Provider Data, and (4) Field Test to Resolve Discrepancies.

Audit – At the beginning of the project it was decided that the best way to obtain quality data was to make sure that the initial data collection was of the highest quality that it could be. The validation team concentration its initial efforts in working with the mapping vendor to get the best quality data and also the largest quantity of data that could be obtained. Mapping vendor processes were reviewed and suggested improvements provided. Web sites and documents that were to be used for data collection were evaluated and improvements suggested. Provider lists were reviewed and additional vendors or potential vendors were identified by the validation team. Once data collection began, the validation team also worked with the mapping team to increase the amount of data collected. KCTCS provided web survey sites to students and faculty across the state to increase participation. Once the data was collected the validation team worked to identify data anomalies and locations where additional data collection was required.

Selective Surveys – The data audits identified locations where there was insufficient data to make valid conclusions about broadband availability. The validation team used a call center to place selective surveys in the targeted areas within the state. In many cases the insufficient data was the result of the failure of vendors to provide data to the mapping vendor. The selective surveys provide validation of the availability of broadband or the absence of broadband within a specific area. This information allows the mapping vendor to concentrate their efforts to obtain the required data from the appropriate vendor. The call center efforts reached almost 10,000 new households that had not been sampled by other methods. The data indicated that 68.8% had computers, 64.7% has access to the Internet, and 56.7% has broadband access. The new data points were located in rural areas of the state and were focused on areas that had been underrepresented in prior data collection efforts.

Reconcile Survey and Provider Data – The mapping vendor survey data (from web surveys), the provider data, and the selective surveys done by the validation team provide an additional reconciliation of the data. While the importance of knowing where broadband is available is critical, it is just as important to know where broadband is not available. The comparison of the various data sources allow for a high confidence in identifying where broadband is available. Additionally, the data reported on the web surveys and the phone surveys identify pockets of citizens of the Commonwealth that don't have access to broadband. The validation team used the data reported by the providers, the data collected by the mapping vendor, and the validation survey data to identify areas of interest for the field data collection efforts. The focus of the field data collection efforts are areas with no reported service, areas where individuals report no availability, and areas where only mobile wireless has been reported as being available for broadband service.

Field Test to Resolve Discrepancies – The reported territory covered by wired broadband infrastructure is reliable. However, the reported territory covered by wireless broadband infrastructure (especially mobile wireless) is less reliable. Many factors can impact the availability of the wireless signal. We simply have to think about our cell phone usage and the frequency of dropped calls or no service availability. It is relatively easy for a vendor to say they provide service to an entire geographic area. The validation team developed software to check on the level of mobile wireless availability and to make sure it is at broadband speeds. The validation team drove mobile devices around the state collecting signal strength and doing periodic speed test to validate the availability of broadband. The initial focus was on areas reported to have no service and areas that only have mobile broadband reported. Test data was collected to validate the data collection process and identify required equipment.

Provider Data Validation Process

Provider Feedback Loop: Feedback received from the providers is visually inspected and integrated directly into the mapping GIS database.

Service Area Validation Data: The MBA wireline service area data is tabular and contains a separate record for each provider/technology of transmission combination with an associated census block or TIGER road segment, depending on the whether the size of the census block area (=/< or > 2 sq. mi.). This data is exported into an ArcGIS data format. The American Roamer and Prior Mapping service area data is already in and ArcGIS data format. The validation data is then joined to the Provider service area data by census block or TIGER road segment ID. Any database records in the Provider or Validation tables that cannot be joined are output to a separate layer that indicates the areas of discrepancy between the two datasets. The joined tables are then queried to detect any speed discrepancies which are also output to a separate discrepancy layer.

Online Surveys, Field and Independent 3rd Party Validation Data: The Public and Targeted Business/Household survey, field and independent 3rd party validation data are also collected in tabular database format, and represent a specific lat/long spatial location for each record. This data is exported into ArcGIS data format, joined to the provider data, queried to validate pertinent attribution. Again, records not joined and or with detected attribution discrepancies are output to separate GIS layers.

Topology: The ArcGIS Validate Topology Tool is used to flag any topology issues in the broadband data. Flagged issues are reviewed to identify false positives and update true errors as required.

SBI Check Submission: The NTIA-provided SBI Check Submission tool is utilized to validate that the deliverable broadband data is consistent with the business logic rules set forth by the NTIA and a passing receipt is provided with the data submittal to NTIA.

Stakeholder Feedback: The state broadband mapping website includes a feedback function. Comments received from stakeholders are reviewed and used to validate provider data submissions.

Validation and Confidence Level Reporting

To facilitate validation and confidence level reporting, Baker deployed a validation application called Statistical Evaluation and Assessment System (SEAS), shown in Figure 7, which automatically compares the multiple independent validation datasets against the broadband service provider's supplied information. The SEAS uses statistical methodologies to report the confidence level in the spatial and attribute accuracy of the information. Appendix B shows the validation workflow.

The SEAS comparison is a three-part validation process:

1. Comparison of the collected validation source against the aggregated broadband provider data.
2. Match percentage calculation for each provider reported in the DataPackage.xls, "Provider Table" tab, "Comments" column.
3. Confidence score calculation displayed on the state broadband website.

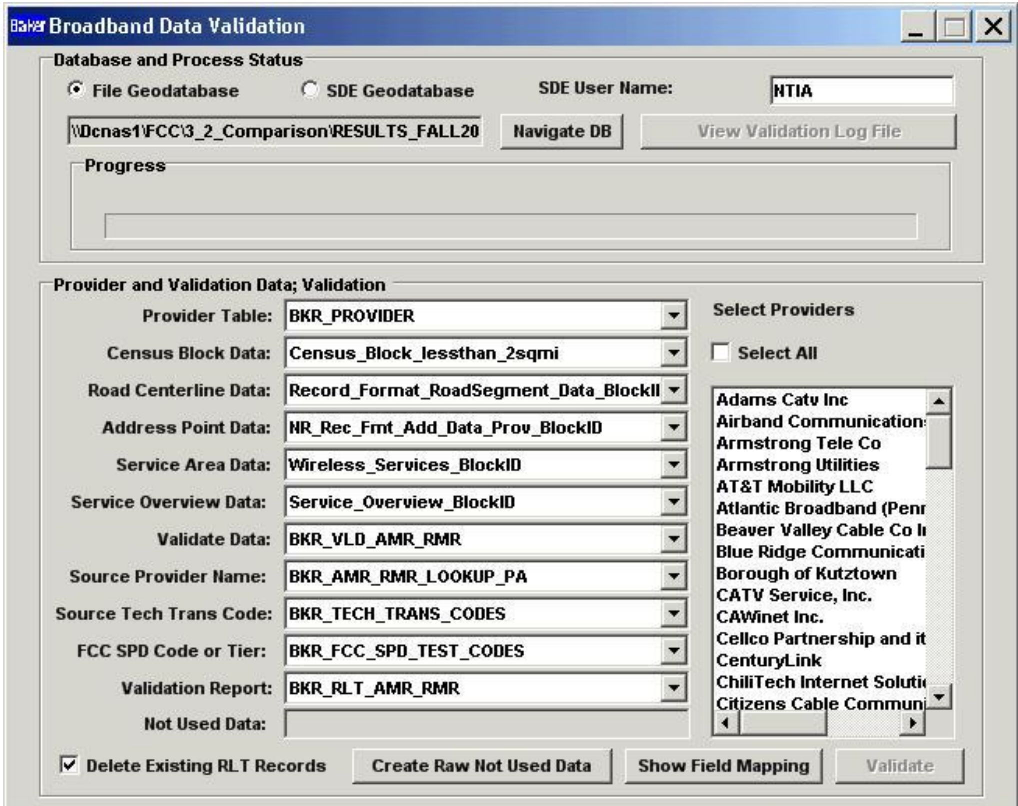


Figure 7 Statistical Evaluation and Assessment System (SEAS)

After completing all validation data source collections, SEAS is used to automatically compare the multiple validation datasets against the aggregated broadband data which came from the providers. Through the SEAS accumulation table, it produces a match percentage per broadband service record based upon the number of matches that record has against each validation source. The matched percentage for each record is the result of the total count of the matched validations for the record divided by the total validation source being compared against the record. A validation confidence rating/score is then assigned on a scale of 1 to 5 based upon the percentage of validation source matches as per the following score results:

- 1 Star = 0% - 19% Match
- 2 Stars = 20% - 39% Match
- 3 Stars = 40% - 59% Match
- 4 Stars = 60% = 79% Match
- 5 Stars = 80% - 100% Match
- “No Analytics” = No validation source available for that provider

The Commonwealth’s public broadband mapping website (www.bakerbb.com/kybroadbandmapping/) is updated with the confidence level results at the record level based upon the queried geographic location and the following is an example of this representation.

Provider Name	Transmission Technology	Max Download Speed	Max Upload Speed	Confidence Score
AT&T Mobility	Mobile Wireless	Greater than or e…	Greater than or e…	★★★☆☆
Verizon	Asymmetric xDSL	Greater than or e…	Greater than or e…	NO ANALYTICS
Comcast	Cable Modem – Other	Greater than or e…	Greater than or e…	★★★★☆

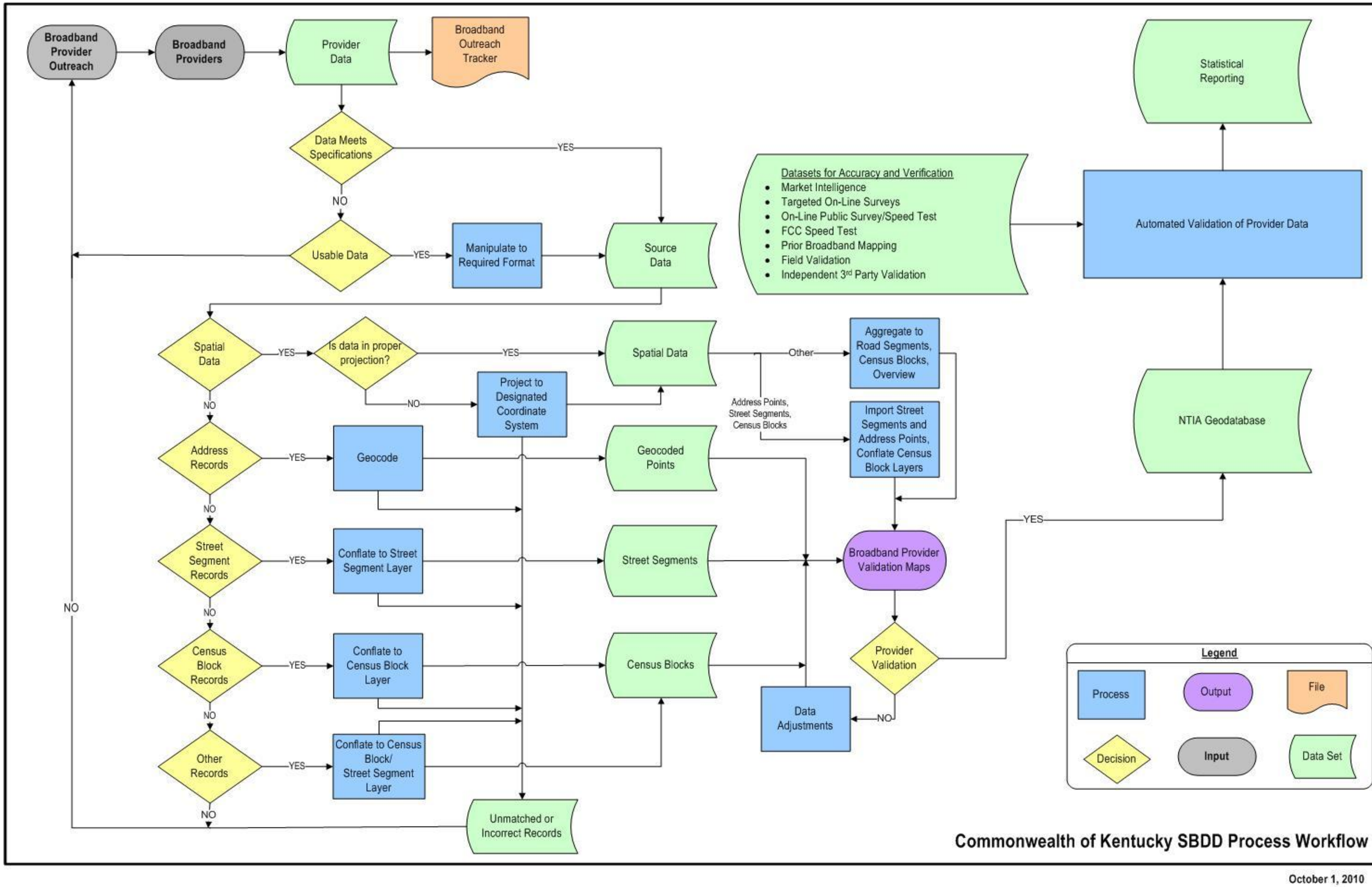
The matched percentage for the records for each provider are summarized and then divided by the total count of the records to create the final matched percentage for the specific provider. These percentages are included in DataPackage.xls on the Provider Table tab in the Comments column.

Low Confidence Provider Feedback

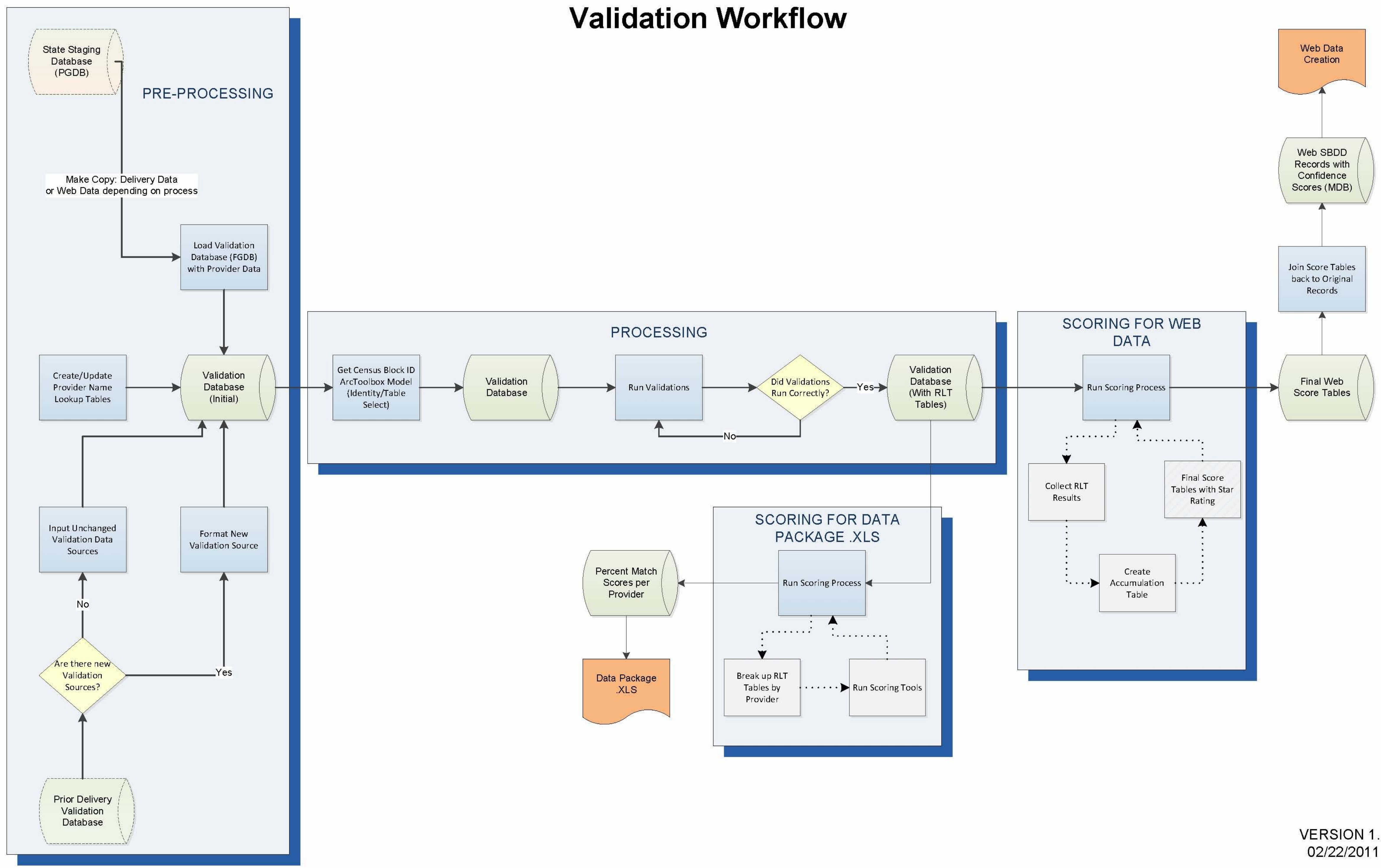
Provider data which is assigned a low confidence (1 or 2 stars) through the SEAS process is communicated back to the provider through a feedback loop. Generally, the low confidence feedback and reconciliation is a continuous refinement process and will occur between update cycles. The goal is to provide this feedback through the Provider Data Update Webportal via a web connection that is available and rolled out to providers in January 2012.

Changes and Corrections Documentation

With each NTIA semiannual data submittal, changes and corrections documentation is provided. Significant changes in a provider's status or data, corrections to previously supplied data, providers supplying data for the first time, etc. are specified by Provider name in the Changes and Corrections document.


Broadband Provider Outreach
Broadband Providers
Provider Data
Broadband Outreach Tracker
Statistical Reporting
Data Meets Specifications
YES
NO
Usable Data
YES
Manipulate to Required Format
Source Data
Datasets for Accuracy and Verification
Market Intelligence
Targeted On-Line Surveys
On-Line Public Survey/Speed Test
FCC Speed Test
Prior Broadband Mapping
Field Validation
Independent 3rd Party Validation
Automated Validation of Provider Data
Spatial Data
YES
Is data in proper projection?
YES
Spatial Data
Other
Aggregate to Road Segments, Census Blocks, Overview
NO
Project to Designated Coordinate System
Address Points, Street Segments, Census Blocks
Import Street Segments and Address Points, Conflate Census Block Layers
NTIA Geodatabase
Address Records
YES
Geocode
Geocoded Points
Street Segment Records
YES
Conflate to Street Segment Layer
Street Segments
Broadband Provider Validation Maps
NO
Census Block Records
YES
Conflate to Census Block Layer
Census Blocks
Provider Validation
Data Adjustments
Other Records
YES
Conflate to Census Block/ Street Segment Layer
Unmatched or Incorrect Records
Legend
Process
Output
File
Decision
Input
Data Set
Commonwealth of Kentucky SBDD Process Workflow
October 1, 2010

State Broadband Data Validation Workflow



Appendix C: Master Outreach List

Filing Company DBA	Filing Company Name	Status
Access Kentucky INC	Access Kentucky INC	Reseller
Blue One Communications, Inc.	Blue One Communications, Inc.	Reseller
Blue One Communications, Inc.	Blue One Communications, Inc.	Reseller
BlueZoom WiFi, Inc.	BlueZoom WiFi, Inc.	Reseller
Broadview Networks, Inc.	Broadview Networks, Inc.	Reseller
Chapel Communications Inc.	Chapel Communications Inc.	Reseller
Frank Howard TV Cable	Frank Howard TV Cable	Reseller
MegaPath Corporation	MegaPath Corporation	Reseller
Ohio County Direct Net	Ohio County Direct Net	Reseller
VCI Internet Services	VCI Internet Services	Reseller
Access Cable Television, Inc.	Access Cable Television, Inc.	Provider
ALTIUS Broadband	ALTIUS Broadband	Provider
Appalachian Wireless	East Kentucky Network, LLC	Provider
Armstrong Utilities	Armstrong Utilities	Provider
AT&T Corp, Inc.	AT&T Corp, Inc.	Provider
AT&T Kentucky	BellSouth Telecommunications, Inc.	Provider
AT&T Mobility LLC	AT&T Mobility LLC	Provider
Avolutia, LLC	Shelby Broadband	Provider
Axon Access	Axon Access	Provider
Ballard Telephone Cooperative	BTC	Provider
Barbourville Online	Barbourville Utility Commission	Provider
Bardstown Cable TV	City of Bardstown	Provider
BGMU	Bowling Green Municipal Utilities	Provider
Big Sandy Broadband, Inc.	Big Sandy Broadband	Provider
Blazing Speeds LLC	Fast Internet	Provider
Bluegrass Cellular	Bluegrass Wireless LLC	Provider
Bluegrass Cellular	Cumberland Cellular Partnership	Provider
Bluegrass Cellular	Kentucky RSA #3 Cellular General Partnership	Provider
Bluegrass Cellular	Kentucky RSA #4 Cellular General Partnership	Provider
BluegrassNet	BluegrassNet	Provider
Bracken Cablevision	Standard Tobacco Company, Inc.	Provider
Brandenburg Telecom LLC	Brandenburg Telecom LLC	Provider
Brandenburg Telephone Company	Brandenburg Telephone Company	Provider
Broadlinc Wireless	Broadlinc Communications LLC	Provider
CBW of Kentucky	Cincinnati Bell Wireless LLC	Provider
Chapel Communications Inc.	Chapel Communications Inc.	Provider
Cincinnati Bell Telephone	Cincinnati Bell Telephone Company LLC	Provider

City of Williamstown, Cable & internet Service	City of Williamstown, Cable & internet Service	Provider
Clearwire Corporation	Clearwire Corporation	Provider
Coalfields Telephone Company, Inc.	Gearheart Communications	Provider
Comcast	Comcast Cable Communications, LLC.	Provider
Community Telecom Services	Community Telecom Services	Provider
ConnectGRADD	Windstream / Norlight Inc	Provider
ConnectLink, Inc	ConnectLink, Inc	Provider
Cricket Communications, Inc.	Leap Wireless International, Inc.	Provider
CSI Telecom Group Inc.	CSI Telecom Group Inc.	Provider
Duo County Telecom	Duo County Telephone Cooperative	Provider
Duo County Telephone Cooperative, Inc.	Duo County Telephone Cooperative	Provider
EarthLink, Inc.	EarthLink, Inc.	Provider
Eastern Cable Corp	Eastern Cable Corporation	Provider
Egan Technology Services	Egan Technology Services	Provider
EPBNET	Electric Plant Board of Russellville Ky	Provider
FiberNet LLC	FiberNet LLC	Provider
Foothills Broadband	Foothills Rural Telephone Cooperative Corporation Inc.	Provider
Frank Howard TV Cable	Frank Howard TV Cable	Provider
Frankfort Plant Board	Frankfort Electric & Water Plant Board	Provider
Galaxy Cablevision	Galaxy Cable Inc.	Provider
Glasgow Electric Plant Board	Glasgow Electric Plant Board	Provider
Harlan Community Television, Inc.	Harlan Community Television, Inc.	Provider
Henderson Municipal Power & Light Company	Henderson Municipal Power & Light Company	Provider
Highland Telephone Cooperative	Highland Telephone Cooperative	Provider
Hopkinsville Electric System	Electric Plant Board of the City of Hopkinsville	Provider
HughesNet	Hughes Communications, Inc.	Provider
IgLou	IgLou	Provider
Inside Connect Cable	Inside Connect Cable	Provider
Integrated Networks, Inc.	Integrated Networks, Inc.	Provider
Inter Mountain Cable, Inc	Inter Mountain Cable, Inc	Provider
Irvine Community Television, Inc.	Irvine Community Television, Inc.	Provider
Ken-Tenn Wireless, LLC	Ken-Tenn Wireless, LLC	Provider
Kentucky OnLine, Inc. (KYOL)	Kentucky OnLine, Inc. (KYOL)	Provider
Kentucky Telephone Company	Kentucky Telephone Company	Provider
Kentucky WiMAX	Kentucky WiMAX	Provider
Kentucky Wireless	Kentucky Wireless	Provider
KRCC	KRCC	Provider
Level 3 Communications, LLC	Level 3 Communications, LLC	Provider
Liberty Communications, Inc.	Liberty Communications, Inc.	Provider

Lightyear Network Solutions, Inc.	Lightyear Network Solutions, Inc.	Provider
Limestone Cablevision	Standard Tobacco Company, Inc.	Provider
LOGAN TELEPHONE COOPERATIVE, INC.	LOGAN TELEPHONE COOPERATIVE, INC.	Provider
Lycom Communications, Inc	Lycom Communications	Provider
Mediacom	Mediacom Southeast, LLC	Provider
MegaPath Corporation	MegaPath Corporation	Provider
megaWi	megaWi	Provider
MEWS	Mayfield Electric & Water	Provider
Mikrotec CATV, LLC	Mikrotec CATV, LLC	Provider
Mountain Telephone	Mountain Rural Telephone Coop. Corp., Inc.	Provider
MST Wireless	MST Wireless	Provider
Murray Electric Systems	Murray Electric Systems	Provider
North Central Communications	North Central Communications	Provider
NTELOS	West Virginia PCS Alliance, L.C.	Provider
OMU	OMU	Provider
OOL Wireless	Windstream / Norlight Inc	Provider
Open World	Open World	Provider
Princeton Electric Plant Board	Princeton Electric Plant Board	Provider
PRTC	Peoples Rural Telephone Coop. Corp., Inc.	Provider
Q-Wireless	Q-Wireless	Provider
QX.net	QX.net	Provider
Skycasters	Skycasters, LLC	Provider
SOUTH CENTRAL RURAL TELEPHONE	SOUTH CENTRAL RURAL TELEPHONE COOPERATIVE, INC.	Provider
SOUTH CENTRAL TELCOM	SOUTH CENTRAL TELCOM, LLC	Provider
Sprint	Sprint Nextel Corporation	Provider
StarBand Communications Inc.	StarBand Communications Inc.	Provider
Suddenlink Communications	Cebridge Acquisition, LLC	Provider
Suddenlink Communications	Cequel III Communications ||, LLC	Provider
Suddenlink Communications	Cequel III Communications I, LLC	Provider
T.V. Service	T.V. Service	Provider
TDS TELECOM	LESLIE COUNTY TELEPHONE COMPANY	Provider
TDS TELECOM	LEWISPORT TELEPHONE COMPANY	Provider
TDS TELECOM	SALEM TELEPHONE COMPANY	Provider
Thacker-Grigsby Telephone	Thacker-Grigsby Telephone Company	Provider
TIME WARNER CABLE	TIME WARNER CABLE LLC	Provider
T-Mobile	T-Mobile USA, Inc.	Provider
tw telecom of kentucky llc	tw telecom of kentucky llc	Provider
Verizon Wireless	Cellco Partnership and its Affiliated Entities	Provider
Vortex Wireless	Vortex Wireless	Provider
WildBlue Communications, Inc.	ViaSat, Inc.	Provider

WiMAX Express	WiMAX Express	Provider
Win.net Internet	Win.net Internet	Provider
Windstream Kentucky East, LLC	Windstream Kentucky East, LLC	Provider
Windstream Kentucky West, LLC	Windstream Kentucky West, LLC	Provider
WK&T Telecommunications	W Kentucky Rural Telephone	Provider
Your Telecommunications Co.	House Enterprises, Inc.	Provider
Cellular South Licenses, Inc.	Cellular South Licenses, Inc.	Potential
City of Bellefonte	City of Bellefonte	Potential
City of Franklin	City of Franklin	Potential
CNI Wireless, Inc.	CNI Wireless, Inc.	Potential
Crystal Broadband Networks	Crystal Broadband Networks	Potential
Hazard Television Co Inc	Hazard Television Co Inc	Potential
Horizon Telecom	Horizon Telecom	Potential
MediaFLO/Qualcomm	MediaFLO/Qualcomm	Potential
PNG Telecommunications	PNG Telecommunications	Potential
SITCO	SITCO	Potential
Tri-Star Communications, Inc	Tri-Star Communications, Inc	Potential
Zito Media, L.P.	Zito Media, L.P.	Potential
Alltel Communications, LLC	Alltel Communications, LLC	Other
ALLTEL Newco LLC	ALLTEL Newco LLC	Other
Bardstown Municipal Utilities	Bardstown Municipal Utilities	Other
Cavalier Telephone	Cavalier Telephone	Other
Cellco Partnership	Cellco Partnership	Other
Cincinnati Bell Extended Territories, LLC	Cincinnati Bell Extended Territories, LLC	Other
Cincinnati SMSA Limited Partnership	Cincinnati SMSA Limited Partnership	Other
Cinergy Communications	Cinergy Communications	Other
City of Barbourville	City of Barbourville	Other
Comcast - Southern Division	Comcast - Southern Division	Other
Community Cable Service	Community Cable Service	Other
Covad Communications (DIECA)	Covad Communications (DIECA)	Other
Cricket Licensee I, LLC	Cricket Licensee I, LLC	Other
DC Kentucky Newco, LLC	DC Kentucky Newco, LLC	Other
Digital on Demand Danville	Digital on Demand Danville	Other
GTE Wireless of the Midwest Incorporated	GTE Wireless of the Midwest Incorporated	Other
Insight Communications	Insight Communications	Other
Kentucky RSA No. 1 Partnership	Kentucky RSA No. 1 Partnership	Other
MCC Telephony of the South, LLC	MCC Telephony of the South, LLC	Other
New Cingular Wireless PCS, LLC	New Cingular Wireless PCS, LLC	Other
New Par	New Par	Other
Norlight, Inc.	Norlight, Inc.	Other

PAETEC Communications, Inc.	PAETEC Communications, Inc.	Other
Powertel Memphis Licenses, Inc.	Powertel Memphis Licenses, Inc.	Other
SouthEast Telephone Inc.	SouthEast Telephone Inc.	Other
Sprintcom Inc	Sprintcom Inc	Other
Telecommunications Management, LLC	Telecommunications Management, LLC	Other
Time Warner NY Cable LLC	Time Warner NY Cable LLC	Other
Vista (Mirror 2) PCS License Holding, LLC	Vista (Mirror 2) PCS License Holding, LLC	Other
Vista License Holdings, L.L.C.	Vista License Holdings, L.L.C.	Other
W. Stephen Cannon, Management Trustee	W. Stephen Cannon, Management Trustee	Other
WIN Enterprises	WIN Enterprises	Other
Wirelessco, L.P.	Wirelessco, L.P.	Other
360networks	360networks	Not a Broadband Provider or Reseller
ACN Communication Services, Inc.	ACN Communication Services, Inc.	Not a Broadband Provider or Reseller
Alltel Communications of Virginia No. 1, LLC	Alltel Communications of Virginia No. 1, LLC	Not a Broadband Provider or Reseller
Altro TV Company Inc.	Altro TV Company Inc.	Not a Broadband Provider or Reseller
Banana Communications, LLC	Banana Communications, LLC	Not a Broadband Provider or Reseller
Bowling Cable TV	Bowling Cable TV	Not a Broadband Provider or Reseller
BroadLink	BroadLink	Not a Broadband Provider or Reseller
Buffalo-Lake Erie Wireless Systems Co., L.L.C.	Buffalo-Lake Erie Wireless Systems Co., L.L.C.	Not a Broadband Provider or Reseller
C & C TV Service	C & C TV Service	Not a Broadband Provider or Reseller
C & W Cable, Inc.	C & W Cable, Inc.	Not a Broadband Provider or Reseller
Cainpro Communications	Cainpro Communications	Not a Broadband Provider or Reseller
CenturyLink (formely Quest Communications)	CenturyLink (formely Quest Communications)	Not a Broadband Provider or Reseller
Charter Communications	Charter Communications	Not a Broadband Provider or Reseller
City of Raceland	City of Raceland	Not a Broadband Provider or Reseller
Community TV Inc	Community TV Inc	Not a Broadband Provider or Reseller
Cook Inlet/VS GSM VII PCS, LLC	Cook Inlet/VS GSM VII PCS, LLC	Not a Broadband Provider or Reseller
Crossroads License Holding Sub A Inc.	Crossroads License Holding Sub A Inc.	Not a Broadband Provider or Reseller
Crossroads Wireless, Inc., Debtor-in-	Crossroads Wireless, Inc., Debtor-in-	Not a Broadband Provider or

Possession	Possession	Reseller
Derby Divestiture Trust	Derby Divestiture Trust	Not a Broadband Provider or Reseller
EnTelegent Solutions, Inc.	EnTelegent Solutions, Inc.	Not a Broadband Provider or Reseller
Evarts T.V. Co. Inc.	Evarts T.V. Co. Inc.	Not a Broadband Provider or Reseller
Franklin Electric Plant Board	Franklin Electric Plant Board	Not a Broadband Provider or Reseller
Granite Telecommunications, LLC	Granite Telecommunications, LLC	Not a Broadband Provider or Reseller
iNetworks Group, Inc.	iNetworks Group, Inc.	Not a Broadband Provider or Reseller
Johnny Wilcop Cable	Johnny Wilcop Cable	Not a Broadband Provider or Reseller
Kentucky Data Link	Kentucky Data Link	Not a Broadband Provider or Reseller
L & L Communications	L & L Communications	Not a Broadband Provider or Reseller
MetroFastNet, LLC	MetroFastNet, LLC	Not a Broadband Provider or Reseller
Morehead State University Campus	Morehead State University Campus	Not a Broadband Provider or Reseller
Netpower, LLC	Netpower, LLC	Not a Broadband Provider or Reseller
Network Telephone	Network Telephone	Not a Broadband Provider or Reseller
NewWave Communications	NewWave Communications	Not a Broadband Provider or Reseller
Northstar Technology, LLC	Northstar Technology, LLC	Not a Broadband Provider or Reseller
NTCH, Inc.	NTCH, Inc.	Not a Broadband Provider or Reseller
Pritchtech	Pritchtech	Not a Broadband Provider or Reseller
Riverside Communications	Riverside Communications	Not a Broadband Provider or Reseller
SCS Wireless	SCS Wireless	Not a Broadband Provider or Reseller
SI Spectrum, LLC	SI Spectrum, LLC	Not a Broadband Provider or Reseller
Sky Blue	Sky Blue	Not a Broadband Provider or Reseller
South Kentucky RECC (formerly Monticello Plant Board)	South Kentucky RECC (formerly Monticello Plant Board)	Not a Broadband Provider or Reseller
SpeedBeam Wireless, Inc.	SpeedBeam Wireless, Inc.	Not a Broadband Provider or Reseller
Systems Solutions (SSINET)	Systems Solutions (SSINET)	Not a Broadband Provider or Reseller
Tennessee RSA No. 3 Limited Partnership	Tennessee RSA No. 3 Limited Partnership	Not a Broadband Provider or Reseller

US Digital Online	US Digital Online	Not a Broadband Provider or Reseller
Vanceburg Electric Plant Board	Vanceburg Electric Plant Board	Not a Broadband Provider or Reseller
Windjammer Communications LLC	Windjammer Communications LLC	Not a Broadband Provider or Reseller
Wirefree Partners III, LLC	Wirefree Partners III, LLC	Not a Broadband Provider or Reseller

LOUISIANA BROADBAND INITIATIVE

DATA DEVELOPMENT & VALIDATION METHODOLOGIES

WHITE PAPER

State of Louisiana

State Broadband Initiative (SBI)

Broadband Mapping Project

NTIA Data Submittal
October 1, 2012

Baker

Table of Contents

Table of Figures

Appendices

Introduction
The following sections of this document provide an overview of the process used for the SBI Broadband Mapping data development for the State of Louisiana. The following narrative is depicted in Appendix A, State of Louisiana SBI Process Workflow, and Appendix B, State Broadband Data Validation Workflow, included at the end of this document.

Broadband Provider Outreach Results
As a result of the outreach to broadband providers and investigating whether an internet service provider (ISP) meets the definition of a broadband provider as per the NOFA, the following is a summary of our findings:

- 139 Total Investigated ISPs
- 64 Total Confirmed Broadband Service Providers (Unique Provider/DBA Combinations)
- 50 Broadband Service Providers who Supplied Data (Unique Provider/DBA Combinations)

Attachment C, Master Outreach List, contains additional provider information.

Broadband Provider Outreach Procedure
The following outreach provides the framework for communicating with Broadband Service Providers (Providers). The primary goals of the outreach approach documented herein are to:

- Promote Provider understanding and acceptance of the Broadband Mapping process, results and benefits
- Clarify NTIA Broadband Mapping requirements
- Facilitate data confidentiality agreements as required
- Minimize the submittal of invalid data
- Enhance provider understanding of the semi-annual update process
- Work with Providers to evaluate submittal options to facilitate data submittals

Data Submission Guidelines
Guidelines for the providers' submission of Broadband Mapping Data are documented in the "Data Submission Guidelines". These Guidelines define technical requirements, submission specifications, and coordination and documentation activities.

Louisiana Broadband Providers Website
A URL was deployed (http://www.broadband.la.gov/lbi_providers.asp) to communicate and distribute NTIA NOFA requirements to providers along with outreach and data submittal materials including:

- NTIA NOFA and subsequent clarification
- Outreach letters to providers
- Non-Disclosure Agreement
- Quick Start Guides

- Data Submission Guidelines
- Data Transmittal Letter
- Broadband Data Submittal Templates
- Census TIGER Data
- Data Submittal Assistance Contact Information

Outreach Delivery Vehicles

- A State Broadband Mapping Initiative Call for Data letter from the State Office of Information Technology (OIT) was mailed to all Broadband Service Providers in the State. This initial provider contact letter described the program and the role of Michael baker Jr., Inc. (Baker) acting on behalf of the OIT for Broadband Data Collection and Mapping.
- Baker distributed a follow-up letter to all Providers describing the data submittal requirements and material and help available to aid with the data submittals.
- Submittal assistance was provided to providers that needed help with data submittals.
- Presentations were conducted with various broadband provider associations to present the data submittal requirements and answer questions.
- Email communication and electronic transfer of data was encouraged to facilitate a faster delivery of data and information.
- A URL was deployed and promoted to distribute outreach material and information concerning the Broadband Mapping Project.
- A secure FTP URL was provided for submittal of broadband data by providers.
- A secure Broadband Provider Data Update Webportal was deployed for providers to redline/update their service coverage, rather than supply their updated coverage for the semi-annual data updates.

Secure Broadband Provider Data Update Webportal

A secure web-based application for broadband service providers has been deployed to simplify and automate the semi-annual process for collecting and verifying data. The webportal provides an easy-to-use map redlining tool for updating a provider broadband service area and attributes. It is expected that the simplification and automation of the data collection process will increase participation and improve the timeliness of provider's response, data accuracy and consistency. Providers are being encouraged to utilize this tool but data is still being accepted through other means and formats.

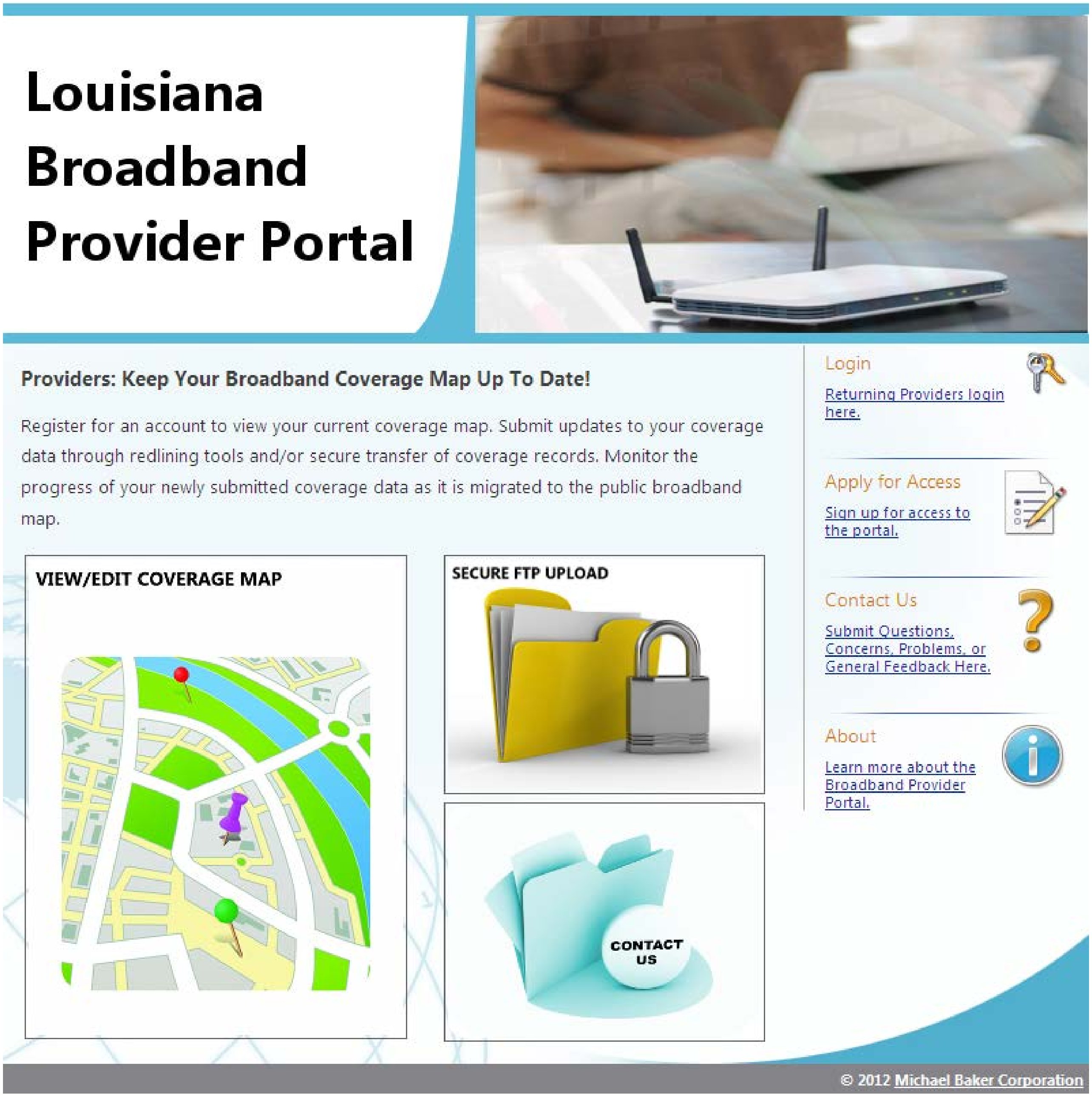


Figure 1 Provider Data Update Webportal Entry Page

The View/Edit Coverage Map functions via secure login/password and secured map services limit broadband providers to see and edit only their own data. Pick lists of valid database attributes eliminates entry errors and create consistency. It also contains a workflow from initial provider input, saving of a provider's work-in-progress, provider formally submitting edits, aggregation into the master geodatabase, soliciting provider approval of aggregated data, and final approval of the edit.

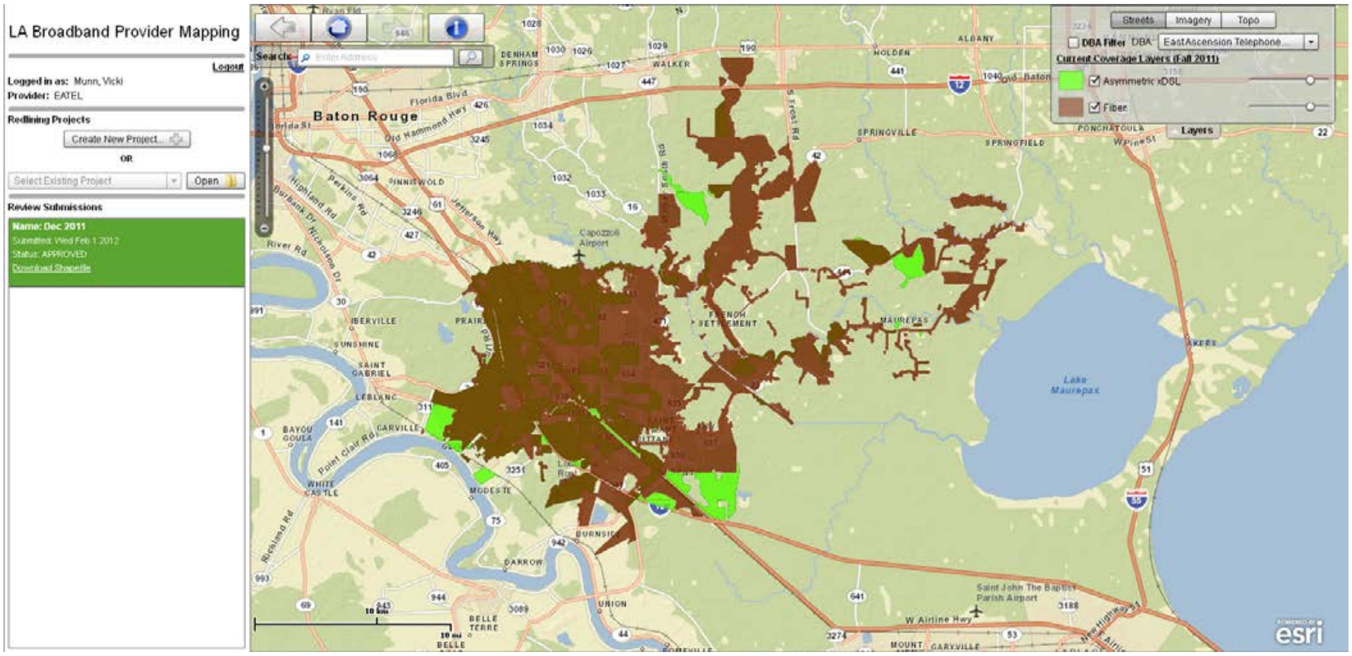


Figure 2 Provider Data Update Webportal – View/Edit Coverage Map Environment

Broadband Outreach Tracker Application

The Tracker application (Figure 3) is utilized to collect all correspondence with Providers and feedback on the effectiveness of the outreach activities by tracking items such as:

- The number and content of incoming e-mails and letters submitted from the Providers
- The number and source of comments, questions, and suggestions made by Providers
- The number and source of comments, questions, and suggestions made by attendees at Provider meetings and conference calls
- Provider contact information and data submittal status.

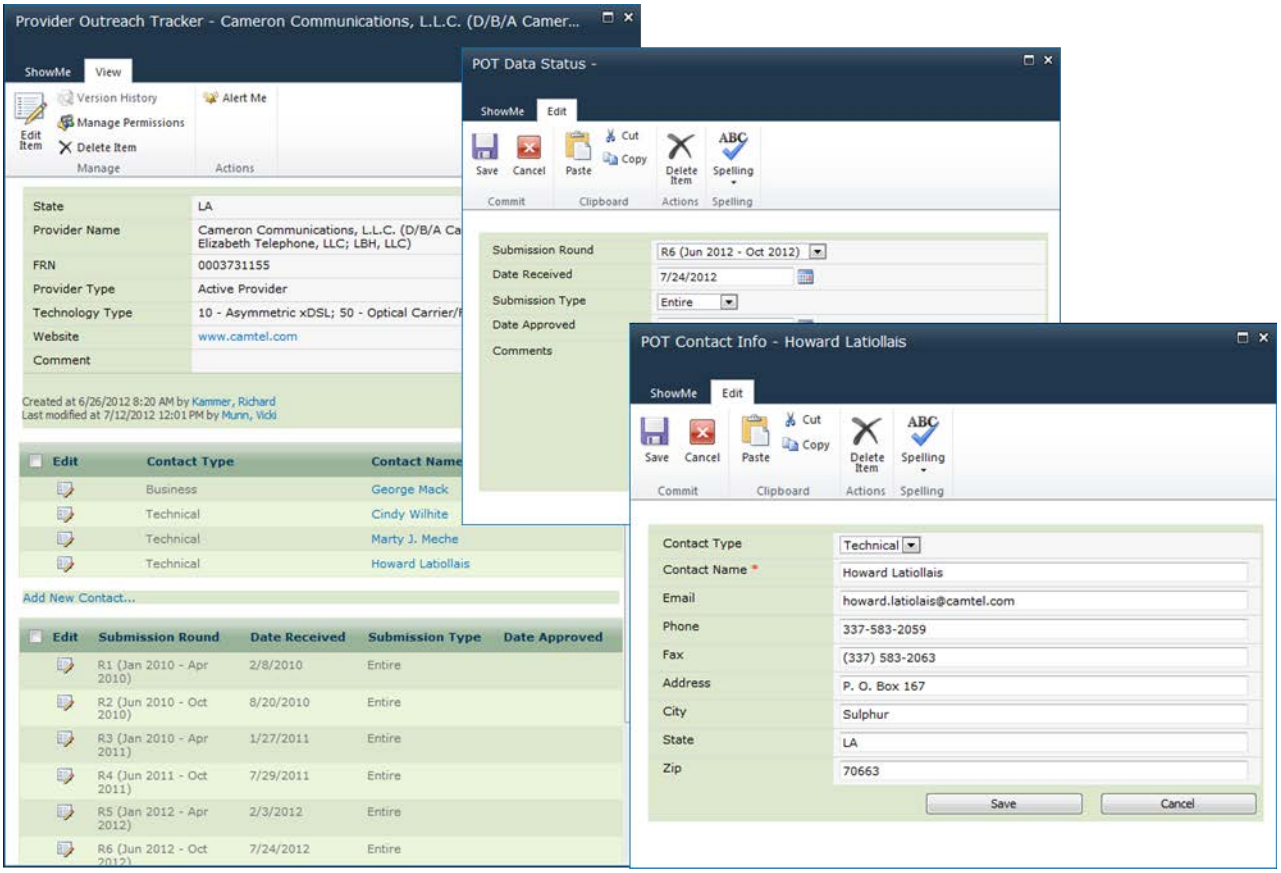


Figure 3 Broadband Outreach Tracker

Provider Submittal Validation

When a data submittal is received from a broadband service provider it is updated in the Broadband Outreach Tracker and run through an initial validation process to assure that it meets the submittal guidelines.

Validation Checklist

The following items are part of this initial data validation process:

- Verify the provider Transmittal Letter is complete and matches submitted data
- Verify the file naming conventions
- Verify each file is machine readable
- Verify data is in the correct GIS or Tabular format/file type
- Verify each field is populated and no empty or NULL values are present for mandatory fields
- Verify all ID (record number points) are unique within the submittal
- Verify all attribute data is formatted according to the submittal guidelines
- Verify topology for all geospatial submissions
- Verify Metadata for all submissions

- Verify the required contact information is included
- Verify adherence to Data Submittal Guidelines (see http://www.broadband.la.gov/lbi_providers.asp to access Data Submittal Guidelines)

Broadband Service Availability (at least one)

- Individual Street Addresses (Sec 3.1 & 4.1)
- Census Blocks < 2 sq mi (3.3 & 4.3)
- Street Segments for Census Blocks > 2 sq mi (3.2 & 4.2)
- Service Overview (Sec 3.4 & 4.4)
- Polygonal Boundary Area(s) (Sec 3.8 & 4.8)

Middle-mile Points (Sec 3.5 & 4.5)

Community Anchor Institutions (Sec 3.7 & 4.7)

Last Mile Connection Points (Sec 3.6 & 4.6)

WISP Antennas (Sec 4.9)

Data Usability Determination

The validation results are evaluated by the outreach and aggregation persons to determine the usability of the data. If the data meets the submission specifications, it is forwarded on for data aggregation. If it is determined to be unusable, it is returned to the provider for resolution. If the data can be manipulated to get it into a usable format, it is manipulated as required, and then forwarded on for data aggregation.

SBI Data Development

Data from the providers may be submitted in various formats as defined in the Data Submittal Guidelines, or in some cases unspecified formats may be accepted to help facilitate provider participation. Depending on the format of the submitted data, it is processed through one of the following processes to upgrade it to the NTIA SBI data standards.

Spatial Data

After validation and any required manipulation of any spatial data submitted by the providers, it is georeferenced and simply loaded into the appropriate NTIA geodatabase feature class.

Address Data Geocoding

If not already in the standard address point template, the provider tabular address data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. ArcGIS geocoding tools are then utilized geospatially locate the address points for the tabular records. Interactive address rematching is performed against two additional street centerline datasets as needed to increase geocoding matching results. The NTIA deliverable is the geocoded address point geodatabase table. The geocoded address points are also subsequently aggregated to the census block or road segment feature class for public web map display.

Census Block Aggregation

If not already in the standard census block template, the provider tabular census block data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The provider tabular census block records are then joined to the geodatabase 2010 U.S. Census Block. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination. The NTIA deliverable is the census block geodatabase table.

If the list of census blocks contains blocks > 2 sq. miles then these blocks are used to select all the 2010 U.S. Census TIGER centerlines that intersect those blocks. The Census Block record data is aggregated to each Road Segment within the Census Block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination.

Road Segment Aggregation

If not already in the standard road segment template, the provider road segment data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. If the provider submittal included graphic centerline segments, these are migrated into the delivery geodatabase along with the linked attribute records. If the provider submittal was tabular road segment records only, they are then joined to the geodatabase 2010 U.S. Census TIGER centerline feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

If the provider road segment data lie within census blocks <= 2 sq. miles then the road segment data is aggregated to the census block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

Overview Data Aggregation

Provider Service Availability Areas submitted for entire county areas are loaded into the NTIA geodatabase Overview table. If not already in the standard template, the provider data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The Provider Overview records are then joined to the geodatabase 2010 U.S. Census County feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination.

Polygonal Boundary Aggregation/Integration

Providers submitting polygonal service area data are handled in two ways. Wireline Provider data is aggregated to the census block feature class for areas where census blocks <= 2 sq. mi., or road segment feature class for areas where census blocks > 2 sq. mi. Wireless Provider Service Availability Areas submitted by polygonal area are simply loaded into the NTIA geodatabase Poly_Bndry feature class.

Wireline Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Depending on the area, census blocks < or => 2 sq. mi., a selection set of either census blocks or road segments that intersect the polygon boundary is created. The attributed polygon boundary is then joined with census blocks or road segments table to attribute accordingly. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination. The NTIA deliverable is the census block or road segment geodatabase table.

Wireless Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Multiple Poly_Bndry records are created for multiple Trans Tech values for each Provider. The NTIA deliverable is the polygon boundary geodatabase table.

Middle/Last Mile Data Integration

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. The NTIA deliverable is the middle or last mile geodatabase table.

Community Anchor Institution Integration

Providers supplied some Community Anchor Institution (CAI) data with the data submittals. But the majority of the data was collected from existing GIS Layers from previous studies and commercial data packages.

Provider CAIs

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. Address data is used to geocode locations only when Lat/Long data is not provided.

State CAIs

CAI shapefiles were downloaded from the commercial data packages. The shapefiles were then exported to the NTIA geodatabase CAI feature class. Various sources for obtaining broadband information for the CAIs were utilized including previous broadband studies.

Typical Speeds from Other Sources

Because not all providers are submitting the typical speed attribution with their data, a method to fill in the missing information has been developed using other sources. The method utilizes speed test data supplied through the FCC speed test information as well as from other speed test data that we are independently collecting. Business rules have been established so quality and realistic typical speeds are produced. The end result is a more complete data submittal to NTIA.

Propagation Modeling

Fixed wireless broadband transmission is a diverse technology. Service may be transmitted over licensed and unlicensed spectrum, and delivered by larger corporate or smaller LLC business entities, many of which serve rural areas of the State. This diversity has resulted in varying levels of SBI participation including Providers that have:

- participated,
- refused to participate,
- wished to participate but lack adequate capabilities and/or tools, or
- supplied data of marginal accuracy

The NTIA's supplemental grant funding has provided the means to generate propagation models to supplement and validate the above scenarios. In addition, the NTIA has identified fixed wireless service coverages with unusual shapes for state grantee analysis.

To facilitate development of propagation mapping, additional tower/antenna information is being requested from fixed wireless broadband providers. For those providers not responding to requests for required tower/antenna information, an attempt is made to gather the information through 3rd party sources and field investigation. The Provider, 3rd party and/or field data is processed using Terrain Analysis Package (TAP) software to develop propagation models. Maps of the resultant propagation study are sent to the fixed wireless providers for their feedback on the propagation model produced for their company.

Data Verification Summary

Louisiana's broadband mapping project employs a multi-prong approach to ensure the provider data is accurate and complete.

In summary, the project employs the following validation methodologies and resources:

- Provider Validation
- Data Validation via Market Intelligence Sources
- Data Validation Using State Supplied Data Points
- Field Validation
- Wireless Coverage Analysis
- Topology Validation
- Automated Validation Processing
- Confidence Level/Statistical Modeling
- SBDD Check Submission
- Stakeholder Validation

The remainder of this verification section describes the various methods in greater detail.

Provider Validation

After data development, service availability maps are generated and submitted to the providers to validate their mapping results. This provides a "sign off" on the interpretation of the submitted data and extends the outreach efforts by providing a visual representation of the data to be delivered to the State and the NTIA.

Types of Provider Maps

Provider maps generally consist of the following types.

Outreach Maps

Often, providers will send data which does not contain all the information needed for a NTIA compliant dataset. In such cases, as an aid to the outreach communication, it may be necessary to produce a map to help the provider locate their service area or verify data they have provided. These maps may take many forms, but generally are of two types:

- General Location Maps – these maps are often produced when the provider does not have a list of address or other standard submittal data and needs help defining their service area. A typical map will show counties, major roads, and towns of the general area the provider has stated as their service area. The intent of the map is to give the provider a way to markup or delineate their service area. If a provider has not provided required attribute information such as Technology of Transmission, Speed Data, etc. then it may be necessary to add a visual clue to this data like an information stamp on the map that they can easily fill out. If the provider sends the map back with a service area boundary, this can then be digitized and sent back to the provider for verification.

- Verification of Provider Supplied Boundaries – these maps are produced when the provider has sent service area boundary information which is confusing or otherwise unclear. Often these are produced when providers send CAD maps, hand drawn maps that need digitization, or lists of zip codes or counties served. A typical map will place the interpreted boundary over a location map so the provider can verify the service area. As with the General Location Map, information stamps or other visual clues may be placed on the map.

Initial Verification Maps

Once the provider data has been processed and the census block and road segment feature classes created, an Initial Verification Map (Figure 4) is produced to give the provider a visual representation of their service area by census block. These maps enable the provider to verify their service area and make changes if necessary. Initial Verification Maps are produced using a set of standards and produced at the highest resolution necessary to convey the map information to the provider. Initial Verification Maps are also produced for Wireless Polygon areas.

Detailed Verification Maps

Providers who have questions about their service areas may request additional information to help clarify issues. In these cases it may be necessary to create a Detailed Verification Map to highlight the areas in question.

Detailed Verification Maps provide the same information as Initial Verification Maps only at a higher resolution. Several maps may be needed to accurately portray an area in question.

Revised Maps

Revised maps take two forms:

- Initial or Detailed Verification Maps which have been annotated or marked-up by the provider
- Outreach produced Initial or Detailed Verification Maps incorporating provider changes

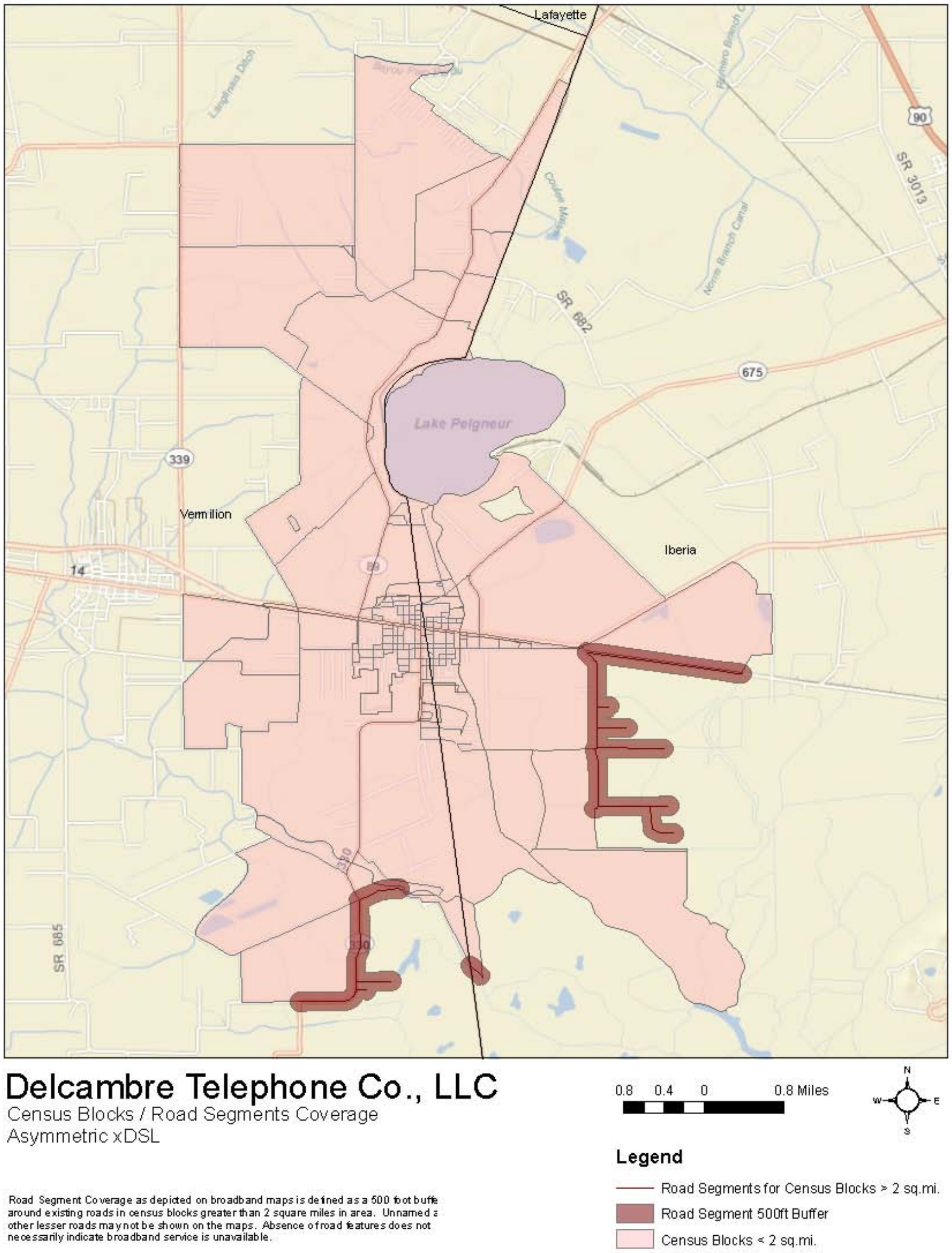


Figure 4 Provider Map

Data Validation

A critical component of the project is the validation of the data submitted by the broadband service providers. Data from various sources, as described in more detail in the following sections, is utilized to develop a level of confidence in the data received from the broadband providers.

Validation Data Set Collection and Development

This validation process employs data sets developed or acquired from different sources as described in the following sections.

Provider Feedback Loop: Maps of completed provider service areas and data are furnished back to the providers for confirmation of the processed/aggregated information. Feedback is integrated into the each Provider's dataset.

Broadband Market Analysis (BMA) Wireline Market Intelligence Data: Data is extracted from internal and commercial databases defining geographic service areas of telephone and cable companies and locations of central office (CO) switches and areas upgraded with fiber. The geographic areas are overlaid with Census demographic data on housing unit counts and density. The areas are then modified based on standard business practices for conducting service build-out and offering broadband service relative to housing density and other variables, such as distance from CO and other infrastructure elements, type of cable franchise (e.g., Census Place vs. Unincorporated County) This represents the first pass conservative estimate of coverage.

The above methods and data sources are supplemented by other data sources and methodologies, including: 1) connectivity data points acquired from InfoUSA that include ISP and type of connection (e.g., DSL, cable modem, dial-up, wireless, fiber) providing Internet service to specific geo-coded (i.e., by Latitude and Longitude) residential addresses; 2) web-based and telephone research, including address-level service-availability queries of web sites operated by service providers and independent entities. This multi-sourced MBA dataset is used as a validation source for provider service area coverage, Technology of Transmission, and Speed.

American Roamer Wireless Market Intelligence Data: Commercially available dataset used as an independent source to verify information submitted by Providers of wireless broadband service. This dataset is used as a validation source for provider service area coverage.

Speed Test: Visitors to the LA Broadband Mapping website are requested to take a speed test that measures downstream and upstream speeds.

Prior Broadband Mapping: Statewide coverage areas for Cable, DSL, and Fixed Wireless providers that were aggregated as part of a previous broadband mapping effort for the State of Louisiana are used to validate against Provider submitted data. In addition to the service areas, the DSL and Fixed Wireless layers contain general speed information that can be compared against Provider submitted data.

FCC Speed Test: The FCC speed test data includes the IP addresses for each specific speed test conducted. This IP address is queried against a web search engine to determine the Provider assigned to that address and is used as a validation source for provider service coverage and typical speeds.

Field Data Acquisition: Broadband technicians visited a sampling of census block locations to gather broadband data to be used for validation. The following criteria were taken into account when developing the census block sampling dataset:

- urban vs. rural census block characteristic
- censes block grouping
- land vs. water census block characteristic

The overarching mission of the Federal broadband stimulus program is to expand Broadband service to areas that are currently unserved and underserved. Also, the market intelligence validation sources typically represent some rural, but more urban areas. Thus, our field data collection efforts were targeted more towards the rural areas; split 90% rural, 10% urban.

Additionally, a study by Penn State University (Glasmeier 2002) notes that a large number of census block groups typically fit within any given cable or telephone company service areas. Therefore, our field sample was also based on selection of one census block per block group. The selected census block also had greater than 50% land area, versus water. There are a total of 3, 512 census block groups statewide. Using a statistical sample size calculator based upon the number of block groups in the state and +/- 4% margin of error at a 95% confidence level, the sample size is 557 census block locations (Figure 5).

For the 557 census blocks that were visited, 3257 individual wired/wireless data elements were recorded and 3410 pictures were taken at those locations. This field collected dataset is used as a validation source primarily for wireline and wireless technology of transmission and middle mile, and for wireless speed.

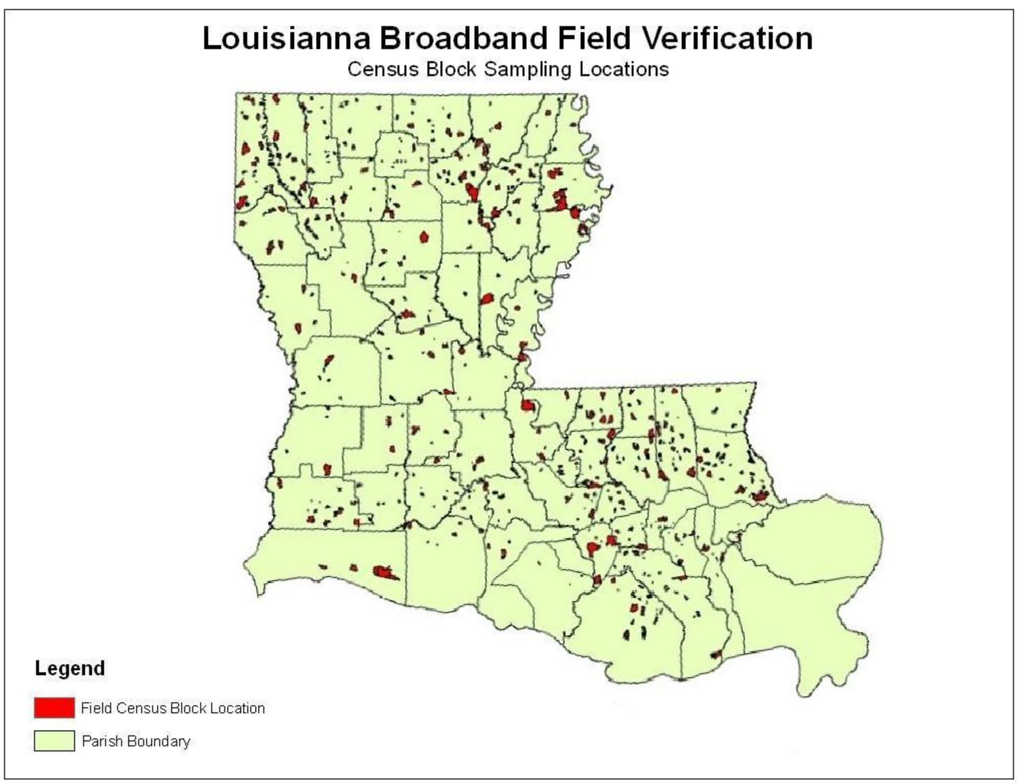


Figure 5 Field Verification Sampling Locations

For each census block in the sample set, broadband technicians collected data using Panasonic Toughbook computers, loaded with MapPoint mapping software, and a customized Microsoft Access data collection form with the ability to automatically import GPS coordinates. The sample census blocks were pre-loaded and directly accessible from MapPoint. Two types of data collection were conducted; infrastructure observation and wireless speed testing; and the results were recorded and linked to the corresponding field location coordinates within the designated sample census block. The information collected by the field broadband technicians includes:

Wireline:

- GPS coordinates
- circuit infrastructure feeding the area (copper, fiber, cable)
- collect site pictures

Wireless:

- GPS coordinates
- internet speed test

This field collected dataset is used as a validation source primarily for wireline and wireless technology of transmission and middle mile, and for wireless speed.

Provider Data Validation Process

Provider Feedback Loop: Feedback received from the providers is visually inspected and integrated directly into the mapping GIS database.

Service Area Validation Data: The BMA wireline service area data is tabular and contains a separate record for each provider/technology of transmission combination with an associated census block or TIGER road segment, depending on the whether the size of the census block area (=/< or > 2 sq. mi.). This data is exported into an ArcGIS data format. The American Roamer and Prior Mapping service area data is already in and ArcGIS data format. The validation data is then joined to the Provider service area data by census block or TIGER road segment ID. Any database records in the Provider or Validation tables that cannot be joined are output to a separate layer that indicates the areas of discrepancy between the two datasets. The joined tables are then queried to detect any speed discrepancies which are also output to a separate discrepancy layer.

Field Validation Data: The field data are also collected in tabular database format, and represent a specific lat/long spatial location for each record. This data is also exported into an ArcGIS data format, joined to the provider data, queried to validate pertinent attribution. Again, records not joined and or with detected attribution discrepancies are output to separate GIS layers.

Topology: The ArcGIS Validate Topology Tool is used to flag any topology issues in the broadband data. Flagged issues are reviewed to identify false positives and update true errors as required.

SBI Check Submission: The NTIA-provided SBI Check Submission tool is utilized to validate that the deliverable broadband data is consistent with the business logic rules set forth by the NTIA and a passing receipt is provided with the data submittal to NTIA.

Stakeholder Feedback: The state broadband mapping website includes a feedback function. Comments received from stakeholders are reviewed and used to validate provider data submissions.

Validation and Confidence Level Reporting

To facilitate validation and confidence level reporting, Baker deployed a validation application called Statistical Evaluation and Assessment System (SEAS), shown in Figure 6, which automatically compares the multiple independent validation datasets against the broadband service providers' supplied information. The SEAS application uses statistical methodologies to report the confidence level in the spatial and attribute accuracy of the information. Appendix B shows the validation workflow.

The SEAS comparison is a three-part validation process:

1. Comparison of the collected validation source against the aggregated broadband provider data.
2. Match percentage calculation for each provider reported in the DataPackage.xls, "Provider Table" tab, "Comments" column.
3. Confidence score calculation displayed on the state broadband website.

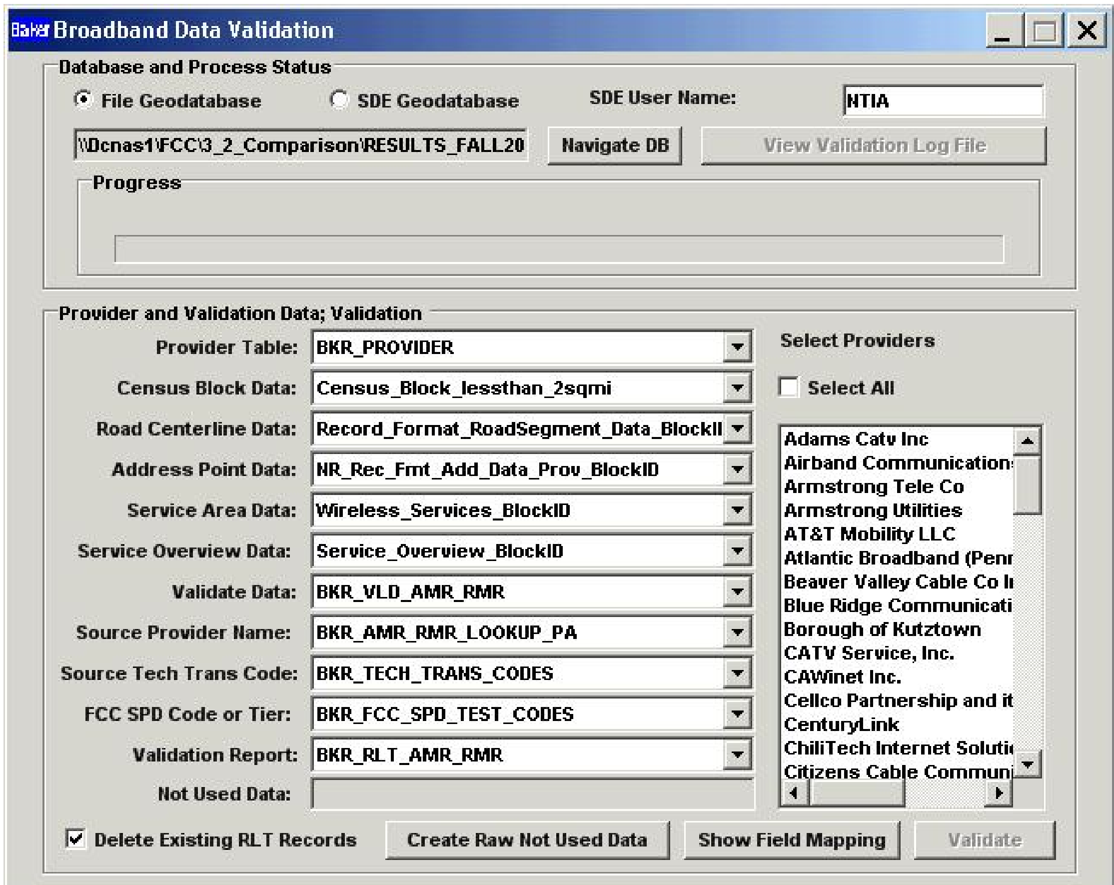


Figure 6 Statistical Evaluation and Assessment System (SEAS)

After completing all validation data source collections, SEAS is used to automatically compare the multiple validation datasets against the aggregated broadband data which came from the providers. Through the SEAS accumulation table, it produces a match percentage per broadband service record based upon the number of matches that record has against each validation source. The matched percentage for each record is the result of the total count of the matched validations for the record divided by the total validation source being compared against the record. A validation confidence rating/score is then assigned on a scale of 1 to 5 based upon the percentage of validation source matches as per the following score results:

- 1 Star   = 0% - 19% Match
- 2 Stars = 20% - 39% Match
- 3 Stars = 40% - 59% Match
- 4 Stars = 60% = 79% Match
- 5 Stars = 80% - 100% Match
- “No Analytics” = No validation source available for that provider

The State's public broadband mapping website (http://www.broadband.la.gov/lbi_providers.asp) is updated with the confidence level results at the record level based upon the queried geographic location and the following is an example of this representation.

Provider Name	Transmission Technology	Max Download Speed	Max Upload Speed	Confidence Score
AT&T Mobility	Mobile Wireless	Greater than or e...	Greater than or e...	
Verizon	Asymmetric xDSL	Greater than or e...	Greater than or e...	NO ANALYTICS
Comcast	Cable Modem – Other	Greater than or e...	Greater than or e...	

The matched percentage for the records for each provider are summarized and then divided by the total count of the records to create the final matched percentage for the specific provider. These percentages are included in DataPackage.xls on the Provider Table tab in the Comments column.

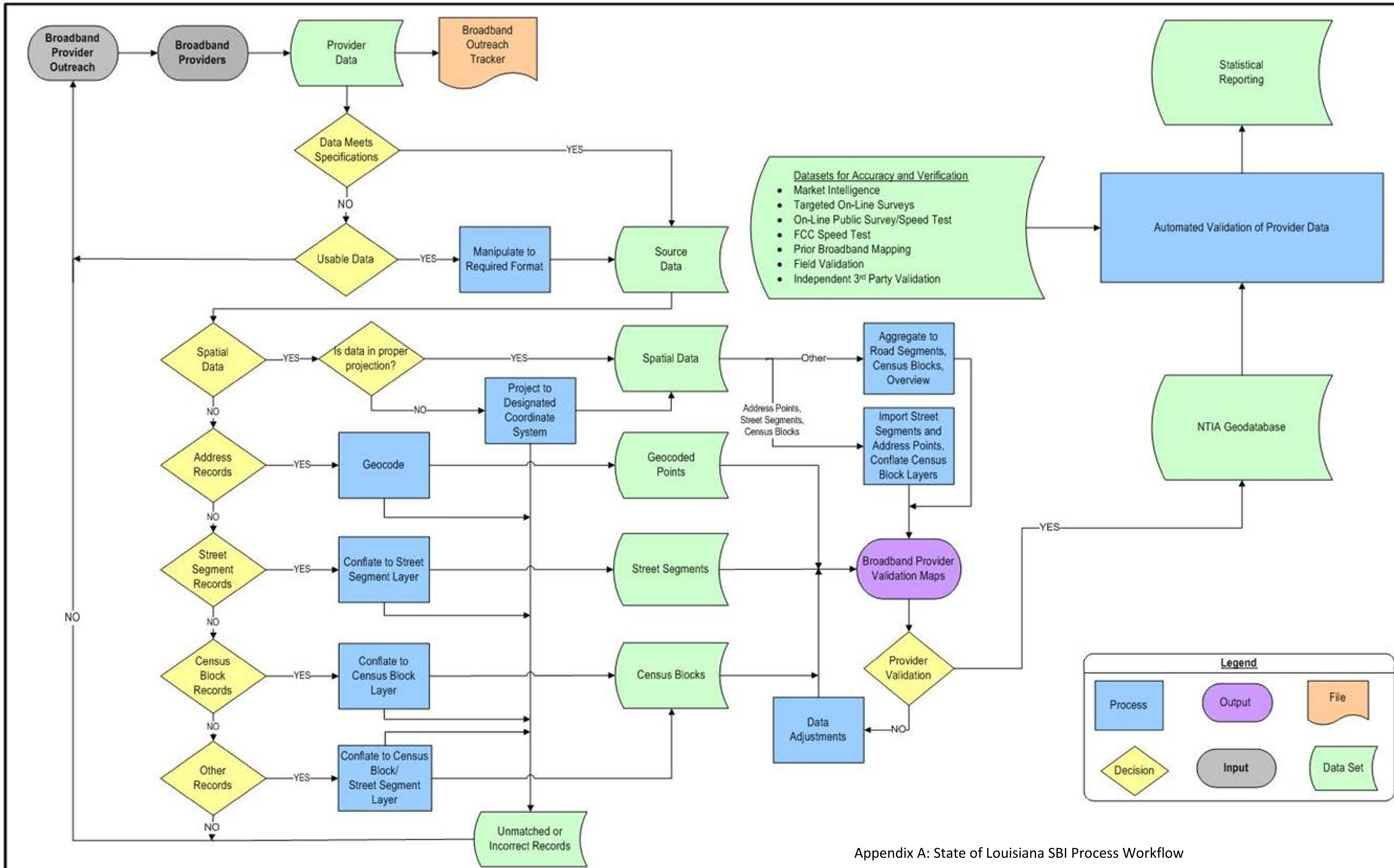
Low Confidence Provider Feedback

Provider data which is assigned a low confidence (1 or 2 stars) through the SEAS process is communicated back to the provider through a feedback loop. Generally, the low confidence feedback and reconciliation is a continuous refinement process and will occur between update cycles. The goal is to provide this feedback through the Provider Data Update Webportal via a web connection that is available and rolled out to providers in January 2012.

Changes and Corrections Documentation

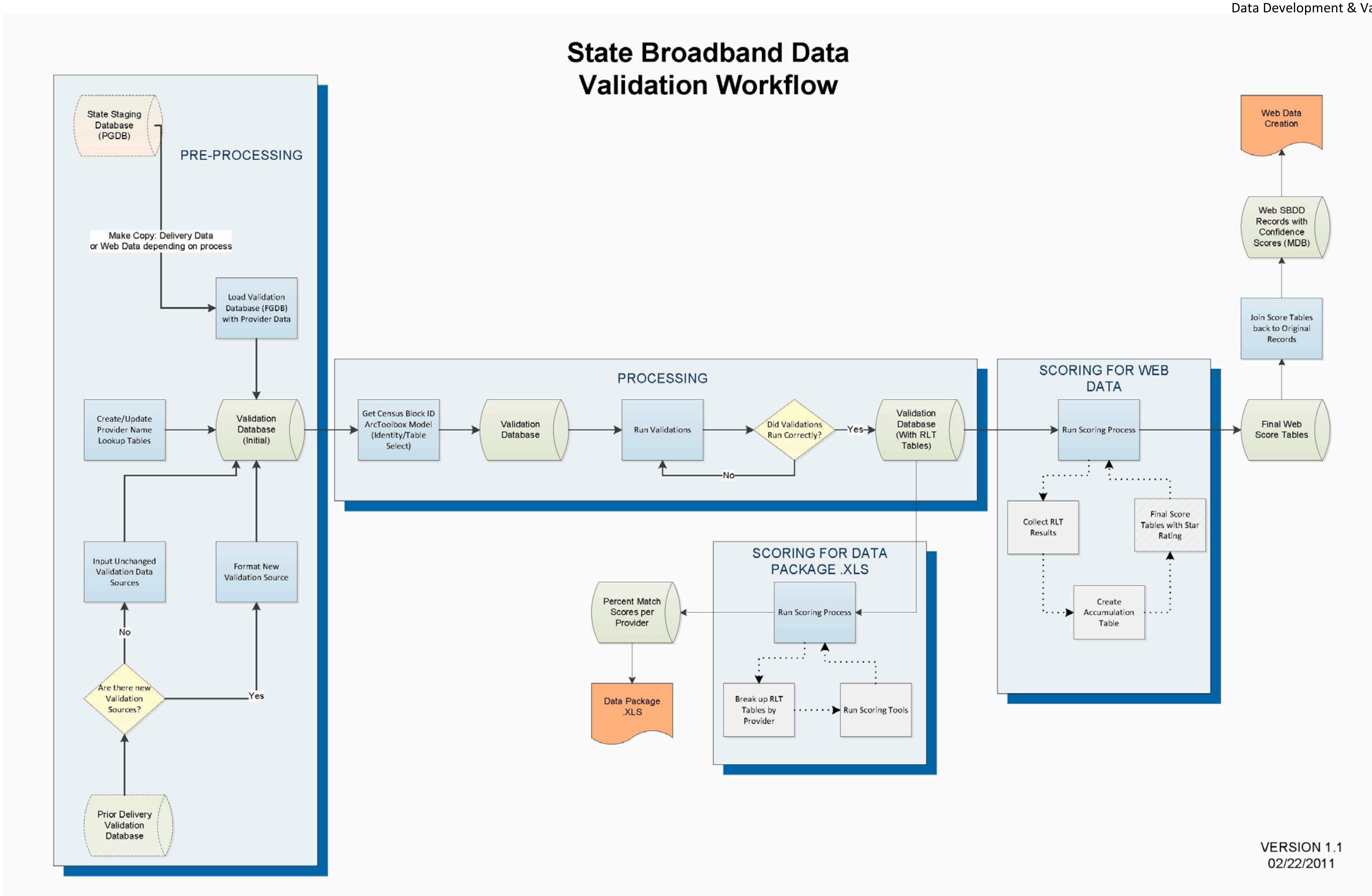
With each semi-annual NTIA data submittal, changes and corrections documentation is provided. Significant changes in a provider's status or data, corrections to previously supplied data, providers supplying data for the first time, etc. are specified by Provider name in the Changes and Corrections document.

Baker



Appendix A: State of Louisiana SBI Process Workflow

October 1, 2010


State Broadband Data Validation Workflow
PRE-PROCESSING
State Staging Database (PGDB)
Make Copy: Delivery Data or Web Data depending on process
Load Validation Database (FGDB) with Provider Data
Create/Update Provider Name Lookup Tables
Validation Database (Initial)
Input Unchanged Validation Data Sources
Format New Validation Source
No
Are there new Validation Sources?
Yes
Prior Delivery Validation Database
PROCESSING
Get Census Block ID ArcToolbox Model (Identity/Table Select)
Validation Database
Run Validations
Did Validations Run Correctly?
Yes
No
Validation Database (With RLT Tables)
SCORING FOR WEB DATA
Run Scoring Process
Collect RLT Results
Final Score Tables with Star Rating
Create Accumulation Table
Final Web Score Tables
Join Score Tables back to Original Records
Web SBDD Records with Confidence Scores (MDB)
Web Data Creation
SCORING FOR DATA PACKAGE .XLS
Run Scoring Process
Break up RLT Tables by Provider
Run Scoring Tools
Percent Match Scores per Provider
Data Package .XLS
VERSION 1.1
02/22/2011

Appendix C: Master Outreach List

Filing Company DBA	Filing Company Name	Status
360networks		Not a Broadband Provider or Reseller
AccessCom, Inc.		Not a Broadband Provider or Reseller
BLC Management LLC of Tennessee D/B/A Angles Communication Solutions d/b/a Mexicall Communications		Not a Broadband Provider or Reseller
BroadPoint, Inc.		Not a Broadband Provider or Reseller
Catcomm Internet Services, LLC		Not a Broadband Provider or Reseller
Crawfish Net / WorldPace Internet		Not a Broadband Provider or Reseller
CS Wireless LLC		Not a Broadband Provider or Reseller
ERF Wireless, Inc.		Not a Broadband Provider or Reseller
Etex Communications		Not a Broadband Provider or Reseller
EZNETLA, L.L.C.		Not a Broadband Provider or Reseller
Galaxy Cable Inc.		Not a Broadband Provider or Reseller
Global Crossing Telecommunications, Inc.		Not a Broadband Provider or Reseller
Ground Control Systems, Inc.		Not a Broadband Provider or Reseller
Gulf Coast Broadband		Not a Broadband Provider or Reseller
LightEdge Solutions, Inc.		Not a Broadband Provider or Reseller
LocalUSA		Not a Broadband Provider or Reseller
McGraw Communications, Inc.		Not a Broadband Provider or Reseller
Metro PCS		Not a Broadband Provider or Reseller
Mitel NetSolutions, Inc.		Not a Broadband Provider or Reseller
Network USA, LLC		Not a Broadband Provider or Reseller
NextGen Communications, Inc.		Not a Broadband Provider or Reseller
Petrocom License Corporation		Not a Broadband Provider or Reseller
Pleasant Vision, Inc.		Not a Broadband Provider or Reseller
Qualcomm Incorporated		Not a Broadband Provider or Reseller
Qwest Communications Company, LLC		Not a Broadband Provider or Reseller
Red River Cable TV Co, Inc.		Not a Broadband Provider or Reseller
Service One Cable TV		Not a Broadband Provider or Reseller
Southern Light of Louisiana, LLC		Not a Broadband Provider or Reseller
Stratos Offshore Service Company		Not a Broadband Provider or Reseller
Superior Wireless		Not a Broadband Provider or Reseller

Filing Company DBA	Filing Company Name	Status
TeleConex, Inc.		Not a Broadband Provider or Reseller
Telepak Networks, Inc.		Not a Broadband Provider or Reseller
Toly Digital Networks, Inc.		Not a Broadband Provider or Reseller
TX-11 Newco LLC		Not a Broadband Provider or Reseller
US LEC Communications Inc. D/B/A PAETEC		Not a Broadband Provider or Reseller
Verizon Business Global LLC D/B/A Verizon Business		Not a Broadband Provider or Reseller
Wave2Wave Communications Inc.		Not a Broadband Provider or Reseller
Wow Technologies, Inc.		Not a Broadband Provider or Reseller
Alltel Corporation	Affiliate of Verizon	Other
Command Conect, LLC	Affiliate of Cameron Communications	Other
DSLnet Communications, LLC	Affiliate of MegaPath	Other
Interlink Communications Partners LLC	Affiliate of Charter Communications	Other
Louisiana Unwired, LLC	Affiliate of Sprint	Other
MediaCom	Affiliate of CommuniComm Services	Other
Plaquemines Cablevision	Affiliate of Etan Industries, Inc.	Other
TriParish.net	Affiliate of Computer Sales and Services, Inc.	Other
Trust Cable TV	Affiliate of Bailey Cable	Other
Wirelessco, L.P.	Affiliate of Sprint	Other
Alliance Communications Network		Potential
Broadcore, Inc.		Potential
Broadview Networks Holdings, Inc.		Potential
Broadvox, LLC		Potential
Cobridge Communications		Potential
Cypress Communications Operating Company, LLC		Potential
Ernest Communications, Inc.		Potential
First Choice Technology of Louisiana, LLC		Potential
Harbor Communications, LLC		Potential
Kricket.net		Potential
Matrix Telecom, Inc.		Potential
Public Service Communications, Inc.		Potential
SkyRider Communications, Inc.		Potential
The Bayou Telephone Company, Inc.		Potential
The Other Phone Company, Inc. D/B/A Access One		Potential

Filing Company DBA	Filing Company Name	Status
Communications		
Windstream		Potential
XO Communications Services, Inc.		Potential
Acadania Wireless		Provider
AllensTV	AllensTV	Provider
American Warrior Network	Communication Construction Services	Provider
AT&T Corp, Inc.	AT&T Corp, Inc.	Provider
AT&T Louisiana	BellSouth Telecommunications, Inc.	Provider
AT&T Mobility LLC	AT&T Mobility LLC	Provider
Audubon Cablevision	Bailey Cable TV, Inc.	Provider
Bayou Cable Inc	Bayou Cable Inc.	Provider
Bayou Internet Inc.		Provider
Bluebird Wireless Broadband Services, LLC		Provider
Buford Media Group		Provider
Cable One	Cable One	Provider
CableSouth Media (formerly known as Media3)		Provider
Cameron Communications	Cameron Telephone Company, LLC	Provider
Cameron Communications	Elizabeth Telephone Company, LLC	Provider
Cameron Communications	LBH, LLC	Provider
Campti-Pleasant Hill Telephone Co., Inc.	Campti-Pleasant Hill Telephone Co., Inc.	Provider
Cellular South		Provider
CenturyLink	CenturyTel, Inc.	Provider
Charter Communications	Chater Communications	Provider
CMA Communications	Etan Industries, Inc.	Provider
Cogent Communications, Inc.	Cogent Communications, Inc.	Provider
Comcast	Comcast Cable Communications, LLC.	Provider
CommuniComm Services	James Cable	Provider
Computer Sales & Services, Inc.	Computer Sales & Services, Inc.	Provider
Conterra Broadband Services D/B/A DETEL		Provider
Covad Communications Company	DIECA Communications, Inc.	Provider
Cox Communications	CoxCom Inc.	Provider
CP-Tel Network Services	CP-Tel Network Services	Provider
Cricket Communications, Inc.	Leap Wireless International, Inc.	Provider
Delcambre Telephone Co., LLC	Delcambre Telephone Co., LLC	Provider
East Ascension Telephone Company LLC	EatelCorp Inc	Provider
Fulair Wireless	Fulair Wireless	Provider
HughesNet	Hughes Communications, Inc.	Provider

Filing Company DBA	Filing Company Name	Status
Hunt Telecom		Provider
Integrated Data Systems		Provider
Interactive E-Solutions		Provider
Kaplan Telephone Co	Kaplan Telephone Co., Inc.	Provider
Kinetix Technologies	Kinetix Broadband, LLC	Provider
Level 3 Communications, LLC	Level 3 Communications, LLC	Provider
LUS Fiber	Lafayette City-Parish Consolidated Government	Provider
Maximum Access, LLC		Provider
Nexus Systems, Inc.		Provider
NORTHEAST LOUISIANA TELEPHONE CO., INC.	NORTHEAST LOUISIANA TELEPHONE CO., INC.	Provider
PC One Cable LLC		Provider
Radio Communications Service	Gonthier, Inc.	Provider
Reserve Telecommunications	Reserve Long Distance Co.	Provider
Skycasters	Skycasters, LLC	Provider
Skycom1		Provider
Spillway Communications Inc.	Spillway Communications Inc.	Provider
Sprint	Sprint Nextel Corporation	Provider
Squire Creek Communications, LLC	Squire Creek Communications (SSL)	Provider
Star Communications	Star Telephone Company, Inc.	Provider
StarBand Communications Inc.	StarBand Communications Inc.	Provider
Suddenlink Communications	Cebridge Acquisition, LP	Provider
Suddenlink Communications	Classic Cable of Louisiana, LLC	Provider
T-Mobile	T-Mobile USA, Inc.	Provider
Trust Cable	Trust Cable TV, Inc.	Provider
tw telecom of lousiana llc	tw telecom of lousiana llc	Provider
Verizon Wireless	Cellco Partnership and its Affiliated Entities	Provider
ViaSat, Inc. (fomerly WildBlue Communications, Inc.)		Provider
Vision Communications	SJI, LLC	Provider
Vision Communications	Vision Communications, LLC	Provider
Xfone USA, Inc.	Xfone USA, Inc.	Provider
Access Point, Inc.		Reseller
Birch Communications, Inc.		Reseller
BullsEye Telecom, Inc.		Reseller
COMTECH 21, LLC		Reseller
DeltaCom, Inc.		Reseller
Meriplex Communications, Ltd.		Reseller
Metropolitan Telecommunications Holding		Reseller

Filing Company DBA	Filing Company Name	Status
Company		
Network Telephone Corp. D/B/A Cavalier Business Communications		Reseller
New Edge Network, Inc.		Reseller
NuVox, Inc.		Reseller
Talk America Inc. D/B/A Cavalier Telephone and TV		Reseller
TEC of Jackson, Inc.		Reseller
Telefonica USA, Inc.		Reseller
Tennessee Telephone Service, LLC D/B/A Freedom Communications USA, LLC		Reseller
XPANCE Broadband, Ltd.		Reseller

Methodologies Used to Create and Validate Broadband Datasets For the October 2012 SBDD Submission

EXECUTIVE SUMMARY

Broadband data for Massachusetts was collected, integrated and verified by the Massachusetts Broadband Institute (MBI), a division of the Massachusetts Technology Collaborative (MTC). This data was prepared for the National Telecommunications and Information Administration (NTIA) as part of the State Broadband Data and Development (SBDD) grant program and will be displayed on the National Broadband Map. This data is current as of June 30, 2012 and will continue to be verified and updated to improve the quality and accuracy of the information to support MBI activities including adoption studies and last mile deployment planning.

About the MBI

The MBI is the central broadband entity for the Commonwealth of Massachusetts, created on August 4, 2008 when Governor Deval Patrick signed Chapter 231 of the Acts of 2008, *An Act Establishing and Funding the Massachusetts Broadband Institute* (the “Broadband Act”). The mission of the MBI is to extend affordable, robust high-speed Internet access to all homes, businesses, schools, libraries, medical facilities, government offices and other public places across our state.

The Broadband Act gives the MBI the authority to invest up to $40 million of state bond funds into broadband infrastructure. This bonding authority is structured as an “incentive fund” intended to stimulate private industry investments that will complement the MBI’s public investments. The MBI is investing its funds in long-lived infrastructure assets, such as conduit, fiber-optic cable and wireless towers, which will lower the cost of entry for broadband providers and make it economically feasible for such firms to provide broadband access service to currently unserved residential, business and institutional customers. For more information about the MBI and its programs and activities, visit the web site at www.massbroadband.org.

Data Summary

The MBI has collected data for the 31 of 40 companies that meet the SBDD program definition of “broadband service provider” in Massachusetts. The complete list of potential providers also includes resellers and other providers that do not meet the SBDD definition as well as companies that filed FCC Form 477 but do not actually provide broadband service in MA. This list may be found in the “Broadband Providers in Massachusetts” section starting on page 13.

Provider Lists	# Providers
Potential providers in MA (from FCC Form 477 and other sources)	144
Verified as a provider in MA (including resellers and other providers that don’t fit the NOFA definition of “provider”	91
Data obtained for or from the provider (included in the October 2012 data submission)	35

Data was acquired from 33 providers of residential and business broadband access in Massachusetts and created from the web sites of 2 additional providers. Data transmission technologies in the datasets include asymmetric and symmetric DSL, other copper wireline, DOCSIS 3.0 and other cable, fiber optic, unlicensed fixed wireless, 3G and 4G mobile wireless and satellite technologies. This information was integrated and submitted to the NTIA in the following four datasets.

Dataset	# Providers	# Records
BB_Service_CensusBlock	18	419,154
BB_Service_RoadSegment	11	11,819
BB_Service_Wireless	15	27
BB_ConnectionPoint_MiddleMile	17	602

Information on broadband services at Community Anchor Institutions (CAIs) were collected by phone, email and web surveys. Approximately 20% of the CAIs participated in the survey, of which 83% subscribe to broadband services.

Dataset	# Institutions	# Records
BB_Service_CAInstitution	5,069	5,343

DATA DEVELOPMENT – GENERAL

Data development was performed using Esri ArcGIS 10.1 software.

Data Integration

Data were received from broadband service providers in varying formats and levels of detail. No two datasets were alike, which required a significant amount of manual review and editing to integrate the information into a common format. Although Excel and Shapefile templates were made available, very few datasets were received in the template formats and attributes were not always provided using the standardized coded values requested. In addition, attribute field names were inconsistent between datasets, contained spaces and special characters or were missing altogether. These differences prevented the use of automated data integration models to format and import data into standardized feature class templates.

All attributes were standardized so that the provider name, doing-business-as name and FCC registration numbers were consistent throughout the datasets and that attributes complied with valid value list (e.g., for technology of transmission, spectrums used, maximum advertised and typical speeds, end user category, etc.).

Geocoding

Unless otherwise specified, address data was geocoded using street addresses and zip codes from NAVTEQ streets data, which was developed though a partnership between NAVTEQ and the

Massachusetts Office of Geographic Information (MassGIS) for increased geocoding accuracy and success rates for the State E911 data.

Data transfer model loading
The final datasets for each provider were appended and loaded into the SBDD transfer schema. Geometry and topology checks were performed a final time and the data were checked for conformance with SBDD database and business rules.

DATA DEVELOPMENT – WIRELINE AVAILABILITY

This section describes the methods used to create the following datasets representing wireline broadband availability (e.g., cable, xDSL, other copper wireline, fiber optic and other unclassified wireline services) by census block and/or road segment:

- BB_Service_CensusBlock and
- BB_Service_RoadSegment

The various wireline broadband availability data formats received include:

1. Non-geographically referenced CAD files containing cable or fiber strands;
2. Geographically referenced Shapefiles containing census block polygons or road segments;
3. Excel spreadsheets or delimited text files containing census block IDs
4. Excel spreadsheets or delimited text files containing individual street addresses;
5. Excel spreadsheets or delimited text files containing street address ranges
6. Written or verbal narratives of service areas; and
7. Excel spreadsheets containing maximum advertised speeds by US Census Bureau core based statistical area (CBSA) and rural statistical area (RSA).

For areas where census blocks are less than or equal to 2 square miles in area, a template containing 2010 census block polygon geography was used. Otherwise, a template was used containing line geography from 2010 TIGER/Line roads that intersect 2010 census blocks greater than 2 square miles in area. Associated attribute information included provider identification, technology of transmission and upload and download speeds.

Data Integration
The integration methods used, and described below, varied according to the source data format.

1. Integrating CAD strands: Cable strands submitted in CAD format were georeferenced to street centerlines and a 200 foot buffer was created from the strands. 2009 census blocks and 2009 TIGER/Line road segments (in census blocks greater than 2 square miles in area) that intersected the 200 foot buffer were classified as served and associated attribute information from tabular datasets or narratives were populated accordingly. These were later converted to 2010 census blocks and roads, as defined in method 4.

2. Integrating census block and road segment polygons: Data provided in Shapefile format required minor formatting of attribute field names and values to match the common schema.

   (a) The census block vintage (2000 or 2010) was determined by reviewing ID values and attributes were imported into the census block template.

   (b) If vector data was provided from a source other than TIGER/Line roads, a spatial intersection with a 200 foot buffer was performed to transfer attributes to the corresponding TIGER/Line road segments.

3. Integrating tabular data containing census block IDs: Tabular information relating to census blocks referenced either 2009 or 2010 census block data and was joined to the corresponding polygon geometry using the 15 or 16 character FIPS IDs. 2009 census block data were summarized and joined to the 2000 census block polygons using the first 15 characters of the FIPS ID while retaining the maximum advertised and typical speeds and other associated validation and data processing attributes. These were then converted to 2010 census blocks, as defined in method 4.

4. Converting to 2010 census blocks: Census blocks and associated attribute information were converted from 2000 to 2010 census blocks by performing a spatial overlay of the adjusted 2000 census blocks and the new 2010 census blocks. Attribute information was summarized by the 15 character GEO ID (i.e., FIPS ID) and statistics were calculated to carry over the appropriate attribute information (e.g. maximum advertised speeds), which were loaded back into a template containing the 2010 census block geometry.

5. Integrating tabular data containing individual street addresses: Tabular data containing individual street addresses, generally representing subscriber addresses, were geocoded using NAVTEQ streets data to generate point locations. 2010 census blocks and 2010 TIGER/Line road segments (in census blocks greater than 2 square miles in area) that intersect a 200 foot buffer of the points were classified as served. Associated attributes were also imported.

6. Integrating tabular data containing street address ranges: (a) If tabular data was based on 2010 TIGER/Line roads and included a TIGER line ID (TLID), the attributes were loaded into a template containing the TIGER/Line geometry by joining the TLIDs.

   (b) If tabular data was not based on TIGER/Line roads or did not have a means for creating a unique ID to link to the TIGER/Line data, the minimum, mean and maximum left and right street addresses were geocoded using NAVTEQ streets data to generate point locations. As with the individual street address methodology above, 2010 census blocks and 2010 TIGER/Line road segments (in census blocks greater than 2 square miles in area) that intersect a 200 foot buffer of the points were classified as served. Associated attributes were also imported.

7. Integrating narrative data: (a) Location information provided in narrative form, such as the names of streets served or unserved, were incorporated by classifying the qualifying road segments as served. A spatial intersection was then performed to classify any census blocks with area less than 2 square miles as served.

(b) Attribute information provided in narrative form generally applied to all records or an easily identifiable subset of records in a dataset and the standardized values were assigned to the appropriate field in batch.

8. Integrating spreadsheets containing speed by CBSA/RSA: The tabular data was joined to corresponding CBSA/RSA polygon geometry using the CBSA/RSA ID. Maximum advertised download and upload speed values were transferred to census block and road segment availability records from the CBSA/RSA polygon they are located within.

Data standardization
All information was imported into to 2010 census blocks and road segments. Records with download speeds below 768 kbps (i.e., that don't qualify as broadband service) were removed from the final dataset.

DATA DEVELOPMENT – WIRELESS AVAILABILITY

This section describes the methods used to create the following dataset representing wireless broadband availability (e.g., fixed and mobile wireless and satellite services) by service area:

- BB_Service_Wireless

The various wireless broadband availability data formats received include:

1. Geographically referenced Shapefiles or MapInfo files containing service area polygons;
2. Geographically referenced KML vector and raster files depicting service areas;
3. Non-geographically referenced PDF and JPG files depicting service area polygons;
4. Hard copy maps with hand-drawn service areas;
5. Excel spreadsheets containing street addresses; and
6. Emails and technical documents containing tower and signal specifications.

Associated attribute information included provider identification, technology of transmission, wireless spectrums used and upload and download speeds. In some cases, attributes were provided in a separate tabular or narrative form or had to be acquired from the provider's web site. If providers offered more than one spectrum, a separate feature was created for each unique provider and spectrum combination.

Data Integration
Data integration methods used, and described below, varied according to the source data format.

1. Integrating service area polygons: Data provided in vector format required minor processing to fix geometry errors and create separate polygons for unique provider and spectrum combinations. Polygons less than 0.125 square miles, except for the islands along the Massachusetts coastline, were removed and the remaining polygons were dissolved to create a single feature for each unique provider and spectrum combination. Attribute field names

and values were created, formatted and/or populated from tabular or narrative form to match the standardized template format.

2. Integrating service area raster images: Propagation model outputs provided as KML raster images were imported into the GIS system; however, the geographic reference information was not able to be preserved. The imported raster images were georeferenced in the GIS by matching the intersections of propagation area boundaries and roads in Google Earth. Once georeferenced, the raster images were converted to polygons, then tagged with and aggregated by the associated tower ID and spectrum information to create service areas polygons for each propagation model. Additional associated attribute values were populated from information provided in narrative form.

3. Integrating static maps: The PDF and JPG maps containing wireless access points and service area buffers were georeferenced using known locations, such as road intersections. Service areas were digitized or recreated from buffered points on the georeferenced maps. Individual service areas were tagged with spectrum information and aggregated into a single service area for the provider and spectrum combination. Additional associated attribute values were populated from information provided in narrative form or from providers' web sites and the resulting service area boundaries received confidence score of 1.

4. Integrating hard copy maps: Hard copy maps containing shaded service areas were reproduced by digitizing boundaries based on known map locations, such as road intersections. Associated attribute values were populated from information provided in narrative form and the resulting service area boundaries received confidence score of 1.

5. Using tabular data containing street addresses: Tabular data containing individual street addresses, representing subscriber addresses or addresses where service was determine not to be available, were geocoded using NAVTEQ streets data to generate point locations. These locations were compared to service areas and propagation models to verify boundaries.

6. Modeling with tower and signal specifications: Wireless tower and signal specifications (e.g., latitude, longitude, cell site height, cell site frequency and effective radiated power) were used as input parameters in SPLAT! radio frequency signal propagation, loss, and terrain analysis software. Service area boundaries were derived from the received power contours in the resulting propagation models. Additional associated attribute values were populated from information provided in narrative form.

7. Integrating online service maps: Wireless service coverage maps downloaded as images from some providers' web sites, georeferenced using roads and other map features and classified by colors into 2 categories (broadband service and all other). The resulting raster representations were converted to polygons representing the providers' wireless service areas.

Data standardization
Service area datasets for each provider were clipped to the state boundary and self-intersecting lines were fixed prior to loading into the SBDD transfer schema.

DATA VERIFICATION – WIRELINE AND WIRELESS AVAILABILITY

This section describes the methods used to verify the following datasets representing wireline broadband availability (e.g., cable, xDSL, other copper wireline, fiber optic and other unclassified wireline services) by census block and/or road segment and wireless broadband availability (e.g., fixed and mobile wireless and satellite services) by service area:

- BB_Service_CensusBlock,
- BB_Service_RoadSegment and
- BB_Service_Wireless

Verification of availability data received from providers is essential to determining the accuracy and completeness of the resulting broadband availability maps and is an ongoing process. Methodologies continue to be developed and implemented for data verification and are incorporated into a confidence ranking process. The data verification and confidence ranking methods are described below.

The data verification process employs the following methods (including ground truthing, modeling, community reviews, crowd sourcing, drive testing and Web research), which supply input for the confidence ranking methodology.

1. Cable service area modeling: Cable strand data for incumbent cable providers were acquired as georeferenced MapInfo files from the MA Department of Telecommunications and Cable (DTC) in 93% of the 305 cable-served towns. The strands were imported and a 200 foot buffer was created to approximate the distance from the cable that a structure can receive service without excessive cost or delay. The 200 foot distance was selected based on observed distances between poles and the acceptable distances of structures from cable as defined in cable license agreements. Census blocks and road segments acquired from providers that intersected the resulting service area buffers for that provider were given an increased confidence score.

2. DSL service area modeling: DSL service areas were modeled from known DSL-equipped central office locations, which were geocoded using NAVTEQ streets data and refined using aerial photography, street views and bird's-eye views from Google Maps and Bing Maps. A linear network was developed, using a comprehensive roads dataset maintained by the MA Department of Transportation (MassDOT), that encompassed all roadways within 17,800 linear feet of the central office location. A 200 foot buffer of the network was created to define a maximum service distance of 18,000 feet from the central office to the service location, based on input from industry experts, with the same 200 foot distance from pole to structure that was used in the cable model. The resulting service area buffers were cropped

at town boundaries except where central offices were known to serve neighboring towns. Census blocks and road segments acquired from providers that intersected the estimated service areas for that provider were given an increased confidence score.

3. Infrastructure field surveys: Targeted field work has been performed to locate broadband infrastructure, such as DSL-equipped remote terminals (RTs). As with the central offices, locations were mapped using address and landmark information acquired in the field by geocoding with NAVTEQ streets data and refining with aerial photography, street views and bird's-eye views from Google Maps and Bing Maps. Although many DSL-equipped RTs have been located in the field, they have not yet been incorporated into the DSL service area model yet due to the difficulty of predicting the directional nature of services provided from those locations. However, the locations are valuable for visual review of DSL coverage areas claimed by providers that fall outside of modeled service areas to evaluate the likelihood of service from a given RT location. These visual reviews are performed by a team consisting of a GIS expert and a DSL technology expert. Confidence scores are modified accordingly.

4. Public surveys: Broadband subscription information is collected through web-based broadband surveys from the public and from community anchor institutions (see www.massbroadband.org/mapping/survey.html). The surveys are publicized through targeted events and publications and MBI email notifications. Information collected includes location, provider name, transmission technology, price, and speed for homes, businesses, and institutions throughout the state. At this time, the survey data is only used to verify availability by provider name and transmission technology. Census blocks and road segments acquired from providers that are within 200 feet of survey locations are given an increased confidence score. As with the service area models, the 200 foot distance represents the distance at which service can be provided without excessive cost or delay. In the future, speed test results will be summarized by census block to verify typical speed information received from providers as well.

   Responses to the public survey are geocoded through Google Maps and visually refined by the user if desired. Responses to the community anchor institution surveys are linked to existing point locations maintained by the Massachusetts Office of Geographic Information (MassGIS) or affiliated agency. Community anchor institutions that have changed addresses or are not already in the MassGIS datasets are geocoded using NAVTEQ streets data and refined using a combination of institution web sites and aerial photography, street views and bird's-eye views from Google Maps and Bing Maps.

   At this time, responses from the FCC's consumer broadband test are not used for data verification, but will be evaluated for inclusion in future data verification phases.

5. Provider web site information: If information acquired by providers – including availability and speed – appeared to be questionable, a search was performed on the provider's web site to confirm it. This type of verification was only performed when uncertainties arose during visual review of the data. In the future, this type of review may be incorporated into a more

structured approach to validate locations that are geographically dispersed throughout a provider's service area.

6. Community cable and DSL feedback: In collaboration with some Regional Planning Agencies (RPAs), availability maps were generated and distributed to carefully selected community representatives, such as local broadband committee members or town officials, with local knowledge of cable and/or DSL services in their town. The community representatives reviewed and marked up hard copy maps to identify services areas that extended too far or not far enough and, in some cases, provided the last known service location or address along a road. This was initially implemented through a pilot project for the member communities of two RPAs and has been rolled out to 3 additional RPAs in other low confidence areas, which include the remainder of western Massachusetts and part of central Massachusetts. Confidence scores are modified based on feedback from the community representatives, and DSL service area boundaries are modified in the areas with the most knowledgeable representatives.

7. Wireless drive studies: In coordination with local colleges, teams of student volunteers were trained to perform wireless drive studies. The students drove pre-defined routes with intermittent stops to collect wireless signal location and quality information using Android phones operating QoS Solutions' QMapper and QPerf software (see www.qos-solutions.com). The drive studies were performed in the same 5 RPA regions in central and western Massachusetts as the community cable and DSL feedback projects. The drive study results will be overlaid on the wireless providers' service areas and submitted for review by the providers. Further verification or service area boundary modifications may be discussed with providers in areas with anomalous results.

Confidence Ranking

As availability data is verified, the verification status is documented in each individual census block or road segment record or subdivision of a wireless service area. The records are also assigned numeric values from 1 to 5 that represent the level of confidence in the likelihood that service is available at that location. When service availability for a given provider and technology is verified by an alternate source, the confidence value for that location is increased by one, up to a maximum score of 5. A value of 1 represents the lowest confidence in provider data and no corroborating information from alternate sources. A value of 5 represents 3 or more corroborating sources or confirmation through field work. Data of all confidence levels are included in the availability datasets; however, locations that are deemed to be inaccurate as a result of the data verification process may have their confidence value reduced and may be tagged as not part of the service area.

General guidelines of the confidence ranking process are as follows:

- Initial rankings: Data records submitted by providers are given an initial confidence ranking of "1" or "2" depending on the level of ambiguity in the submission method. For example, availability information provided by census block ID, street address or spatial object is given a confidence ranking of 2. Whereas, availability information provided as hand-drawn or narrative estimates may be given a confidence ranking of 1.

- Verification from alternate sources: If availability at a given location is corroborated by an alternate dataset (such as the cable or DSL models, broadband survey responses, cable or DSL service area feedback from community representatives, or wireless drive study data interpolation), the verified location receives a 1 point increase in the confidence score for each corroborating dataset, with a minimum score of 3 and a maximum score of 5.

- Field confirmation: If availability at a given location is confirmed by known service locations identified through field work, it is given a confidence score of 5. Confirmed field locations include known infrastructure, such as DSL-equipped remote terminals, or known service availability acquired in wireless drive studies.

Provider Feedback Loop
All providers that submitted data received a written data submission report that described the format and completeness of the datasets they provided. This report included requests for additional information or alternate formats in the next submission and other data clarifications or corrections needed. Additional feedback was provided by phone or email conversations as needed. In addition, PDF maps of estimated services, based on the census blocks and roads or wireless area boundaries, were provided for verification and/or modification. Information on conflicting alternate data sources may also be provided for comment or challenge. In the future, this process will be standardized and formalized through the development of a web-based provider data portal.

DATA DEVELOPMENT – MIDDLE MILE INTERCONNECTION FACILITIES

This section describes the methods used to create the following dataset representing the location, technology and capacity of facilities that connect a service provider's network to another provider's network or the Internet:

- BB_ConnectionPoint_MiddleMile

Tabular data – including provider identification and facility ownership, capacity and type – were received from providers by street address or latitude and longitude. Latitude and longitude values were used to create point geometry when possible. Otherwise, street address data was geocoded using NAVTEQ streets data.

The MBI did not have alternate data sources for the verification of these datasets.

Data standardization
Facility ownership, capacity and type values were standardized to comply with valid value lists. Due to the field type of double used to store latitude and longitude, values with trailing 0's did not meet the 6-digit business rule. However, to preserve the accuracy of the data, these values

were not modified to contain 6 decimal places. Latitude and longitude values received from providers with less than 6 decimal places were also not modified to prevent misrepresenting the data as more accurate than it really was.

DATA DEVELOPMENT – COMMUNITY ANCHOR INSTITUTION SERVICE SUBSCRIPTIONS

This section describes the methods used to create the following dataset representing the location and broadband service subscription of community anchor institutions throughout the state:

- BB_Service_CAInstitutions

The community anchor institution datasets deemed most relevant to broadband issues in Massachusetts were:

- K-12 schools
- Colleges and universities
- Public libraries
- Hospitals
- Community health centers
- Police stations
- Sheriffs' offices
- Fire Stations
- Career centers
- Town halls

Existing spatial datasets containing community anchor institution names and locations were acquired from state and regional agencies. The attributes were standardized and imported into a template dataset. Missing attributes (e.g., zip codes) were acquired through web searches (e.g., on institution web sites or from the US Postal Service).

Initial data requests were made to state and regional agencies and/or associations to acquire any existing compilations of information on broadband service information at affiliated anchor institutions. Complete or almost complete datasets for career centers, state police and county sheriffs were acquired from the MA Executive Office of Labor and Workforce Development (EOLWD) and MA Executive Office of Public Safety and Security (EOPSS).

For the remainder of the anchor institutions, a campaign was implemented to acquire information through phone, email and web-based surveys from individuals associated with individual anchor institutions who were knowledgeable about the institution's broadband services. Requests were also made through targeted outreach at events and in publications targeted at anchor institutions to increase awareness of broadband issues and participation in the broadband survey. Agencies and organizations that assisted in this effort included the MA Department of Secondary and Elementary Education (ESE), MA Board of Library Commissioners (MBLC), MA Chiefs of Police Association (MCOPA), Massachusetts Municipal Association (MMA), MA Department of Revenue (DOR), Mass League of Community Health Centers (MLCHC) and a CIO group for public and community colleges.

Data standardization
Survey questions were developed to request information that were easily understood and acquired by anchor institution staff. As a result, survey results required additional formatting to standardize the information in accordance with SBDD valid values. This information included broadband subscription status, transmission technology and maximum advertised speeds were collected and standardized to comply with valid value lists. In addition, street addresses for new anchor institutions that were not in the original GIS datasets were geocoded using NAVTEQ streets data and refined using visual references such as Google satellite photography and street view imagery.

In some cases, standardized transmission technology attribute values were used by the MBI to track uncertain technology categories. These were converted in the final datasets, as shown below, to comply with SBDD valid values.

MBI Technology Values	SBDD Technology Values
1: Unknown	0: Other
42: Cable - DOCSIS Unknown	40 or 41: Cable - DOCSIS 3.0 or Other (depending on provider)
72: Fixed Wireless - Unknown	70: Fixed Wireless - Unlicensed

In some cases, transmission technology was corrected to reflect the service known to be offered by the specified provider. For anchor institutions that have more than one broadband connection, only records with the maximum speeds for each transmission technology type were included. For anchor institutions that did not provide broadband information, the broadband service field was set to unknown (BBSERVICE = U).

BROADBAND CHALLENGES IN MASSACHUSETTS

Broadband access differs significantly between the eastern, central and western parts of the state as well as the cape and islands. The majority of “unserved” and “underserved” communities are in western Massachusetts, which represents approximately 1/3 of the land mass in the state. Barriers to broadband access and deployment in this region are primarily due to topography, vegetation and population density. Western Massachusetts, as well as Cape Cod and the islands, currently lacks the middle mile infrastructure needed to encourage private sector development of last mile service or to achieve downstream speeds of 4 Mbps.

Wireline broadband availability in Massachusetts, particularly in western Massachusetts, is overstated in the current broadband datasets. This is due, in part, to generalizations resulting from census block size and population distribution in rural areas. The MBI is also working with communities to incorporate local knowledge of service availability in our feedback to broadband service providers and flagging census blocks and road segments requiring additional verification.

Wireless broadband availability in Massachusetts is also overstated. The reliability of propagation modeling has been identified as a concern in establishing wireless broadband availability. Although topography is factored into propagation models, vegetation is also a significant barrier to wireless in Massachusetts and makes it difficult to determine if service is really available at a location. In addition, at least one fixed wireless provider is not able to accept new customers within its service area due to limited capacity. Responses to the MBI survey also indicate that typical mobile wireless speeds do not always qualify as broadband.

Information provided by the community anchor institutions also requires additional review and modification. Respondents had difficulty selecting the correct transmission technology (e.g., the provider name frequently did not correspond to the technology) and often did not know the advertised speed of their service.

BROADBAND PROVIDERS IN MASSACHUSETTS

The MBI performed web research and/or attempted to contact all of these companies to verify if they were a broadband service provider in Massachusetts. Potential providers were asked the following questions to determine how to classify them on the list and if they should be included on the state and national broadband maps.

1. Do you provide broadband services in MA?
2. What part(s) of MA do you serve?
3. What type of broadband services do you offer?
   - What type of technologies?
   - Do you offer residential services, business services or both?
4. Do you own the infrastructure or are you a reseller?
5. Do you offer separate services under different names or do you have multiple names related to the same service?
6. Can you provide service within 10 days?

Below is the full list of providers potentially offering broadband services in Massachusetts, including companies that filed FCC Form 477 and additional providers identified by the MBI through other sources. Alternate provider names, resulting in duplicate provider entries, were removed from the list.

The list is broken down into three sections.

1. Verified providers with data included in the data submission.
2. Verified providers in Massachusetts that were not included in the data submission. (Note: This category is made up primarily of resellers and other providers that do not fit the SBDD definition of a broadband service provider, generally because they can't provide service within 10 days.)
3. Other companies that do not offer broadband service in Massachusetts.

A. Verified providers included in the October 2012 data submission

Number	Filing Company DBA	Provider Type
1	AT&T Corp, Inc.	Meets NOFA Definition
2	AT&T Mobility LLC	Meets NOFA Definition
3	BELD Broadband	Meets NOFA Definition
4	Charter Communications Inc.	Meets NOFA Definition
5	Chappy WISP	Meets NOFA Definition
6	Comcast	Meets NOFA Definition
7	Country Roads Networks, Inc.	Meets NOFA Definition
8	Covad Communications Company	Meets NOFA Definition
9	Cox Communications	Meets NOFA Definition
10	FairPoint Communications	Meets NOFA Definition
11	Fibertech	Other
12	FiberTower Network Services Corp.	Other
13	GAW High-Speed Internet Inc	Meets NOFA Definition
14	HGE.net Fiber Optic Internet	Other
15	HughesNet	Meets NOFA Definition
16	Level 3 Communications, LLC	Other
17	MetroPCS	Meets NOFA Definition
18	Norwood Light Broadband	Meets NOFA Definition
19	OTT Communications	Meets NOFA Definition
20	PMLDnet.com	Meets NOFA Definition
21	RCN	Meets NOFA Definition
22	Richmond Telephone Company	Meets NOFA Definition
23	Russell Municipal Cable T.V.	Meets NOFA Definition
24	Shrewsbury Electric and Cable Operations (SELCO)	Meets NOFA Definition
25	Sidera Networks	Meets NOFA Definition
26	Sprint	Meets NOFA Definition
27	StarBand Communications Inc.	Meets NOFA Definition
28	Time Warner Cable	Meets NOFA Definition
29	T-Mobile	Meets NOFA Definition
30	USAi.net	Meets NOFA Definition
31	Verizon	Meets NOFA Definition
32	Verizon Wireless	Meets NOFA Definition
33	Warwick Broadband Service	Meets NOFA Definition
34	WildBlue Communications, Inc.	Meets NOFA Definition
35	WiSpring	Meets NOFA Definition

B. Verified providers not included in the October 2012 data submission

Number	Filing Company DBA	Provider Type
36	Clearwire Corporation	Meets SBDD Definition
37	DSCI Corporation	Meets SBDD Definition
38	Mega Broadband Inc.	Meets SBDD Definition
39	segTel, Inc.	Meets SBDD Definition
40	Sentinel Tree Telephone Company	Meets SBDD Definition
41	Towerstream	Meets SBDD Definition
42	tw telecom inc.	Meets SBDD Definition
43	Wave2Wave Communications Inc.	Meets SBDD Definition
44	XO Communications Inc.	Meets SBDD Definition
45	Ace Innovative Networks, Inc.	Reseller
46	ACN, Inc.	Reseller
47	ACN, Inc.	Reseller
48	Airespring, Inc.	Reseller
49	American Telephone Company LLC	Reseller
50	Bandwidth.com, Inc.	Reseller
51	Barry Communications, Inc.	Reseller
52	BCN Telecom, Inc.	Reseller
53	Broadcore, Inc.	Reseller
54	Broadview Networks Holdings, Inc.	Reseller
55	BullsEye Telecom, Inc.	Reseller
56	Communication Solutions Partners, Inc.	Reseller
57	Cordia Corporation	Reseller
58	Evolve IP, LLC	Reseller
59	Fidelity Voice Services LLC	Reseller
60	Granite Telecommunications, LLC	Reseller
61	iCore Networks, Inc.	Reseller
62	Internet & Telephone, LLC	Reseller
63	LY Holdings, LLC	Reseller
64	McGraw Communications, Inc.	Reseller
65	Metropolitan Telecommunications Holding Company	Reseller
66	Midwest Marketing Group, Inc.	Reseller
67	Network Billing Systems LLC	Reseller
68	New Edge Holding Company	Reseller
69	nexVortex, Inc.	Reseller
70	One Communications	Reseller
71	Qwest Communications International, Inc.	Reseller
72	Smart Choice Communications, LLC	Reseller

Number	Filing Company DBA	Provider Type
73	Stage 2 Networks, LLC	Reseller
74	TReseller Technologies	Reseller
75	Utel, Inc.	Reseller
76	Velocity Networks Inc.	Reseller
77	Broadvox Go!, LLC	Other
78	Cbeyond Communications, Inc.	Other
79	Cogent Communications Group	Other
80	Cypress Communications, Inc.	Other
81	EarthLink	Other
82	Ernest Communications, Inc.	Other
83	Global Crossing	Other
84	Lightower Fiber Networks	Other
85	M5 Networks, Inc.	Other
86	PaeTec Corporation	Other
87	South Hadley Electric Light Department	Other
88	Telesphere Networks Ltd.	Other
89	Transbeam Inc.	Other
90	Vocal IP Networx Ltd.	Other
91	Westfield Gas and Electric	Other

C. Other companies that do not offer broadband service in Massachusetts

Number	Filing Company DBA	Provider Type
92	5LINX Enterprises, Inc.	No service in MA
93	8x8, Inc.	No service in MA
94	Access One, Inc.	No service in MA
95	Access Point, Inc.	No service in MA
96	Accessline Holdings, Inc.	No service in MA
97	Apptix, Inc.	No service in MA
98	Aptela, Inc.	No service in MA
99	Birch Communications Inc.	No service in MA
100	C3IP Communications LLC	Dissolved/Liquidated
101	Call Catchers, Inc.	No service in MA
102	Cause Based Commerce Inc.	No service in MA
103	Cincinnati Bell Inc.	No service in MA
104	CommPartners Holding Corporation	No service in MA
105	ConnectMe, L.L.C.	No service in MA
106	Cordia Corporation	No service in MA
107	DataNet Communications Group, Inc.	Needs further research

Number	Filing Company DBA	Provider Type
108	Equinox, Inc.	No service in MA
109	First Communications, LLC	No service in MA
110	GlobalPhone Corp.	No service in MA
111	GreatCall, Inc.	No service in MA
112	IDT Corporation	No service in MA
113	InPhonex.com, LLC	No service in MA
114	IP Communications, LLC	No service in MA
115	Jivetel Communications	No service in MA
116	Kosmaz Technologies, LLC	No service in MA
117	LightSquared LP	No service in MA
118	Matrix Telecom, inc.	No service in MA
119	Millicorp	No service in MA
120	Mitel Netsolutions Inc.	No service in MA
121	Mix Networks, Inc.	No service in MA
122	N.W.ComTech, Inc	No service in MA
123	Navigator Telecommunications, LLC	No service in MA
124	NextWave Wireless Inc.	No service in MA
125	NOS Communications, Inc.	No service in MA
126	OnWav, Inc.	No service in MA
127	Openairboston.net	No service in MA
128	Phone.com, LLC	No service in MA
129	PNG Telecommunications, Inc.	No service in MA
130	Proximiti Technologies, Inc.	No service in MA
131	Quality Telephone Inc.	No service in MA
132	Razorline LLC	No service in MA
133	Reign Integrated Network Solutions LLC	No service in MA
134	Semperon Corporation	No service in MA
135	Spectrotel, Inc.	No service in MA
136	Telekenex, Inc.	No service in MA
137	TelLan Network Technologies, Inc.	No service in MA
138	Thinking Phone Networks, LLC	No service in MA
139	Tidal Communications, LLC	No service in MA
140	Trans National Communications International, Inc., TNCII	No service in MA
141	vCom Solutions	No service in MA
142	VoIPStreet, Inc.	No service in MA
143	Vonage Holdings Corp.	No service in MA
144	Zayo Group, LLC	No service in MA

Maryland Broadband Mapping Initiative
Broadband Availability Map Data
Submission Summary for Fall 2012

September 27, 2012

Submitted by:
Michael S. Scott, PhD, GISP
Eastern Shore Regional GIS Cooperative
Salisbury University
msscott@salisbury.edu
410.543.6456

Table of Contents

Submission Summary

The staff of the Eastern Shore Regional GIS Cooperative (ESRGC) at Salisbury University in Salisbury, Maryland, in its role as primary technical lead for the Maryland Broadband Mapping Initiative, originally contacted 120 potential facilities-based broadband service providers (BSPs), receiving data from 41 providers which representing 39 different companies (See Appendix A). In this sixth submission, 40 different companies responded to our data request An overall summary of the Fall 2012 data submission can be described as:

50 potential facilities-based broadband service providers were contacted
4 BSPs from previous submissions were not contacted because they have merged with other BSPs
7 BSPs did not respond but had in previous submissions
2 BSPs responded but did not provide updated data
40 BSPs responded and either provided data or affirmed no change to data
1 BSPs responded and agreed to provide data but have not as of September 28, 2012

Of those that provided broadband availability data,

16 provided addresses
7 provided census block information only
9 provided census blocks and road segments
18 provided wireless coverage areas

In addition, 8 of the 50 responsive BSPs provided middle mile infrastructure points

Since our last submission, we gained one participant namely Skycasters. MegaPath, DSL.net, Inc, and DSLnet Communications LLC have all merged with Covad Communications Company and Covad has included these areas in this submission. Finally, we received word from One Communications that they will no longer be participating in the Maryland Broadband Mapping Initiative.

Data Processing

For a specific discussion of the data processing steps for any particular BSP, please see the individual dataset report for each BSP below. In general, the data processing used to create the Fall 2012 data submission depended on the type of data provided by the BSP.

Census Blocks

To process the served census blocks, the steps are as follows. First, geocode the provider-submitted address table (if applicable) to the ArcGIS 10 US Streets Geocode Service. Second, spatially join the address points to the Year 2010 census blocks. Third, divide the address points into the different technologies of transmission. Fourth, select those address points that are within the census blocks that are greater than 2 mi^2, exporting them as a separate feature class. Fifth, switch the selected set (thus creating all the address points in blocks that are less than 2 mi^2), and select those blocks. Sixth, import the provider-submitted table of served census blocks and merge with the address-created blocks (if applicable). Finally, export the results.

Road Segments

To process the served road segments that are within census blocks that are greater than 2 mi^2, we import the table of road segment address ranges provided by the BSP, unless a Tiger Line ID (TLID) is provided. We then take the TO address values and the FROM address values on both the left and the right side of the segment and concatenate those address numbers with the street name, type, and direction, thus creating a maximum of 4 point addresses per road segment. Those point addresses are then address matched against the ArcGIS 10 US Streets geocoding service. We can then find the street segments in TIGER that are adjacent to the located points. Finally, we select those TIGER lines that intersect the census blocks that are greater than 2 mi^2. If a TLID is provided we join the delivered table to the appropriate year Tiger Lines by the TLID and the joined results are exported. The result can be loaded into the SBDD Transfer data model.

Service Addresses

The process for creating the service addresses is the same as the census blocks (above), except that the addresses that fall within the census blocks that are greater than 2 mi^2 are kept as the key feature class.

Middle Mile Infrastructure

Processing the middle mile infrastructure is relatively trivial, in that the providers submit geographic coordinates with the middle mile attributes. Most of the providers, however, do not submit new middle mile data every six months. Therefore, any middle mile infrastructure collected during previous submission periods have been include in the current submission.

Community Anchor Institutions

For the October 2012 data submission, the Center for GIS at Towson University (CGIS) improved the quality of Maryland's Community Anchor Institution (CAI) broadband dataset by focusing on the following action items.

- For each category, perform outreach with primary State of Maryland contacts to aid in data collection and maintenance.

- Determine the "universe" of CAIs in Maryland by verifying existing locations and adding additional locations.
- Enhance the medical category to contain only authoritative licensed facilities and physician group practices and solo offices.
- Improve the percentage of CAIs that have known broadband information.

The most significant change from prior submissions is within the medical database, which was reduced for the October 2012 submission by 22,325 records. As further explained in the Medical/Healthcare section of this narrative, the CAI data collection team discovered a contact within the Maryland Department of Health and Mental Hygiene who directs the Center for Health Information Technology's comprehensive data collection work. Subsequently, the CAI data collection team replaced the previous Medical dataset with a dataset containing only data from the Office of Health Care Quality (OHCQ), due to the previous dataset's issues with duplicates, sustainability, and data accuracy. The team has established a sustainable procedure for obtaining accurate Medical category data for future submissions.

<u>Public Schools K-12</u>
Public schools are the top priority for the K-12 Maryland Schools category. The Maryland State Department of Education (MSDE) is no longer administering the annual Technology Survey that was utilized for previous broadband data collection. Therefore, focus for the Fall 2012 submission was placed on developing a new sustainable method to collect and maintain the data. The CAI data collection team reached out to MSDE and was invited to attend and present at the Quarterly MSDE Chief Information Officers' (CIO) meeting. The CIOs expressed significant interest in the data being collected. The team has requested to participate in the next CIO meeting to discuss a single county case study of how the broadband data can support decisions on technology improvements. In addition, significant positive contacts were made with private K-12 Maryland schools. Data from these contacts will be included in the Spring 2013 submission. For the Fall 2012 submission, a total of 15 institutions were updated. The data were reviewed for errors and the CAIID field was also updated to include the National Center for Education Statistics unique identifier.

<u>Libraries</u>
A connection was made with the Assistant State Superintendent for Libraries. The team was invited to speak at Maryland Public Library Administrators (MAPLA) working group meeting in October about the data collection. An expected outcome of this meeting is an action item for MAPLA members to provide the Maryland Broadband Mapping team with contact information for personnel who can provide broadband information for all 196 Maryland public libraries. In the meantime, the team received a copy of a national survey conducted by the Bill and Melinda Gates Foundation in 2009. From this document, the team collected download speeds and Wi-Fi

details for approximately 150 Maryland public libraries. Additionally, as our Higher Education category outreach efforts yielded results, Broadband connectivity information for Maryland's university and college libraries was also added to the Library category, based on information received during University/College category outreach. The dataset submitted in Fall 2012 contains 369 records. Data for a total of 21 libraries was updated and reviewed for errors. The CAIID field was also updated to include the National Center for Education Statistics (NCES) unique identifier.

Medical

The data collection team reached out to and met with Dr. David Sharp, Director of the Center for Health Information Technology (a component of the Maryland Healthcare Commission within the Department of Health and Human Services [DHMH]), to obtain authoritative, up-to-date medical category data. Dr. Sharp already has mechanisms in place to collect various types of information from licensed medical facilities and physicians in Maryland.

Dr. Sharp's team conducts a mandatory annual census on all licensed ambulatory surgery facilities, long-term care, hospitals, and physicians in Maryland. Although the census does not currently collect broadband information, Dr. Sharp agreed to add the Maryland Broadband Mapping team's CAI data questions to the April 2013 census for ambulatory surgery facilities and the July 2013 long-term care, hospital, and physician census. This will assist with sustainability for collecting and maintaining broadband information for medical facilities and physicians.

The Office of Health Care Quality (OHCQ) updates the licensed medical facility data on a monthly basis and makes the data available on the OHCQ website. Maryland's CAI data collection team identified and geocoded licensed medical facilities to obtain the spatial locations. Dr. Sharp's team will provide a list of all licensed primary care physicians in October 2012. While the primary focus for the broadband data collection will be on group practices (clusters) of licensed primary care physicians, a key goal is to capture connectivity gaps, particularly in rural areas. Because of this goal and the likelihood that there are more solo practices in rural than urban areas, the team will also collect data for physicians down to the solo practice level for the Spring 2013 data submission.

The dataset submitted in October 2012 contains 2,705 records. The medical database was significantly changed from prior submissions due to the quality of information received from Dr. Sharp. The number of records in this category was reduced by 22,325 records. Data provided in previous submissions have been replaced with only the OHCQ data listed above because of issues with duplicates, sustainability, and the data accuracy.

Public Safety

We continue to work with the Maryland Fire Chief Association, the Maryland Fireman's Association, the regional State Fire Marshals, and the Maryland Emergency Management Agency (MEMA) for collaboration and assistance in reaching out to the public safety community for data collection. The dataset submitted for Fall 2012 contains 1,714 records; a total of 38 institutions were updated.

Universities
For the Fall 2012 submission, the data collection strategy was expanded to collect broadband data for Maryland's community colleges and private universities. Email and phone contacts were made with each facility individually. In addition, contacts were made with the Maryland Independent College and University Association (MICUA) and the Maryland Association of Community College's (MACC) Chief Information Officers affinity group for help with collecting broadband data at member institutions. Both organizations agreed to help collect and maintain the data in the future by surveying member institutions. The dataset submitted for Fall 2012 contains 108 records. A total of 38 institutions were updated. The CAIID field was also updated to include the National Center for Education Statistics (NCES) unique identifier.

Community Support – Government
In June 2012, emails were sent to all 24 jurisdictional contacts for updates to their CAI data. Nine counties responded. The dataset submitted for Fall 2012 contains 1,398 records.

Community Support – Non-Government
Work continued on building the partnerships necessary to collect and maintain the nongovernmental CAIs. Specifically, negotiations continue with the University of Maryland Center for Substance Abuse Research (CESAR) team to to obtain an extract of the MDCSL database containing records that fit the non-government community support category, and to examine options for establishing a sustainable method for collecting the required broadband service level information for this CAI category. The dataset submitted in Fall 2012 contains 2,365 records. A total of 314 records were removed from the database since the Spring 2012 submission because they were duplicates.

In summary, the Maryland broadband CAI database now contains 10,575 records, a decrease of 22,713 (68.2%) from the Fall 2011 submission. However, we believe that the vast majority of the records removed were of questionable quality. Because of both the team's data collection efforts and the removal of so many unknown data points, information regarding the broadband service increased to 3,708 (35.1%) CAIs.

		Spring 2012 Submission			Fall 2012 Submission		
	CAI Category	# CAIs with BBSERVICE	Total CAIs	% of CAIs with BBSERVICE	# CAIs with BBSERVICE	Total CAIs	% of CAIs with BBSERVICE
1	School (K-12)	1,418	1,922	73.7%	1,433	1,916	74.8%
2	Library	252	366	68.9%	273	369	74.0%
3	Medical / Healthcare	112	25,030	0.4%	95	2,705	3.5%
4	Public Safety	993	1,695	58.6%	1,031	1,714	60.2%

5	University / College/Other Post-Secondary	50	111	45.0%	96	108	88.9%
6	Other Community Support - Government	716	1,485	48.2%	712	1,398	50.9%
7	Other Community Support - Non-Government	74	2,679	2.8%	68	2,365	2.9%
	Total	**3,615**	**33,288**	**10.9%**	**3,708**	**10,575**	**35.1%**

Data Verification

The ESRGC, in partnership with the Center for GIS at Towson University and as a subcontract to the SBDD grantee in Maryland, the Maryland Broadband Cooperative, conducted a number of verification and validation tests on the provider-submitted broadband availability data. In the event that inconsistencies or errors were found, certain changes are made to the provider-submitted data. These changes are either retention but modification to provider-submitted data or the removal of the provider-submitted data, depending on the type and severity of the error. Given our extensive review and testing of broadband availability information in Maryland, we feel confident that the changes we make are improving the accuracy of the provider's submission. We continue to search for new ways to refine the submitted data and present an ever-increasing accurate portrayal of broadband availability in our state.

In the first phase of data validation, the provider-submitted data is processed for inclusion within the NTIA transfer model. During this processing, several data inconsistencies can be found. They include:

1) Submitted download and upload speeds do not match the values expected for a given technology of transmission
2) Service addresses are located hundreds of miles away from the provider's known service areas
3) Served blocks with technologies and speeds that do not meet the working definition of broadband
4) Addresses/road segments/blocks that have no technology of transmission

For each of these, the initial remedy is to contact the provider for clarification/modification. If that communication is not successful for whatever reason, the data team makes a decision to either modify the data to match expected values or removes the errant data.

In the second phase of data validation, a maximum of fourteen data checks are conducted on each of the provider-submitted broadband availability data, listed below. Different versions of data verification tests were conducted on submissions from wireline broadband providers versus wireless providers, because of the differing submission geometry. Each check will be explained in detail below. The result of each of these tests is an error statistic, cataloged in a data verification report. No changes to the data are made based on these tests.

1) Maximum down/upload speeds reported by provider
2) Typical down/upload speeds reported by provider
3) Typical down/upload speed from speed tests
4) Speed tests match reported typical speeds or are within 1 speed tier
5) Speed tests present within blocks not reported as served by provider
6) Census blocks/coverage area reported to project, but no tract reported directly to FCC
7) Tracts reported directly to FCC, but no census blocks/coverage area reported to project
8) Census blocks/coverage areas versus unserved area locations reported
9) Total number of unserved area locations reported per provider
10) Web search verification
11) Census blocks that are outside providers Cable Franchise Boundary
12) Census blocks that are within another providers Cable Franchise Boundary
13) Census blocks that are outside DSL boundary
14) Wireless broadband presence and speed systematic field sampling
15) Comparison of areas reported as served in last submission, to areas served this submission

This last test was adding during this Spring 2012 submission round. It came to our attention as we were examining the broadband availability data for another purpose that some of the blocks that were submitted as "served" by a provider in previous submissions were being submitted as "unserved" in later submissions. While it is certainly possible that a provider decides to stop serving the residents and businesses of a particular block, it is not probable and is more likely explained by an error either in reporting or geocoding.

Finally, the third and final phase of data validation is an in-depth discussion of a provider’s data submission and the subsequent data tests with the provider via web conference. During this discussion, a detailed review of the submission takes place including an examination of their resulting availability maps. Several of these web conferences were attempted in preparation for the Spring 2012 submission, with limited results. Most providers were not willing to admit that any portion of their data were inaccurately portrayed. However, we have now conditioned several of the providers to ask for and review the maps, prior to our submission to the NTIA. While no major (or even minor) modifications have been requested prior to submission, that feedback loop has been established.

Maximum down/upload speeds reported by provider

Facilities-based BSPs are required to provide the maximum downstream and upstream speeds by the NTIA and the NoFA of August 2009. These speeds are dependent upon the technology of transmission the BSP uses to deliver broadband service. Speeds are reported in ordinal categories, or tiers, as defined by the NoFA. They are:

Downstream Speed Tier	Upstream Speed Tier	Corresponding Speed
--	1	Less than or equal to 200 kbps
--	2	Greater than 200 kbps and less than 768 kbps
3	3	Greater than or equal to 768 kbps and less than 1.5 mbps
4	4	Greater than or equal to 1.5 mbps and less than 3 mbps
5	5	Greater than or equal to 3 mbps and less than 6 mbps
6	6	Greater than or equal to 6 mbps and less than 10 mbps
7	7	Greater than or equal to 10 mbps and less than 25 mbps
8	8	Greater than or equal to 25 mbps and less than 50 mbps
9	9	Greater than or equal to 50 mbps and less than 100 mbps
10	10	Greater than or equal to 100 mbps and less than 1 gbps
11	11	Greater than or equal to 1 gbps

For this data check, the maximum downstream/upstream speeds reported from each provider are summarized in a table. These speeds are summarized for census blocks, wireless coverage areas, road segments, and service address points.

For the data submission, 32 providers (100%) reported maximum downstream/upstream speeds for census blocks. The lowest maximum downstream speed reported is greater than or equal to 768 kbps and less than 1.5 mbps, reported by 5 providers. The highest maximum downstream speed was greater than or equal to 1 gbps, reported by 6 providers. The most frequent maximum downstream speed was greater than or equal to 10 mbps and less than 25 mbps, reported by 15 providers.

Typical down/upload speeds reported by provider

BSPs are required to provide the typical downstream and upstream speeds by the NTIA and the NoFA of August 2009. Typical speeds are, per the NoFA, intended to be “the data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed can achieve consistently during expected periods of heavy network usage.” These speeds are dependent upon the technology of transmission the BSP uses to deliver broadband service. Speeds are reported in ordinal categories, or tiers, as defined by the NoFA (see table above).

For this data check, the typical downstream/upstream speeds reported from each provider are summarized in a table. These speeds are summarized for census blocks, wireless coverage areas, road segments, and service address points

For the data submission, 16 providers (50%) reported typical downstream/upstream speeds. The lowest typical downstream speed was greater than or equal to 768 kbps and less than 1.5 mbps, reported by 3 providers. The highest typical downstream speed was greater than or equal to 1 gbps, reported by 2 providers. The most frequent typical downstream speed of the census blocks was greater than or equal to 10 mbps and less than 25 mbps, reported by 7 providers.

Typical down/upload speed from mobile speed test
Typical down/upload speed from computer-based speed test

Beginning in April 2010, the MBBMI team and the FCC (nearly simultaneously) began collecting speed test information from broadband consumers in the state of Maryland. This speed test information included the downstream and upstream speed in kbps, the signal latency, the street address of the tester, the type of connection location (home, work, etc), the connection technology (cable/DSL, fiber optic, satellite/dial-up, or unknown – MBBMI test only), the IP address of the test machine, and the corresponding BSP. The MBBMI contracted with a company named Ookla to create their test; the FCC used both Ookla and an alternative method developed by a company named MLab.

From mid-April 2010 until May 31, 2012, 12,141 speed tests were collected by MBBMI and 29,504 PC-based speed tests were collected by the FCC (the FCC also collected mobile speed tests, see below). After removing any MLab-based FCC speed tests to insure consistent speed test results and removing any without a valid address, the FCC and the MBBMI speed tests were then combined and geocoded using their street address. With about 12% of the addresses not being able to be resolved, a total of 20,893 of speed tests were used in verification processing. Note that speed tests were collected after May 31, 2012, however, the updated speed test data was not provided by the NTIA in time for use in this submission

The speed tests associated with each reporting BSP were extracted from the geocoded set. The downstream and upstream speeds were classified according to the NTIA's speed tiers (see table above) and the number of tests in each tier were counted. A table of those results in included in each data validation/verification report. For mobile broadband providers, a distinction was made between the results from mobile speed tests (generated by an iOS or Android app) and the results from computer-based speed tests (generated by a web-based speed test) as those results are likely to be different (due to significant hardware/software differences) even though the network being accessed is the same

For the state of Maryland as a whole, the PC-based speed test results are:

Speed Tier	Number of Downstream Tests	% of Downstream Tests	Number of Upstream Tests	% of Upstream Tests
1	549	2.6%	1,568	7.5%
2	1,637	7.8%	4,980	23.8%
3	2,024	9.7%	1,310	6.3%
4	2,002	9.6%	2,888	13.8%
5	1,846	8.8%	6,330	30.3%
6	2,599	12.4%	1,592	7.6%
7	7,849	37.6%	2,013	9.6%
8	1,835	8.8%	189	0.9%
9	480	2.3%	19	0.1%
10	72	0.3%	4	0.0%

For the state of Maryland as a whole, the mobile speed test results are:

Speed Tier	Number of Downstream Tests	% of Downstream Tests	Number of Upstream Tests	% of Upstream Tests
1	7,594	8.8%	14,377	16.6%
2	13,186	15.2%	22,827	26.3%
3	13,125	15.1%	14,374	16.6%
4	14,752	17.0%	9,612	11.1%
5	11,634	13.4%	14,869	17.1%
6	7,982	9.2%	4,881	5.6%
7	17,101	19.7%	5,246	6.0%
8	1,347	1.6%	540	0.6%
9	13	0.0%	8	0.0%
10	1	0.0%	1	0.0%

Speed tests match reported typical speeds or are within 1 speed tier

For the 16 providers that submitted typical speeds for their data, a comparison was conducted between the mode (the most frequent value) of the typical download speed tier from the provider area and the FCC/Ookla speed tests. In instances where the most frequent download speed tier from the speed tests matched, or was within one tier of, the typical download speed tier from the provider, the response to this statement is affirmative (4 providers). When the response to this statement is negative (9 providers), there is question about the typical download speeds that have been submitted by the provider. The remaining 7 providers provided typical speeds but none of their customers have taken a speed test to verify.

Speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted)
Number and percentage of mobile speed tests verifying coverage area
Number and percentage of computer-based speed tests verifying coverage area

Using the location of speed tests submitted through the FCC or the MBBMI speed test tools, the team sought to compare the location of broadband availability submitted by BSPs and the location of actual broadband service reported by speed test takers.

For this verification test on wireline provider census block submissions, the number of census blocks served (as determined by the location of a speed test) but were not reported by provider were calculated. That number is then divided by the total number of blocks submitted by the provider, reported as an error percentage.

For the state of Maryland, the maximum number of census blocks shown to be served by speed test data but not reported by a BSP is 303 (for Comcast Cable Communications, LLC , 0.54% of their total reported blocks). The minimum percentage of served census blocks confirmed by speed test was 0% (7 providers). The maximum percentage was 350% - Cogent had 14 blocks with speed tests but only reported 4 total blocks.

For this verification test on wireless provider coverage area submissions, the following statistics are reported:

1) Confirmation of coverage area served
   - The number/percentage of computer-based speed tests that fall within the BSP's reported coverage area(s).
   - The number/percentage of mobile speed tests that fall within the BSP's reported coverage area(s).
2) Area served, not reported by provider
   - The number/percentage of computer-based speed tests that fall outside the BSP's reported coverage area(s).
   - The number/percentage of mobile speed tests that fall outside the BSP's reported coverage area(s).

For the wireless providers in the state of Maryland, 44% (8 of 18) had computer-based speed tests submitted by users. The maximum number of computer-based speed tests shown to fall within the reported coverage area of a BSP is 634 (for Sprint, 97.8% of their computer-based speed tests). Some BSPs that has 100% of their computer-based speed tests fall within their reported coverage area namely ATTWireless , Cricket Communications, Hughes Communications, and ViaSat Communications, Inc.. The minimum percentage of computer-based speed tests shown to fall within the reported coverage area of a BSP was 5.9% (Easton Utilities, 12 tests fell inside out of 205). On average, 85% of computer-based speed tests fell within the BSP's reported coverage area.

Regarding the number of mobile speed tests that fall within the reported coverage area of a BSP, 61% (11 of 18) of the wireless BSPs had tests and the maximum number came from Sprint customers, with 11,921 tests within their reported coverage area. Five wireless BSPs had 100% of their mobile speed tests fall within their reported coverage area: Believe Wireless, Brookwood Wireless, Cricket Communication, Hughes, and Easton Utilities. ViaSat had the smallest percentage of tests falling within their reported coverage area – 40%. On average, 98.3% of mobile speed tests fell within the BSPs reported coverage areas.

Census blocks/coverage area reported to project, but no census tract reported to FCC
Census tracts reported to FCC, but no census blocks/coverage areas reported to project

Another source of data validation was the FCC's Form 477 data as of December 2011. This dataset is collected semi-annually by the FCC from BSPs, both facility-based and not facility-based. The BSPs report the number of residential and business subscribers to their broadband service per census tract. For comparison, the average census tract in Maryland contains 67 census blocks. While the Form 477 data is much coarser than the SBDD-reported data, it still should align spatially.

Therefore, as another verification check, we test the number of census blocks that are reported by wireline BSPs that have no corresponding reported census tract in the BSP's Form 477 data. Similarly, we test the number of tracts from the wireline BSP's Form 477 data that do not have corresponded census blocks reported in this initiative.

For the state of Maryland, the maximum number of census blocks that were reported as served but had no corresponding Form 477 census tract was 10,430 from Covad Communications Company. On average, 675 census blocks (from 22 providers) had no corresponding census tract. The maximum number of census tracts that had no corresponded reported census blocks was 597 from PAETEC Communications, Inc. On average, 42 census tracts (from 22 providers) had no corresponding census blocks.

For wireless BSPs, we tested the number of census tracts that either intersect or do not intersect each reported coverage area. Because it is not possible to tell what portion of the Form 477 reported census tract may receive the wireless service, a simple intersect between served tracts and coverage areas is the only test available from these data sources. For those wireless BSPs reporting to the FCC on Form 477 (10 of 18), all but one had 100% of their served census tracts intersecting their reported coverage areas. Only NTELOS had less, with 39% of their 477 census tracts intersecting their coverage area.

Census blocks/coverage areas versus unserved area locations reported
Total number of unserved area locations reported per provider

At the MBBMI website (www.mdbroadbandmap.org) and at the FCC website (www.broadband.gov), residents and business owners have the opportunity to report unserved areas. These are locations, specifically addresses, at which the potential broadband customer cannot access broadband service. Those unserved area reports are taken in by the MBBMI team, geocoded according to their address, and are examined for their spatial coincidence with BSP availability coverages. For each wireline provider, the number of census blocks reported as served that contain a unserved area report are calculated, as well as the total number of unserved area reports within a BSPs availability area. For each wireless BSP, the number/percentage of unserved area reports from both the FCC and the MBBMI that fall within and outside the reported coverage area are calculated.

It is important to note that, at the present time, these unserved area reports are unverified. It is possible that broadband service may be available either at the address (but the person reporting the unserved area location was unaware of service availability), or not available at the address because of some unique configuration problem at that address specifically. It is also entirely possible that portions of a census block may be served but other portions may not.

For the state of Maryland, the maximum number of a wireline BSP's available census blocks that contain an unserved area location report is 125 (Verizon Communications, Inc.). This represents 0.16% of Verizon's reported census blocks. The maximum rate of deadzone reports as a percentage of blocks reported is 4.6% (Alantech Online, Inc.). The minimum number is 0 (14 providers). The maximum number of unserved area location reports in a wireline BSP's available area is 188 (Verizon Communications, Inc.).

For the state of Maryland, the maximum percentage of unserved area locations reported from the FCC within a wireless BSP's reported coverage area is 100% (each are satellite providers). The maximum percentage of unserved area locations reported from the FCC within a non-satellite wireless BSP's reported coverage area is AT&T Wireless at 100% (278 of 278). The average percentage of unserved area locations (reported from the FCC) that fall within a wireless BSP's reported coverage area is 44.2% (123 of 278). For those unserved area locations reported by the MBBMI, the maximum percentage of unserved area locations within a wireless BSP's reported coverage area is 100% (231 of 231), true for each of the satellite wireless providers (HughesNet, StarBand, and ViaSat). The maximum percentage of unserved area locations reported from the MBBMI within a non-satellite wireless BSP's reported coverage area is AT&T Wireless at 99.1% (229 of 231). The average percentage of unserved area locations (reported from the MBBMI) that fall within a wireless BSP's reported coverage area is 41.6% (96 of 231).

Web search verification

Some broadband service providers publish service availability query tools on their corporate websites. The MBBMI team took the opportunity to test the broadband availability areas submitted by the BSPs against the BSP's web-based service availability tools. A systematic sampling grid was created for the entire state of Maryland. A sample point was placed every 4000 meters, then the nearest property address (within at most 1000 m) was chosen. This yielded a grid of 1,472 sample points. In Baltimore City, an additional 24 sample points were added (approximately every 2000 meters) in order to have reasonable sampling density within the small area of the City. This brought the total sample points to 1,496.

For each BSP that had a web-based service availability query tool (11 providers), the sample point grid addresses were used to verify the availability of service (or lack thereof) compared to both the reported service area, the area just outside the stated service area, and a random selection of grid points across the state. The following combinations of reported service vs. queried service were tallied:

1) A census block/coverage area was reported as served and the sample was returned as served
2) A census block/coverage area was reported as served but the sample was returned as unserved
3) A census block was not reported as served (or the location was outside the wireless coverage area) and the sample was returned as not served
4) A census block was not reported as served (or the location was outside the wireless coverage area) but the sample was returned as served

The total number of sample points in categories 2 and 4 are reported as error (of commission and of omission, respectively).

For Comcast and Verizon, all 1,496 sample points were used as those two BSPs offer broadband service in all areas of the state.

For the eleven wireline BSPs in the state of Maryland that have a Internet-based availability tool, the maximum omission error rate was 24.5% reported by Comcast. The minimum omission error rate was 0% and was reported by Charter Communications and Starpower. The average omission error rate was 12.2%. The maximum commission error rate was 29.1% reported by Verizon Maryland. The minimum commission error rate was 0% and was reported by Armstrong Cable, Anne Arundel Broadband, and Comcast. The average commission error rate was 5.9%. The maximum total error rate was 33.1% reported by Verizon Maryland. The minimum total error rate was 5.5% reported by Charter. The average total error rate was 18.1%.

Census blocks that are outside provider's own Cable Franchise Boundary
Census blocks that are within a different provider's Cable Franchise Boundary

For those BSPs that provide broadband service via cable modem technology, they are (supposedly) constrained to a service area defined by a local (or several local) cable franchise boundar(ies). The MBBMI team obtained the spatial extent of the cable franchise boundaries within the state of Maryland from the Maryland Broadband Cooperative. With these cable franchise boundary areas, a test can be performed to count both the number of served census blocks that fall outside of a provider's designated cable franchise boundary area and the number of served census blocks the fall within a different provider's cable franchise boundary. The first statistic may or may not be an error. If a cable provider is surrounded by an area that has no competing franchises, some expansion beyond the existing franchise boundary is expected. The second test may also not be an error in that franchise boundaries usually refer to cable television service specifically. A provider may be allowed to expand non-television services like broadband into competing areas. It is also possible that the cable franchise boundaries are not up-to-date.

In Maryland, we can test if any of seven providers report blocks outside of their own boundary. The maximum number of blocks that fall outside the cable franchise boundaries is 7,613 reported by Comcast Cable Communications, LLC. This represents 13.8% of their total number of served blocks. The minimum number of "outside" blocks is 187 reported by Easton Utilities, or 12.5% . The average number of blocks that fall outside the cable franchise boundary is 1,770.

Thirteen broadband providers that deliver service via cable modem have the potential of serving blocks contained within someone else's boundary. The maximum number of blocks that fall into someone else's cable franchise boundaries is 6,194 reported by Starpower. This represents 92.3% of their total number of served blocks. The minimum number of blocks to fall in someone else's boundary is 1 reported by Hotwire Communications, but that represents 100% of their coverage area. The average number of blocks that fall outside the cable franchise boundary is 1,030.

Census blocks that are outside DSL boundary

For those BSPs that provide broadband service via digital subscriber line (DSL) technology, the general area of DSL availability is tracked by several industry groups. The MBBMI team obtained the spatial extent of the DSL availability areas within the state of Maryland from the Maryland Broadband Cooperative. With these DSL availability areas, a test can be performed to count the number of census blocks that fall outside of the DSL availability area. This may indicate an error, although it is possible that the DSL availability boundaries are not up-to-date or correct. There was no metadata concerning currentness or quality included in the DSL availability areas.

In Maryland, 9 providers are eligible for this test. The maximum number of blocks that fall outside the DSL availability areas is 20,220 reported by Verizon Maryland Inc. This represents 26.3% of their total number of served blocks. The minimum number of “outside” blocks is 0 reported by Tata. The average number of blocks that fall outside the DSL availability area is 2,500.

Wireless broadband presence and speed systematic field sampling

Wireless coverage area field testing was not conducted for the Fall 2012 submission.

Comparison of areas reported as served in last submission, to areas served this submission

It recently became clear as we were examining the broadband availability data that some of the blocks that were submitted as "served" by a provider in previous submissions were being submitted as "unserved" in later submissions. While it is certainly possible that a provider decides to stop serving the residents and businesses of a particular block, it is not probable and is more likely explained by an error either in reporting or geocoding. Therefore, we added a test that simply compares the unique block count from the previous submission to this submission. In addition to this simple test, we are making maps of change for each provider and will be reviewing those maps with the providers.

The range of change from the Fall 2011 submission to Spring 2012 was a loss of 40 blocks (Covad) to no change (22 providers) to a gain of 4,944 blocks (Starpower). For those registering change (8 providers), the average was a gain of 1,179 blocks.

Individual Provider Data Summaries

Allied Telecom Group, LLC

DBA: Allied Telecom Group, LLC

Data Characteristics

Date of Original Submission:	3/7/2011
Date of Update Submission:	8/14/2012
Currency of Data:	6/30/2012
FRN:	0014531073
Type of data submitted:	Address Table
Census Block Count:	95
Total Matched Address Points Count:	193
Unmatched Address Points:	0
Number of Technology of Transmission Types:	4
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
    - Number matched: 193
    - Number unmatched: 0
- Spatially join matched address points to 2010 census blocks
- Separate addresses by technology of transmission

Census Block Process:

- Join the spatial join result to the 2010 census blocks based on the GEOID10 field for each technology
    - Export results for each technology
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

<u>Data Verification</u>

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
4	5	4%
7	29	23%
10	57	46%
11	33	27%

Max Upload Category	Count	% of Blocks
4	5	4%
5	29	23%
10	57	46%
11	33	27%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
4	5	4%
7	29	23%
10	57	46%
11	33	27%

Typical Upload Category	Count	% of Blocks
4	5	4%
5	29	23%
10	57	46%
11	33	27%

Typical down/upload speed from 2010 – 2012 <u>computer based</u> speed test:

Speed Test Download Tier	Count	% of Tests
4	1	50%
9	1	50%

Speed Test Upload Tier	Count	% of Tests
6	1	50%
7	1	50%

Computer based speed tests match reported typical speeds or are within 1 speed tier: Yes

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/95 (< 1%)

Typical down/upload speed from 2010 – 2012 <u>mobile</u> based speed test:

Speed Test Download Tier	Count	% of Tests
3	1	13%
6	2	25%
7	5	63%

Speed Test Upload Tier	Count	% of Tests
1	1	13%
2	1	13%
3	2	25%
4	1	13%
7	3	38%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 4/95 (< 4%)

Form477 Verification:

Number of census blocks reported to project, but no tract reported to FCC: 39/95 (41%)

Number of tracts reported to FCC, but no census blocks reported to project: 2

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 1/95 (1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 1

Number of census blocks with dead zones reported via mdbroadbandmap.org: 1/95 (1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 1

Web Search Verification: N/A

Census blocks that are outside DSL boundary: 17/95 (17.9%)

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: 11 census block increase

Anne Arundel Broadband

DBA Name: Anne Arundel Broadband

Data Characteristics

Date of Original Submission:	4/14/2010
Date of Update Submission:	9/10/2012
Currency of Data:	6/30/2012
FRN:	0003773843
Type of data submitted:	Address Table
Census Block Count:	2949
Total Matched Address Points Count:	107378
Unmatched Address Points:	100
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 103647
  - Number unmatched: 840
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 636
  - Number unmatched: 204
- Unmatched address are geocoded to Maryland street centerline address locator
  - Number matched: 636
  - Number unmatched: 204
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Select by location the address points that are completely within a greater than two square mile census block
  - Export as address points to be loaded into the NTIA data model
    - Result: BB_Service_Address
  - Switch the selection and export as points to create census blocks

Census Block Process:

- Join the switched selection (BB_Service_Address) address points to the 2010 census blocks based on the GEOID10 field
    - Export results Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Modification:

- Removed 2 addresses from data set – address out of provider area
    - Milford, MI
    - Cecil County, MD

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	2949	100%

Max Upload Category	Count	% of Blocks
4	2949	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
3	3	5%
4	2	3%
5	9	16%
6	17	29%
7	23	40%
8	1	2%
9	2	3%
10	1	2%

Speed Test Upload Tier	Count	% of Tests
1	3	5%
2	4	7%
3	6	10%
4	45	78%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/2949 (0%)

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
0	7	4%
3	19	11%
4	39	23%
5	48	29%
6	29	17%
7	25	15%

Speed Test Upload Tier	Count	% of Tests
1	77	46%
2	37	22%
3	9	5%
4	41	25%
5	3	2%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 4/2949 (< 1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 8/2949 (<1%)
Number of tracts reported to FCC, but no census blocks reported to project: 3

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 1/2949 (<1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 1

Number of census blocks with dead zones reported via mdbroadbandmap.org: 1/2949 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 1

Web Search Verification: 17/2949 (1%) of census blocks were confirmed using online search feature of given provider

Anne Arundel Broadband WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	85	6%
Result is yes and census block is in served area	17	20%
Result is yes but not in a census block reported as served	15	18%
Result is no and census block is in served area	0	0%
Result is no and census block not served area	53	62%

Census blocks that are outside providers own Cable Franchise Boundary: N/A

Census blocks that fall within another provider's Cable Franchise Boundary: 2773/2949 (94%)

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: no change

Antietam Cable Television, Inc.

DBA Name: Antietam Cable Television, Inc.

Data Characteristics

Date of Original Submission:	7/29/2010
Date of Update Submission:	9/20/2012
Currency of Data:	6/30/2012
FRN:	0002154367
Type of data submitted:	Addresses, Tracts
Census Block Count:	5588
Total Matched Address Points Count:	21847
Unmatched Address Points:	37
Number of Technology of Transmission Types:	3
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
    - Number matched: 21021
    - Number unmatched: 863
- Unmatched address are geocoded to Maryland Property View address locator
    - Number matched: 548
    - Number unmatched: 315
- Unmatched addresses are geocoded to Maryland centerline address locator
    - Number matched: 278
    - Number unmatched: 37
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Select by location the address points that are completely within a greater than two square mile census block
    - Export as address points to be loaded into the NTIA data model
        - Result: BB_Service_Address
    - Switch the selection and export as points to create census blocks

Census Block Process:

- Join delivered tract table to 2010 census tracts, calculate provider fields, export results
  - Load results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	984	13%
9	4604	59%
10	2224	28%

Max Upload Category	Count	% of Blocks
7	984	13%
9	4604	59%
10	2224	28%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
6	3208	41%
9	4604	59%

Typical Upload Category	Count	% of Blocks
3	7812	100%

Typical down/upload speed from 2010 – 2012 <u>computer based</u> speed test:

Speed Test Download Tier	Count	% of Tests
0	1	1%
3	5	3%
4	33	17%
5	126	65%
6	9	5%
7	11	6%
8	2	1%
9	1	1%
10	7	4%

Speed Test Upload Tier	Count	% of Tests
1	1	1%
2	36	18%
3	130	67%
4	26	13%
5	1	1%
6	1	1%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: No

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/5588 (< 1%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	10	5%
3	10	5%
4	46	24%
5	101	53%
6	15	8%
7	9	5%

Speed Test Upload Tier	Count	% of Tests
1	3	2%
2	15	8%
3	136	71%
4	32	17%
5	5	3%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 4/5588 (< 1%)

Form 477Verification:
Number of census blocks reported to project, but no tract reported to FCC: 33/5588 (< 1%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov:
7/5588 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 8

Number of census blocks with dead zones reported via mdbroadbandmap.org:
4/5588 (< 1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 4

Web Search Verification: 59/5588 (1%) of census blocks were confirmed using online search feature of given provider.

Antietam WebSearch Verification Table	**Count**	**Percentage**
Total # of sample points	1496	
Number of sample points with results	123	8%
Result is yes and census block is in served area	59	48%
Result is yes but not in a census block reported as served	8	7%
Result is no and census block is in served area	7	6%
Result is no and census block not served area	49	40%

Census blocks that are outside providers own Cable Franchise Boundary: 735/5588 (13.2%)

Census blocks that fall within another provider's Cable Franchise Boundary: 58/5588 (1%)

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: 3164 census block increase

Armstrong Holdings, Inc.

DBA Name: Armstrong Utilities, Inc.

Data Characteristics

Date of Original Submission:	3/31/2010
Date of Update Submission:	8/1/2012
Currency of Data:	6/30/2012
FRN:	0003765617
Type of data submitted:	Census Block Table & Road Segments
Census Block Count:	2592
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

***See ReadMe.txt**

Data Processing

Census Block Process:

- Join the provided census block table to the 2010 census blocks based on the GEOID10 field
    - Export results
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Road Segment Process:

- Create beginning and ending road segment addresses for all submitted road segments by concatenating the address number, street direction, street name, street type.
- Remove any duplicate addresses and those with no address number.
- Address-match those road segment addresses against the ArcGIS US Streets geocoding service to create beginning/ending road segment points
- Select those TIGER line segments that are within 10 m of a segment point location
- Spatial join the points to the TIGER lines so that the Technology of Transmission and Speed Tiers are attached to the appropriate line segment.
- Select just those line segments that intersect the census blocks that are greater than 2 square miles
    - Export results

- Load exported results into the NTIA data model
  - Result: BB_Service_RoadSegment

Data Verification

Census Blocks

Max Download Category	Count	% of Blocks
9	2592	100%

Max Upload Category	Count	% of Blocks
5	2592	100%

Road Segments

Max Download Category	Count	% of Road Segments
9	198	100%

Max Upload Category	Count	% of Road Segments
5	198	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 <u>computer based</u> speed test:

Speed Test Download Tier	Count	% of Tests
0	12	13%
3	3	3%
4	3	3%
5	13	14%
6	42	46%
7	19	21%

Speed Test Upload Tier	Count	% of Tests
1	2	2%
2	9	10%
3	14	15%
4	65	71%
5	1	1%
6	1	1%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: No

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/2592 (0%)

Typical down/upload speed from 2010 – 2012 <u>mobile</u> speed test:

Speed Test Download Tier	Count	% of Tests
0	116	44%
3	29	11%
4	19	7%
5	33	13%
6	51	20%
7	13	5%

Speed Test Upload Tier	Count	% of Tests
1	42	16%
2	72	28%
3	34	13%
4	108	41%
5	5	2%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 9/2592 (< 1%)

Form 477Verification:
Number of census blocks reported to project, but no tract reported to FCC: 92/2592 (2%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov:
9/2592 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 9

Number or census blocks with dead zones reported via mdbroadbandmap.org:
8/2592 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 9

Web Search Verification: 46/2592 (2%) of census blocks were confirmed using online search feature of given provider

Armstrong WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	166	11%
Result is yes and census block is in served area	46	28%
Result is yes but not in a census block reported as served	40	24.1%
Result is no and census block is in served area	0	0%
Result is no and census block not served area	80	48%

Census blocks that are outside providers own Cable Franchise Boundary: 2132/2592 (82%)

Census blocks that fall within another provider's Cable Franchise Boundary: 742/2592 (29%)

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: no change

AT&T Mobility LLC
DBA Name: AT&T Mobility LLC

Data Characteristics

Date of Original Submission:	3/9/2010
Date of Update Submission:	8/20/2012
Currency of Data:	6/30/2012
FRN:	0004979233
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area “holes” less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
4	2	40%
5	2	40%
7	1	20%

Max Upload Category	Count	% of Area
3	2	40%
5	3	60%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 - 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
0	557	37%
3	370	25%
4	399	27%
5	106	7%
6	37	2%
7	30	2%

Speed Test Upload Tier	Count	% of Tests
1	717	48%
2	407	27%
3	190	13%
4	81	5%
5	41	3%
6	32	2%
7	28	2%
8	3	0%

Mobile based speed tests match reported typical download speeds or are within 1 speed tier:
N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 1498/1499 (99.9%)
Number of mobile speed tests reported outside coverage area: 1/1499 (0.0%)

Typical down/upload speed from 2010 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	7	70%
3	2	20%
4	1	10%

Speed Test Upload Tier	Count	% of Tests
1	5	50%
2	2	20%
3	3	30%

#/% of computer based speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 10/10 (100%)
Number of mobile speed tests reported outside coverage area: 0/10 (0%)

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 326/326 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/326 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
278/278 (100%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
229/231 (99%)

Web Search Verification: N/A
Wireless Verification: N/A

Atlantech Online, Inc.
DBA: Atlantech Online, Inc.

Data Characteristics

Date of Original Submission:	3/7/2011
Date of Update Submission:	9/10/2012
Currency of Data:	6/30/2012
FRN:	0018854935
Type of data submitted:	Address Table
Census Block Count:	22
Total Matched Address Points Count:	39
Unmatched Address Points:	0
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Census Block Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 39
  - Number unmatched: 39
- Spatially join matched address points to 2010 census blocks
- Separate addresses by technology of transmission

Census Block Process:

- Join the spatial join result to the 2010 census blocks based on the GEOID10 field for each technology
  - Export results for each technology
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
11	2	9%
7	20	91%

Max Upload Category	Count	% of Blocks
11	2	9%
7	20	91%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
3	6	13%
4	1	2%
5	20	44%
6	9	20%
7	3	7%
8	3	7%
9	3	7%

Speed Test Upload Tier	Count	% of Tests
2	1	2%
3	10	22%
4	12	27%
5	11	24%
6	2	4%
7	5	11%
8	2	4%
9	2	4%

Computer based speed tests match reported typical speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 10/22 (45%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	4	29%
3	5	36%
5	2	14%
6	1	7%
7	2	14%

Speed Test Upload Tier	Count	% of Tests
1	4	29%
2	2	14%
3	3	21%
5	2	14%
6	1	7%
7	2	14%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 11/22 (50%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 0/22 (0%)
Number of tracts reported to FCC, but no census blocks reported to project: 61

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 1/22 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 2

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/22 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: no change

Atlantic Broadband (Penn), LLC

DBA Name: Atlantic BroadBand

Data Characteristics

Date of Original Submission:	3/26/2011
Date of Update Submission:	9/25/2012
Currency of Data:	6/30/2012
FRN:	0009596883
Type of data submitted:	Address Table
Census Block Count:	3870
Total Matched Address Points Count:	63765
Unmatched Address Points:	4183
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
    - Number matched: 59443
    - Number unmatched: 8505
- Unmatched address are geocoded to Maryland Property View address locator
    - Number matched: 3282
    - Number unmatched: 5223
- Unmatched addresses are geocoded to Maryland center line address locator
    - Number matched: 1040
    - Number unmatched: 4183
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Select by location the address points that are completely within a greater than two square mile census block
    - Export as address points to be loaded into the NTIA data model
        - Result: BB_Service_Address
    - Switch the selection and export as points to create census blocks

Census Block Process:

- Join the switched selection (BB_Service_Address) address points to the 2010 census blocks based on the GEOID10 field
  - Export results Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Modification:

- Provider submitted 92 addresses with Category of End User of 3 - Small Business. The SBDD data model does not allow this code for addresses; the 92 addresses were changed to 5 – Other.

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	3870	100%

Max Upload Category	Count	% of Blocks
3	3611	93%
4	259	7%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
7	3870	100%

Typical Upload Category	Count	% of Blocks
3	3870	100%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	31	15%
3	8	4%
4	17	8%
5	104	49%
6	39	18%
7	13	6%
9	1	0%

Speed Test Upload Tier	Count	% of Tests
1	1	0%
2	192	90%
3	17	8%
4	3	1%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: No

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 10/3870 (< 1%)

Typical down/upload speed from 2010 – 2012 mobile based speed test

Speed Test Download Tier	Count	% of Tests
0	10	3%
3	22	8%

Speed Test Upload Tier	Count	% of Tests
1	6	2%
2	143	50%

4	49	17%
5	127	44%
6	31	11%
7	38	13%
8	9	3%

3	91	32%
4	39	14%
5	7	2%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 20/3870 (< 1%)

Form 477Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 4/3870 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 5

Number or census blocks with dead zones reported via mdbroadbandmap.org: 8/3870 (< 1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 10

Web Search Verification: 87/3870 (2.2%) of census blocks were confirmed using online search feature of given provider

Atlantic Broadband WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	1496	100%
Result is yes and census block is in served area	87	6%
Result is yes but not in a census block reported as served	116	8%
Result is no and census block is in served area	2	0%
Result is no and census block not served area	1289	86%

Census blocks that are outside providers own Cable Franchise Boundary: 1255/3870 (32.4%)

Census blocks that fall within another provider's Cable Franchise Boundary: 266/3870 (6.9%)

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: no change

Bay Country Communications, Inc.

DBA Name: Bay Country Communications, Inc.

Data Characteristics

Date of Original Submission:	8/9/2010
Date of Update Submission:	9/7/2012
Currency of Data:	6/30/2012
FRN:	0020136552
Type of data submitted:	Census Block Table
Census Block Count:	1841
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Census Block Process:

- Join the provided census block table to the 2010 census blocks based on the 2010 block name field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	1841	100%

Max Upload Category	Count	% of Blocks
7	1841	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
4	1841	100%

Typical Upload Category	Count	% of Blocks
2	1841	100%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
3	2	100%

Speed Test Upload Tier	Count	% of Tests
2	2	100%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: Yes

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/1841 (0%)

Form 477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov:
1/1841 (<1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 2

Number of census blocks with dead zones reported via mdbroadbandmap.org:
1/1841 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 1

Web Search Verification: N/A

Census blocks that are outside providers own Cable Franchise Boundary: N/A

Census blocks that fall within another provider's Cable Franchise Boundary:
1439/1841 (78.2%)

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: no change

Believe Wireless, LLC.

DBA: Believe Wireless Broadband

Data Characteristics

Date of Original Submission:	3/1/2011
Date of Update Submission:	7/26/2012
Currency of Data:	6/30/2012
FRN:	9999
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Spectrum not provided
  - Spectrum selected by comparing similar providers and choosing the most likely option
- Use raster analysis to extract coverage area from map
- Repair Geometry on coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area “holes” less than 0.125 square miles
- Simplify Polygon of coverage area
- Load coverage area into the NTIA data model
  - Result: BB_Service_Wireless

Speed Domains:

- Maximum Advertised Speeds changed
  - Reported speeds exceed domain – changed from tier 11 to 7

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
7	1	100%

Max Upload Category	Count	% of Area
7	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
6	1	100%

Typical Upload Category	Count	% of Area
6	1	100%

Typical down/upload speed from 2010 - 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
4	3	38%
5	4	50%
6	1	13%

Speed Test Upload Tier	Count	% of Tests
2	1	13%
4	6	75%
5	1	13%

Mobile based speed tests match reported typical download speeds or are within 1 speed tier:
Yes

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 8/8 (100%)
Number of mobile speed tests reported outside coverage area: 0/8 (0%)

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
15/278(5%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
7/231 (3%)

Web Search Verification: N/A

Wireless Verification: N/A

Bloosurf

DBA: Bloosurf

Data Characteristics

Date of Original Submission:	2/28/2011
Date of Update Submission:	8/20/2012
Currency of Data:	6/30/2012
FRN:	0019496462
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Digitize coverage area from map
- Repair Geometry on coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area “holes” less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
5	1	100%

Max Upload Category	Count	% of Area
3	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 mobile speed test: N/A

Mobile based speed tests match reported typical speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
5/278 (2%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
1/231 (< 1%)

Web Search Verification: N/A

Wireless Verification: N/A

Broadview Networks Holdings, Inc.

DBA Name: Broadview Networks Holdings, Inc.

Data Characteristics

Date of Original Submission:	2/24/2010
Date of Update Submission:	9/10/2012
Currency of Data:	6/30/2012
FRN:	0010296853
Type of data submitted:	Address Table
Census Block Count:	600
Total Matched Address Points Count:	797
Unmatched Address Points:	10
Number of Technology of Transmission Types:	3
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 786
  - Number unmatched: 23
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 12
  - Number unmatched: 11
- Unmatched address are geocoded to Maryland street centerline address locator
  - Number matched: 1
  - Number unmatched: 10
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Modification:

- Dropped 32 blocks reported by provider that do not meet broadband speeds

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
3	20	3%
4	496	81%
5	84	14%
6	11	2%

Max Upload Category	Count	% of Blocks
2	37	6%
3	33	5%
4	459	75%
5	72	12%
6	10	2%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 <u>computer based</u> speed test:

Speed Test Download Tier	Count	% of Tests
0	1	17%
3	1	17%
4	1	17%
5	1	17%
6	1	17%
9	1	17%

Speed Test Upload Tier	Count	% of Tests
2	2	33%
3	2	33%
5	2	33%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 2/600 (<1%)

Typical down/upload speed from 2010 – 2012 <u>mobile based</u> speed test:

Speed Test Download Tier	Count	% of Tests
3	2	29%
4	4	57%
5	1	14%

Speed Test Upload Tier	Count	% of Tests
3	1	14%
4	5	71%
5	1	14%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/600 (<1%)

Form 477Verification:
Number of census blocks reported to project, but no tract reported to FCC: 53/600 (9%)
Number of tracts reported to FCC, but no census blocks reported to project: 42

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/600 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 2/600 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 2

Web Search Verification: N/A

Census blocks that are outside DSL boundary: 111/600 (19%)

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: no change

Brookwood Ventures LLC

DBA Name: Brookwood Ventures LLC

Data Characteristics

Date of Original Submission:	3/12/2010
Date of Update Submission:	3/7/2012
Currency of Data:	12/31/2011
FRN:	0018426684
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Perform Topology on coverage area
  - Rule: Coverage area should not overlap
  - Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
5	1	100%

Max Upload Category	Count	% of Area
3	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010-2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
4	1	100%

Speed Test Upload Tier	Count	% of Tests
2	1	100%

Mobile speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 1/1 (100%)
Number of mobile speed tests reported outside coverage area: 0/1 (0%)

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 1/1 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/1 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
1/278 (<1%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
0/231 (0%)

Web Search Verification: N/A

Wireless Verification: N/A

Cavalier Telephone Mid-Atlantic, LLC

DBA Name: Cavalier Telephone Mid-Atlantic, LLC

Data Characteristics

Date of Original Submission:	3/10/2010
Date of Update Submission:	N/A
Currency of Data:	6/30/2011
FRN:	0015799133
Type of data submitted:	Census Block Table, Middle Mile
Census Block Count:	6856
Total Matched Address Points Count:	10263
Unmatched Address Points:	34
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 10212
  - Number unmatched: 85
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 42
  - Number unmatched: 43
- Unmatched addresses are geocoded to Maryland center line address locator
  - Number matched: 9
  - Number unmatched: 34
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Modification:

- 6342 blocks with technology of transmission 10 exceed domain speed
    - changed to MAXADUP speed tier 7
- Provider did not submit elevation for middle mile - elevation changed to 0.

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Area
8	6856	100%

Max Upload Category	Count	% of Area
8	6856	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	37	22%
3	25	15%
4	32	19%
5	41	24%
6	23	13%
7	10	6%
8	2	1%
10	1	1%

Speed Test Upload Tier	Count	% of Tests
1	16	9%
2	108	63%
3	36	21%
4	1	1%
5	3	2%
6	4	2%
7	3	2%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 19/6856 (< 1%)

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
0	13	16%
3	11	13%
4	23	28%
5	34	41%
6	1	1%
7	1	1%

Speed Test Upload Tier	Count	% of Tests
1	5	6%
2	35	42%
3	20	24%
4	19	23%
5	2	2%
6	2	2%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 27/6856 (< 1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov:
9/6856 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 13

Number of census blocks with dead zones reported via mdbroadbandmap.org:
5/6856 (< 1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 5

Web Search Verification: 20/6856 (1%) of census blocks were confirmed using online search feature of given provider

Cavalier WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	432	29%
Result is yes and census block is in served area	20	5%
Result is yes but not in a census block reported as served	47	11%
Result is no and census block is in served area	26	6%
Result is no and census block not served area	339	78%

Census blocks that are outside DSL boundary: 263/6856 (4%)

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: no change

Cellco Partnership and its Affiliated Entities

DBA Name: Verizon Wireless

Data Characteristics

Date of Original Submission:	3/8/2010
Date of Update Submission:	7/17/2012
Currency of Data:	6/30/2012
FRN:	0003290673
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
3	3	75%
7	1	25%

Max Upload Category	Count	% of Area
2	3	75%
5	1	25%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
3	3	75%
6	1	25%

Typical Upload Category	Count	% of Area
2	3	75%
5	1	25%

Typical down/upload speed from 2010-2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	2687	51%
3	1485	28%
4	1037	20%
5	38	1%
6	21	0%
7	32	1%
8	3	0%

Speed Test Upload Tier	Count	% of Tests
1	1150	22%
2	3295	62%
3	689	13%
4	76	1%
5	41	1%
6	9	0%
7	22	0%
8	21	0%

Mobile speed tests match reported typical download speeds or are within 1 speed tier: No

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 5144/5303 (97%)
Number of mobile speed tests reported outside coverage area: 159/5303 (3%)

Typical down/upload speed from 2010-2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	240	58%
3	122	29%
4	51	12%
5	1	0%

Speed Test Upload Tier	Count	% of Tests
1	129	31%
2	282	68%
3	2	0%
4	1	0%

#/% of computer based speed tests verifying coverage area:
Number of computer based speed tests reported inside coverage area: 406/414 (98%)
Number of computer based speed tests reported outside coverage area: 8/414 (2%)

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
247/278 (89%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
218/231 (94%)

Web Search Verification: N/A

Wireless Verification: N/A

CHARTER COMMUNICATIONS INC.

DBA Name: **CHARTER COMMUNICATIONS INC.**

Data Characteristics

Date of Original Submission:	3/31/2010
Date of Update Submission:	7/19/2012
Currency of Data:	6/30/2012
FRN:	0017179383
Type of data submitted:	Census Block Table, Road Segments
Census Block Count:	421
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

Data Processing

Census Block Process:

- Join the provided census block table to the 2010 census blocks based on the 2010 block name field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Join road segments to TigerLine by TLID, remove driveways
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	421	100%

Max Upload Category	Count	% of Blocks
3	421	100%

Road Segments

Max Download Category	Count	% of Road Segments
7	37	100%

Max Upload Category	Count	% of Road Segments
3	37	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
7	421	100%

Typical Upload Category	Count	% of Blocks
3	421	100%

Road Segments

Typical Download Category	Count	% of Road Segments
7	37	100%

Typical Upload Category	Count	% of Road Segments
3	37	100%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
4	4	57%
5	2	29%
7	1	14%

Speed Test Upload Tier	Count	% of Tests
2	4	57%
3	3	43%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: No

Computer bases speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/421 (0%)

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
4	4	36%
5	4	36%
6	2	18%
7	1	9%

Speed Test Upload Tier	Count	% of Tests
1	1	9%
2	1	9%
3	3	27%
4	4	36%
5	2	18%

Mobile bases speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 5/421 (1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 0/421 (0%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/421 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 1

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/421 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: 2/421 (1%) of census blocks were confirmed using online search feature of given provider

Charter WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	55	4%
Result is yes and census block is in served area	2	4%
Result is yes but not in a census block reported as served	0	0%
Result is no and census block is in served area	3	5%
Result is no and census block not served area	50	91%

Census blocks that are outside providers own Cable Franchise Boundary: 242/421 (57%)

Census blocks that fall within another provider's Cable Franchise Boundary: 0/421 (0%)

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: no change

Clearwire Corporation

DBA Name: **Clearwire Corporation**

Data Characteristics

Date of Original Submission:	3/5/2010
Date of Update Submission:	7/17/2012
Currency of Data:	6/30/2012
FRN:	0017775628
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area “holes” less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
5	1	100%

Max Upload Category	Count	% of Area
4	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
5	1	100%

Typical Upload Category	Count	% of Area
4	1	100%

Typical down/upload speed from 2010-2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	91	19%
3	123	25%
4	160	33%
5	90	18%
6	21	4%
7	5	1%
8	1	0%

Speed Test Upload Tier	Count	% of Tests
1	52	11%
2	176	36%
3	242	49%
4	18	4%
7	3	1%

Mobile speed tests match reported typical download speeds or are within 1 speed tier: Yes

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 396/491 (81%)
Number of mobile speed tests reported outside coverage area: 95/491 (19%)

Typical down/upload speed from 2010-2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	8	8%
3	14	13%
4	24	23%
5	41	39%
6	14	13%
7	3	3%

Speed Test Upload Tier	Count	% of Tests
1	4	4%
2	31	30%
3	69	66%

#/% of computer based speed tests verifying coverage area:
Number of computer based speed tests reported inside coverage area: 98/104 (94%)
Number of computer based speed tests reported outside coverage area: 6/104 (6%)

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
36/278 (12.9%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
11/231 (4.7%)

Web Search Verification: N/A

Wireless Verification: N/A

Cogent Communications Group

DBA Name: Cogent Communications Group

Data Characteristics

Date of Original Submission:	2/1/2010
Date of Update Submission:	8/14/2012
Currency of Data:	6/30/2012
FRN:	0019066034
Type of data submitted:	Address Table, Middle Mile
Census Block Count:	4
Total Matched Address Points Count:	3
Unmatched Address Points:	3
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Address Table Process:

- Geocode address table to ESRI US streets address locator
  - Number matched: 3
  - Number unmatched: 0
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Modifications:

- Provider did not submit elevation for middle mile - elevation changed to 0.

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
11	4	100%

Max Upload Category	Count	% of Blocks
11	4	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	4	14%
3	6	21%
4	4	14%
5	4	14%
6	8	28%
7	2	7%
8	1	3%

Speed Test Upload Tier	Count	% of Tests
1	2	7%
2	6	21%
3	4	14%
4	3	10%
5	2	7%
6	9	31%
7	3	10%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 14/4 (> 100%)

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
0	21	33%
3	13	21%
4	15	24%
5	3	5%
6	1	2%
7	10	16%

Speed Test Upload Tier	Count	% of Tests
1	7	11%
2	8	13%
3	25	40%
4	15	24%
5	1	2%
6	7	11%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 14/4 (> 100%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 0/4 (0%)
Number of tracts reported to FCC, but no census blocks reported to project: 2

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/4 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/4 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: 1 census block increase

Comcast Corporation

DBA Name: Comcast Cable Communications, LLC

Data Characteristics

Date of Original Submission:	1/19/2010
Date of Update Submission:	8/29/2012
Currency of Data:	6/30/2011
FRN:	0004441663
Type of data submitted:	Census Block Table, Road Segments
Census Block Count:	55294
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

Data Processing

Census Block Process:

- Join the census block table to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Create beginning and ending road segment addresses for all submitted road segments by concatenating the address number, street direction, street name, street type.
- Remove any duplicate addresses and those with no address number.
- Address-match those road segment addresses against the ArcGIS US Streets geocoding service to create beginning/ending road segment points
- Select those TIGER line segments that are within 10 m of a segment point location
- Spatial join the points to the TIGER lines so that the Technology of Transmission and Speed Tiers are attached to the appropriate line segment.
- Select just those line segments that intersect the census blocks that are greater than 2 square miles
  - Export results
  - Load exported results into the NTIA data model

- Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
10	55294	100%

Max Upload Category	Count	% of Blocks
7	55294	100%

Road Segments

Max Download Category	Count	% of Blocks
10	1226	100%

Max Upload Category	Count	% of Blocks
7	1226	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	66	1%
3	157	3%
4	130	2%
5	488	8%
6	795	13%
7	3953	64%
8	559	9%
9	52	1%
10	15	0%

Speed Test Upload Tier	Count	% of Tests
1	38	1%
2	199	3%
3	306	5%
4	1166	19%
5	4154	67%
6	311	5%
7	39	1%
8	1	0%
9	1	0%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 303/55294 (<1%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	695	4%
3	535	3%
4	979	6%
5	2071	13%
6	2897	18%
7	8197	52%
8	473	3%

Speed Test Upload Tier	Count	% of Tests
0	187	1%
1	385	2%
2	735	5%
3	957	6%
4	2260	14%
5	8529	54%
6	2790	18%
8	3	0%
9	1	0%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 560/55294 (1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 2098/55294 (<1%)
Number of tracts reported to FCC, but no census blocks reported to project: 31

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov:
93/55294 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 128

Number of census blocks with dead zones reported via mdbroadbandmap.org:
56/55294 (< 1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 72

Web Search Verification:
478/55294 (1%) of census blocks were confirmed using online search feature of given provider

Comcast WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	1016	68%
Result is yes and census block is in served area	478	47%
Result is yes but not in a census block reported as served	249	25%
Result is no and census block is in served area	0	0%
Result is no and census block not served area	285	28%

Census blocks that are outside providers own Cable Franchise Boundary: 7613/55294 (14%)

Census blocks that fall within another provider's Cable Franchise Boundary: 325/55294 (<1%)

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: 2605 census block increase

DIECA Communications, Inc.

DBA: Covad Communication Company

Data Characteristics

Date of Original Submission:	2/1/2010
Date of Update Submission:	8/16/2012
Currency of Data:	6/30/2012
FRN:	0003753753
Type of data submitted:	Census Block Table, Road Segments, Middle Mile
Census Block Count:	73622
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	3
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

Data Processing

Census Block Process:

- Join the census block table to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Join road segments to 2010 TigerLine by TLID
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
3	7501	5%

Max Upload Category	Count	% of Blocks
2	18998	12%

4	15745	10%
5	84913	52%
6	26598	16%
7	24108	15%
8	4620	3%

3	34967	21%
4	8851	5%
5	73652	45%
6	2274	1%
7	20123	12%
8	4620	3%

Road Segments

Max Download Category	Count	% of Road Segments
3	13	1%
4	235	11%
5	1668	82%
6	123	6%
7	7	0%

Max Upload Category	Count	% of Road Segments
2	114	6%
3	130	6%
4	193	9%
5	1601	78%
6	1	0%
7	7	0%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
3	14868	9%
4	29050	18%
5	87496	54%
6	6890	4%
7	20561	13%
8	4620	3%

Typical Upload Category	Count	% of Blocks
2	48508	30%
3	5930	4%
4	17789	11%
5	64241	39%
6	4502	3%
7	17895	11%
8	4620	3%

Road Segments

Typical Download Category	Count	% of Road Segments
3	55	3%
4	288	14%
5	1695	83%
6	1	0%
7	7	0%

Typical Upload Category	Count	% of Road Segments
2	244	12%
4	221	11%
5	1573	77%
6	1	0%
7	7	0%

Typical down/upload speed from 2010 – 2012 <u>computer based</u> speed test:

Speed Test Download Tier	Count	% of Tests
0	14	14%
3	48	49%
4	25	26%

Speed Test Upload Tier	Count	% of Tests
1	24	25%
2	39	40%
3	20	21%

5	4	4%
6	2	2%
7	3	3%
10	1	1%

4	10	10%
5	4	4%

Computer based speed tests match reported typical speeds or are within 1 speed tier: No

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/73622 (0%)

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
0	19	20%
3	23	24%
4	42	44%
5	7	7%
6	3	3%
7	1	1%

Speed Test Upload Tier	Count	% of Tests
1	7	7%
2	65	68%
3	19	20%
4	2	2%
5	1	1%
6	1	1%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/73622 (< 1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC:
10430/73622 (14%)
Number of tracts reported to FCC, but no census blocks reported to project: 3

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov:
60/73622 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 75

Number of census blocks with dead zones reported via mdbroadbandmap.org:
34/73622 (< 1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 43

Web Search Verification: N/A

Census blocks that are outside DSL boundary: 1668/73622 (2%)

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: 40 census block decrease

Easton Utilities Commission

DBA Name: Easton Utilities Commission

* Easton Utilities Commission provides wireline and wireless service

Data Characteristics

Date of Original Submission:	2/5/2010
Date of Update Submission:	8/17/2012
Currency of Data:	6/30/2012
FRN:	0003793726
Type of data submitted:	Addresses, Tracts, Coverage Area
Census Block Count:	1499
Total Matched Address Points Count:	4687
Unmatched Address Points:	3
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Wireline Data Processing

Address Table Process:

- Geocode address table to ESRI address locator
  - Number matched: 4316
  - Number unmatched: 374
- Unmatched address are geocoded to MDPV address locator
  - Number matched: 367
  - Number unmatched: 7
- Unmatched address are geocoded to Maryland street centerline address locator
  - Number matched: 4
  - Number unmatched: 3
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Select by location the address points that are completely within a greater than two square mile census block
  - Export as address points to be loaded into the NTIA data model
    - Result: BB_Service_Address
  - Switch the selection and export as points to create census blocks

Census Block Process:

- Join delivered tract table to 2010 census tracts, calculate provider fields, export results
  - Load results into the NTIA data model
    - Result: BB_Service_CensusBlock

Wireline Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
9	1499	100%

Max Upload Category	Count	% of Blocks
6	1499	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
9	1499	100%

Typical Upload Category	Count	% of Blocks
3	1499	100%

Typical down/upload speed from 2010-2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	8	8%
3	8	8%
4	9	9%
5	57	54%
6	22	21%
7	1	1%

Speed Test Upload Tier	Count	% of Tests
1	12	11%
2	61	58%
3	28	27%
4	3	3%
6	1	1%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: No

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/1499 (0%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 176/1499 (12%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 4
Total number of dead zones reported per provider via mdbroadbandmap.org: 4

Web Search Verification: N/A

Census blocks that are outside providers own Cable Franchise Boundary: 187/1499 (12%)

Census blocks that fall within another provider's Cable Franchise Boundary: 164/1499 (11%)

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: 969 census block increase

---

Wireless Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Wireless Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
3	1	100%

Max Upload Category	Count	% of Area
2	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010-2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	2	8%
3	1	4%
4	1	4%
5	7	27%
6	10	38%
7	2	8%
8	3	12%

Speed Test Upload Tier	Count	% of Tests
2	8	31%
3	9	35%
4	3	12%
5	3	12%
7	3	12%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 26/26 (100%)
Number of mobile speed tests reported outside coverage area: 0/26 (0%)

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 1/1 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/1 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
0/278 (0%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
2/231 (<1%)

Web Search Verification: N/A

Wireless Verification: N/A

FiberLight LLC

DBA Name: FiberLight LLC

Data Characteristics

Date of Original Submission:	3/31/2010
Date of Update Submission:	N/A
Currency of Data:	12/31/2011
FRN:	0014117139
Type of data submitted:	Census Block Table
Census Block Count:	1128
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Census Block Process:

- Join census block table to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
10	1128	100%

Max Upload Category	Count	% of Blocks
10	1128	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test: N/A

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0/1128 (0%)
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/1128 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: no change

Freedom Wireless Broadband, LLC

DBA Name: **Freedom Wireless Broadband, LLC**

Data Characteristics

Date of Original Submission:	1/28/2010
Date of Update Submission:	6/18/2012
Currency of Data:	6/30/2012
FRN:	0018643155
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Load coverage area into the NTIA data model
  - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
4	1	100%

Max Upload Category	Count	% of Area
4	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010-2012 mobile speed test: N/A

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:

Number of mobile speed tests reported inside coverage area: N/A

Number of mobile speed tests reported outside coverage area: N/A

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 1/1 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/1 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
11/278 (4%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
7/231 (3%)

Web Search Verification: N/A

Wireless Verification: N/A

Gans Communications, LP

DBA: MetroCast Communications

Data Characteristics

Date of Original Submission:	3/5/2010
Date of Update Submission:	N/A
Currency of Data:	12/31/2011
FRN:	0016642761
Type of data submitted:	Census Block Table, Road Segments
Census Block Count:	2467
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

Data Processing

Census Block Process:

- Join the census block table to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Road segments are 2009 geometry
- Join road segments to TigerLine by TLID
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	2467	100%

Max Upload Category	Count	% of Blocks
4	2467	100%

Road Segments

Max Download Category	Count	% of Segments
7	800	100%

Max Upload Category	Count	% of Segments
4	800	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
6	2467	100%

Typical Upload Category	Count	% of Blocks
2	2467	100%

Road Segments

Typical Download Category	Count	% of Segments
7	800	100%

Typical Upload Category	Count	% of Segments
2	800	100%

Typical down/upload speed from 2010-2012 <u>computer based</u> speed test:

Speed Test Download Tier	Count	% of Tests
0	43	8%
3	33	6%
4	10	2%
5	62	11%
6	391	71%
7	11	2%
8	1	0%

Speed Test Upload Tier	Count	% of Tests
1	24	4%
2	513	93%
3	9	2%
4	3	1%
6	1	0%
7	1	0%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: Yes

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 2/2467 (< 1%)

Typical down/upload speed from 2010-2012 <u>mobile based</u> speed test:

Speed Test Download Tier	Count	% of Tests
0	1	3%
3	3	10%
4	3	10%
5	4	14%
6	12	41%
7	6	21%

Speed Test Upload Tier	Count	% of Tests
1	2	7%
2	15	52%
3	5	17%
4	7	24%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 2/2467 (< 1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov:
8/2467 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 10

Number of census blocks with dead zones reported via mdbroadbandmap.org:
7/2467 (< 1%)

Total number of dead zones reported per provider via mdbroadbandmap.org: 8

Web Search Verification: 36/2467 (2%) of census blocks were confirmed using online search feature of given provider

MetroCast Web Search Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	107	7%
Result is yes and census block is in served area	36	34%
Result is yes but not in a census block reported as served	20	19%
Result is no and census block is in served area	1	1%
Result is no and census block not served area	50	47%

Census blocks that are outside providers own Cable Franchise Boundary: N/A

Census blocks that fall within another provider's Cable Franchise Boundary: 1094/2467 (44%)

Change in coverage area from Fall 2011 Submission to Spring 2012 Submission: no change

HNS License Sub, LLC

DBA: Hughes Communications, Inc.

Data Characteristics

Date of Original Submission:	2/2/2010
Date of Update Submission:	9/7/2012
Currency of Data:	6/30/2012
FRN:	0018483073
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
5	1	100%

Max Upload Category	Count	% of Area
2	1	100%

Typical down/upload speeds reported by provider:

Typical Download Category	Count	% of Area
3	1	100%

Typical Upload Category	Count	% of Area
2	1	100%

Typical down/upload speed from 2010-2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	34	64%

Speed Test Upload Tier	Count	% of Tests
1	15	28%

3	10	19%
4	6	11%
5	3	6%

2	20	38%
3	2	4%
4	5	9%
5	9	17%
7	2	4%

Speed tests match reported typical download speeds or are within 1 speed tier: No

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 53/53 (100%)
Number of mobile speed tests reported outside coverage area: 0/53 (0%)

Typical down/upload speed from 2010-2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	34	64%
3	10	19%
4	6	11%
5	3	6%

Speed Test Upload Tier	Count	% of Tests
1	15	28%
2	20	38%
3	2	4%
4	5	9%
5	9	17%
7	2	4%

#/% of computer based speed tests verifying coverage area:
Number of computer based speed tests reported inside coverage area: 78/78 (100%)
Number of computer based speed tests reported outside coverage area: 0/78 (0%)

Form477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 334/334 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/334 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
278/278 (100%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
231/231 (100%)

Web Search Verification: N/A

Wireless Verification: N/A

Hotwire Communications, Ltd

DBA Name: Hotwire Communications, Ltd

Data Characteristics

Date of Original Submission:	2/19/2010
Date of Update Submission:	N/A
Currency of Data:	12/31/2011
FRN:	0009846494
Type of data submitted:	Addresses
Census Block Count:	1
Total Matched Address Points Count:	1
Unmatched Address Points:	0
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 1
  - Number unmatched: 0
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
5	1	100%

Max Upload Category	Count	% of Blocks
3	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test: N/A

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Census blocks that are outside providers own Cable Franchise Boundary: N/A

Census blocks that fall within another provider's Cable Franchise Boundary: 1/1 (100%)

Change in coverage area from Fall 2011 Submission to Fall 2012 Submission: no change

Leap Wireless International, Inc.
DBA: **Cricket Communications**

Data Characteristics

Date of Original Submission:	3/17/2010
Date of Update Submission:	9/5/2012
Currency of Data:	6/30/2011
FRN:	0002963528
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
  - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
3	1	100%

Max Upload Category	Count	% of Area
2	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010-2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	81	91%

Speed Test Upload Tier	Count	% of Tests
1	23	26%

3	3	3%
4	5	6%

2	52	58%
3	11	12%
7	1	1%
8	2	2%

Mobile speed tests match reported typical speeds or are within 1 speed tier: N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 89/89 (100%)
Number of mobile speed tests reported outside coverage area: 0/89 (0%)

Typical down/upload speed from 2010-2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
3	1	100%

Speed Test Upload Tier	Count	% of Tests
2	1	100%

#/% of computer based speed tests verifying coverage area:
Number of computer based speed tests reported inside coverage area: 1/1 (100%)
Number of computer based speed tests reported outside coverage area: 0/1 (0%)

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
114/278 (41%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
68/231 (29.4%)

Web Search Verification: N/A

Wireless Verification: N/A

Level 3 Communications, LLC

DBA Name: Level 3 Communications, LLC

Data Characteristics

Date of Original Submission:	1/18/2010
Date of Update Submission:	N/A
Currency of Data:	12/31/2011
FRN:	0003723822
Type of data submitted:	Address Table, Middle Mile
Census Block Count:	170
Total Matched Address Points Count:	210
Unmatched Address Points:	5
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 196
  - Number unmatched: 19
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 9
  - Number unmatched: 10
- Unmatched address are geocoded to Maryland centerline address locator
  - Number matched: 5
  - Number unmatched: 5
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Select by location the address points that are completely within a greater than two square mile census block
  - Export as address points to be loaded into the NTIA data model
    - Result: BB_Service_Address

- Switch the selection and export as points to create census blocks

Census Block Process:

- Join the switched selection (BB_Service_Address) address points to the 2010 census blocks based on the GEOID10 field
  - Export results Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Modifications:

- Provider did not submit elevation for middle mile - elevation changed to 0.
- Provider did not submit owned/leased information for middle mile and SBDD check submission script does not allow Null field. Maryland calculated field to "Leased" as default.

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
11	170	100%

Max Upload Category	Count	% of Blocks
11	170	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
11	129	100%

Typical Upload Category	Count	% of Blocks
11	129	100%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	40	37%
3	20	18%
4	7	6%
5	7	6%
6	5	5%
7	13	12%
8	13	12%
9	3	3%
10	1	1%

Speed Test Upload Tier	Count	% of Tests
1	20	18%
2	28	26%
3	21	19%
4	11	10%
5	4	4%
6	13	12%
7	9	8%
8	3	3%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: No

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 56/170 (33%)

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
0	2	6%
3	5	16%
4	7	23%
5	5	16%
6	7	23%
7	5	16%

Speed Test Upload Tier	Count	% of Tests
1	2	6%
2	3	10%
3	5	16%
4	5	16%
5	6	19%
6	7	23%
7	2	6%
8	1	3%

Mobile based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 19/170 (11%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 64/170 (38%)
Number of tracts reported to FCC, but no census blocks reported to project: 37

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 1/170 (< 1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 2

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/170 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2011 Submission to Fall 2012 Submission: no change

Mediacom Communications

DBA: Mediacom Delaware LLC

Data Characteristics

Date of Original Submission:	8/4/2011
Date of Update Submission:	8/15/2012
Currency of Data:	6/30/2012
FRN:	0003572633
Type of data submitted:	Addresses
Census Block Count:	551
Total Matched Address Points Count:	11445
Unmatched Address Points:	227
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 11274
  - Number unmatched: 399
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 97
  - Number unmatched: 302
- Unmatched addresses are geocoded to Maryland center line address locator
  - Number matched: 75
  - Number unmatched: 227
- Merge matched addresses
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Modification:

- Removed 1 address from provider submission – out of service area bounds

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
7	551	100%

Max Upload Category	Count	% of Blocks
3	551	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
7	551	100%

Typical Upload Category	Count	% of Blocks
3	551	100%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	1	2%
4	9	19%
5	4	9%
6	12	26%
7	21	45%

Speed Test Upload Tier	Count	% of Tests
2	6	13%
3	31	66%
4	8	17%
5	2	4%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: Yes

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 0/551 (0%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	3	4%
3	3	4%
4	16	19%
5	38	45%
6	25	29%

Speed Test Upload Tier	Count	% of Tests
1	1	1%
2	10	12%
3	60	71%
4	13	15%
5	1	1%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 8/551 (1.4%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 2/551 (<1%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 1
Total number of dead zones reported per provider via broadband.maryland.gov: 3

Number of census blocks with dead zones reported via mdbroadbandmap.org: 1
Total number of dead zones reported per provider via mdbroadbandmap.org: 1

Web Search Verification: 11/551 (1.9%) of census blocks were confirmed using online search feature of given provider

Mediacom WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	85	6%
Result is yes and coverage area is in served area	11	13%
Result is yes but not in a coverage area reported as served	17	20%
Result is no and coverage area is in served area	3	4%
Result is no and coverage area is not in served area	54	64%

Census blocks that are outside providers own Cable Franchise Boundary: 224/551 (40.7%)

Census blocks that fall within another provider's Cable Franchise Boundary: 69/551 (12.5%)

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: no change

Mountain Communications, LLC

DBA: **ProCom**

Data Characteristics

Date of Original Submission:	5/31/2010
Date of Update Submission:	N/A
Currency of Data:	6/30/2010
FRN:	0008039323
Type of data submitted:	Census Blocks, Road Segments
Census Block Count:	161
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

Data Processing

Census Block Process:

- Join the census block table to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Road segments are 2009 geometry
- Join road segments to TigerLine by TLID
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
10	161	100%

Max Upload Category	Count	% of Blocks
10	161	100%

Road Segments

Max Download Category	Count	% of Blocks
10	95	100%

Max Upload Category	Count	% of Blocks
10	161	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test: N/A

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 66/161 (50%)
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 1/1 (100%)
Total number of dead zones reported per provider via broadband.maryland.gov: 1

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0/1 (0%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2011 Submission to Fall 2012 Submission: no change

Neon Connect, Inc

DBA: Sidera Networks

Data Characteristics

Date of Original Submission:	3/5/2010
Date of Update Submission:	7/17/2012
Currency of Data:	6/30/2012
FRN:	0006254403
Type of data submitted:	Addresses, Middle Mile
Census Block Count:	1
Total Matched Address Points Count:	1
Unmatched Address Points:	0
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
    - Number matched: 1
    - Number unmatched: 0
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
    - Export results
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Modifications:

- Provider did not submit elevation for middle mile - elevation changed to 0.

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
10	1	100%

Max Upload Category	Count	% of Blocks
10	1	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
10	1	100%

Typical Upload Category	Count	% of Blocks
10	1	100%

Typical down/upload speed from 2010 – 2012 <u>computer based</u> speed test: N/A

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: no change

New Edge Holding Company

DBA Name: New Edge Network, Inc

Data Characteristics

Date of Original Submission:	1/22/2010
Date of Update Submission:	N/A
Currency of Data:	6/30/2011
FRN:	0003720471
Type of data submitted:	Address Table
Census Block Count:	273
Total Matched Address Points Count:	371
Unmatched Address Points:	0
Number of Technology of Transmission Types:	3
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI address locator
  - Number matched: 335
  - Number unmatched: 2
- Unmatched address are geocoded to MDPV address locator
  - Number matched: 1
  - Number unmatched: 1
- Unmatched address are geocoded to Maryland street centerline address locator
  - Number matched: 1
  - Number unmatched: 1
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission Select by location the address points that are completely within a greater than two square mile census block
  - Export as address points to be loaded into the NTIA data model
    - Result: BB_Service_Address
  - Switch the selection and export as points to create census blocks

Census Block Process:

- Join the switched selection (BB_Service_Address) address points to the 2010 census blocks based on the GEOID10 field
    - Export results (for each technology of transmission)
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Modification:

- Provider submitted 3 locations with a technology 40, Cable Modem - DOCSIS 3.0 Down. This technology is regarded as an error as all other locations are served by DSL technologies and were removed from the submission.

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
3	58	20%
4	216	73%
5	20	7%
7	1	0%

Max Upload Category	Count	% of Blocks
2	167	57%
3	80	27%
4	47	16%
7	1	0%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
3	58	20%
4	216	73%
5	20	7%
7	1	0%

Typical Upload Category	Count	% of Blocks
2	167	56%
3	80	28%
4	47	16%
7	1	0%

Typical down/upload speed from 2010 – 2012 computer based speed test: N/A

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
3	2	22%
4	7	78%

Speed Test Upload Tier	Count	% of Tests
2	3	33%
3	2	22%
4	4	44%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 3/273 (<1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Census blocks that are outside DSL boundary: 45/273 (16%)

Change in coverage area from Fall 2011 Submission to Fall 2012 Submission: no change

NTELOS

DBA Name: NTELOS

Data Characteristics

Date of Original Submission:	2/3/2012
Date of Update Submission:	7/17/2012
Currency of Data:	6/30/2012
FRN:	0005849518
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
  - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
3	1	100%

Max Upload Category	Count	% of Area
2	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010-2012 mobile based speed test: N/A

Mobile based speed tests match reported typical download speeds or are within 1 speed tier:
N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 20/52 (39%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 32/52 (62%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
2/278 (< 1%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
72/231 (31%)

Web Search Verification: N/A

Wireless Verification: N/A

One Communications

DBA: **One Communications**

Data Characteristics

Date of Original Submission:	3/8/2011
Date of Update Submission:	9/1/2011
Currency of Data:	6/30/2011
FRN:	0015337702
Type of data submitted:	Address Table
Census Block Count:	148
Total Matched Address Points Count:	161
Unmatched Address Points:	8
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 156
  - Number unmatched: 13
- Unmatched addresses are geocoded to Maryland Property View address locator
  - Number matched: 4
  - Number unmatched: 9
- Unmatched addresses are geocoded to Maryland centerline address locator
  - Number matched: 1
  - Number unmatched: 8
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the switched address points to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
4	94	64%
5	45	30%
6	7	5%
7	2	1%

Max Upload Category	Count	% of Blocks
4	94	64%
5	45	30%
6	7	5%
7	2	1%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	1	17%
3	2	33%
4	1	17%
7	1	17%
8	1	17%

Speed Test Upload Tier	Count	% of Tests
3	3	50%
4	1	17%
5	1	17%
6	1	17%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 6/148 (4%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	2	29%
3	2	29%
4	1	14%
5	2	29%

Speed Test Upload Tier	Count	% of Tests
1	1	14%
2	1	14%
3	4	57%
4	1	14%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/148 (<1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 3/148 (2%)
Number of tracts reported to FCC, but no census blocks reported to project: 7

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 1
Total number of dead zones reported per provider via mdbroadbandmap.org: 1

Web Search Verification: N/A

Census blocks that are outside DSL boundary: 115/148 (78%)

Change in coverage area from Fall 2011 Submission to Fall 2012 Submission: no change

PAETEC Communications, Inc.

DBA Name: PAETEC Communications, Inc.

Data Characteristics

Date of Original Submission:	2/28/2011
Date of Update Submission:	N/A
Currency of Data:	12/31/2010
FRN:	0011017795
Type of data submitted:	Address Table
Census Block Count:	301
Total Matched Address Points Count:	373
Unmatched Address Points:	4
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 359
  - Number unmatched: 18
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 9
  - Number unmatched: 9
- Unmatched address are geocoded to Maryland centerline address locator
  - Number matched: 5
  - Number unmatched: 4
- Merge matched addresses
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Modification:

- 52 blocks with Technology of Transmission 30 exceed Maximum Advertised Down and Maximum Advertised Up speed domain (delivered as tier 11)
    - Changed to speed tier 8 to fit domain

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
11	315	100%

Max Upload Category	Count	% of Blocks
11	315	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
3	92	29%
4	223	71%

Typical Upload Category	Count	% of Blocks
3	92	29%
4	223	71%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	65	60%
3	22	20%
4	14	13%
5	5	5%
8	3	3%

Speed Test Upload Tier	Count	% of Tests
1	57	52%
2	11	10%
3	22	20%
4	11	10%
5	6	6%
6	1	1%
7	1	1%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: No

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 25/301 (8%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	31	39%
3	22	28%
4	12	15%
5	7	9%
6	1	1%
7	6	8%

Speed Test Upload Tier	Count	% of Tests
1	5	6%
2	14	18%
3	12	15%
4	9	11%
5	8	10%
6	4	5%
7	27	34%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 32/301 (11%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 4/301 (1%)
Number of tracts reported to FCC, but no census blocks reported to project: 597

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Fall 2011 Submission to Fall 2012 Submission: no change

QCOL, Inc.

DBA Name: QCOL

Data Characteristics

Date of Original Submission:	5/31/2010
Date of Update Submission:	9/10/2012
Currency of Data:	6/30/2012
FRN:	0019663095
Type of data submitted:	Census Block Table, Road Segments
Census Block Count:	308
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

Data Processing

Census Block Process:

- Join the census block table to the 2010 census blocks based on the GEOID10 field
    - Export results for each technology of transmission
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Road Segment Process:

- Road segments are 2009 geometry
- Join road segments to TigerLine by TLID
    - Export results
    - Load exported results into the NTIA data model
        - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
10	205	55%

Max Upload Category	Count	% of Blocks
10	205	55%

6	167	45%

6	167	45%

Road Segments

Max Download Category	Count	% of Segments
10	27	56%
6	21	44%

Max Upload Category	Count	% of Segments
10	27	56%
6	21	44%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test: N/A

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Typical down/upload speed from 2010 – 2012 mobile based speed test:

Speed Test Download Tier	Count	% of Tests
0	2	29%
3	2	29%
4	1	14%
5	1	14%
6	1	14%

Speed Test Upload Tier	Count	% of Tests
2	3	43%
3	2	29%
4	2	29%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 5/308 (2%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 6/308 (2%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 3/308 (1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 3

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Census blocks that are outside providers own Cable Franchise Boundary: N/A

Census blocks that fall within another provider's Cable Franchise Boundary: 272/308 (88%)

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: no change

Shentel Cable Company

DBA: **Shentel Cable Company**

Data Characteristics

Date of Original Submission:	5/31/2010
Date of Update Submission:	9/3/2012
Currency of Data:	6/30/2012
FRN:	0013962170
Type of data submitted:	Census Blocks, Road Segments
Census Block Count:	611
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

Data Processing

Census Block Process:

- Join the census block table to the 2010 census blocks based on the GEOID10 field
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Join the road segment table to the 2010 Tiger Lines based on TLID field
  - Load exported results into the NTIA data model
    - Result: BB_Service_RoadSegment

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
9	611	100%

Max Upload Category	Count	% of Blocks
5	611	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
9	611	100%

Typical Upload Category	Count	% of Blocks
5	611	100%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	1	2%
3	1	2%
4	7	14%
5	13	25%
7	3	6%
8	6	12%
9	9	18%
10	11	22%

Speed Test Upload Tier	Count	% of Tests
1	2	4%
2	10	20%
3	17	33%
4	22	43%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: No

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/611 (<1%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
3	2	29%
4	1	14%
5	4	57%

Speed Test Upload Tier	Count	% of Tests
3	7	100%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/611 (<1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: no change

Skycasters

DBA Name: Skycasters

Data Characteristics

Date of Original Submission:	9/13/2012
Date of Update Submission:	9/13/2012
Currency of Data:	6/30/2012
FRN:	0018756155
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area “holes” less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
6	1	100%

Max Upload Category	Count	% of Area
4	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
5	1	100%

Typical Upload Category	Count	% of Area
2	1	100%

Typical down/upload speed from 2010-2012 mobile speed test: N/A

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
278/278 (100%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
231/231 (100%)

Web Search Verification: N/A

Sprint Nextel Corporation

DBA Name: Sprint Nextel Corporation

Data Characteristics

Date of Original Submission:	2/18/2010
Date of Update Submission:	7/10/2012
Currency of Data:	6/30/2012
FRN:	0003774593
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area “holes” less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Modifications:

- Provider did not submit elevation for middle mile - elevation changed to 0.

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
3	1	50%
5	1	50%

Max Upload Category	Count	% of Area
2	1	50%
3	1	50%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
3	1	50%
5	1	50%

Typical Upload Category	Count	% of Area
2	1	50%
3	1	50%

Typical down/upload speed from 2010-2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	5479	45%
3	2087	17%
4	2533	21%
5	1655	14%
6	313	3%
7	52	0%

Speed Test Upload Tier	Count	% of Tests
1	2826	23%
2	5762	48%
3	2958	24%
4	386	3%
5	96	1%
6	18	0%
7	36	0%
8	37	0%

Mobile speed tests match reported typical download speeds or are within 1 speed tier: No

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 11921/12119 (98.3%)
Number of mobile speed tests reported outside coverage area: 198/12119 (1.6%)

Typical down/upload speed from 2010-2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	356	1079%
3	234	709%
4	19	58%
5	13	39%
6	5	15%
7	11	33%
8	6	18%
9	4	12%

Speed Test Upload Tier	Count	% of Tests
1	220	667%
2	380	1152%
3	21	64%
4	6	18%
5	8	24%
6	9	27%
7	2	6%
8	2	6%

#/% of computer based speed tests verifying coverage area:
Number of computer based speed tests reported inside coverage area: 634/648 (97.8%)
Number of computer based speed tests reported outside coverage area: 14/648 (2.1%)

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 26/26 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/26 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
214/278 (76.9%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
169/231 (73.1%)

Web Search Verification: N/A

Wireless Verification: N/A

StarBand Communications Inc.

DBA Name: StarBand Communications Inc.

Data Characteristics

Date of Original Submission:	1/26/2010
Date of Update Submission:	7/17/2012
Currency of Data:	6/30/2012
FRN:	0005087457
Type of data submitted:	Coverage
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
  - Result: BB_Service_Wireless

Data Modifications: Speed Domains:

- Provider delivered Typical Upstream Speed less than speed tier 2
  - Calculated Typical Upstream speed to 2

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
3	1	100%

Max Upload Category	Count	% of Area
2	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
3	1	100%

Typical Upload Category	Count	% of Area
2	1	100%

Typical down/upload speed from 2010-2012 mobile speed test: N/A

Speed tests match reported typical speeds or are within 1 speed tier: N/A

# of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 23/23 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/23 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
278/278 (100%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
231/231 (100%)

Web Search Verification: N/A

Wireless Verification: N/A

Starpower Communications, LLC

DBA Name: RCN & RCN Business Solutions

Data Characteristics

Date of Original Submission:	3/5/2010
Date of Update Submission:	8/8/2012
Currency of Data:	6/30/2012
FRN:	0003735016
Type of data submitted:	Address Table, Middle Mile
Census Block Count:	6708
Total Matched Address Points Count:	73723
Unmatched Address Points:	547
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Partial
Provided Max Typical Upload Speed:	Partial
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 73492
  - Number unmatched: 788
- Unmatched address are geocoded to Maryland Property View address locator
  - Number matched: 117
  - Number unmatched: 661
- Unmatched addresses are geocoded to Maryland Centerline address locator
  - Number matched: 114
  - Number unmatched: 547
- Merge matched addresses
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Modifications:

- Provider submitted technologies 40 and 41 for the same area with the same speed tier of 9. Maryland submitted the entire service area as technology 40 and speed tier 9.
- Provider did not submit elevation for middle mile - elevation changed to 0.

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
9	1764	100%

Max Upload Category	Count	% of Blocks
6	1318	75%
7	446	25%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
no data	6418	96%
7	1	0%
9	290	4%

Typical Upload Category	Count	% of Blocks
no data	6418	96%
3	2	0%
4	59	1%
5	26	0%
6	191	3%
7	13	0%

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	13	7%
4	12	7%
5	37	20%
6	45	25%
7	72	39%
8	2	1%
9	1	1%
10	1	1%

Speed Test Upload Tier	Count	% of Tests
1	3	2%
2	106	58%
3	6	3%
4	60	33%
5	8	4%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: No

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 15/6708 (<1%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	14	6%
3	16	7%
4	19	8%
5	29	12%
6	60	26%
7	81	35%
8	14	6%

Speed Test Upload Tier	Count	% of Tests
1	5	2%
2	72	31%
3	22	9%
4	107	46%
5	3	1%
6	18	8%
7	6	3%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 15/6708 (<1%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: N/A
Number of tracts reported to FCC, but no census blocks reported to project: N/A

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 34/6708 (<1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 63

Number of census blocks with dead zones reported via mdbroadbandmap.org: 21/6708 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 29

Web Search Verification: 5/6708 (< 1%) of census blocks were confirmed using online search feature of given provider

Starpower WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	1016	68%
Result is yes and census block is in served area	5	0%
Result is yes but not in a census block reported as served	0	0%
Result is no and census block is in served area	141	14%
Result is no and census block not served area	870	86%

Census blocks that are outside providers own Cable Franchise Boundary: N/A

Census blocks that fall within another provider's Cable Franchise Boundary: 6194/6708 (92%)

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: 4,944 census block increase

Tata Communications (America) Inc.

DBA Name: Tata Communications (America) Inc.

Data Characteristics

Date of Original Submission:	2/1/2010
Date of Update Submission:	7/27/2012
Currency of Data:	6/30/2012
FRN:	0009480302
Type of data submitted:	Address Table
Census Block Count:	1
Total Matched Address Points Count:	1
Unmatched Address Points:	0
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 1
  - Number unmatched: 0
- Spatially join address points to 2010 census blocks

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
4	1	100%

Max Upload Category	Count	% of Blocks
4	1	100%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	1	100%

Speed Test Upload Tier	Count	% of Tests
2	1	100%

Computer based speed tests match reported typical downloaded speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 1/1 (100%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 0/1 (0%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Census blocks that are outside DSL boundary: 0/1 (0%)

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: no change

T-Mobile USA, Inc.

DBA Name: T-Mobile USA, Inc.

Data Characteristics

Date of Original Submission:	2/25/2010
Date of Update Submission:	8/16/2012
Currency of Data:	6/30/2012
FRN:	0006945950
Type of data submitted:	Coverage Area, Middle Mile
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	No

***See ReadMe.txt**

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area “holes” less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
4	1	33%
6	1	33%
7	1	33%

Max Upload Category	Count	% of Area
2	1	33%
4	2	67%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
2	1	33%
5	1	33%
6	1	33%

Typical Upload Category	Count	% of Area
1	1	33%
3	2	67%

Typical down/upload speed from 2010 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	3672	32%
3	1818	16%
4	2796	25%
5	2499	22%
6	527	5%
7	87	1%

Speed Test Upload Tier	Count	% of Tests
1	1652	14%
2	4358	38%
3	3369	30%
4	1774	16%
5	180	2%
6	22	0%
7	34	0%
8	10	0%

Speed tests match reported typical speeds or are within 1 speed tier: No

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 11335/11399 (99%)
Number of mobile speed tests reported outside coverage area: 64/11399 (<1%)

Form477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
141/278 (51%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
2/231 (<1%)

Web Search Verification: N/A

Wireless Verification: N/A

twtelecom of maryland, llc

DBA Name: twtelecom of maryland, llc

Data Characteristics

Date of Original Submission:	1/30/2010
Date of Update Submission:	9/6/2012
Currency of Data:	6/30/2012
FRN:	0017348202
Type of data submitted:	Address table
Census Block Count:	97
Total Matched Address Points Count:	143
Unmatched Address Points:	0
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
  - Number matched: 143
  - Number unmatched: 0
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Data Modification:

- Provider did not submit elevation for middle mile - elevation changed to 0.

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
3	9	9%
4	25	25%
5	15	15%
6	2	2%
7	28	28%
8	5	5%
9	4	4%
10	9	9%
11	2	2%

Max Upload Category	Count	% of Blocks
3	9	9%
4	25	25%
5	15	15%
6	2	2%
7	28	28%
8	5	5%
9	4	4%
10	9	9%
11	2	2%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	6	38%
3	1	6%
4	3	19%
5	3	19%
7	3	19%

Speed Test Upload Tier	Count	% of Tests
1	5	31%
2	1	6%
3	1	6%
4	3	19%
5	5	31%
7	1	6%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 8/97 (8%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	10	56%
3	1	6%
4	1	6%
5	2	11%
6	2	11%
7	2	11%

Speed Test Upload Tier	Count	% of Tests
1	5	28%
2	5	28%
4	1	6%
5	3	17%
6	4	22%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 6/97 (6%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 21/97 (22%)
Number of tracts reported to FCC, but no census blocks reported to project: 5

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: 13 census block increase

United States Cellular Corporation

DBA Name: US Cellular

Data Characteristics

Date of Original Submission:	2/2/2012
Date of Update Submission:	7/26/2012
Currency of Data:	6/30/2012
FRN:	0004372322
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area “holes” less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
4	1	100%

Max Upload Category	Count	% of Area
3	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
4	1	100%

Typical Upload Category	Count	% of Area
3	1	100%

Typical down/upload speed from 2010-2012 mobile speed test: N/A

Mobile based speed tests match reported typical download speeds or are within 1 speed tier:
N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477 Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: N/A
#/% of tracts reported as served to FCC but do not intersect coverage area: N/A

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
26/278 (9%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
17/231 (7%)

Web Search Verification: N/A

Wireless Verification: N/A

Vector Data Systems LLC

DBA Name: Vector Data Systems LLC

Data Characteristics

Date of Original Submission:	February 2010
Date of Update Submission:	8/14/2012
Currency of Data:	6/30/2012
FRN:	0017306663
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Remove coverage areas less than 0.125 square miles
- Remove coverage area "holes" less than 0.125 square miles
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
7	1	100%

Max Upload Category	Count	% of Area
7	1	100%

Typical down/upload speeds reported by provider:

Coverage Area

Typical Download Category	Count	% of Area
5	1	100%

Typical Upload Category	Count	% of Area
4	1	100%

Typical down/upload speed from 2010-2012 <u>mobile</u> speed test: N/A

Mobile based speed tests match reported typical download speeds or are within 1 speed tier:
N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: N/A
Number of mobile speed tests reported outside coverage area: N/A

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 7/7 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/7 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
4/278 (1%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
0/231 (0%)

Web Search Verification: N/A

Wireless Verification: N/A

Verizon Communications Inc

DBA: Verizon Maryland Inc

Data Characteristics

Date of Original Submission:	2/15/2010
Date of Update Submission:	9/5/2012
Currency of Data:	6/30/2012
FRN:	0002166825
Type of data submitted:	Census Block Table, Road Segments
Census Block Count:	76752
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	2
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	Yes
Provided Road Segments for census blocks greater than 2 sq miles:	Yes

Data Processing

Census Block Process:

- Join the census block table to 2010 census blocks based on the GEOID10 field
  - Export results for each technology of transmission
  - Load exported results into the NTIA data model
    - Result: BB_Service_CensusBlock

Road Segment Process:

- Join road segments to 2010 TigerLine by TLID
  - Export results
  - Load exported results into the NTIA data model
    - Result: BB_Service_RoadSegment

Data Modification:

- Provider did not submit elevation for middle mile - elevation changed to 0.

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
4	11646	12%

Max Upload Category	Count	% of Blocks
2	11646	12%

5	37030	39%
6	12490	13%
9	32838	35%

3	49520	53%
7	32838	35%

Road Segments

Max Download Category	Count	% of Blocks
4	1215	30%
5	1572	39%
6	117	3%
9	1101	27%

Max Upload Category	Count	% of Blocks
2	1215	30%
3	1689	42%
7	1101	27%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	653	8%
3	563	7%
4	1436	19%
5	441	6%
6	733	9%
7	2497	32%
8	1365	18%
9	42	1%
10	27	0%

Speed Test Upload Tier	Count	% of Tests
1	620	8%
2	2225	29%
3	61	1%
4	919	12%
5	1636	21%
6	660	9%
7	1472	19%
8	163	2%
9	1	0%

Speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 31/76752 (<1%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	1054	7%
3	849	6%
4	1683	11%
5	1820	12%
6	2422	16%
7	6646	44%
8	760	5%
9	1	0%
10	1	0%

Speed Test Upload Tier	Count	% of Tests
1	593	4%
2	2333	15%
3	638	4%
4	1898	12%
5	3932	26%
6	1826	12%
7	3850	25%
8	165	1%
11	1	0%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 295/76752 (<1%)

Form 477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 3610/76752 (5%)
Number of tracts reported to FCC, but no census blocks reported to project: 0

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 125/76752 (<1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 188

Number of census blocks with dead zones reported via mdbroadbandmap.org: 102/76752 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 133

Web Search Verification: 485/76752 (<1%) of census blocks were confirmed using online search feature of given provider

VerizonMD WebSearch Verification Table	Count	Percentage
Total # of sample points	1496	
Number of sample points with results	1428	95%
Result is yes and census block is in served area	485	34%
Result is yes but not in a census block reported as served	57	4%
Result is no and census block is in served area	415	29%
Result is no and census block not served area	467	33%

Census blocks that are outside DSL boundary: 20220/76752 (26%)

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: 63 census block increase

ViaSat, Inc.

DBA Name: ViaSat Communications, Inc.

Data Characteristics

Date of Original Submission:	4/21/2010
Date of Update Submission:	7/24/2012
Currency of Data:	6/30/2012
FRN:	0007843766
Type of data submitted:	Coverage Area
Census Block Count:	N/A
Total Matched Address Points Count:	N/A
Unmatched Address Points:	N/A
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Coverage Area Process:

- Repair Geometry on delivered coverage area
- Load coverage area into the NTIA data model
    - Result: BB_Service_Wireless

Data Modification:

- Provider submitted Maximum Advertised Downstream Speed as speed tier 4
    - Calculated Maximum Advertised Downstream Speed to 5
- Provider submitted Maximum Advertised Upstream Speed as speed tier 3
    - Calculated Maximum Advertised Upstream Speed to 4

Data Verification

Maximum down/upload speeds reported by provider:

Coverage Area

Max Download Category	Count	% of Area
4	1	50%
5	1	50%

Max Upload Category	Count	% of Area
2	1	50%
4	1	50%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010-2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	5	50%
3	4	40%
7	1	10%

Speed Test Upload Tier	Count	% of Tests
1	9	90%
5	1	10%

Mobile bases speed tests match reported typical download speeds or are within 1 speed tier:
N/A

#/% of mobile speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 4/10 (40%)
Number of mobile speed tests reported outside coverage area: 6/10 (60%)

Typical down/upload speed from 2010-2012 computer speed test:

Speed Test Download Tier	Count	% of Tests
0	31	55%
3	14	25%
4	7	13%
7	2	4%
8	2	4%

Speed Test Upload Tier	Count	% of Tests
1	52	93%
4	4	7%

#/% of computer based speed tests verifying coverage area:
Number of mobile speed tests reported inside coverage area: 56/56 (100%)
Number of mobile speed tests reported outside coverage area: 0/56 (0%)

Form 477Verification:
#/% of tracts reported as served to FCC that overlaps with coverage area: 2/2 (100%)
#/% of tracts reported as served to FCC but do not intersect coverage area: 0/2 (0%)

Dead zones:
Number of dead zones reported within coverage area via broadband.maryland.gov:
278/278 (100%)
Number of dead zones reported within coverage area via mdbroadbandmap.org:
230/231 (99.5%)

Web Search Verification: N/A

Wireless Verification: N/A

XO Holdings, Inc

DBA Name: XO Communications, LLC

Data Characteristics

Date of Original Submission:	2/1/2010
Date of Update Submission:	9/10/2012
Currency of Data:	6/30/2012
FRN:	0006275945
Type of data submitted:	Census Blocks
Census Block Count:	322
Total Matched Address Points Count:	354
Unmatched Address Points:	0
Number of Technology of Transmission Types:	3
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	No
Provided Max Typical Upload Speed:	No
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Address Table Process:

- Geocode address table to ESRI US Streets address locator
    - Number matched: 354
    - Number unmatched: 0
- Spatially join address points to 2010 census blocks
- Separate and export the address points according to technology of transmission

Census Block Process:

- Join the address points to the 2010 census blocks based on the GEOID10 field
    - Export results for each technology of transmission
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Modification:

- 27 addresses do not meet broadband speeds – dropped from submission

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
3	30	9%
4	193	60%
5	48	15%
6	13	4%
7	29	9%
8	7	2%
10	3	1%

Max Upload Category	Count	% of Blocks
2	7	2%
3	28	9%
4	188	58%
5	48	15%
6	13	4%
7	29	9%
8	7	2%
10	3	1%

Typical down/upload speeds reported by provider: N/A

Typical down/upload speed from 2010 – 2012 computer based speed test:

Speed Test Download Tier	Count	% of Tests
0	25	30%
3	21	26%
4	17	21%
5	7	9%
6	6	7%
7	1	1%
8	5	6%

Speed Test Upload Tier	Count	% of Tests
1	2	2%
2	31	38%
3	23	28%
4	7	9%
5	7	9%
6	5	6%
7	6	7%
8	1	1%

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer base speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 43/322 (13%)

Typical down/upload speed from 2010 – 2012 mobile speed test:

Speed Test Download Tier	Count	% of Tests
0	29	58%
3	13	26%
4	3	6%
5	4	8%
6	1	2%

Speed Test Upload Tier	Count	% of Tests
0	7	14%
1	2	4%
2	16	32%
3	16	32%
4	4	8%
5	2	4%
6	2	4%

	7	1	2%

Mobile speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): 28/322 (9%)

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 45/322 (14%)
Number of tracts reported to FCC, but no census blocks reported to project: 140

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 1/322 (<1%)
Total number of dead zones reported per provider via broadband.maryland.gov: 3

Number of census blocks with dead zones reported via mdbroadbandmap.org: 1/322 (<1%)
Total number of dead zones reported per provider via mdbroadbandmap.org: 1

Web Search Verification: N/A

Census blocks that are outside DSL boundary: 59/322 (18%)

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: no change

Zayo Bandwidth LLC

DBA Name: Zayo Bandwidth LLC

Data Characteristics

Date of Original Submission:	1/13/2011
Date of Update Submission:	9/17/2012
Currency of Data:	6/30/2012
FRN:	0019133826
Type of data submitted:	Census Tracts
Census Block Count:	60
Total Matched Address Points Count:	0
Unmatched Address Points:	0
Number of Technology of Transmission Types:	1
Provided Max Advertised Download Speed:	Complete
Provided Max Advertised Upload Speed:	Complete
Provided Max Typical Download Speed:	Complete
Provided Max Typical Upload Speed:	Complete
Provided Middle Mile:	No
Provided Road Segments for census blocks greater than 2 sq miles:	No

Data Processing

Census Block Process:

- Select by location all census blocks within tract, removing water blocks
    - Export results
    - Load exported results into the NTIA data model
        - Result: BB_Service_CensusBlock

Data Verification

Maximum down/upload speeds reported by provider:

Census Blocks

Max Download Category	Count	% of Blocks
8	60	100%

Max Upload Category	Count	% of Blocks
8	60	100%

Typical down/upload speeds reported by provider:

Census Blocks

Typical Download Category	Count	% of Blocks
8	60	100%

Typical Upload Category	Count	% of Blocks
8	60	100%

Typical down/upload speed from 2010 – 2012 computer based speed test: N/A

Computer based speed tests match reported typical download speeds or are within 1 speed tier: N/A

Computer based speed tests present within blocks not reported as served by provider (error reported as proportion of total blocks submitted): N/A

Form477 Verification:
Number of census blocks reported to project, but no tract reported to FCC: 0/60 (0%)
Number of tracts reported to FCC, but no census blocks reported to project: 1

Dead zones:
Number of census blocks with dead zones reported via broadband.maryland.gov: 0
Total number of dead zones reported per provider via broadband.maryland.gov: 0

Number of census blocks with dead zones reported via mdbroadbandmap.org: 0
Total number of dead zones reported per provider via mdbroadbandmap.org: 0

Web Search Verification: N/A

Census blocks that are outside providers own Cable Franchise Boundary: N/A

Census blocks that fall within another provider's Cable Franchise Boundary: N/A

Change in coverage area from Spring 2012 Submission to Fall 2012 Submission: 58 census block increase

Maine SBDD Data Submittal to NTIA

Technical Whitepaper

6th Data Delivery

October 1, 2012

Table of Contents

List of Figures

1 Introduction

As an NTIA State Broadband Data and Development (SBDD) grant recipient, the State of Maine is undertaking a statewide project to inventory and map broadband services for inclusion in both national and state broadband maps. The SBDD grantee project team for Maine consists of the ConnectME Authority (ConnectME), the Maine Office of GIS (MeGIS), and the James W. Sewall Company (Sewall). The team is collecting broadband service availability data, including speeds and types of technology, as well as information on Community Anchor Institution (CAI) locations across the entire state. The collected service data undergoes geospatial processing and verification steps before it is loaded into Maine's broadband geodatabase. This geodatabase is used to satisfy NTIA's bi-annual submission requirements as well as support the ConnectME Authority's statewide initiatives and programs.

This whitepaper describes the deliverable datasets, the data collection process and the verification process.

2 Data Description

The Maine team is providing spatial data representing provider coverage in the state as well as information on validation and verification processes. Files provided are as follows:

Filename	Description
ME_SBDD_2012_10_01.gdb	Folder containing SBDD transfer file geodatabase
ME_DataPackage_2012_10_01.xlsx	Data Package file
ME_2012_10_01.txt	Data Submission Receipt file
ME_Methodology_2012_10_01.pdf	Methodology Paper file
ME_ReadMe_2012_10_01.txt	ReadMe file
ME_2012_10_01_Changes_and_Corrections.pdf	Document listing changes and corrections since 1-April-2012 submission to NTIA

3 Provider Participation

Company Response	*Number*	*% of Total Companies*
Provided data	36	66.67%
Will provide data	1	1.85%
Will not provide data	8	14.81%
Non-responsive	9	16.67%
Total	**54**	**100.00%**

The Maine team identified 54 individual providers. Companies that provide multiple technologies of service or have multiple subsidiaries are counted only once.

Information on the providers is included on the ‘ProviderTable’ spreadsheet in the file **ME_DataPackage_2012_10_01.xlsx** included as part of the submission to NTIA.

4 Data Collection and Integration

4.1 Provider Outreach and Data Gathering

Mapping broadband footprints across the State begins by identifying potential providers and contacting them to determine service capabilities and level of participation. If a provider offers broadband level Internet service in Maine, the provider will be invited to participate in the project. After executing a non-disclosure agreement (NDA), the provider submits data showing where services are offered, technology of transmission used, and maximum advertised downstream and upstream speeds. The project team has developed a step by step process that has been captured by the high-level workflow shown in ***Figure 1***. Starting with contacting a service provider, the workflow allows a user to determine whether a provider should be included and if so what types of service are offered.

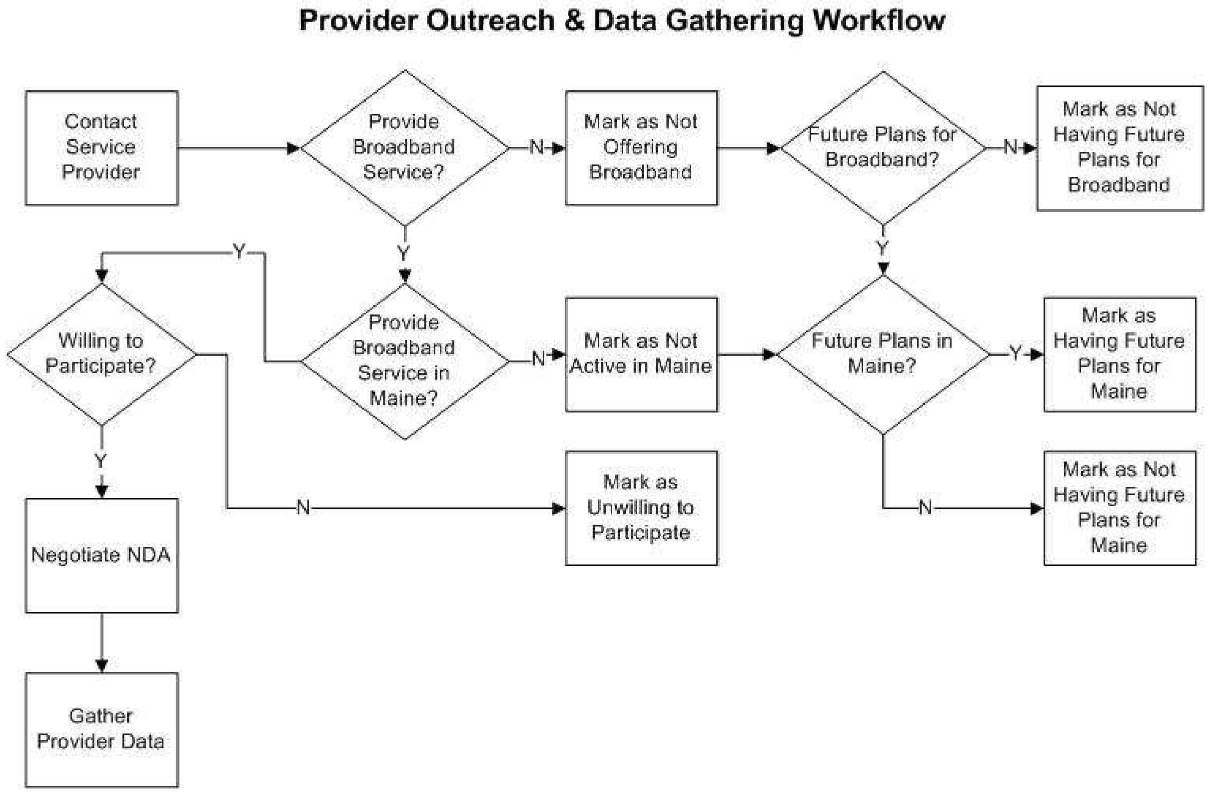


Figure 1 - Provider Outreach and Data Gathering Workflow

The task of reaching out to the provider community and gathering service data has five main tasks: Research Service Providers, Execute NDA, Gather Provider Data, Assess Provider Data, and Categorize Data for Production.

4.1.1 Research Service Providers

The Maine project team has established a service provider contact database, which contains contact information for all of the potential broadband service providers in the state. The initial set of providers was obtained from state and industry lists as well as Internet research. Ongoing management of the list is required because new providers begin offering services that qualify as broadband and changes occur to existing provider companies through mergers or acquisitions.

Sewall initially contacts each provider by phone and introduces the project. One purpose for the initial contact is to identify the individual at the provider company with whom the team should be working. In some instances, especially for larger companies it may take multiple attempts before the appropriate person is reached.

Another purpose is to determine if the company's services meet the requirements for inclusion in the project. If a company offers broadband level service in Maine then the next step is to determine the type(s) of service being offered, whether the service offerings are as an end-user provider or as a middle mile/back haul provider, and whether the company owns facilities or re-sells services using another carrier's network. Data from back haul carriers and resellers are included in the project.

A third purpose behind the initial contact is to confirm that the provider wants to participate in project and is willing to submit data that represents its service offerings and coverages. Provider companies who elect to participate are invited to execute an NDA to protect those data items considered to be confidential or proprietary. If a provider company does not want to participate, Sewall may look for assistance from the ConnectME Authority and the NTIA SBDD project team to encourage participation.

4.1.2 Execute Non-Disclosure Agreement (NDA)

The process of executing an NDA starts with sending a letter of introduction along with an NDA template and a copy of a ConnectME Protective Order. **Appendix A** contains a sample letter. The NDA template was drafted by the Maine law firm, Rudman & Winchell, based on confidentiality guidelines presented by NTIA and can be found in **Appendix B**. A copy of the ConnectME Protective Order signed on 21 December 2009 at the request of many of the service providers is in **Appendix C**.

Changes to the NDA template are negotiated with individual companies as needed. Once finalized, the NDA is signed by the provider company, Sewall, and the ConnectME Authority before the data gathering process begins.

4.1.3 Gather Provider Data

More often than not after an NDA has been executed, a different individual at a provider company is identified as the primary contact for data submittals. Once the contact is confirmed, a data submittal information sheet prepared by the project team is sent to the contact. The data submittal sheet identifies the data items desired and has definitions from the SBDD NOFA. The items requested include:

- FRN or provider FCC Registration Number
- Location and extents of service coverage
- Technology of service
- Speeds of service including maximum advertised downstream & upstream speeds and typical downstream & upstream speeds
- Tower and transmitter locations and transmission attributes (for fixed wireless service)
- Middle mile and back haul connection points
- Customer service locations (for wired and fixed wireless service)
- Failed service locations (for wired and fixed wireless service)
- Service to Community Anchor Institutions

After sending the data submittal information Sewall follows up with the provider contact to review the requested data items and discuss potential formats for submitting data. The team is cognizant of the wide range of environments operated by the provider companies and recognizes the need to accommodate submissions in many different formats including tabular (CSV, Excel, DBF), GIS (ESRI shapefile, ESRI geodatabase, MapInfo, Google KML/KMZ, CAD (AutoCAD, Microstation), and hardcopy. The team also understands that many of the smaller providers in Maine are handicapped by a lack of resources in trying to comply with the project's data submission requirements. Some of the issues facing these providers include small staff sizes, lack of mapping technical expertise, and proprietary digital systems. Sewall lends technical assistance and expertise as needed.

Sewall has deployed a web-based GeoPortal site to accommodate all digital data transfers related to the broadband mapping project. Additional details pertaining to this site can be found in **Section 5.6.1**.

4.1.4 Assess Provider Data

After data has been submitted by a provider, Sewall catalogues it and assesses the data files to see if all of the requested items were provided and what data types were received. Sewall also verifies the locations and spatial definitions for the data items and checks for missing attribute information. Any questions generated are sent to the provider for clarification. It is common for the initial submission to need multiple iterations of data exchanges and feedback before the submission is completed.

Once an initial set of broadband service data is in place, follow-up rounds of data gathering will incorporate modifications to existing service coverages, service types, or service speeds. Later submittals by a provider could consist of an entire set of data records or may only contain updates since the previous submission. Sewall's integration processes are equipped with GIS and database tools to fold newer versions of provider records into the existing baseline. The team anticipates that further development and refinement of these processes and tools will be made as more update submissions are received.

4.1.5 Categorize Data for Production

When data from a provider has been received and assessed, production processes are needed to integrate the data into the project database. **Section 4** of this paper describes the various workflows to turn the submitted data into the SBDD data transfer model features and attributes.

4.2 Community Anchor Outreach and Data Gathering

Community Anchor Institutions (CAI), as defined by NTIA NOFA category codes, consist of the following:

Category 1: School – K through 12
Category 2: Library
Category 3: Medical/Healthcare
Category 4: Public Safety
Category 5: University, College, Other post secondary
Category 6: Other community support – government
Category 7: Other community support – non-governmental

The three primary steps with the CAI are data gathering, data processing and attribution.

4.2.1 Data Gathering

Several data sources were utilized to represent all CAI categories across the state.

State of Maine, Office of Geographic Information Systems (MEGIS)

ARMORIES
CEMA (County Emergency Management Agency)
COLLEGES
FIRE
HOSPITAL
HAS (Hospital Service Areas)
MEAIR (Airports)
POLICE
REDCROSS
RESCUE
SCHLIB (Schools & Libraries)

NAVTEQ-NAVSTREETS (Points of Interest)

NAVTEQ-COMMSVC
NAVTEQ-EDUINSTS
NAVTEQ-HOSPITAL

NAVTEQ-TRANSHUBS

State of Maine, Office of Information Technology – State Facilities

State Facilities File

Maine Department of Health & Human Services (DHHS) – Maine Care Services

Hospitals
Clinics/Rehab/Nursing
Schools
Pharmacies
Home Care
Counseling/Psychologists
Shared Living
Mental Health
School Departments
Health related businesses

Maine School and Library Network (MSLN)

K-12 schools
Public libraries

Maine's Research & Education Network (MaineREN)

Universities and colleges

United States Postal Service (USPS)

Post Office Locations

Service Provider Data

CAI data submitted by provider companies

4.2.2 Data Processing

The data processing task involved an in-depth cleaning and sorting of all CAI source records. Data is initially sorted as spatial (e.g., GIS layer) and non-spatial (e.g., table) data. The spatial data consisted of points and generally needed minimal formatting before loading into a personal geodatabase. The non-spatial data required some initial format revisions to prepare the data for geocoding to generate spatial geometry. The following descriptions associated with ***Figure 2*** below outline the overall workflow and processes involved.

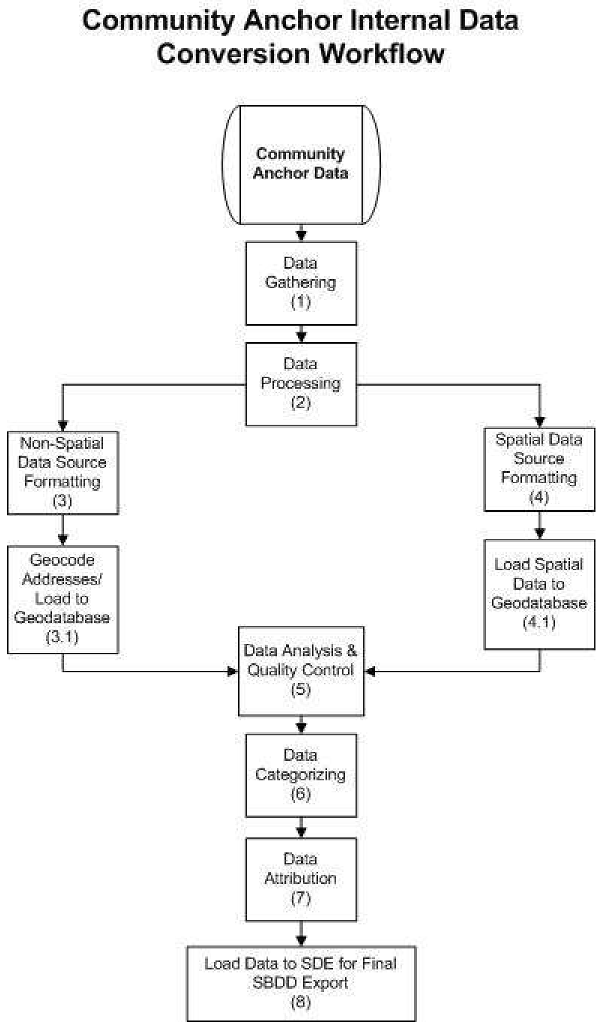


Figure 2 - Community Anchor Internal Workflow

(1) Data Gathering

Data gathering involves acquiring source data involving the seven categories defined by NTIA NOFA. Data may originate from several sources including state, county, town, outreach programs, service providers and more. Records are documented for metadata and given a level of confidence reflecting the data source, spatial accuracy and processing enhancements.

(2) Data Processing

The data processing phase separates the data sources into two types: flat file (non-spatial) and spatial. A flat file refers to data or a table that contains 1 record per line, generally in the format of an .xls spreadsheet or .dbf table. Without spatial coordinate values to translate to points, this type of data must be geocoded in ArcGIS. Spatial data contains pre-defined coordinate values or is already in a format containing spatial geometry with a defined projection and can be imported directly.

(3) Non-Spatial Data Source Formatting
Non-spatial data files are scrubbed to ensure that all necessary fields are present and are formatted to run through the geocoding process.

(3.1) Geocode Addresses/Load to Geodatabase
Using the geocoding tool in ArcGIS, an address locator file must first be setup. The address locator file maps out the ConnectME street centerline fields and is used as a reference for the non-spatial data during the geocoding process. The non-spatial data is saved as a .csv file. Shown below is a typical record formatted to geocode.

Name	Address1	City	State	Zip
Healthworks	10 Bangor St	Bangor	ME	04401

In this example, the geocoding process will reference or match this address record to the ConnectME street address locator and place a point at this location in the map layer. All records in the source file are processed at once. Points are generated, based on how matching parameters or set. Points are then loaded into personal geodatabase for final scrubbing and quality acceptance.

Name	Address1	City	State	Latitude	Longitude
Healthworks	10 Bangor St	Bangor	ME	46.1252	-67.8422

(4) Spatial Data Source Formatting
Spatial data sources are received as flat files with spatial coordinate values or reside in a GIS layer as points. Each source type is processed differently.

Flat files with coordinate values:

- Prepare field name formats
- Prepare coordinate values in decimal degrees
- Add X,Y data into ArcGIS, generating the point locations on the fly
- Output to personal geodatabase for final scrubbing and quality acceptance

Point files:

- Export file to shapefile format if necessary
- Project file to state coordinate system (UTM NAD83 Zone19 Meters) for compatibility with other data layers
- Output to personal geodatabase for final scrubbing and quality acceptance

(4.1) Load Spatial Data to Geodatabase
All spatial data types (point files) are loaded into a personal geodatabase for final scrubbing and quality acceptance.

(5) Data Analysis and Quality Control
A final analysis is completed on all points loaded in the personal geodatabase to identify any issues. The table below indicates the primary types of issues, the means to detect them, and the resulting solution.

Issue ⇒	***Identification*** ⇒	***Result***
Duplicate Points	Selection by location/imagery review	Delete incorrect record
Unmatched geocoded records	Google Maps review	Matched record
Inaccurate CAI locations	Imagery review	Modify point location
Unsuitable CAI	-	Delete record

(6) Data Categorizing
Once the CAI records have gone through the data analysis and quality control, the records are given a category value of 1 to 7, as discussed in the introduction.

(7) Data Attribution
CAI attributes are the most difficult to acquire at the data gathering stage and are typically acquired through additional steps, including contacting each CAI. The required attributes are:

- Broadband Service
- Technology of Transmission
- Advertised Downstream and Upstream Speeds

The project team has completed the initial round of contacting each CAI to collect the above information. The task was completed by assembling a call center group assigned to contacting each CAI to establish a primary contact and address verification followed by exercising an on-line survey aimed to provide feedback to the items listed above. Completed surveys were compiled through the use of SurveyMonkey.com and final survey output (.csv) was prepped and values were loaded into the CAI database to populate attributes.

Additional sources and surveys have been utilized to populate the database including MSLN (Maine School and Library Network), NCES (National Center for Education Statistics), the Maine Fiber Company as part of its Three-Ring Binder project, and state agency listings provided by the chief technical officer. The project team will continue to compile CAI data utilizing all the above resources and research additional data sources and methodologies to populate these attributes.

(8) Load Data to SDE for Final SBDD Export
CAI data is loaded from the personal geodatabase to the SDE environment for final export to SBDD format.

4.3 Data Analysis and Conversion

Data is analyzed and converted with different processes, depending on its type and characteristics.

4.3.1 Fixed Wired Transmission

Fixed wired service provider companies in the state of Maine range from small to large businesses and utilize several distinct types of technology to deploy broadband service. In order to accommodate the varied inputs, Sewall has developed a flexible and comprehensive workflow to incorporate provider information into a state broadband map developed by Sewall in conjunction with the ConnectME Authority.

The ConnectME model depicts broadband service provider coverage at the street segment level. The model uses a street centerline as the spatial component of the coverage, and a related table stores provider specific information for street segments. Sewall developed production tools to accommodate the incorporation of service provider data into this ConnectME model and instill quality control into the process.

The steps in the process for analyzing and converting Fixed Wired Transmission data are outlined in ***Figure 3*** and described below.

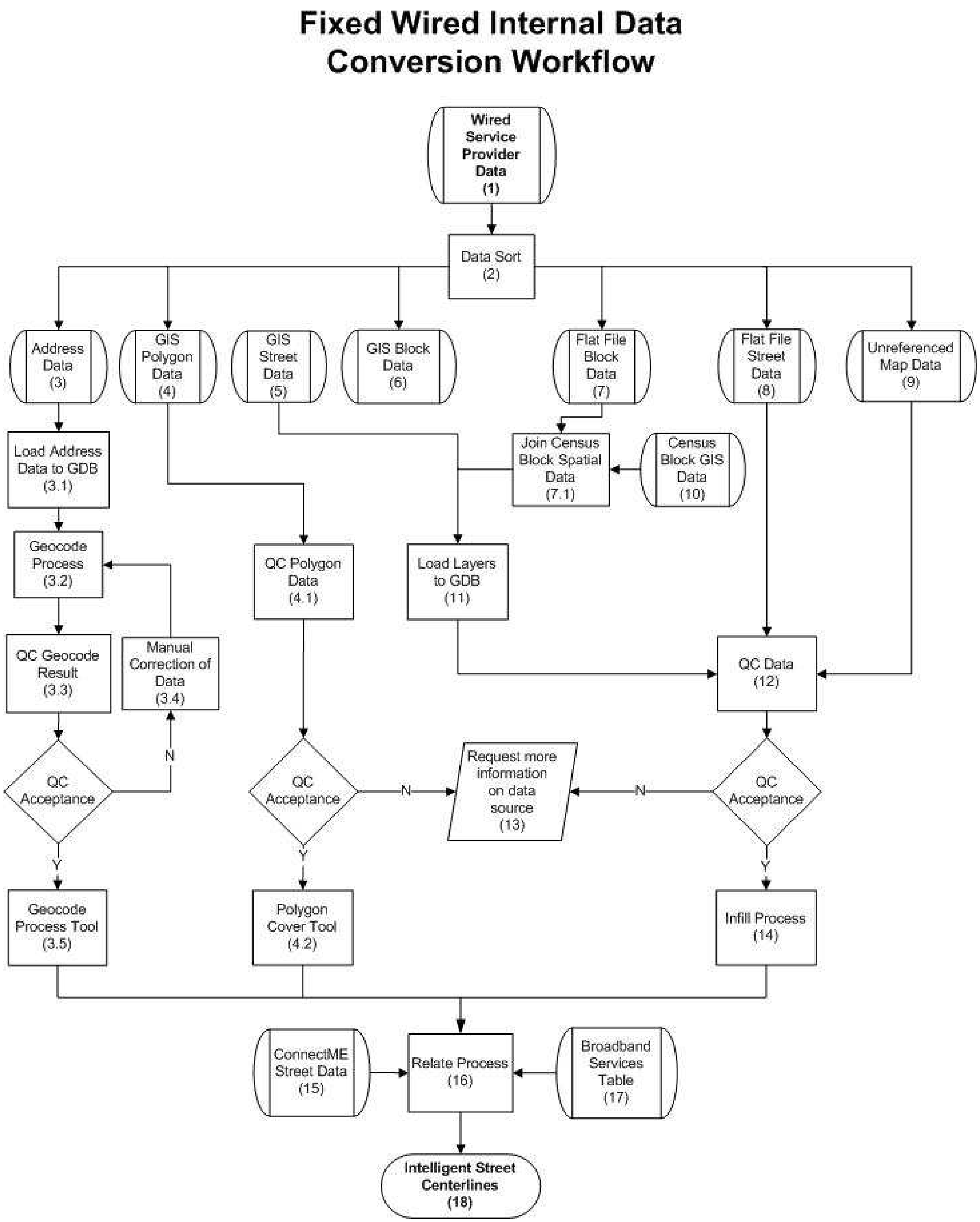


Figure 3 - Data Flow for Fixed Wired Transmission Providers

(1) Wired Service Provider Data

The data bin is the storage location for wired broadband service provider data gathered by Sewall.

(2) Data Sort
The data sort phase immediately follows the data collection process. Analysts sort the wired data by provider and by data characteristics. The wired data can consist of address data, predefined coverage data, flat file coverage data and unreferenced maps. Individual workflows have been developed by Sewall for the various data formats.

(3) Address Data
The address data bin is reserved for service provider data that is at the address level. Examples of address data formats received are spreadsheet and text file format.

(3.1) Load Address Data to Geodatabase
Address data is formatted to meet the ArcGIS geocoder standards and loaded into the geodatabase for processing. The formatting of the address data will include ensuring fields with the full street address and town name are populated in the dataset.

(3.2) Geocode Process
Formatted address data is geocoded using the ConnectME street centerline dataset. The address locator style used in this process is the ArcGIS US Streets with Zone. For this process, the city fields of the ConnectME street dataset are utilized in the zone component of the locator.

(3.3) QC Geocode Result
Analysts review the address data geocode result for the following:

- Overall geocode hit rate
- Town geocode hit rates
- Data anomalies

If address data fails any of these checks the data will not pass QC acceptance.

(3.4) Manual Correction of Data
Address data that has not passed the QC acceptance is evaluated for corrections necessary for the data to pass QC acceptance. Corrections to town names and updates to street names are commonly required to match the naming conventions in the ConnectME roads dataset.

(3.5) Geocode Process Tool
Sewall has developed an ArcGIS tool named Geocode Process Tool that translates the accepted geocoded address data into tabular address range records related to the accompanying ConnectME street centerlines. This tool is shown in ***Figure 4*** below.

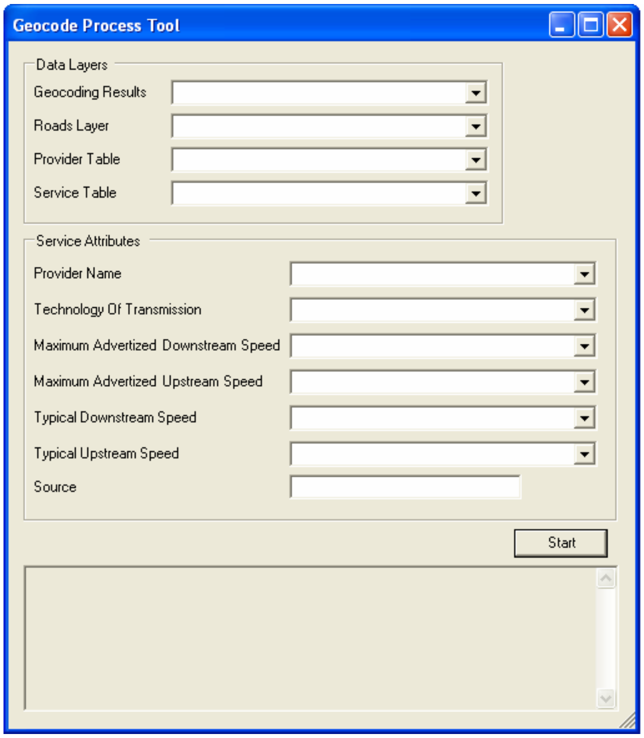


Figure 4 - Geocode Process Tool
Data Layers:(1) Geocoding Results - geocoded layer of address data (2) Roads Layer - ConnectME roads data layer (3) Provider Table - table of provider specific information (4) Service Table - broadband service output table where the service provider street address ranges are stored.
Service Attributes: The first six values are necessary to populate fields in the deliverable. Source is used to designate that the records created are from the Geocode Process Tool.

In ArcMap the user specifies which layers in the map correspond with the data layer inputs for the tool as well as the service provider service attributes that correspond with the geocode address point layer. Once the information is set the user clicks 'Start' and the process begins.

Each geocoded address point within the geocode layer has as an attribute the street segment that the address was geocoded to. Using this street link, the tool can locate all of the geocoded address points assigned to a given street segment and build a modified street range of broadband service for the street segment. The tool then creates a record in the Broadband Service table that contains a link to the street segment in the ConnectME street feature class and populates the record with the derived broadband service street segment range and specified service provider information. This process is repeated for each unique street segment listed in the geocoded address point layer.

(4) GIS Polygon Data
The GIS polygon data bin is for service provider data that represents a coverage area of broadband availability and is delivered in a GIS format.

(4.1) QC Polygon Data

Datasets from the GIS polygon data bin are reviewed by an analyst. The QC routine ensures that the data has spatial integrity and includes the necessary attribution for inclusion to the state broadband project.

(4.2) Polygon Cover Tool

Sewall has developed an ArcGIS tool named Polygon Cover that converts service provider coverage area polygons into street segment related tabular records. Each tabular record created by the tool incorporates the service provider broadband specification information as well as modified street ranges representing provider street coverage.

This tool was initially created by Sewall for use on the fixed wireless viewshed datasets but was incorporated into the wired workflow for service providers that provided polygon regions of service coverage.

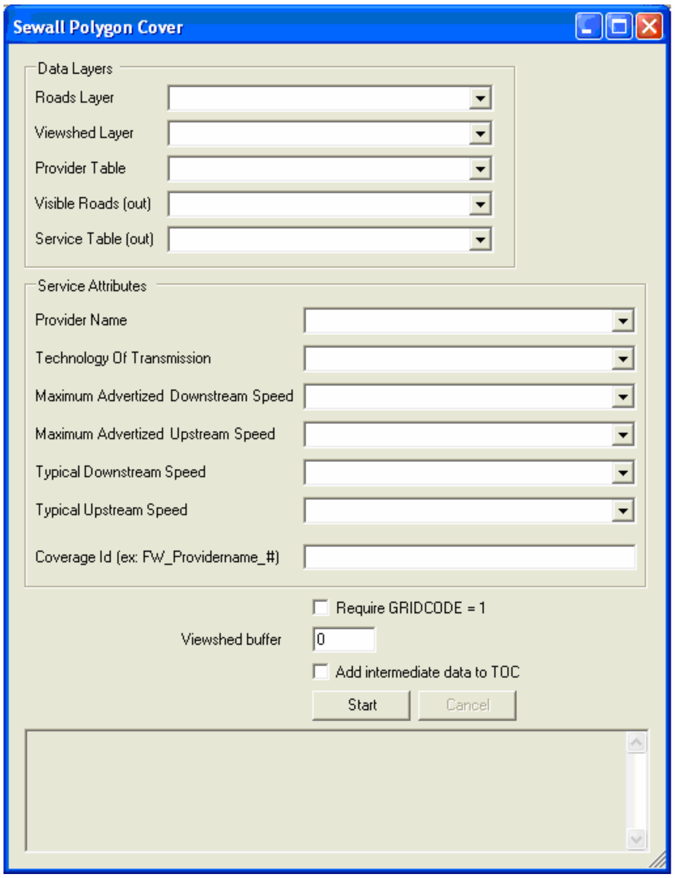


Figure 5 - Polygon Cover Tool

Data Layers: (1) Roads Layer - ConnectME street centerline data layer with address ranges (2) Viewshed Layer - viewshed layer used in delineating visible polygons for clipping road segments. For wired providers this would be the polygon layer that depicts a provider's coverage area. (3) Provider Table - internal processing flag (4) Visible Roads (out) - output feature class that stores the clipped road segment geometry (5) Service Table (out) - output table that the extracted address ranges populate.
Service Attributes: The first seven values are necessary to populate fields in the deliverable.
Require GRIDCODE = 1: Toggle is unchecked when running a wired broadband provider dataset that is represented as a coverage area.

In ArcMap the user specifies which layers in the map correspond with the data layer inputs for the tool as well as setting the service attributes for the service provider polygon layer. While running the Polygon Cover tool for fixed wired service regions analysts ensure the Require GRIDCODE = 1 toggle is unchecked. Since this tool was initially created for use with a viewshed polygon output, the tool will not run on a non-viewshed layer unless this toggle is unchecked. Once the information is set the user clicks 'Start' and the process begins.

The tool selects street segments from the input Roads layer that intersect the input polygon coverage and exports the street segments to a separate working file. These streets are then clipped to the polygon coverage. Next the tool runs a length ratio process that assigns each street segment a fractional value based on the clipped and original lengths. The tool then populates modified street range attributes based on the length ratio of a segment and the original street range of a segment. These modified street range values represent the broadband service street range of the provider. For each street segment the tool also creates a record in the Broadband Service table that contains a link to the original street segment in the ConnectME street feature class and populates the record with the modified broadband service street segment range and specified service provider information.

(5) GIS Street Data
The GIS street data bin is for wired broadband provider data at the street segment level that is delivered in a GIS format.

(6) GIS Block Data
The GIS block data bin is for provider data that is delivered at the census block level in a GIS format.

(7) Flat File Block Data
Census block service data delivered in a flat file format is stored in the flat file block data bin. Examples of flat file data are spreadsheets, text files and database files.

(7.1) Join Census Block Spatial Data
Flat file block provider coverage information is joined to a spatial census block layer using the full census block id value. Blocks with provider information joined are exported creating a spatial representation of the provider's census block broadband coverage.

(8) Flat File Street Data
The flat file street data bin is where provider data is stored when Sewall receives street level information in a format that cannot be associated spatially. Examples of files types delivered in a flat file format are spreadsheet, database and text file.

(9) Unreferenced Map Data
Provider data that cannot be referenced in ArcGIS are stored in the unreferenced map data bin. Examples of this type include paper maps and PDF documents.

(10) Census Block GIS Data
This data is Census 2010 block data in GIS format for the state of Maine that has been downloaded from the US Census website.

(11) Load Layers to GDB
Provider GIS data is loaded into the Sewall SDE geodatabase. A feature class is created for each provider's dataset. Sewall workflow tracking attributes are added to the feature classes.

(12) QC Data
Datasets are sent to a Sewall analyst for QC. The QC routine is to ensure that the data includes the necessary information for inclusion to the state broadband project. Provider data is cross-referenced with information on broadband availability that has been gathered from other sources. The QC of datasets with spatial data includes additional QC routines to ensure spatial integrity.

(13) Request more information on data source
Broadband provider data that does not meet the QC acceptance criteria Sewall initiates a request order to the provider for additional information. This request includes a detailed listing of the deficiencies found in the data as well as inquiries regarding spatial inaccuracies and anomalies discovered in the analysis.

(14) Infill Process
Sewall developed a tool named Infill to interact with the ConnectME street segments and populate related tabular records for fixed wired service provider availability. The Infill Tool allows a user to configure a specific set of service provider parameters, select ConnectME street segments, and then view and edit the related broadband availability information in the Broadband Services table that corresponds with the configured attributes. This tool is used to input fixed wired broadband availability data that Sewall received as census block, street or unreferenced map data. The majority of fixed wired service provider datasets utilize the Infill Tool for processing. A screenshot of the configuration dialog box is shown as Figure 6 below.

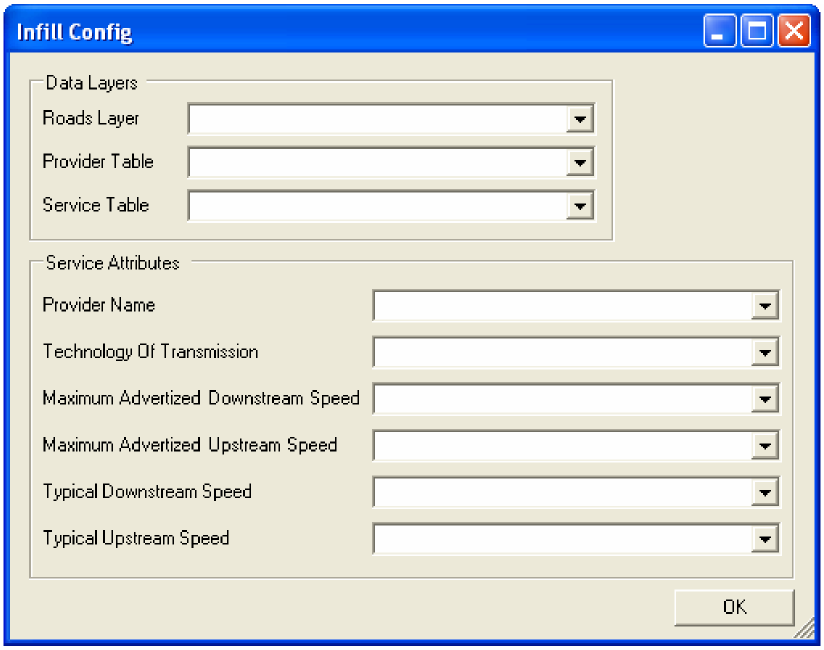


Figure 6 - Infill Tool Configuration
Data Layers: (1) Roads Layer: ConnectME roads data layer (2) Provider Table: Internal processing flag (3) Service Table: Broadband Service output table where the service provider street address ranges are stored. Service Attributes: These fields are necessary to populate fields in the deliverable.

The first time a user uses the Infill tool in an ArcMap session, the 'Infill Config' screen appears. The user enters the input data layers and the attributes for the service provider dataset that the tool will utilize during processing.

Once the Infill Config screen has been set a user selects one or more ConnectME road segments. Using the unique primary key values of the selected streets and the specified provider name and technology of transmission the tool searches the Broadband Services table for existing matching tabular records. If matches are found from this search, the tool reports the information in the Infill window. For selected street segments where no match was found in the Broadband Services table, the tool populates the Infill window with street segment road name and street range attributes representing potential broadband service ranges for the provider on the selected streets. These street range attributes can be updated in the Infill window based on provider sources. This Infill tool window is shown as ***Figure 7***.

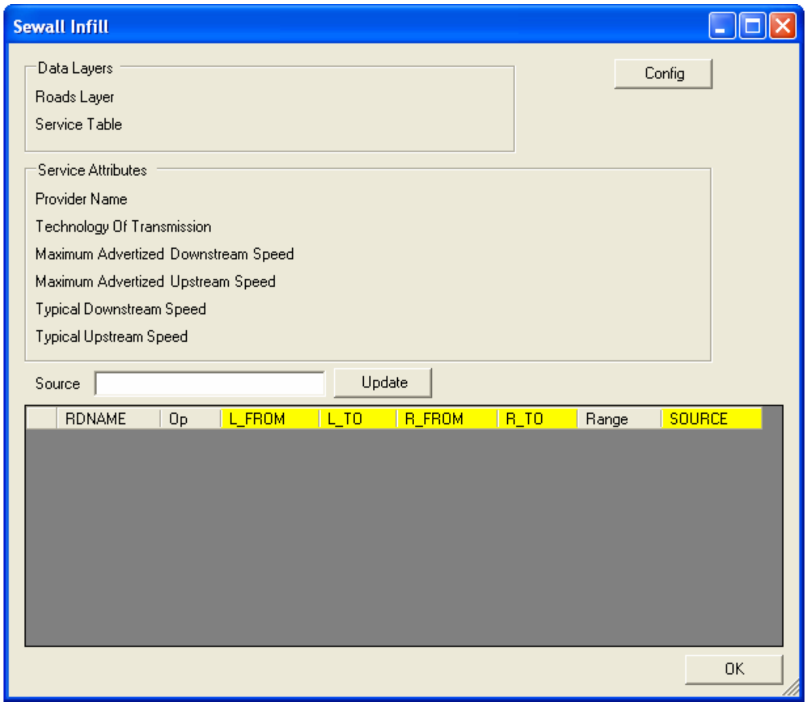


Figure 7 - Infill Tool
Data Layers: (1) Roads Layer: ConnectME roads data layer (2) Service Table: Broadband Service output table where the service provider street address ranges are stored
*Config: Opens the Infill Config window (**Figure 6**)*
Service Attributes: These fields are necessary to populate fields in the deliverable.
Source: Internal flag for source of service availability
Update: Updates selected tabular records SOURCE field to the value entered in the Source field
Tabular Record Attributes: (1) RDNAME: Name of ConnectME road segment (2) Op: Operation being performed {INSERT-new tabular record, UPDATE-update existing tabular record, DELETE-delete tabular record} (3) L_FROM: "Left from" broadband address range of ConnectME road segment (4) L_TO: "Left to" broadband address value of ConnectME road segment (5) R_FROM: "Right from" broadband address value of ConnectME road segment (6) R_TO: "Right to" broadband address value of ConnectME road segment (7) Range: Reports either "full" or "partial" and is a comparison for each tabular record of the broadband provider street range to the accompanying ConnectME street range (8) SOURCE: Internal process flag.

Once the user has reviewed the values, pressing 'OK' will perform the operations listed in the Op field.

(15) ConnectME Street Data
The ConnectME street data bin contains the street centerline dataset used in the geocode and street relate processes. The Maine Office of GIS E-911 street centerline file was used to create the base street segments and gives the project the most accurate street centerline file for the State of Maine. The NAVTEQ street centerline dataset NAVSTREETS was utilized to infill street segments in areas where gaps were assessed in the MEGIS E-911 file.

(16) Relate Process
Through the use of Sewall developed tools the data gathered for fixed wired broadband service providers gets stored in the Broadband Services table as availability street ranges associated with street centerline segments. Each record in the Broadband Services table is

associated by a foreign key/primary key relationship with a street segment in the ConnectME street centerline dataset. This relationship allows for clean and easy access to street level availability of service providers.

(17) Broadband Services Table
The Broadband Services geodatabase table was developed by Sewall to store broadband service provider information and street range coverage. NTIA requirements and formats were utilized when creating the fields to ensure the records stored in the Broadband Service table are compatible with the SBDD data model.

(18) Intelligent Street Centerlines
The output from the fixed wired workflow is a comprehensive intelligent street centerline network comprised of street centerlines and related service availability tabular records.

4.3.2 Fixed Wireless Transmission

The initial stage of mapping terrestrial fixed wireless service territories depends on the quality of the data received. To process any service footprint of a particular transmitter, the initial resources acquired during the data collection phase of the project are critical.

Terrestrial Fixed Wireless technology is clouded by many variables that determine the overall performance of each transmitter signal. Inaccurate data pertaining to location, height of a transmitter, horizontal and vertical limitations, signal range and many more factors present potential obstacles to producing an accurate representation of any transmitter's service footprint. Some of these factors have not been considered during the mapping process due to lack of data needed for modeling them. For example, while a 10-meter DEM is used to represent the surface terrain, we have not incorporated obstructions on the surface such as trees and other man-made obstacles that could influence a transmitter's propagation model.

The data collection process and subsequent conversion workflow is designed to accommodate a variety of data sources received from the service providers and production tools have been developed to build efficiencies and quality control into the workflow. When received by the service providers, supplemental data is used throughout the conversion workflow to help verify the mapping results. However, a larger scale verification process is described in **Section 5**.

The data conversion process for fixed wireless transmission is represented by ***Figure 8*** and described below.

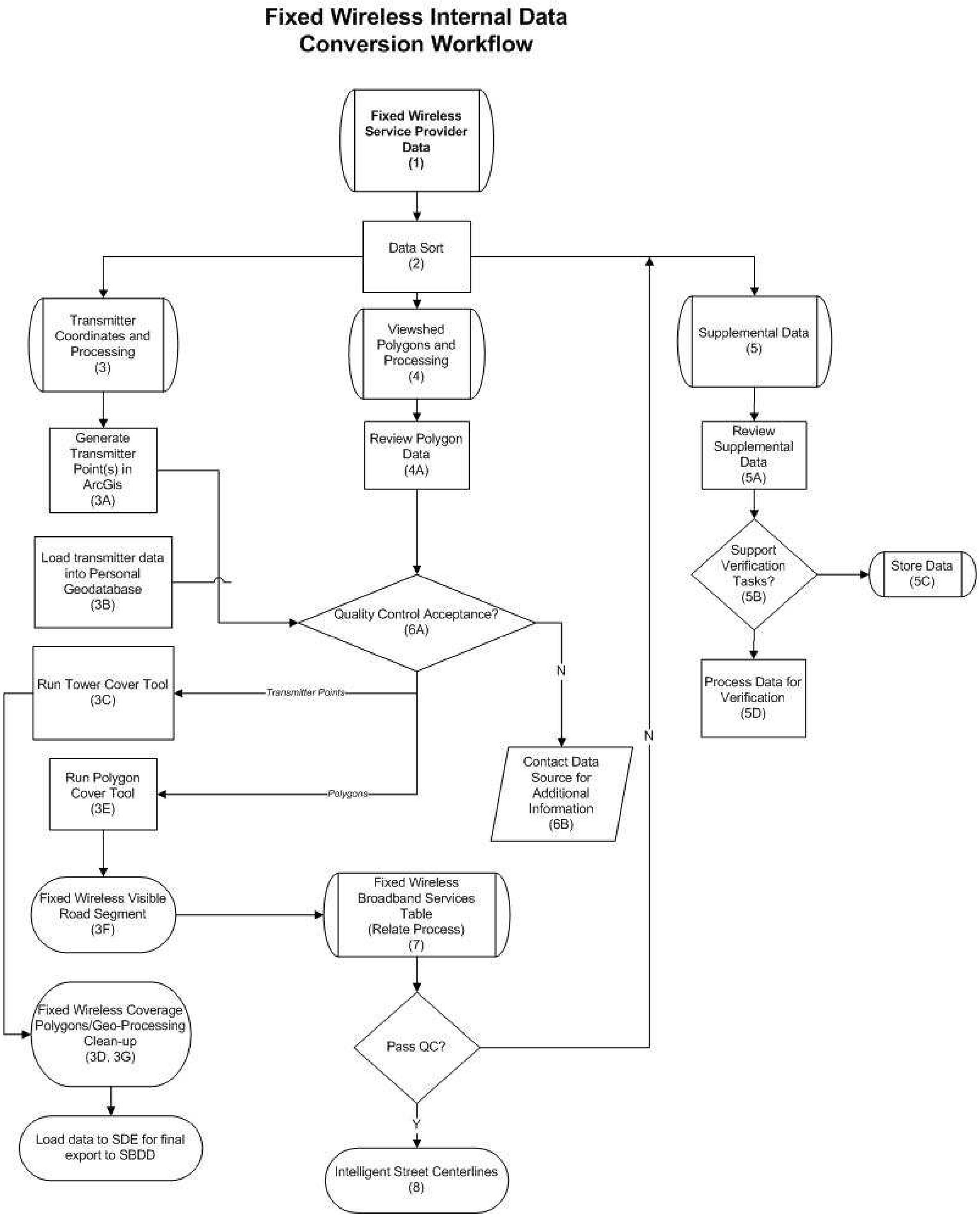


Figure 8 - Fixed Wireless Internal Conversion Workflow

(1) Fixed Wireless Service Provider Data

Service provider data gathered during the data collection phase. Data is cataloged in separate folders by provider and managed according to task and technology of transmission.

(2) Data Sort
The data sort phase of production immediately follows the data collection process. During this task, a thorough review of the service provider data determines the type of data received. Fixed wireless data generally consists of three types: transmitter coordinates and attributes, pre-defined polygons and attributes, and supplemental data. Each type of data follows unique internal processing steps.

(3) Transmitter Coordinates and Processing
Transmitter coordinate data is essentially the raw data necessary to generate a viewshed for each transmitter. In order to be processed, the transmitter source data must have certain required fields such as latitude and longitude, spot (ground elevation), equipment height at the transmitting and receiving ends, horizontal and vertical limitations, and range of transmission. The content of the transmitter data is carefully reviewed for completeness and overall consistency prior to the next step. Once completed, the data is imported into ArcGIS for continued processing and quality control.

(3B) Load Transmitter Data into Personal Geodatabase
Using the newly scrubbed .csv file, transmitter points are created in ArcGIS and the transmitter location points are displayed. A final comparison against supplemental data is performed to ensure the transmitter locations are in the correct locations. Supplemental data includes such layers as imagery, political boundaries, and road centerlines.

(3C) Run Tower Cover Tool
This tool was designed and developed by Sewall to batch process 1 or more transmitter point viewsheds. A screenshot of the tool is shown below as ***Figure 9***.

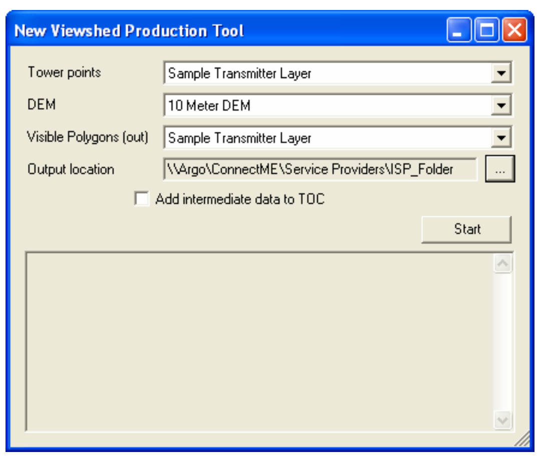


Figure 9 - Tower Cover Tool (Viewshed Production)
Tower Points: The data layer containing records of all transmitters that need a viewshed generated. Originally received from ISP and pre-processed by Sewall for format compatibility.
DEM: 10-meter digital elevation model obtained from MEGIS as the primary surface model for generating the viewshed
Visible Polygons (out): Visible polygons (only) output to an SDE layer
Output location: Location of output to personal geodatabase workspace to be used for additional processing.

(3D) Fixed Wireless Coverage Polygons

The Tower Cover Tool generates raster data sets depicting the visible and non-visible surfaces representing each transmitter. As a final output, the tool extracts the visible components of the raster data and outputs to polygon vector layers stored in the SDE environment as supplemental reference data.

(3E) Run Sewall Polygon Cover Tool

This tool was designed and developed by Sewall to facilitate several production steps.

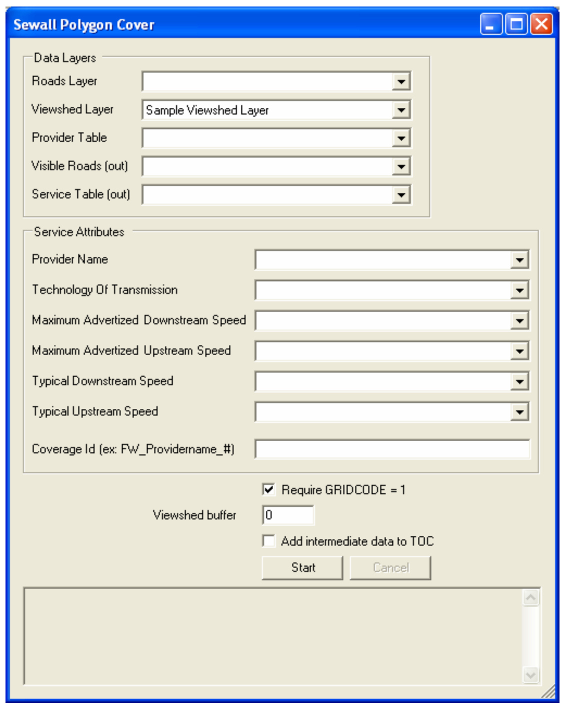


Figure 10 - Polygon Cover Tool
Data Layers: (1) Roads Layer - ConnectME Street data layer with address ranges (2)Viewshed Layer - viewshed layer used toe delineate visible polygons for clipping road segments (3)Provider Table - internal processing flag (4) Visible Roads (out) - output feature class that stores the clipped road segment geometry (5) Service Table (out) - output table that the extracted address ranges populate.
Service Attributes: These fields are populated, if data is available, to meet NTIA NOFA requirements.

(3F) Fixed Wireless Visible Road Segments

The Polygon Cover Tool clips road segments that are within visible polygon viewsheds and writes them out to a polyline vector layer stored in the SDE environment as supplemental reference data.

(3G) Fixed Wireless Geo-Processing Clean-up

The fixed wireless polygons or propagation models generated for each provider step through several geo-processing routines to check for and eliminate the following conditions:

- Single pixels less than 0.125 square miles
- Holes inside the polygons less than 0.125 square miles

- Data layer clipped to state polygon file downloaded from U.S. Bureau of the Census website, filename: tl_2010_23_state10.

In each case, all identified polygons are removed and dissolved to create multipart polygons by provider, technology, speed and spectrum. Each provider's propagation model differs in size and complexity due to the number of transmitters and their individual parameters that determine each view shed. Because the geometries are manipulated through many geo-processing procedures, multiple cycles of validation are run to ensure the geometries are in tact and repair routines are run if necessary. Once all propagation models meet internal quality control standards, the geometry is loaded to SDE and stored for final export to the SBDD deliverable format.

(4) Viewshed Polygons and Processing
Although not as common, another source of data received from the service providers is a polygon dataset that has already been generated to represent visible service territory of transmitters. Service providers or third party vendors will frequently run their own propagation models to be used for broadband mapping. Polygon formats include ESRI shapefiles, MapInfo files, Google .kml files, and raster files. Each format requires a thorough review to determine the subsequent processing steps.

(4A) Review Polygon Data
Although each format listed is unique, the data eventually runs through the Polygon Cover tool so that the address ranges within the polygons can be clipped out. Each format is carefully inspected for content, spatial characteristics and accuracy. The general workflow for each format is as follows:

- Shapefile: Review content > Edits > Project > QC > Load for processing > Run Sewall Polygon Cover Tool
- MapInfo: Review content > Translate to ESRI shapefile > Edits > Project > QC > Load for processing > Run Sewall Polygon Cover Tool
- Google .kml: Review content > Translate to ESRI shapefile > Edits > Project > QC > Load for processing > Run Sewall Polygon Cover Tool
- Raster: Review content > Translate raster to polygon > Edits > Project > QC > Load for processing > Run Sewall Polygon Cover Tool

(5) Supplemental Data
Supplemental data received by service providers is generally used for verification to support internal processing results. It is not used as a data source to generate transmitter locations or viewsheds. Supplementary data includes, but is not limited to, failed service locations, customer service locations, hard copy plots, PDF files, and other digital reference files. In most circumstances, the data can be used for cross-referencing.

(5A) Review Supplemental Data
Each format is unique and so are the processing steps that are necessary to prepare the data for use.

- Failed Service Locations: Provides an excellent source for cross-referencing to viewshed polygons (visible and non-visible) but must have complete address in order to geocode location of address.
- Customer Service Locations: Provides an excellent source for cross-referencing to the viewshed polygons (visible and non-visible) but must have a complete address in order to geocode location of address.
- Hard copy plots: May be used for verification purposes if the content of the material is applicable.
- PDF files: May be used for verification purposes if the data content is applicable.
- Other data sources: All sources are reviewed for potential use.

(5B) Support Verification Tasks
Supplemental data sources are reviewed to determine if they hold any value to the project workflow. Value added data will be stored and utilized as needed to support internal processing.

(5C) Store Data
Data received from service providers that does not have any given value to the project is organized and stored under the service provider folder.

(5D) Process Data for Verification Tasks
Supplemental data sources are scrubbed for compatibility and processed.

(6) Quality Control Acceptance
Quality control procedures are implemented at each of the three production stages depending on the data (transmitter coordinates, viewshed polygons, or supplemental data). Because the service provider data is received in numerous formats, styles, and content, much of the initial QC is completed during the data collection stage. When data is received from a service provider, an initial review is done to determine what is received and what is outstanding. This cycle of communication with the providers continues until all the necessary data is either received or clearly understood that it will not be received. Throughout the data collection process, Sewall keeps an inventory of receivables.

(6A) Contact Data Source for Additional Information
During the data collection phase of the project, questions or clarifications may have been overlooked, or items may present road blocks at some point later during the processing. If an internal quality review does not resolve an issue, the service provider is contacted for additional information or clarification.

(7) Fixed Wireless Broadband Services Table (Relate Process)
The Polygon Cover Tool has two outputs; both generated using the visible polygons created by the Tower Cover Tool: (1) road segments, and (2) calculated address ranges. While the visible road segments are not part of the NTIA deliverable, they are stored as a reference file named CONNECTME.FW_VISIBLE_ROAD_SEGMENTS.

(8) Intelligent Street Centerlines
The output from the fixed wireless workflow is a comprehensive intelligent street centerline network comprised of street centerlines and related service availability tabular records.

4.3.3 Mobile/Satellite Transmission

Wireless broadband technology consists of all facilities-based providers of wireless broadband service that is not address specific. For the State of Maine, this includes terrestrial mobile wireless and satellite broadband service. Mapping mobile wireless and satellite coverage requires less processing than other technologies that are address-based, such as wired and fixed wireless service. Data consists of polygons generated by the providers or third party vendors, representing areas where broadband service is offered. As shown in the workflow below, the data received from providers is sorted, processed and loaded into a geodatabase. Minimal steps are required to process this data, but established internal workflows are taken to ensure that proper protocols and quality assurance are met. The primary steps of the internal workflow are shown in ***Figure 11*** and described below.

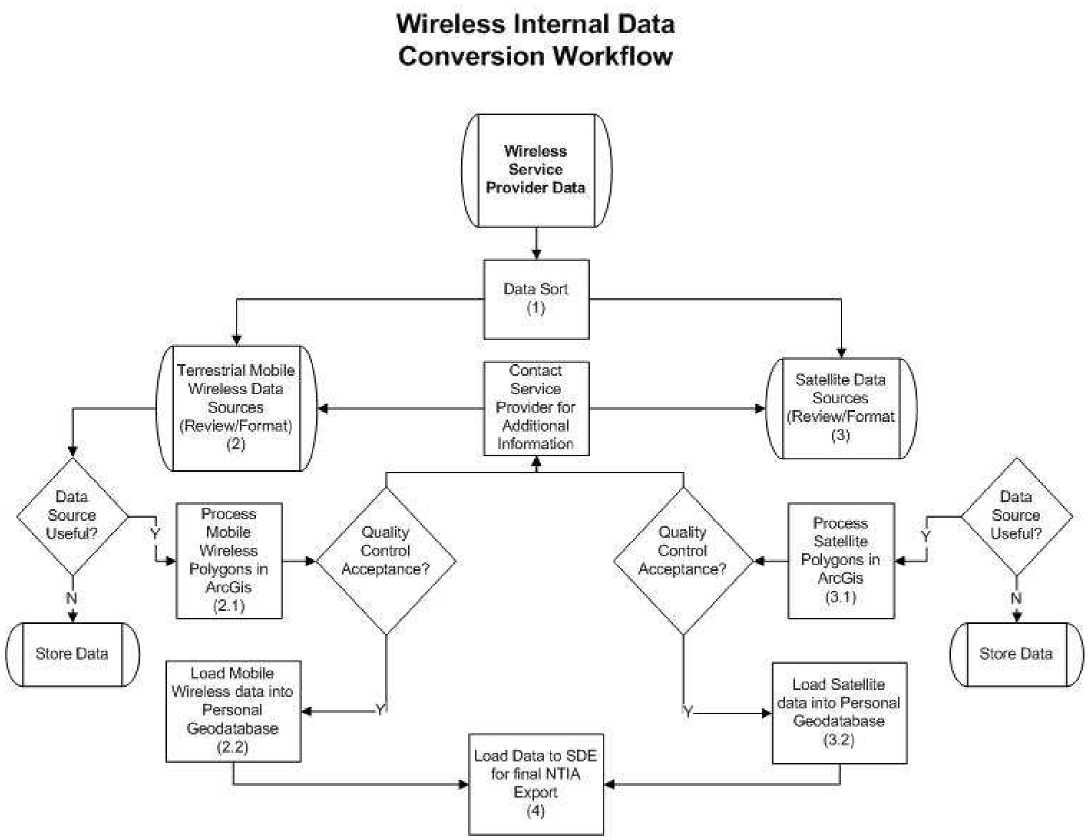


Figure 11 - Wireless Internal Conversion Data Workflow

(1) Data Sort
Upon receiving data from a mobile or satellite service provider, Sewall initially sorts and stores the data by technology - terrestrial or satellite.

(2) Terrestrial Mobile Wireless Data Sources (Review)
After the data is sorted, an initial data analysis is performed to determine if the data received appears to be intact spatially and is accompanied by the proper attribution required for adherence to the SBDD data model. Follow-up with the service provider continues until all necessary information is acquired.

(2.1) Process Mobile Wireless Polygons in ArcGIS
After determining that the data has value, the polygons are projected into the proper coordinate system to complement the internal workflow. Depending on the source data, additional data processing routines may be necessary before loading the data into the geodatabase.

(2.2) Load Mobile Wireless data into Personal Geodatabase
Although the primary quality control procedures are completed during the verification process, initial acceptance testing to ensure the data is spatially valid is performed by cross-referencing to additional data sources such as aerial imagery or information taken from the service provider website. Discrepancies are documented for use in subsequent verification processes. Once quality checks are complete, the data is loaded into a personal geodatabase

(3) Satellite Data Sources (Review)
When all the spatial and attribute information is received, the satellite data follows the same internal workflow as mobile wireless data (Steps 2, 2.1 and 2.2).

(4) Terrestrial Mobile Wireless Geo-Processing Clean-up
The propagation models submitted by each provider are run through several geo-processing routines to check for and eliminate the following conditions:

- Single pixels less than 0.125 square miles
- Holes inside the polygons less than 0.125 square miles
- Data layer clipped to state polygon file downloaded from U.S. Bureau of the Census website, filename: tl_2010_23_state10.

In each case, all identified polygons are removed and dissolved to create multipart polygons by provider, technology, speed and spectrum. Because the geometries are manipulated through many geo-processing procedures, multiple cycles of validation are run to ensure the geometries are in tact and repair routines are run if necessary. Once all propagation models meet internal quality control standards, the geometry is loaded to SDE and stored for final export to the SBDD deliverable format.

(5) Load Data to SDE for final SBDD Export
Mobile wireless and satellite data is loaded to SDE environment for final export to SBDD format.

4.3.4 Middle Mile Locations

Middle Mile and Internet Backhaul Connection Points are defined by NTIA as "interconnection points that typically enable relatively fast data rates, are built to handle substantial capacities, and may be service-quality assured." At this stage of the mapping, middle mile data has been the most difficult to obtain from service providers during the data collection process. Service provider networks can include as little as one middle mile location such as a backhaul connection point or as many as dozens, operating as interconnection points within a fixed wireless network reaching out to end users. Furthermore, some service providers may offer middle mile connection points only as a service, such as a splice into a fiber line to support a lateral to a central office or business.

Regardless of the technical framework, all middle mile locations that meet the NTIA definition are captured in a point feature class with additional attribution including the ownership of the facility, serving facility capacity and serving facility type.

The outline of workflow is shown as ***Figure 12***. The description of each step follows.

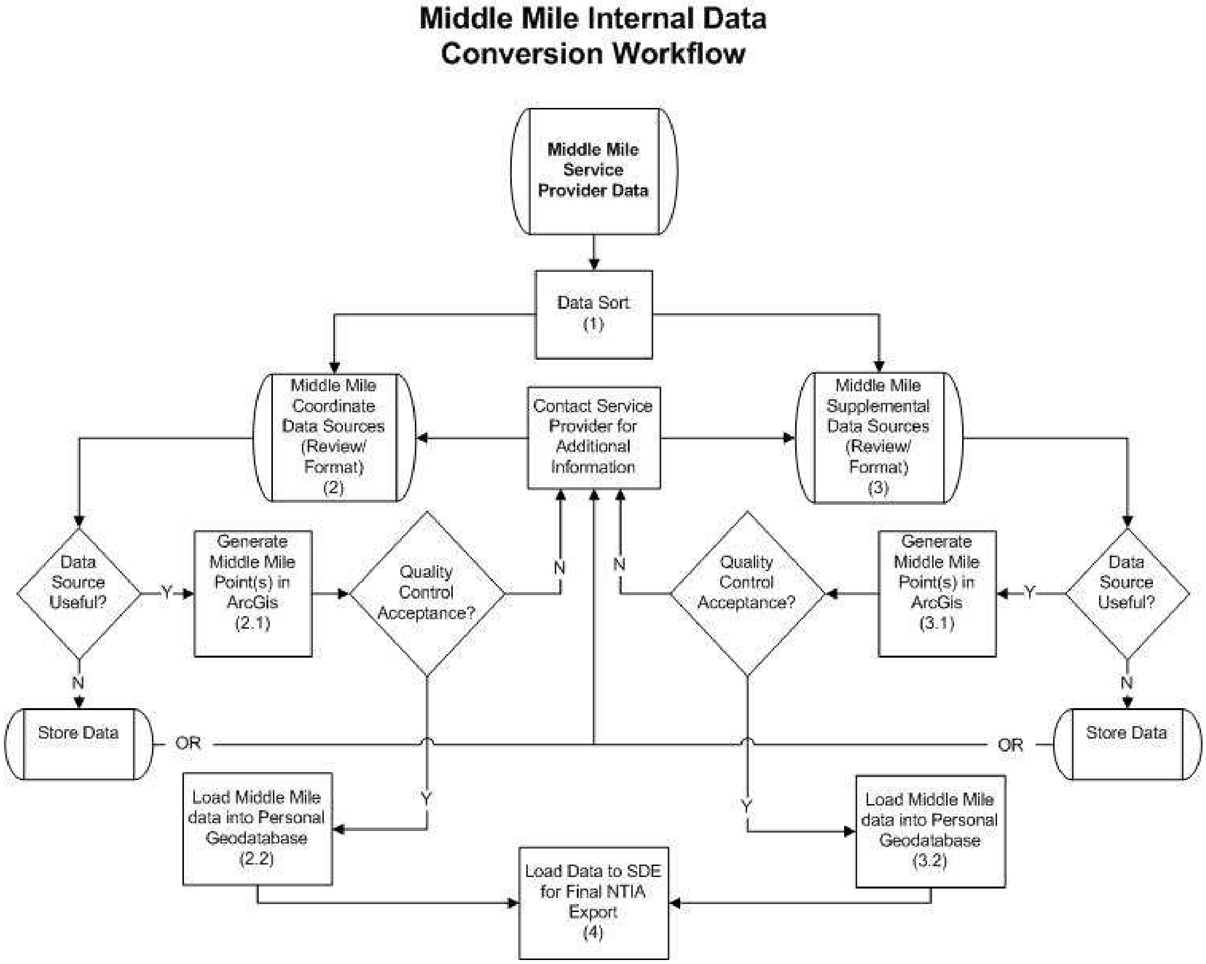


Figure 12 - Middle Mile Internal Data Conversion Workflow

(1) Data Sort

The initial data sort separates the data and distinguishes formats more compatible to the database model, such as middle-mile coordinate values listed in a spreadsheet or ESRI shapefiles. Data received in compatible formats require minimal processing steps. Supplemental data sources generally require additional processing steps. Examples may include the conversion of .kml files to ESRI shapefiles or polyline files that require points to be added at splice or lateral connections.

(2) Middle Mile Coordinate Data Sources Review

Sewall reviews the data to ensure that the information is a valid input. If so, the data is reformatted and loaded into in ArcGIS. Sources deemed as invalid are stored, or the service provider is contacted for additional information if necessary.

(2.1) Generate Middle Mile Points in ArcGIS

Points are loaded into ArcGIS. Sewall analysts run acceptance procedures to verify data translation to ArcGIS and spatial accuracy and completeness using supplemental data sources provided such as addresses, imagery or descriptive information about the point locations. In addition to the point geometry, all attribution carried over in the translation is confirmed.

Conflicts or questions are referred back to the service provider for further clarification if necessary.

(2.2) Load Middle Mile Data into Personal Geodatabase
Middle-Mile data is loaded to a personal geodatabase. Additional data received by the service providers or revisions will cycle through the same process and be stored in the personal geodatabase prior to loading to the SDE environment for final export.

(3) Middle-Mile Supplemental Data Sources (Review)
Supplemental data sources may involve additional processing during this step in order to proceed. Some of the more common supplemental data sources include, but are not limited to, the following:

- Google .kml files
- .jpg images showing middle-mile locations
- AutoCAD point or polyline files
- e-mails with descriptions of locations
- Other miscellaneous information

Once the data has been fully reviewed and normalized, the remaining steps follow the same internal workflow as coordinate data sources (Steps 2.1 and 2.2).

(4) Load Data to SDE for final SBDD Export
Middle mile data is loaded from the personal geodatabase to the SDE environment for final export to SBDD format.

4.3.5 Service Overview

Broadband service providers that participate in the state broadband mapping project have been asked to provide broadband service territory footprints at the address, street, census block or county level. The service overview dataset contains the information that has been delivered at the county level.

The workflow developed by Sewall integrates the gathered data from broadband service providers into a consistent spatial format that is stored in a geodatabase designed to be compatible with the SBDD deliverable.

The service overview workflow is described below and depicted in ***Figure 13***.

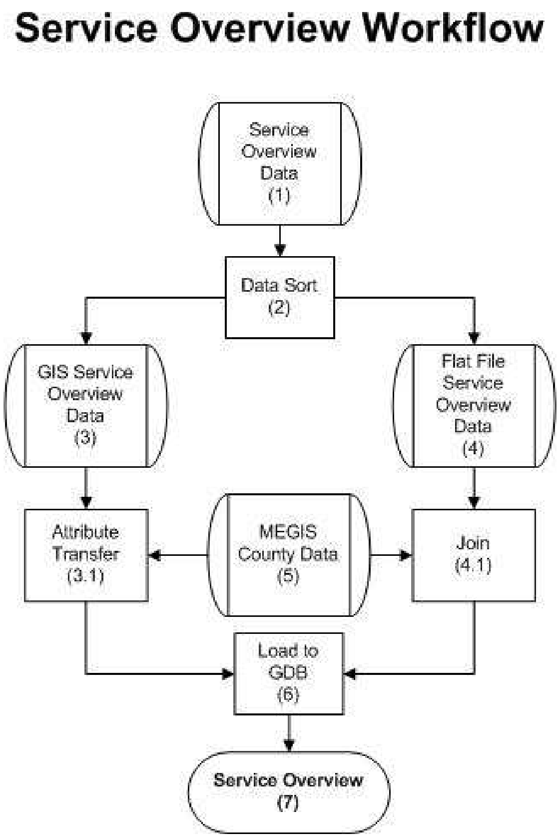


Figure 13 - Service Overview Workflow

(1) Service Overview Data
The Service overview data bin is the storage location for service overview specific broadband service provider data gathered by Sewall. Sewall specifies what information is necessary for this deliverable and what formats are acceptable when contacting each provider during the data gathering phase of the project.

(2) Data Sort
The service overview data is sorted into categories by data type.

(3) GIS Service Overview Data
The GIS data bin is used to store provider data that has been delivered to Sewall with service overview attribution and is in the requested GIS format.

(3.1) Attribute Transfer
Attributes contained in the GIS data are sent through an attribute transfer process that populates county data from the MEGIS County data. This step ensures that there is one consistent spatial dataset utilized as a basemap in the service overview.

(4) Flat File Service Overview Data
The flat file data bin is used to store provider data that has been delivered to Sewall with service overview information in a flat file format.

(4.1) Join
Using county name information provided in the flat files the MEGIS county data is joined to the flat files. The joined dataset is exported and stored in the GIS service Overview data bin.

(5) MEGIS County Data
The shapefile cnty24p.shp was downloaded from the MEGIS website (megis.maine.gov) and utilized for county spatial representation of the service overview dataset during the workflow.

(6) Load to Geodatabase
Once the service overview data has been processed, the data is reviewed for content and accuracy and then loaded to the ConnectME production database.

(7) Service Overview
The output of the service overview workflow is a polygon dataset that is compatible with the SBDD data model.

5 Validation

The validation process is used to ensure that the data delivered is in fact valid and current. Methods used by the Maine team to validate coverage areas include:

- field tests with mobile devices
- responses to surveys sent to residents and businesses
- comparison with third-party datasets both private and governmental
- crowdsourced data (speed test results and feedback forms)

Once the data has been collected, processed and verified, the results are statistically analyzed and plotted atop the original provider data coverages in GIS. Any 'holes' or inconsistencies in the data from the service provider are reported to the provider in a feedback loop to ensure all parties involved are aware of the potential issues with the broadband service in an area.

5.1 Field Tests for Mobile Coverage

Mobile coverage consists of data from providers who offer mobile broadband services to consumers through devices such as smartphones or mobile laptop aircards. Common providers of this type of broadband service in Maine are AT&T, Verizon Wireless, and Sprint.

In order to verify the existence of wired and fixed wireless coverage in an area, direct access to the provider's service is needed. Logistically this would be difficult because transmission receivers, accounts and other equipment would have been required for each of the providers. Instead, the project team opted to gather information through other means, so field tests were only conducted to validate mobile coverage.

Mobile coverage data is received by Sewall from the service providers in the form of GIS polygon files. After these files have been reviewed and properly projected (see **Section 4.3** for details), they can be analyzed in the verification process. The mobile coverage file is compared against the State of Maine boundary file in a GIS application in order to assess the size and location of the coverage area with respect to the State.

5.1.1 Methodology

The methodology developed by the ConnectME Authority to verify mobile coverage in Maine is to select a series of points throughout a provider's coverage and have field crews run tests at these predetermined locations. A minimum of 37 points per coverage area are needed in order for the statistical analysis on the field data to be valid (see Section 5.1.2 for how this was determined).

To select the points for field verification, a 28-square-mile grid was created in GIS and layered with the provider's coverage area, the E911 road layer and the state boundaries. One point was placed per grid block within the provider's coverage network. Each point was placed on a road, usually at road intersections for ease of access by the field crew. Once all the points were placed, the points were divided into groups for distribution to field crew personnel.

The points were assigned attributes of point ID, latitude and longitude. The attribute table was then exported to an Excel file for further editing. The columns: field connect, upload speed, download speed and notes were added to the spreadsheet. The field connect column holds values to describe whether the field crew was able to log on to the provider's network., speeds collected from the state website at that location are stored in the upload speed and download speed columns. The spreadsheet was loaded onto the field laptops for data entry.

Crews utilized Microsoft Streets & Trips to assist in navigating to each of the field points across the state. The software, which was loaded on each of the field laptops, has a GPS component that could track and direct field crews. The spreadsheet used for data entry was also loaded into the software so the points could be plotted based on given coordinates. The field crews could properly identify each of the points based on the Point Name attribute.

The program turned each of the points into a "stop." The start and ending points of the trip were also added, allowing the software to calculate an optimized route to reduce driving time and mileage. After optimization, the software also provided driving directions, which were saved and loaded onto the field laptops.

Mobile broadband aircards from each of the mobile service providers were purchased outright directly from the providers. This eliminated the need for a service contract so that the aircards can be deactivated after the verification process without a contract cancellation fee. Service providers activated the mobile aircards with a month-to-month data package of 5GB.

Aircards from each of the providers were then loaded onto the field crew laptops. The software from the aircards was installed, aircard functionality was checked, and any updates were installed prior to crews leaving the office.

Each time verification tasks are performed, the points are visited by a field crews who are equipped with a field laptop enabled with the mobile broadband aircard of the corresponding service provider and proper navigation information. The field crews drive to each of the points, log onto the service provider's network and navigate via Internet Explorer to an internet speed test website created by the James W. Sewall Company specifically for the ConnectME Broadband Mapping Project.

For each test point, the point number, service provider and date are entered into the internet speed test website (e.g., Test_745_verizon_20120821) and a test is executed. Results are recorded both in the speed test database (automatically) and in the spreadsheet. Once all of the points are completed, crews return to the office and spreadsheets are combined. Data columns are filled in with corresponding broadband upload and download speeds for sites with connectivity.

Data points are then plotted on maps to view where broadband coverage is full strength or where it is lacking. If there are large 'holes' in the coverage areas, the points are revisited to ensure that readings were accurate and not subject to user or equipment error.

5.1.2 Statistical Process Validation

Large data sets are often expressed best in terms of summary statistics. It is often easier to look at commonly defined statistics (stats) to get a quick overview of what the data describes, than to look at all the raw data. A sample set of data points field testing was selected. The following steps were taken to ascertain that the sample set was statistically representative of the actual data.

In analyzing this data, we chose statistics using the following criteria:

- Commonly used and understood
- Fit the data (data type) in question
- Had practical application to the reader in understanding what the data was describing

We believe that the statistics presented can be beneficial in several ways:

- Description/Summary: they consolidate many data observations into a few summary stats that can be quickly compared
- Quantification: they describe which portion of the data falls within or outside of the limits of acceptable criteria
- Reliability/Prediction: in some cases, they attest to the reliability of the data collection

The following statistics were used:

- Number of samples (n): number of data points in the sample
- Average (xbar): arithmetic mean or the mean value of a set of integers, terms, or quantities, expressed as their sum divided by their number.
- Standard Deviation (sd): used as a measure of the dispersion or variation in a distribution, equal to the square root of the arithmetic mean of the squares of the deviations from the arithmetic mean.
- Percentages (%): a proportion or share in relation to a whole; a part; a fraction or ratio with 100 understood as the denominator (e.g., 0.98 equals a percentage of 98).
- Hypothesis testing: statistical process used when trying to determine if it is reasonable to conclude that the entire population possesses a certain characteristic by the analysis of a sample.

Explanation of choices made:

- Quantitative statistics were only applied on sample data that fell within the published service area of the provider in question. This was possible because the area was "bounded" by the geographic area described in the "service area." Outside the service area there is no bound (limit), so these same statistics would not be reliable as used with our methodology.

- Assumed a normal distribution because this is the most common and typical distribution type for this type of data, and we had no evidence to counter this assumption.
- Chose sample statistics because we were not dealing with the whole population (almost unlimited sample points possible).
- Chose hypothesis testing because we wanted to have the most valid predictor of the population parameters given the variability of our sample data.
- Chose student's T-distribution when sample size was equal to or less than 30 (n=<30) and Z-test when populations were above 30 (n>30).
- Used one-tailed tests because we were interested in the area above the curve from a single lower parameter (criteria of minimum speed).

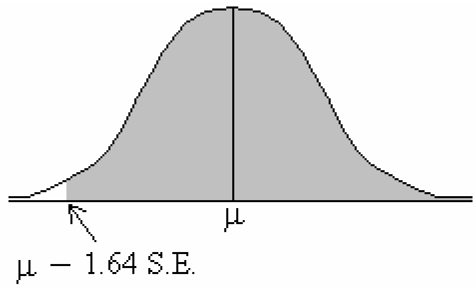
Data was sorted to yield only those sample points that fell within the published service area of the provider in question.

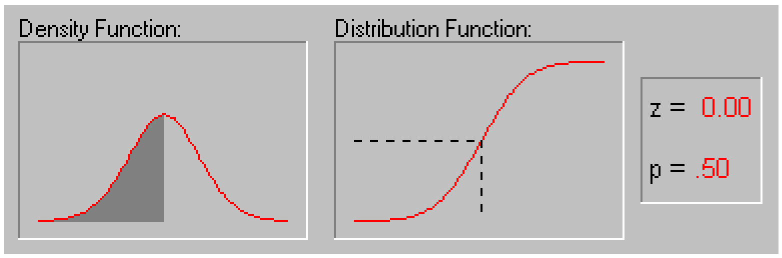
Then the following information was calculated:

- n = number of total sample points
- Degrees of Freedom (df) = n-1
- Selection of t-distribution (df < 30) or standard normal curve (df >= 30)
- Percent of points where connection was established
- Percent of points where both tested upload and download speeds were equal to or greater than (=>) broadband speeds (200 and 768 kb/sec respectively).
- Percent of points where either the upload or download speed was equal to or greater than (=>) broadband speed, but not both.
- Percent of points where neither the tested upload or download speeds was equal to or greater than (=>) broadband speeds.

Using all data points within the designated service provider coverage that registered an upload speed during the test, the following were calculated:

- Average # of points where a connection was made that had an upload speed equal or greater than broadband minimums.
- Average upload speed (xbar/upload)
- Standard deviation of the sample (SD/upload)
- Statistical prediction of percent of points that would meet minimum 3G upload speed in subsequent samplings (using one-tailed t-test or z-score, depending on df) – see schematic below





Using all data points within the designated service provider coverage that registered a download speed during the test, the following were calculated:

- Average # of points where a connection was made that had a download speed equal or greater than broadband minimums.
- Average download speed (xbar/download)
- Standard deviation of the sample (SD/download)
- Statistical prediction of percent of points that would meet minimum 3G upload speed in subsequent samplings (using one-tailed t-test or z-score, depending on df) – see schematic above.

The sampling method was determined to be valid. ConnectME is collecting enough sample points to be a statistically valid representation of the data.

5.2 Surveys

The project team is surveying residents and businesses in Maine utilizing a questionnaire about their current internet connections. The ConnectME Authority has opted begin the verification of residential broadband service with a pilot survey.

5.2.1 Pilot Residential Survey

According to the 2000 Census, there are approximately 518,000 households in Maine, of which 10,000 were included with the pilot survey. Residential addresses were purchased from InfoUSA for the mailing as 2,500 addresses in each of four geographic areas: Maine North, Maine South, Maine East, and Maine West. Addresses were selected at random by InfoUSA from the provided GIS polygons constituting adjacent census blocks in each area containing approximately 5000 households.

The survey questionnaire is comprised of 10 questions and takes about two minutes to complete. A copy is included in **Appendix E**.

The survey identifies the consumer by the physical address, which is geocoded against a street centerline file in GIS to create a point file. The data associated with each address (e.g., transmission type and provider) is analyzed by layering the consumer information with the coverage data provided by the service provider. Sewall can analyze the layers to verify if each service provider does cover the areas represented by the data it submitted. In addition, if an area shown to have no service by a provider appears in the consumer survey, the provider in question can be contacted to confirm and provide updated coverage information.

There is also an online version of the survey that people can access by navigating to a link indicated on the delivered hardcopy of the questionnaire. The electronic version, once completed, directs the person to the ConnectME internet speed test website, which reports the upload and download speeds of the user's internet connection. The speeds are recorded in a database that tracks entered physical address and speed test results for future analysis (see Section 5.4.1 for further details).

5.3 Third Party Data

The Maine team has acquired data from Mosaik Solutions (American Roamer) and from the FCC. These datasets will be used to validate the mapped coverage for each provider through spatial analysis.

5.3.1 Mosaik Solutions data

Maine acquired Mosaik Solutions (American Roamer) data, which includes coverages for Sprint, Verizon Wireless, AT&T and T-Mobile. The data consists of polygon shapefiles, which Sewall could overlay with the coverages received from the providers. For each provider, the area in common and the area covered only by one dataset were determined from geospatial analysis. Differences are used for analysis and refinement of the service territory.

5.3.2 FCC Form 477 aggregate data

The FCC has provided SBDD grantees and their teams access to the FCC Form 477 aggregate data. This data contains information on service providers in Maine at an aggregate or granularity higher than the SBDD data, but is useful for checking the list of providers and their locations at Census Track level.

The project team has recently developed a tool that compares the records in the Form 477 aggregate data to the provider data in the SBDD project database. The tool lists out by Census Track each provider that includes the tract in the Form 477 filing. Each provider that has service data that falls within the tract is considered a match. Using this data, the team has been able to find potential providers that were not previously included in the study, as well using the tract locations as a cross-reference to where each provider has service. The team has plans to further enhance the tool to provide a set of results centric to each provider.

5.3.3 Maine Office of GIS E911 data

The Maine Office of GIS (E911 Services Group) provided the Maine team with a listing of the first and last address of each street in the E911 database, along with a count of households located on each street. This is referenced as the Automatic Location Identification (ALI) database. As a first step in the validation process, the information in this file was cross-referenced to each broadband provider in our broadband mapping database. As a result, potential coverage gaps in broadband service were flagged and prioritized based on the number of household counts for the street. Gaps with potential high household counts were given a higher priority than those with minimal households. The Maine team has completed this initial validation step and is currently developing follow-up procedures to target the gaps with high priority flags.

5.4 Crowdsourced Data

5.4.1 Speed test results

For the SBDD project, the ConnectME Authority has implemented an online speed test tool. The website was developed by Ookla Net Metrics and was brought online on January 13, 2010. To date, over 12,000 tests have been recorded. The speed test stores downstream and upstream speeds as well as the user's address and ISP. The results from the speed test tool are scrubbed and geocoded. The information will be used to help verify service coverages and service speeds for wired, fixed wireless, and satellite providers.

5.4.2 FCC Consumer Broadband Test (CBT) data

The Consumer Broadband Test data provided by the FCC consists of three datasets: Speed Test records, Mobile Broadband Speed Test records, and Broadband Dead Zone Report records. The project team plans to incorporate the FCC speed test records along with those records captured by the ConnectME speed test tool. However, the name of the service provider is not included with data, so a method for mapping the IP address in these records to the appropriate provider must be developed.

The dead zone reports are used to identify locations reported to be without coverage. The addresses from these records are geocoded and then are cross-referenced with service provider coverages in the areas.

5.4.3 Public feedback records

As part of the interactive broadband availability map website, the ConnectME Authority has included a form for public feedback on the results of an address level search on broadband service. Using the form, someone can enter information regarding broadband at his/her location. The feedback records are used to help identify areas where broadband service may be in question and will lead the team to take additional steps to verify service coverage in these areas.

5.5 Service Locations / Failed Service Locations

Service providers are encouraged to submit service locations and/or failed service locations to help validate extents of service coverage. The service addresses and failed service addresses are geocoded and the data is analyzed with the coverage data submitted by the service provider. This validation step will continue throughout the project as the team continues to receive these locations as part of the providers' data submittals.

5.6 Feedback Loop

Once broadband service territories are mapped, Sewall generates maps for each provider company representing the status of data at the time of the mapping. This gives each service provider the opportunity to validate its broadband service footprint and provide feedback to the Sewall project team. ***Figure 14*** below represents a fixed wired validation map where a provider company's broadband service (DSL) foot print is symbolized in red. Depending on the size of a service footprint and map density, additional information, such as road names, may be represented.

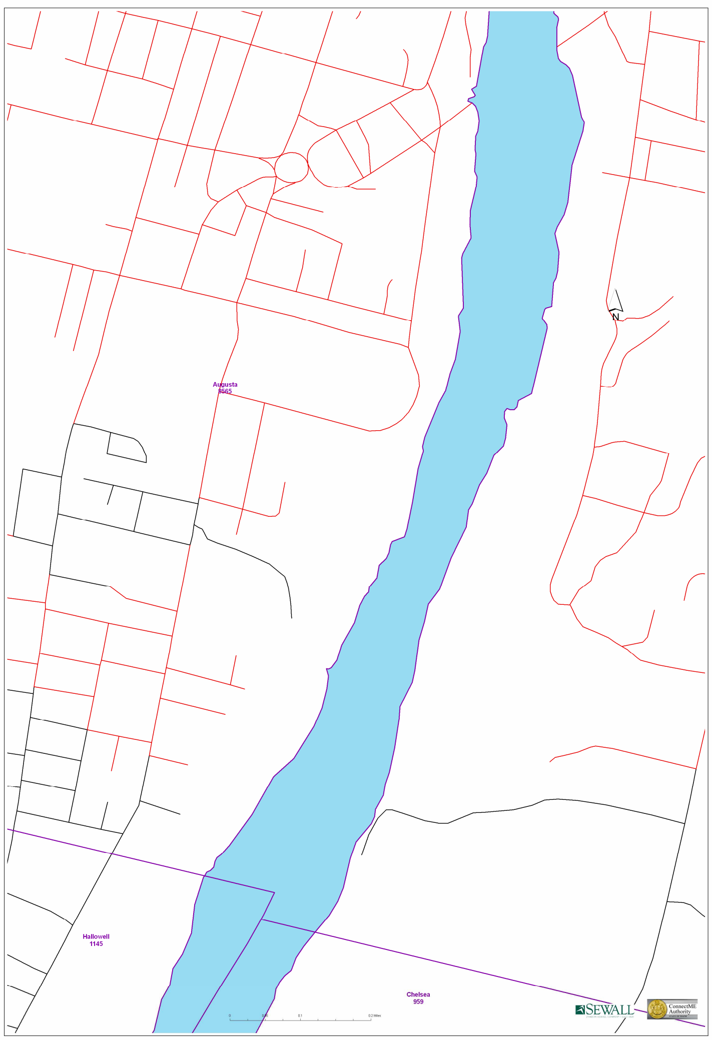


Figure 14 - Fixed Wired Validation Map

Sewall forwards the maps of the service territory, along with any anomalies noted from the third-party and crowd-sourced data analysis to each service provider. Sewall communicates regularly with each provider to ensure that the mapping is as comprehensive and correct as possible.

Sewall also generates maps for mobile service providers showing the coverage and service levels according to FCC and NTIA standards. ***Figure 15*** below represents a sample validation map showing FCC-defined levels of service. Town lines and town names are shown.

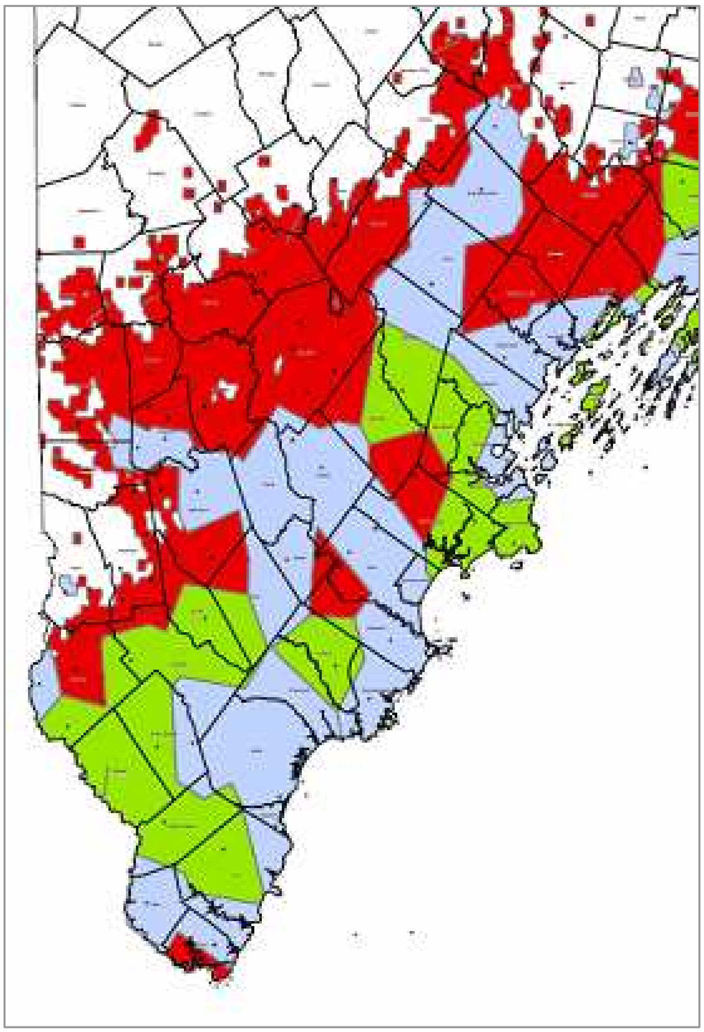


Figure 15 - Mobile Validation Map

5.6.1 GeoPortal Transfer Site

In August 2011 Sewall deployed a web-based GeoPortal site to manage all data transfers related to the ConnectME Authority Broadband Mapping Project, see ***Figure 16***. Each broadband service provider has a secure password-authenticated account set up which allows designated users to upload and download digital data. All users receive an e-mail notification when their account is set up.

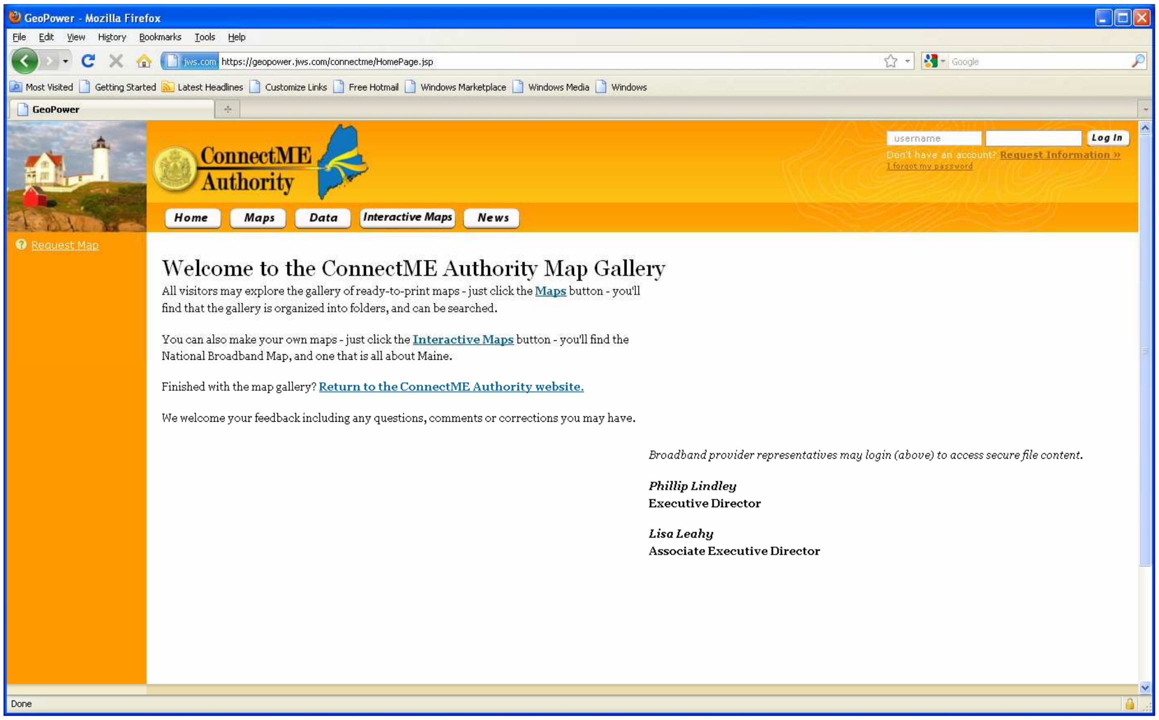


Figure 16 – Screenshot of GeoPortal web site

Data exchanges between Sewall and the service providers will include, but not be limited to, data round submissions, validation maps and other miscellaneous correspondence. In addition to data transfers, the GeoPortal will also be used by the general public for viewing the static maps posted in the map gallery. Currently the map gallery contains statewide maps representing FCC speed tier coverages, broadband service availability for Maine house and senate legislative districts and grant overview maps depicting awarded ConnectME Authority grant applications throughout the state.

6 Data Delivery

Service provider data that has been processed to the Sewall production model needs to be transferred to the SBDD data model for delivery. In order to accomplish this Sewall has developed a process by which the Sewall production datasets are exported to the current SBDD data model structure.

The Sewall production model was designed with the NTIA delivery model in mind and, in as many cases as possible, the production model utilizes the NTIA delivery defined attribute definitions and domain values. Through the use of this design philosophy, Sewall has mitigated the pitfalls for exporting to the SBDD data model.

To facilitate the transfer of data stored in the Sewall production model to the SBDD model for delivery Sewall has developed an ArcCatalog tool named State Broadband Data Export. This tool reads a source geodatabase set of features and writes to a destination geodatabase set of features. A screenshot of the tool dialog box is shown in ***Figure 17***.

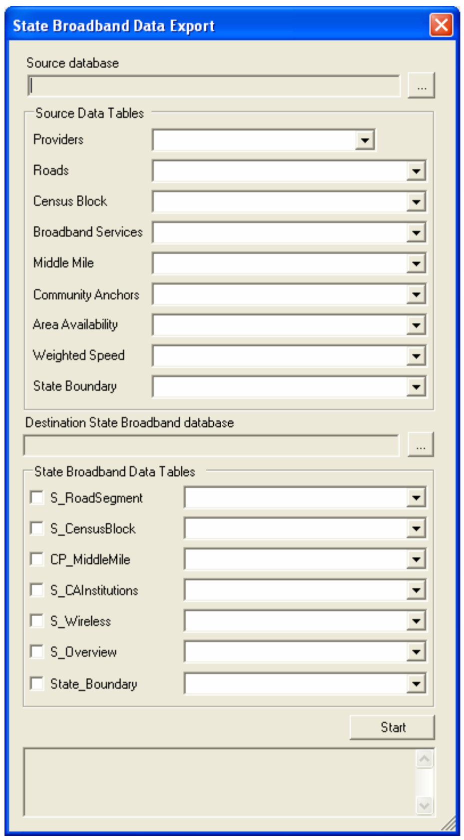


Figure 17 - State Broadband Data Export Tool
Source database: Sewall production geodatabase location.
Source Data Tables: (1) Providers - Geodatabase table with list of provider specific information (2) Roads - ConnectME street centerline feature class (3) Census Block - Census 2010 block geodatabase feature class (4) Broadband Services - Geodatabase table containing broadband provider characteristics and street ranges linked to ConnectME street centerline segments (5) Middle Mile - Geodatabase point feature class containing broadband service provider middle mile locations (6) Community Anchors - Geodatabase point feature class

containing community anchor institution locations (7) Area Availability - Geodatabase polygon feature class containing mobile wireless and satellite broadband provider coverage (8)Weighted Speed - Geodatabase polygon feature class service overview data (9) State Boundary - Geodatabase polygon feature class portraying the Maine state boundary.
Destination State Broadband database: SBDD geodatabase location.
State Broadband Data Tables: These are the required SBDD deliverables.

On launching the ArcCatalog tool, the user selects the source and destination geodatabases for the transfer process. The source geodatabase is the Sewall internal production model, and the destination geodatabase is the empty SBDD model. Next the user matches the items listed in the Source Data Tables section to the production model features. Once complete, the user checks which deliverables the tool will export in the State Broadband Data Tables section. Clicking ‘Start’ will begin the export process.

The road segment and census block exports are performed simultaneously in the State Broadband Data Export Tool with road segments being reported in census blocks greater than 2 square miles and census blocks being reported in areas up to 2 square miles. The tool reads the service provider data stored in the Sewall production geodatabase and performs an analysis through which the deliverables are extracted. The analysis process by which the tool extracts the road segments and census block data is outlined in the whitepaper entitled “Misalignment between Census Blocks & Maine E911 Streets: Technical Whitepaper,” dated 30 September 2011. This paper is included in **Appendix D**. The switch from 2000 Census Blocks to 2010 Census Blocks for the October 1st 2011 delivery caused the team to re-evaluate the export process as the 2010 Census Blocks were reported to be a closer match to the Maine E911 street dataset. The finding of that study revealed that the 2010 Census Blocks still had spatial misalignments with the Maine street dataset and the conclusions of the study in **Appendix D** are still valid.

Once the census block data has been exported it is run through a QC routine. As the census blocks are created from broadband data at the street level and there is a spatial misalignment between the two datasets erroneous data can be created through the export process. The exported census block data is checked against the baseline broadband street dataset for inconsistencies.

Middle mile and community anchor institution data are stored as point features in the Sewall production model and are extracted utilizing a standard export routine. The datasets are reprojected from the production UTM projection to the SBDD WGS84 projection and LAT/LON attributes are populated. Once complete, the points are loaded into the destination feature classes of the SBDD geodatabase.

Wireless, service overview and state boundary data are stored as polygon features in the Sewall production model and a standard export routine extracts these to the SBDD features. The datasets are reprojected from the production UTM projection to the SBDD WGS84 projection as features are loaded.

Address data that has been collected is stored as point features in the Sewall production model and exported to the SBDD geodatabase using standard export routines within ArcGIS.

During the export process features with front-end business rule violations get reported. The report is than reviewed by a Sewall analyst, and necessary corrections are made to the base datasets. This reporting mechanism ensures the data delivered in the SBDD geodatabase is as complete and accurate as the provided data sources allow.

Once the SBDD transfer file geodatabase has been created and its content validated, the geodatabase files are included in the data submittal zip file along with the other submittal files including ‘datapackage.xls,’ schema modifications report, data verification summaries, and this technical whitepaper.

Appendix A - Sample Letter to Service Providers

[date]

Sewall
P.O. Box 433
136 Center St.
Old Town, ME 04468
207-827-4456

[address]
[address]
[address]
[address]

Dear Mr. [name]:

The National Telecommunications and Information Administration (NTIA) of the U. S. Department of Commerce has been charged by Congress under the American Recovery and Reinvestment Act of 2009 and the Broadband Data Improvement Act (BDIA) to develop and maintain a comprehensive, interactive, and searchable nationwide inventory map of existing broadband service capability and availability in the United States that depicts the geographic extent to which broadband service is deployed and available from a commercial or public provider throughout each state (the Program).

The ConnectME Authority (the Authority) is responsible for developing and maintaining these data for the State of Maine and for serving as the conduit for this information to the NTIA. The Authority has contracted with James W. Sewall Company of Old Town, Maine, to undertake the initial mapping and to consult with the Authority on how best to update and maintain these data going forward.

We are writing to insure that you are familiar with this Program and to invite your collaboration in teaming with us in this important, statewide initiative. (See the URL's provided at the end of this letter for further information.) Indeed, your organization's collaboration is essential to the Program's success, and we thank you in advance for your participation.

To comply with the Program, the NTIA requires each state to provide structured data that includes:

- the availability of broadband service at the address level;
- advertised and "expected actual" speeds of broadband service;
- the technology used to deliver broadband service;
- location and capability of critical broadband related infrastructure (this data will not be publicly displayed on the national broadband map);
- the spectrum used by wireless broadband service providers.

We expect that the publicly searchable national broadband map and database will contain:

- geographic areas in which broadband service is available;
- the technologies used to provide broadband service in such areas;
- the speed at which broadband service is available in such areas;
- broadband service availability at public schools, libraries, hospitals, colleges, and all public buildings used by the state or municipalities.
- other economic or demographic data that may enable Federal efforts to provide usable and searchable data on a variety of issues pertinent to the public interest.

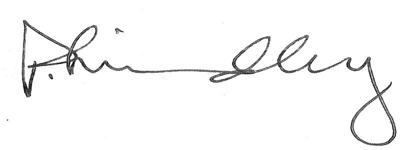
We recognize that some of the data we will ask you to provide is proprietary. Consequently, we include a Protective Order authorized by the ConnectME Authority and an accompanying non-disclosure agreement (NDA) for your review and execution. Please note, however, that the NTIA requires that this NDA may not restrict the Authority from providing all data collected to the NTIA or restrict the NTIA's use of such data as contemplated under this Program, including sharing such data with the FCC or other federal agencies. Furthermore, the NTIA prohibits the Authority or Sewall from agreeing to a more restrictive definition of Confidential Information than that adopted by the NTIA. Currently, as required under the BDIA, the NTIA identifies Confidential Information as any information, including trade secrets, or commercial or financial information, submitted under the Program that:

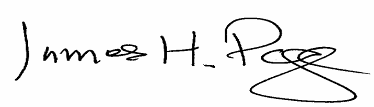
- identifies the location, type and technical specification of infrastructure owned, leased or used by a specific broadband service provider; or
- explicitly identifies a broadband service provider in relation to its specific service area or at a specific service location.

Confidential Information will not be made publicly available pursuant to the limits set forth in the BDIA except as required by applicable law or judicial or administrative action or proceeding, including Freedom of Information Act requirements. From the BDIA (§ 106(h)): "Notwithstanding any provision of Federal or State law to the contrary, an eligible entity shall treat any matter that is a trade secret, commercial or financial information, or privileged or confidential, as a record not subject to public disclosure except as otherwise mutually agreed to by the broadband service provider and the eligible entity." Sewall was chosen to lead this task in part because of its long history of handling confidential information for a variety of industries. Finally, should your organization apply for a Broadband Technology Opportunities Program (BTOP) grant to support the deployment of broadband infrastructure in unserved and underserved areas, enhance broadband capacity at public computer centers or to encourage sustainable adoption of broadband service, the NTIA requires that you participate in this mapping Program.

The NTIA has set a very aggressive Program schedule, with many deliverables due by November 2009 and all initial deliverables due in March 2010. Consequently, a representative from the Sewall team will be contacting you soon to discuss any questions you may have and to facilitate completion of the NDA and your participation. If we should be in communication with others in your organization concerning either the NDA or the data transfers, please inform the Sewall representative as soon as possible. Thank you again and we look forward to working with you.

Sincerely,





Phillip W. Lindley, Executive Director
ConnectME Authority

James H. Page, CEO
James W. Sewall Company

URLs for:
www.maine.gov/connectme
www.ntia.doc.gov/press/2009/BTOP_mappingtotals_090909.html

Appendix B - ConnectME Authority Protective Order

STATE OF MAINE December 21, 2009

CONNECTME AUTHORITY PROTECTIVE ORDER
(Proprietary Business Information)

Pursuant to 35-A M.R.S.A. § 9207(1) and Rule Chapter 101, § 4, the ConnectME Authority (Authority) may designate information as confidential to protect the legitimate competitive or proprietary interests of communications service providers and mobile communications service providers. The Authority may designate information as confidential only to the minimum extent necessary to protect such legitimate competitive or proprietary interests. Information designated as confidential is not a public record under 1 M.R.S.A. § 402(3).

The Authority is currently conducting a Broadband Mapping and Inventory Project with the services of a private contractor, James Sewall Company (Sewall). Sewall is required to obtain data from service providers (Provider) by the Authority and the National Telecommunications and Information Administration (NTIA) pursuant to the Broadband Data Improvement Act (BDIA) and the NTIA Notice of Funds Availability (NOFA). The NTIA requires that the Authority agree to comply with confidentiality requirements in section 106(h)(2) of the BDIA.

It is anticipated that providers submitting data to Sewall or the Authority may have a need to provide information considered to be confidential, in that the information provided may involve commercially sensitive and/or proprietary information regarding information that identifies (i) the location, type, and technical specifications of infrastructure owned, leased, or used by providers or (ii) explicitly identifies providers in relation to their specific service area or at a specific service location (collectively, the "Confidential Information"). The Authority has determined that such Confidential Information is generally not disclosed publicly, and that the public disclosure of such Confidential Information without restriction would cause competitive harm to the applicant or provider.

Accordingly, the following terms shall apply unless and until modified by the Authority or a court of competent jurisdiction:

1. Data submitted to Sewall or the Authority falling within the above definition of Confidential Information, as well as any data submitted to Sewall or the Authority pursuant to the Non-Disclosure Agreement set forth in Attachment A , (collectively, "Designated Confidential Information") shall be deemed to be competitively sensitive and/or proprietary in nature and such Designated Confidential Information shall be and remain exempt from public disclosure pursuant to the terms of this Protective Order and the articles referenced therein.

2. All Designated Confidential Information shall be and remain exempt from public disclosure pursuant to the terms of this Protective Order, unless removed from the coverage of this Protective Order as provided below or otherwise by a court of competent jurisdiction. No persons provided access to any Designated Confidential Information by reason of this Protective Order shall use such information for any purpose other than the purposes designated by the Authority. Every person provided access to Designated Confidential Information shall use his or her best efforts to keep the Designated Confidential Information secure and shall not publicly disclose it or accord public access to it to any person not authorized by the terms of this Protective Order.

3. Any person or the Authority may challenge the designation of any document or other information as Designated Confidential Information. The Authority will provide reasonable prior notice to the applicant or provider and an opportunity for hearing prior to ruling on any such challenge. In considering any such challenge, the usual burdens of proof and production shall apply and no additional presumption shall be given as a result of the prior acceptance by the Authority of material as Designated Confidential Information. In the event the Authority should rule over the objections of the person providing the Designated Confidential Information that any information should no longer be subject to the terms of this Protective Order, such information shall not be publicly disclosed until the later of five (5) business days after the Authority so orders

or, if the person files within such five day period an appeal or request for stay of such order, the date upon which such appeal or request for stay is decided; provided, however, that said periods may be extended in accordance with any stay ordered by the Authority or a reviewing court. Upon the entry of a final unappealed decision by the Authority or a reviewing court granting public disclosure, the terms of this Protective Order shall cease to bind any person with respect to the information that the order granting disclosure shall have expressly and clearly removed from the coverage of this Protective Order.

4. Any person provided access to Designated Confidential Information shall review and be bound by the terms of this Protective Order. Prior to obtaining access to any Designated Confidential Information, such person shall sign an acknowledgment of his or her obligation to abide by the terms of this Protective Order in the Non-Disclosure Agreement (NDA) attached hereto as Attachment A.

5. Unless modified by the Authority or a court of competent jurisdiction, access to Designated Confidential Information shall be limited to Authority Staff, Sewall, any independent consultants or experts retained by the Authority, the National Telecommunications and Information Administration, and those designated persons, who have signed the NDA.

6. No copies of Designated Confidential Information shall be circulated to persons other than those authorized under paragraph 5 of this Protective Order. Persons authorized under paragraph 5 hereof also may take such notes as may be necessary. Such notes shall be treated as Designated Confidential Information.

7. The restrictions upon, and obligations accruing to, persons who become subject to the terms of this Protective Order shall not apply to any Designated Confidential Information submitted in accordance with this Protective Order if the Authority rules, after reasonable notice to the applicant or provider and an opportunity for hearing, that such Designated Confidential Information was publicly known at the time it was furnished or has since become publicly known.

8. Where reference to Designated Confidential Information is required in any Authority document, such reference shall be by citation of title or attachment number only or by some other non-confidential description to the extent possible.

9. Designated Confidential Information furnished to the Authority pursuant to this Protective Order shall remain in the possession of the Authority, under seal, and subject to the terms of this Protective Order, until the Authority or a court of competent jurisdiction shall otherwise order.

10. The terms of this Protective Order may be modified on motion of any person or on the Authority's own motion upon reasonable prior notice to the applicant or provider and an opportunity for hearing.

BY ORDER OF THE CONNECTME AUTHORITY

Phillip Lindley, Executive Director

ATTACHMENT A [Non-Disclosure Agreement]

Appendix C - Template for Non-Disclosure Agreement

NON-DISCLOSURE AGREEMENT

THIS AGREEMENT is made this ________ day of _________________, 20___, by and between ____, a _________________________________ having a principal place of business at ____ ("PROVIDER") and ConnectME Authority, a body corporate and politic and a public instrumentality of the State of Maine established pursuant to 35-A M.R.S.A. § 9203 (the "AUTHORITY") and James W. Sewall Company, a corporation organized under the laws of the State of Maine and having a principal place of business at 136 Center Street, Old Town, Maine 04419 ("SEWALL") (AUTHORITY and SEWALL individually or collectively referred to as "RECIPIENTS") (PROVIDER AND RECIPIENTS collectively referred to as the "Parties").

Recitals

WHEREAS, the National Telecommunications and Information Administration (the "NTIA") of the United States Department of Commerce has been charged by Congress under the America Recovery and Reinvestment Act of 2009 (the "ARRA") and the Broadband Data Improvement Act (the "BDIA") to develop and maintain a comprehensive, interactive, and searchable nationwide inventory map of existing broadband service capability and availability in the United States that depicts the geographic extent to which broadband service is deployed and available from a commercial or public provider throughout each state (the "Data"); and

WHEREAS, the AUTHORITY is responsible for developing and maintaining the Data for the State of Maine and for serving as a conduit for the Data to the NTIA; and

WHEREAS, SEWALL is contracted by the AUTHORITY to undertake the initial mapping and to consult with the AUTHORITY on how best to update and maintain the Data going forward; and

WHEREAS, the PROVIDER has trade secrets and commercial or financial information relating to the location, type, and technical specifications of infrastructure owned, leased, or used by PROVIDER, which is included in the Data (the "PROVIDER Information"); and

WHEREAS, the PROVIDER has agreed to provide PROVIDER Information to SEWALL and/or the AUTHORITY pursuant to the requirements of the ARRA and the BDIA for use by the NTIA.

NOW THEREFORE, for and in consideration of the mutual promises and covenants contained herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

1. As requested in writing by PROVIDER, RECIPIENTS agree to hold in absolute and strict confidence and shall not disclose or reveal in any manner or form to any entity other than the NTIA any PROVIDER Information identified as confidential that identifies (i) the location, type, and technical specifications of infrastructure owned, leased, or used by PROVIDER or (ii) explicitly identifies PROVIDER in relation to its specific service area or at a specific service location (collectively, the “Confidential Information”), whether such disclosure was made orally, in writing, or in any other form, without prior written permission from PROVIDER.

Notwithstanding the foregoing, Confidential Information shall not include the following:

(a) information that now is or hereinafter becomes publicly known or available otherwise than through unauthorized disclosure by RECIPIENTS;
(b) information that was in RECIPIENTS’ possession at the time of disclosure and was not acquired, directly or indirectly, from PROVIDER;
(c) information that RECIPIENTS received in good faith from a third party who is not under a similar restriction of confidentiality and having a right to disclose the Confidential Information; or
(d) information that is required to be disclosed pursuant to applicable law or judicial or administrative action or proceeding, including the Freedom of Information Act requirements.

2. RECIPIENTS agree not to use for any purpose the Confidential Information except as provided for under the ARRA and the BDIA, without prior written permission from PROVIDER.

3. This Agreement shall be governed by the laws of the State of Maine and applicable federal law, except for the State of Maine’s conflict-of-laws provisions, as applicable. The Parties to this Agreement each specifically consent to jurisdiction in Maine in connection with any dispute between the Parties arising out of this Agreement or pertaining to the subject matter hereof, with venue being in a court of competent jurisdiction located in Penobscot or Kennebec County, Maine, United States of America.

4. This Agreement shall inure to the benefit of and be binding on the Parties and their respective successors and assigns.

5. This Agreement constitutes the complete and exclusive agreement of the Parties hereto with respect to the matters set forth herein. The terms of this Agreement may not be modified or amended except by an instrument in writing signed by each of the Parties hereto.

6. This Agreement shall be construed without regard to any presumption or other rule requiring construction against the drafting Party.

7. This Agreement may be executed in counterparts and each Party hereto may execute each such counterpart, each of which when executed and delivered shall be deemed to be an original and both of which counterparts taken together shall constitute but one and

the same instrument. This Agreement shall become binding when all counterparts taken together shall have been executed and delivered by all Parties. Execution and delivery of this Agreement may be made by facsimile transmission, and each Party agrees that the delivery of the Agreement by facsimile shall have the same force and effect as delivery of original signatures and that each Party may use such facsimile signatures as evidence of the execution and delivery of the Agreement by all Parties to the same extent that an original signature could be used.

IN WITNESS WHEREOF, the Parties have executed this Agreement the day and year first above written.

WITNESSED BY:	PROVIDER
______________________	By: ______________________
	Title: ______________________
	ConnectME Authority
______________________	By: ______________________
	Title: ______________________
	James W. Sewall Company
______________________	By: ______________________
	Title: ______________________

Appendix D - White Paper: Maine-SBDD Census Block-Street Segment Misalignment

Misalignment between Census Blocks & Maine E911 Streets

Technical Whitepaper

30 September 2011

Introduction

Importing broadband service provider data into the State Broadband Data Development (SBDD) Map Data Transfer Model at the census block versus street segment level has created challenges for the grantees. For the State of Maine one of the challenges involves the spatial misalignment between the Census Block polygon geometries and Maine's street centerline dataset.

In order to better understand the challenge that Maine is encountering it is necessary to review how the State is collecting and maintaining broadband service provider data.

As a result of Maine's geographic population distribution, mapping broadband service at a census block level does not satisfy the State's requirements for statewide broadband tracking and development. Instead of utilizing the hybrid census block-street centerline model outlined in the SBDD NOFA, the State is collecting service provider coverages at a street level for wired and fixed wired technologies. The State has developed a relational model to best represent the one-to-many relationship between a street segment and its broadband service provider coverages.

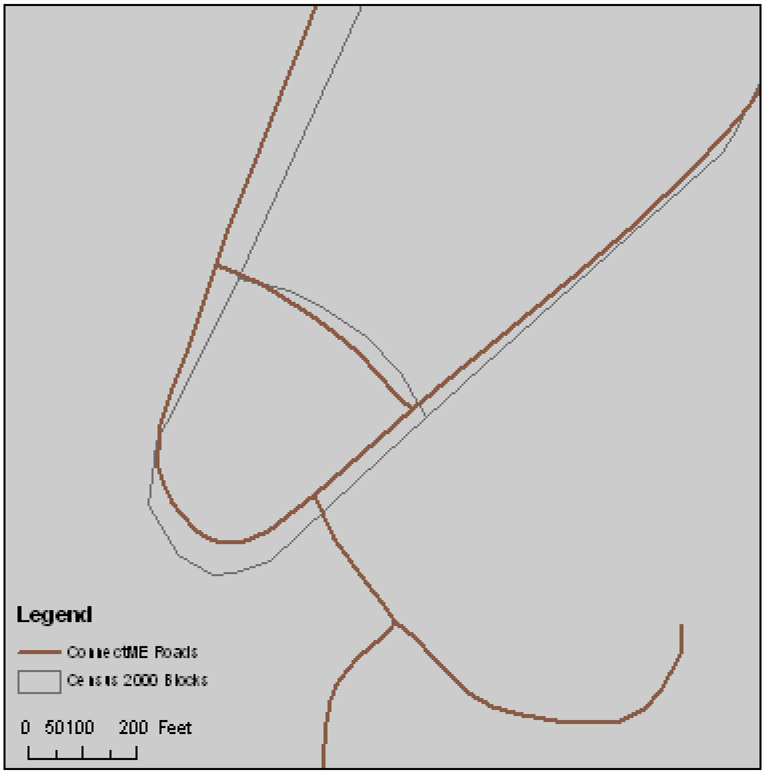
The street segment data that the State is utilizing is based primarily on the State's E911 street centerline GIS layer with additional street coverage added from a 3rd party dataset for those towns not yet participating in the E911 project. For information on the broadband service providers, a database table was developed based on the required attribution descriptions outlined in the NOFA.

With the data structure in place the challenge of importing this data into the transfer model can be discussed along with the State's proposed solution to minimize its impact of the misalignment on the broadband data processing.

The Challenge

Census Block geometry is spatially misaligned with the Maine's street centerlines.

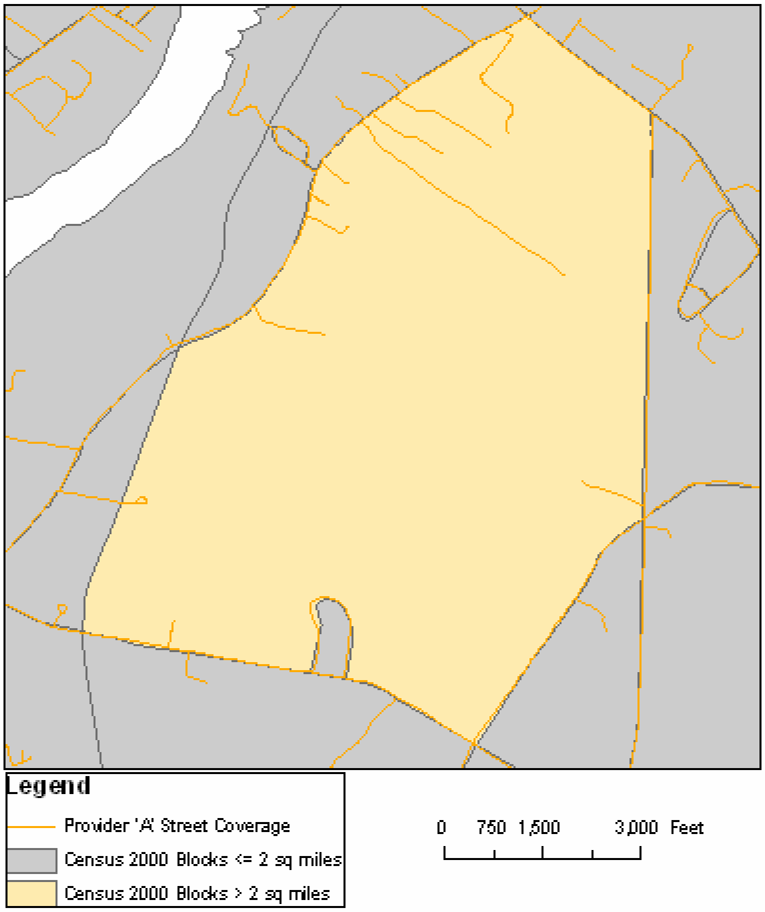
Examples described herein reference 2000 Census Block data and reflect examples found in both 2000 and 2010 Census Block datasets.



As shown in the above screen capture the typical misalignment between these two datasets is between 50 and 100 feet.

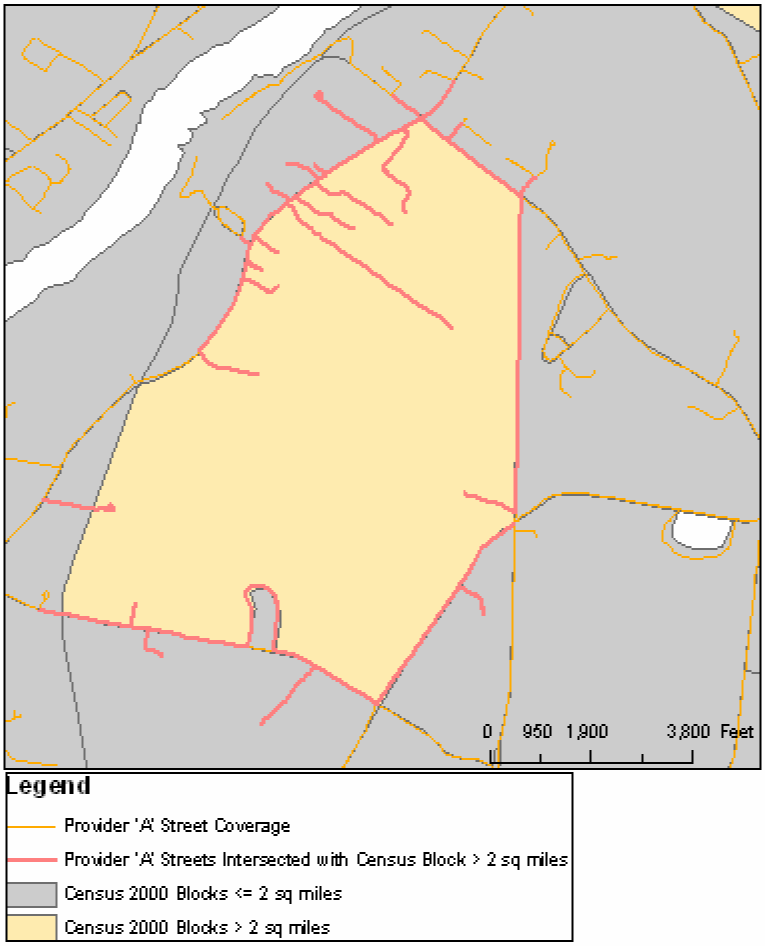
Since Maine is storing all broadband service providers' information as records associated with street centerlines this misalignment causes considerable challenges when trying to accurately export this information into the new SBDD data transfer model. The misalignment is great enough that utilizing basic intersect methodology is not enough to provide NTIA with a highly accurate representation of broadband coverage in Maine.

Example: Basic Intersect



The above screen capture shows an example of a 2000 Census Block that is greater than 2 square miles and Provider 'A' street coverage data that is to be reported.

Performing an intersect between the greater than 2 square mile census block and the street network for Provider 'A' results in the highlighted streets being reported.

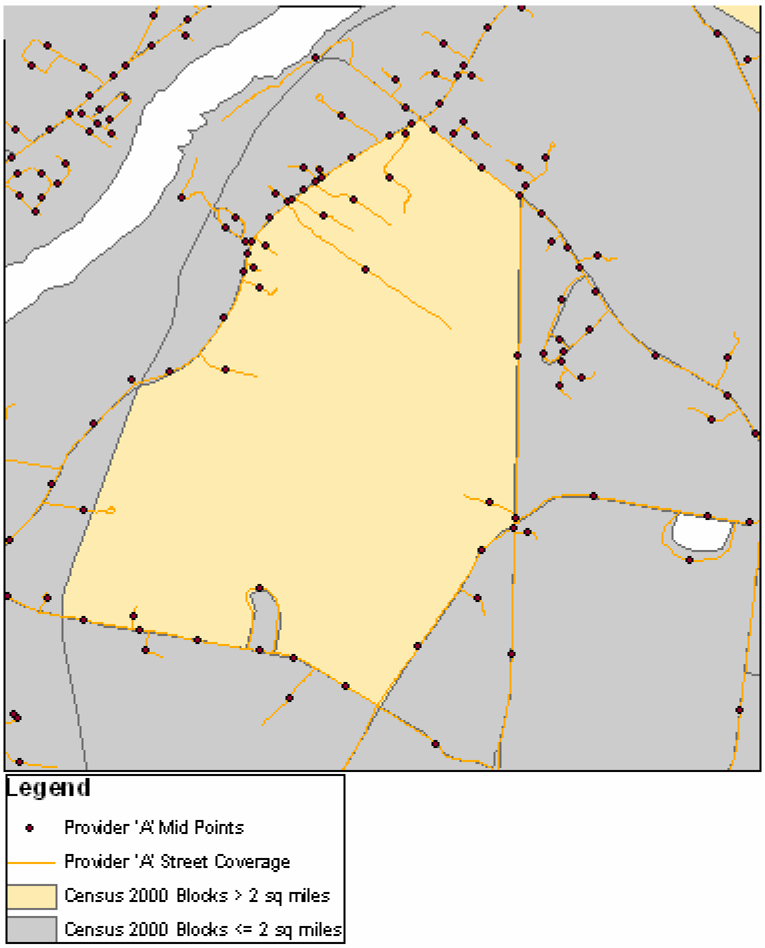


It is clear from the screen capture that several extra streets where selected and a few streets were missed by using the intersection method.

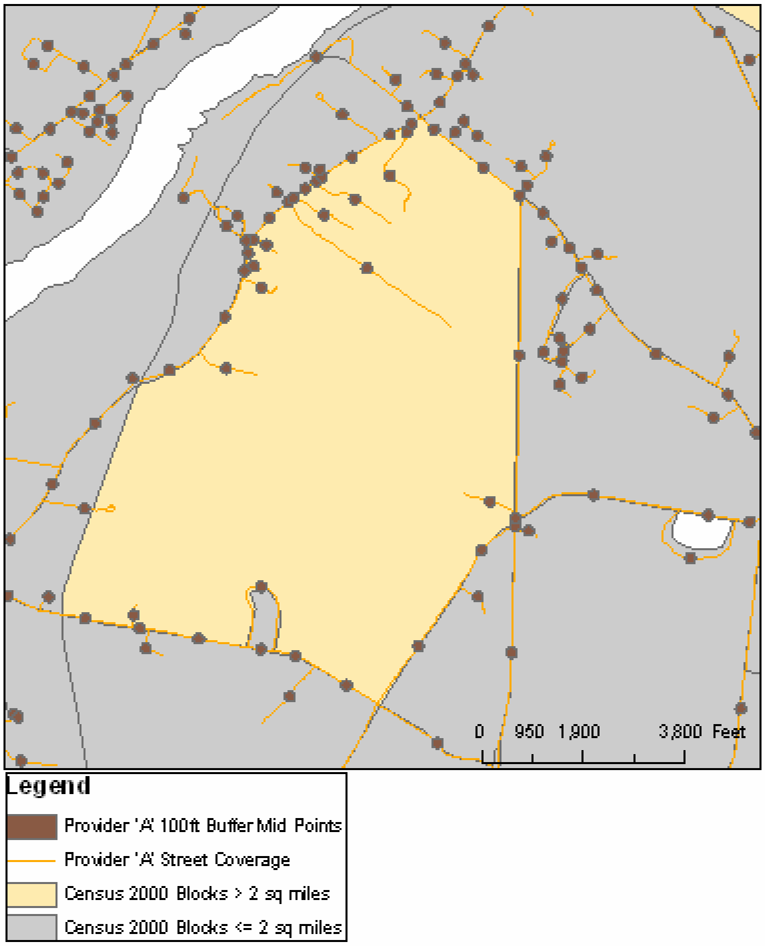
Proposed Technical Solution

The solution to this challenge is a multi-step process that needs to be run on each street segment with intelligent analysis employed to minimize errant representation of broadband service in census blocks greater that 2 square miles.

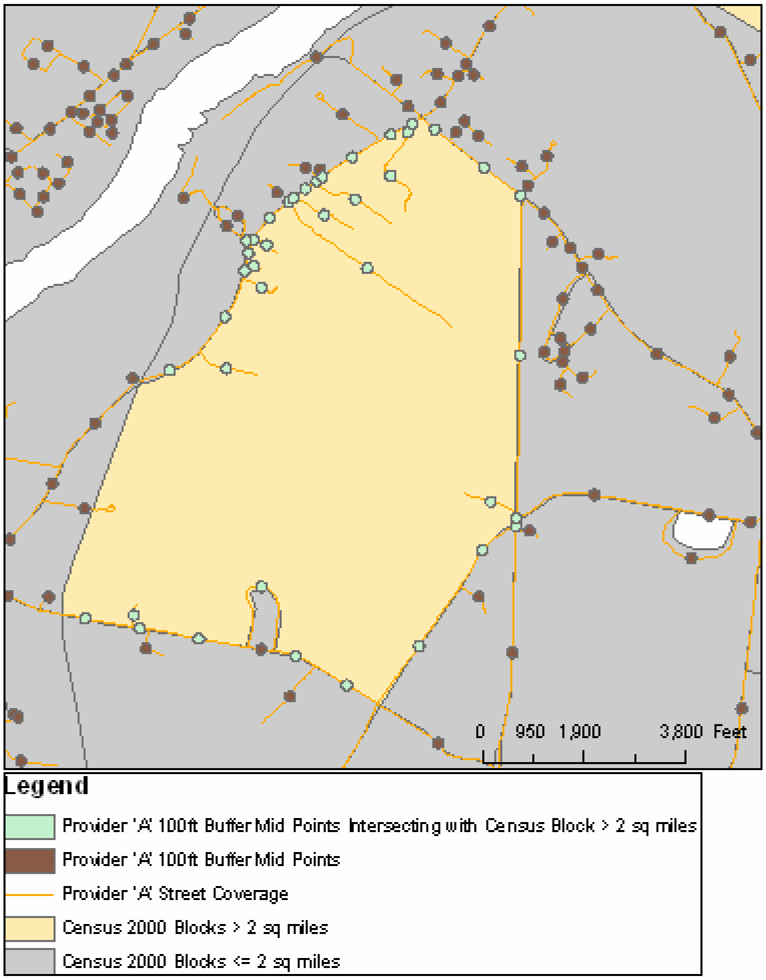
The first step is to create mid points of the street centerlines for Provider 'A'.



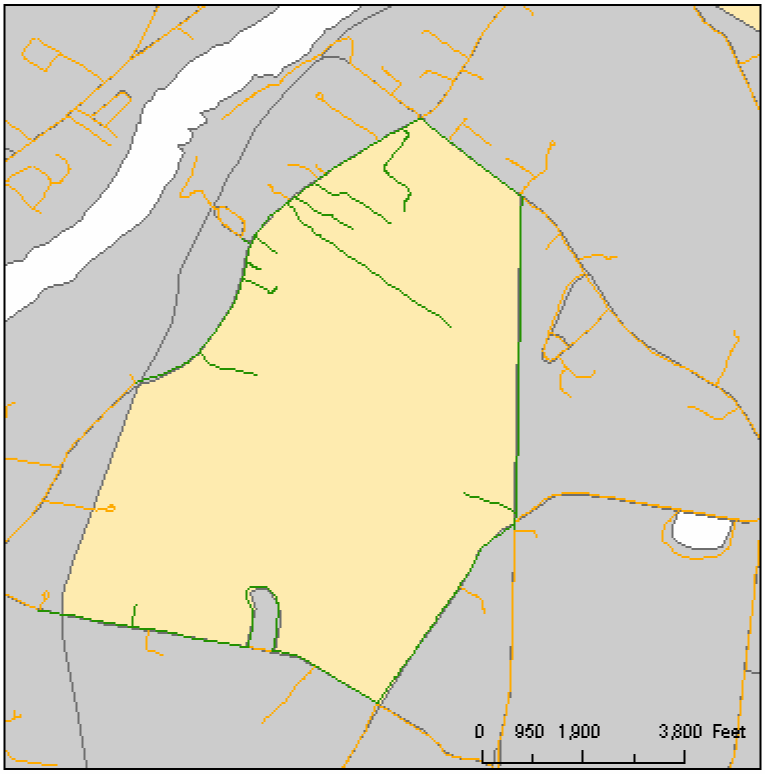
The next step is to create a buffer around the mid points using a distance to compensate for the misalignment in the census blocks. The distance found to have the best return for this process was determined to be 100 feet.



Selecting the buffered mid points that intersect the greater than 2 square miles census block returns the following results:



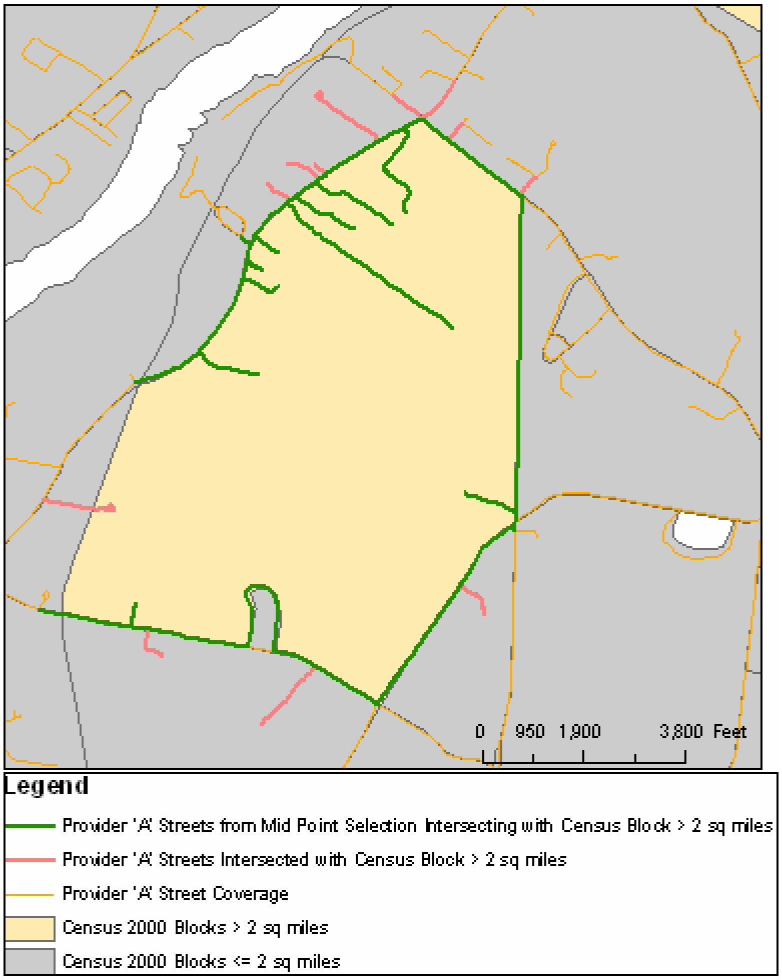
The selected buffered mid points relate back to the following street selection:



Legend

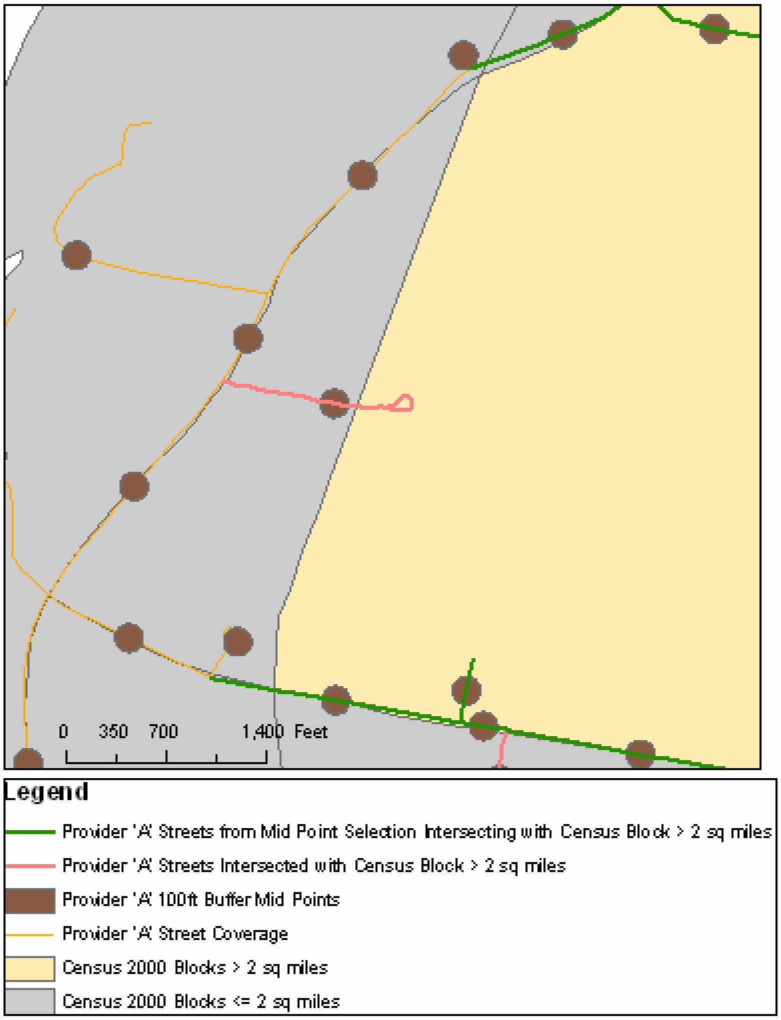
- Provider 'A' Streets from Mid Point Selection Intersecting with Census Block > 2 sq miles
- Provider 'A' Street Coverage
- Census 2000 Blocks > 2 sq miles
- Census 2000 Blocks <= 2 sq miles

Compare this selection to the original intersection process selection:



The result of the mid point buffering process is a much better representation of streets contained within the greater than 2 square miles census block. A large number of the erroneous streets initially marked as included in the census block have been dropped providing a much improved report.

Taking a look at the left hand side of the map there is a street that intersects the census block but is not reported in the mid point buffering process. A closer look reveals why.

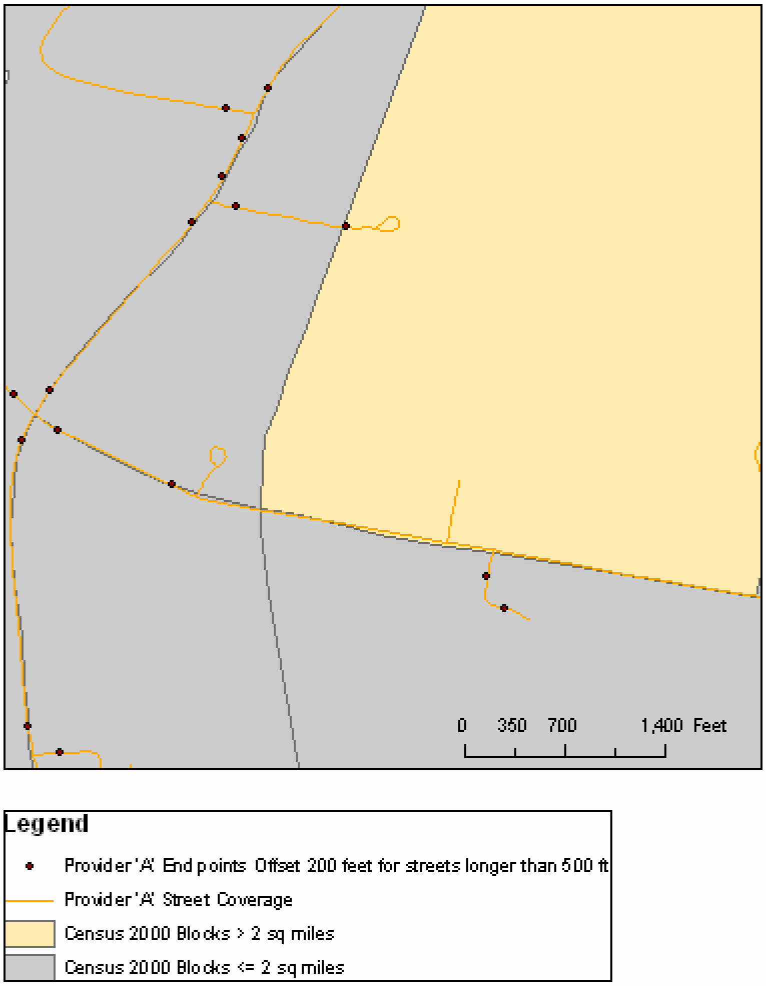


The street in question is relatively long in length and has a midpoint that is located outside of the greater than 2 square miles census block resulting in it not being reported.

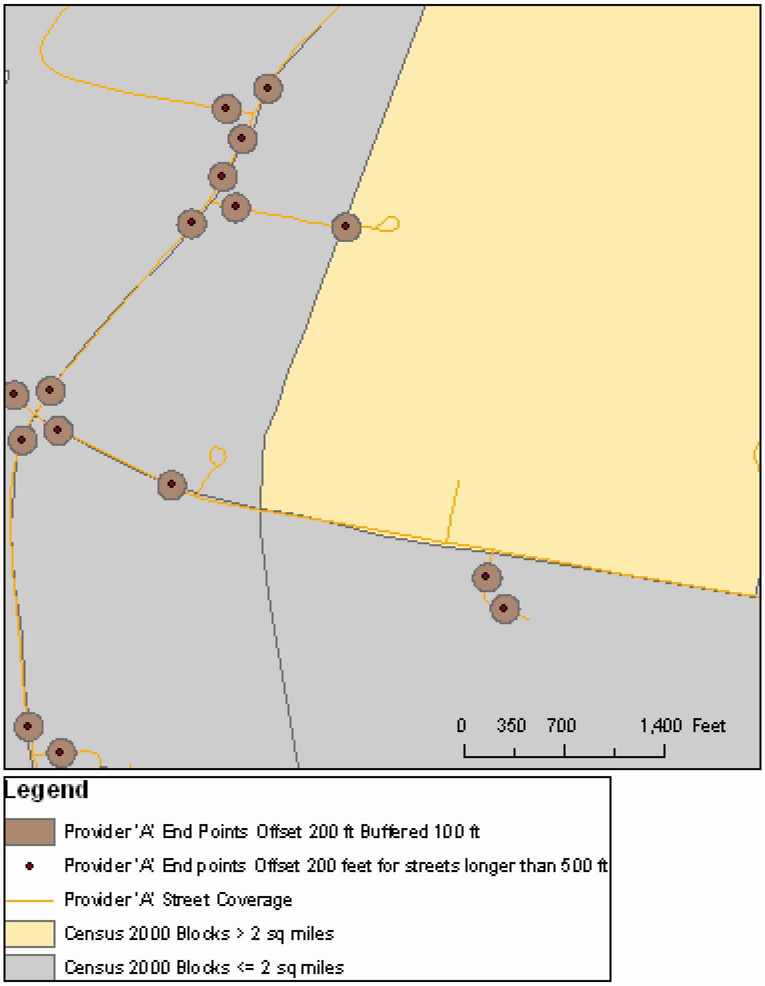
Building onto what has been performed already an additional automation check can locate and incorporate these long streets into the dataset.

The Proposed Solution: Additional Intelligence

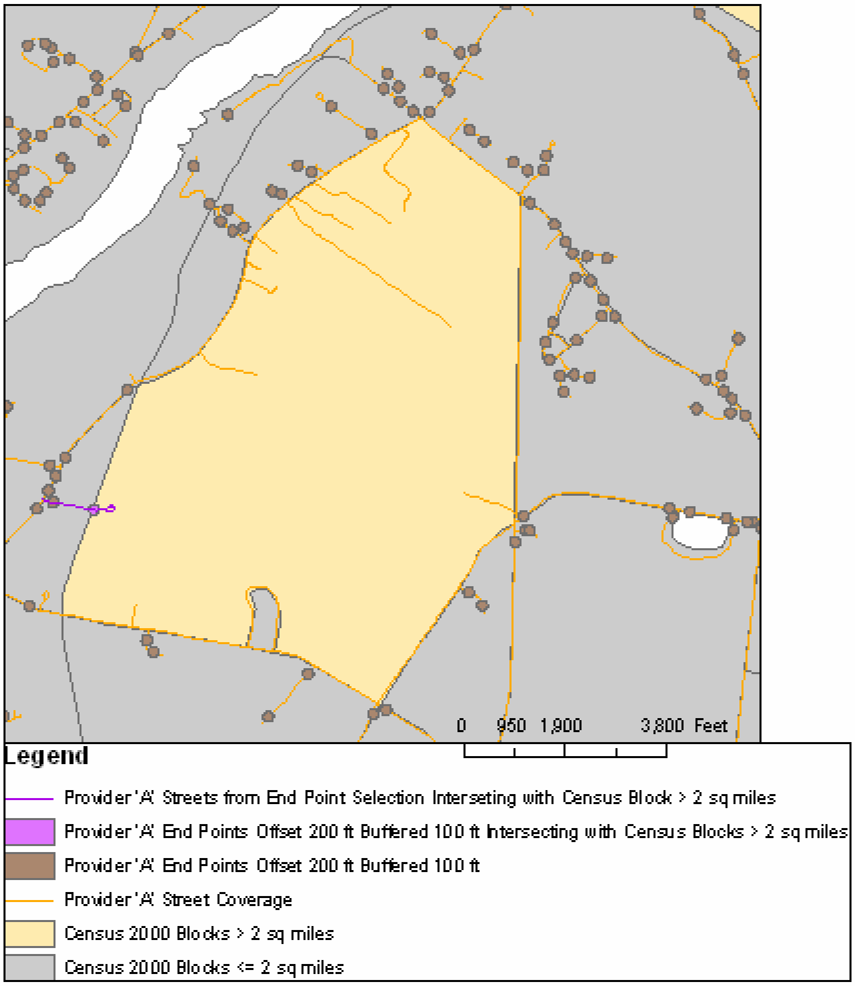
The first step in this additional iteration is to select streets that have not been flagged as being contained within a census block greater than 2 square miles and are longer than 500 feet. Then create points that are offset 200 feet from each end of the selected streets.



Next these 200 feet offset points are buffered 100 feet:

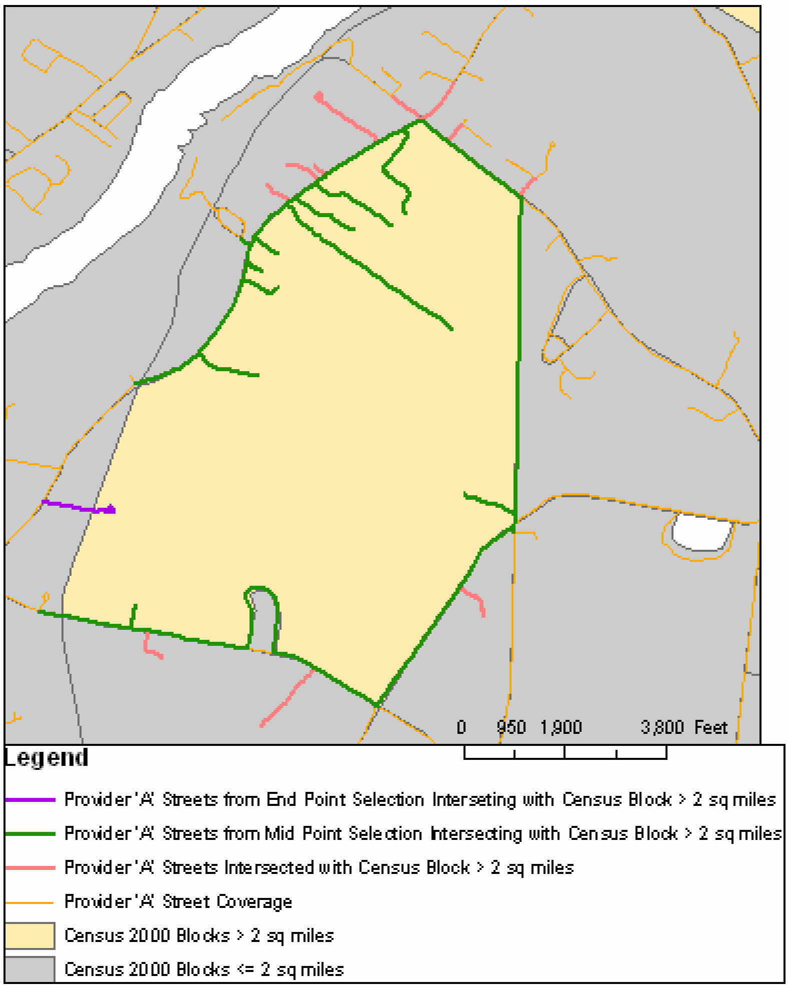


Then by selecting the buffers that intersect the greater than 2 square miles census block and selecting the associated streets, the process results in the following:



The Results

The screen capture below shows the streets reported using the two step process in comparison to the basic intersect method of reporting street segments.



The following table shows the results of the processes for Provider 'A' for this particular census block:

Method	Missed Streets	Extra Streets	%Error
Basic Intersect Process	2	11	35.14
MID Point Process	1	2	8.11
MID and END Point Process	0	2	5.41

The proposed solution gives a much better representation of the data set and minimizes the errors induced by using a basic intersection process.

Summary

The SBDD data submission requirements involving census blocks and street segments have created a challenge for the grantees to accurately represent broadband service provider information. In particular the State of Maine has a significant offset between the 2010 Census Block geometries and the corresponding street centerlines that the State is utilizing to map broadband availability data. A basic spatial intersect method has proven to be highly inaccurate in identifying street centerline data in census blocks greater than 2 square miles.

Through analysis the State has found that using a two step process using mid-point and offset end point buffering provides improved results for street centerlines in the greater than 2 square mile census blocks. The State expects this methodology to improve the accuracy of street segment determination by approximately 50% for these regions. Unless instructed otherwise by the NTIA project team, the State intends to utilize this two step process to develop the SBDD deliverables for street centerlines in census blocks greater than 2 square miles.

Appendix E – Residential Survey Letter

ConnectME Authority

SEWALL

State of Maine Internet Service Questionnaire

This survey is PREPAID to return to the State of Maine! It is only 10 questions long and will take less than 2 minutes to complete. The information is confidential. The data will only be used for the purpose of verifying where high speed internet is and is not offered across the State of Maine. More information about this initiative is provided at the end of the survey.

Thank you in advance for you participation.

If you have access to the internet and wish to complete this survey electronically, you may do so at:
http://www.surveymonkey.com/s/JBLNRHX

1. Please enter your physical home address if it is different than your mailing address:
   Street Address ______________________________
   City ____________________ State ________ Zip Code __________
2. Do you currently subscribe to internet service? Yes No
   If No, please proceed to Question 7, otherwise continue to question 3.
3. What form of internet service do you purchase?
   a. Dialup Service b. DSL or Higher Wired Service c. High Speed Cable
   d. Satellite e. Fixed Antennae Wireless
   f. Mobile Wireless (Mobile Laptop Card, Smartphone, or similar device)
4. Who is your internet service provider? ______________________________
5. Does this provider meet the level of advertised internet speed for the plan you subscribe?
   Yes No I Don't Know
6. Have you ever purchased internet service from a different provider at this address? Yes No
   If YES, please list the name of the previous provider(s)? ______________________________
7. If you do not currently have internet service, have you attempted, in the past, to acquire service at this address but were unable to locate a providing company? Yes No N/A
8. In the past, has an internet provider tested access to the internet at this address? Yes No I Don't Know
   If YES, please list the name of the service provider? ______________________________
9. Was the internet connection test successful? Yes No I Don't Know N/A
10. If you do not subscribe to high speed internet, but it IS available, what is the reason you do not subscribe?
    a. No interest b. Price of service c. Limitations of the service
    d. Need a different option to fit my internet hardware needs e. N/A
    f. Other ______________________

Thank you for taking the time to help shape the future development of broadband service in Maine!

Please fold the survey so the prepaid return label is on the outside and drop it into the nearest mailbox.

More Information about this initiative…
In 2007, the Maine State Legislature created the ConnectME Authority with the mission to promote the development of high speed internet communications systems in the un-served and underserved regions of the state. To fulfill this mission we are seeking your assistance in providing valuable information about the availability and use of high speed internet, otherwise known as broadband, at your location.

The ConnectME Authority has established a website where you can perform a test of internet speed for your location. If you are interested in running a test of your internet speed, please visit http://connectmespeedtest.maine.gov and follow the instructions provided. Access to this site does require a device capable of running flash applications such as a laptop or desktop computer. The test tool is not currently supported by smart phone devices.

To learn more about this project please visit our websites:
http://www.maine.gov/connectme/mapping/BroadbandMappingProject.htm
http://www.sewall.com/projects/project_connectme.php

Appendix F – Mobile Provider Feedback Letter

Welcome Mobile Providers!
Thank you for your participation in the State of Maine's Broadband Mapping Project. As part of our contract/delivery to the National Telecommunications and Information Administration (NTIA) and to the State of Maine we are initiating mobile coverage verification feedback. In your geoportal account you will find two maps of your company's coverage area in Maine.

How did we come up with these maps?
Each time we receive a coverage shapefile from a mobile provider we first overlay the current coverage with the previous round's coverage to find changes in the service area. When an area has a change of service we place a point at a road intersection, based on the E911 roads layer, within the new coverage. Field crews visit each of the points and perform an internet speed test using a mobile aircard from that specific carrier. All point data is analyzed back at the office to determine whether the test point qualifies as having reached broadband speeds. These points are then projected on to maps and the data is extrapolated based on a Thiessen Model to show the internet speed coverages. Two different National Standards are presented: FCC Standards and NTIA Standards.

FCC Standards
FCC Standards break internet speeds into categories called "Tiers"
First Generation
First Generation speed is defined as between 200kbps to 768kbps, symmetrical. This means both upload and download need to be between 200 and 768 to qualify. Any speed (upload or download) less than 200kbps qualifies as "Less than First Generation" regardless of the reciprocating speed (e.g., if you have an upload speed of 120kbps and a download speed of 706kbps the category is still "Less than First Generation" because both speeds were not equal to or greater than 200kbps.

Tier 1
Tier 1 speed is defined as between 768.1kbps to 1.5Mbps, symmetrical. This means both upload and download need to be between 768.1kbps and 1.5Mbps to qualify. Any speed (upload or download) less than 768.1kbps qualifies as "First Generation" regardless of the reciprocating speed (e.g., if you have an upload speed of 767kbps and a download speed of 1.3Mbps the category is still "First Generation" because both speeds were not equal to or greater than 768.1kbps.

Tier 2
Tier 2 speed is defined as between 1.51Mbps to 3Mbps, symmetrical. This means both upload and download need to be between 1.51kbps and 3Mbps to qualify. Any speed (upload or download) less than 1.51kbps qualifies as "Tier 1" regardless of the reciprocating speed (e.g., if you have an upload speed of 1.4Mbps and a download speed of 2.78Mbps the category is still "Tier 1" because both speeds were not equal to or greater than 1.51Mbps.

NTIA Standards

Broadband service is defined as a minimum of 200kbps upload and 768kbps download. Both speeds, upload and download, have to reach 200kbps and 768kbps respectively or they do not qualify as broadband. (e.g.,if you have an upload speed of 240kbps and a download of 766kbps, the speed test does not qualify as broadband). If a speed test reached broadband speed in only the upload or the download, but not both, then the speed test was deemed as "Inconsistent Broadband". If neither upload nor download reached broadband speeds the speed test was deemed "No Broadband". If the speed test could not be performed because of a lack of internet service completely then the test was deemed "No Connect".

In the future we will be working with individual mobile providers regarding discrepancies in coverage based on our verification findings. We welcome any questions or feedback you may have regarding this project. Thank you again for your participation and look forward to working with you in the future.

Sincerely,

Sewall Broadband Mapping Team

OFFICIAL OCTOBER 2012 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE STATE OF MICHIGAN

October 1, 2012

TABLE OF CONTENTS

October 1, 2012

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

As the State Broadband Designated Entity, in partnership with the Michigan Public Service Commission, please accept this submission from Connected Nation on behalf of the state of Michigan's State Broadband Initiative (SBI) Grant Program, known as Michigan.

The Michigan program and its collective stakeholder community continue to be faithful and energized contributors to the National Telecommunications and Information Administration's (NTIA) SBI program. Now more than ever, the significance of complete and validated data as compiled through the Federal Communications Commission's (FCC) National Broadband Map is instrumental in forging the innovation economy of the 21st century. As the Commission relies upon this unique resource to distribute monies under the Connect America Fund, through the Universal Service Fund reform, the Michigan program equally values this data in informing meaningful program interventions relating to broadband access, adoption, and use initiatives. Truly, this coordination embodies the spirit of the SBI and demonstrates the joint effort of the NTIA, FCC, state governments, industry, and non-profits like Connected Nation as it continues to serve as a key tool for the American public and policymakers. We are proud of the role that Michigan has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit broadband providers, consumers, and businesses nationwide.

The artifacts that comprise this submission should be found to be compliant with the October 1, 2012, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Michigan: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area

Appendix A:	1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles
Appendix A:	1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A:	3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A:	4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A:	4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)		n/a	Accuracy and Verification Report
n/a		DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a		n/a	List of Changes and Corrections to the Dataset
n/a		n/a	Non-Participating Provider (NPP) Narratives
n/a		n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the April 2012 SBI data submission for the Michigan program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on August 9, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance
New to the semi-annual submission for October 2012 is a more robust version of the ReadMe text file. As per the template released on the Grantee Workspace on May 18, 2012, this file contains a high-level summary of the items contained within the submission, including the exact file deliverables, a description of the errors and warnings from the Check Submission report, and extraneous information of which the NTIA and other users of the dataset should be made aware.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the April 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That practice continues in this submission as technology and speed combinations are reviewed and scrutinized; any questionable information supplied by providers is reviewed more in depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

Also in this submission are narratives describing the data and coverage estimation of non-participating providers. While Michigan continues outreach to all providers prior to each submission period, the need to submit broadband service data for all providers regardless of their participation is evident as the SBI program continues into this sixth round of data submissions. The submission of this estimated broadband service area for providers that have not supplied data to Michigan is essential in being able to portray a more accurate depiction of the current broadband landscape.

In addition to the requirements mentioned above, please find this methodology paper to be inclusive of the ongoing section pertaining to industry mergers and acquisitions – specifically this section details any and all mergers or acquisitions that have taken place in Michigan since the April 2012 submission. The intent of this updated section is to provide a better understanding of how the broadband provider landscape has changed since the last submission cycle.

This October 2012 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for approximately 91.97 percent of the Michigan provider community, or 126 of 137 total providers. There are 124 participating providers and 2 additional non-participating providers whose estimated coverage areas have been submitted. Of the 124 participating providers, 44 supplied an update to their network or coverage area(s), while 47 have reported no change. The remaining 33 represent providers who previously supplied data but were non-responsive in the October 2012 update effort; therefore their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact record is contained herein. Of the 11 providers that are not represented in the attached datasets, 10 have refused to participate in the voluntary program or were non-responsive to multiple contact attempts, and one provider is currently in some form of progress toward data submission but was not able to submit coverage areas at the time of this submission.

In addition to the facilities-based and middle-mile broadband providers tracked above, this submission contains datasets for four resellers that were able to provide sufficient information on their service area(s) to be included in the data transfer model.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Michigan principals that all commercially reasonable efforts were made to account for 100 percent of the known Michigan broadband provider community, pursuant to this semi-annual data update submission.

Michigan has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Michigan conducts field validation efforts. To date, 97 (70.80 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Michigan website, (www.connectmi.org), continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Michigan website encountered 8,305 unique visits during this reporting period (37,702 total to date for the life of the grant awarded on December 20, 2009). Additionally, this pronounced Web activity netted 101 broadband inquiries over this same reporting period (1,477 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Michigan website and the Michigan interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Michigan mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Michigan to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Michigan has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

In conjunction with Michigan Public Service Commission, outreach was conducted during this data update reporting period by Michigan to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Michigan website. During this reporting period Michigan has developed a number of new relationships with statewide associations such as the following:

Michigan Association of Counties
Michigan Community College Association

Michigan Department of Community Health
Michigan Health and Hospital Association
Michigan Local Government Management Association
Michigan Municipal League
Michigan Nonprofit Association
Michigan Primary Care Association
Michigan Township Association

Building relationships with entities such as these yields a positive impact in promoting the importance of broadband connectivity at anchor institutions and participation in this data collection process. It became apparent that these relationships are beneficial to the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Michigan will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Michigan has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Michigan is also working hard to clarify CAI information associated with wireless broadband. NTIA has requested in-depth questioning of CAI listing a wireless broadband service as their sole form of connectivity. This follow-up allows us to better understand the reason for adopting the wireless broadband service.

From our work in Michigan, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Michigan efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Michigan program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Michigan, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,

Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

DATA ACQUISITION: MICHIGAN COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this sixth reporting period of the SBI, Connect Michigan, working in close coordination with the state of Michigan, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connect Michigan has continued to identify and process CAI data obtained through an ongoing statewide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connect Michigan through Esri ArcGIS software.

Connect Michigan continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connect Michigan website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the state as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the state client. Connect Michigan will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link:
http://www.surveymonkey.com/s/RTWDM66

In addition to the survey, Connect Michigan has developed a number of new relationships with statewide associations such as: Michigan Association of Counties, Michigan Community College Association, Michigan Department of Community Health, Michigan Health and Hospital Association, Michigan Local Government Management Association, Michigan Municipal League, Michigan Nonprofit Association, Michigan Primary Care Association, and Michigan Township Association to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connect Michigan will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connect Michigan has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connect Michigan conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect Michigan continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect Michigan works with the Michigan Public Service Commission to identify existing relationships that can support CAI outreach.

Connect Michigan has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Michigan project as well as self-awareness of their own CAI connectivity (specifically upload and download speeds). Connect Michigan will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the Michigan Public Service Commission will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the state.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	4612	4612	4608	356	327	328
Libraries	2300	2300	2296	897	900	38
Healthcare	259	259	258	4	4	4
Public Safety	956	956	949	18	17	17
Higher Ed Institutions	242	242	238	35	34	34
Other Government	89	89	88	26	23	23
Other Non-Government	512	512	512	8	7	7
Total	8,970	8,970	8,970	1,344	1,312	451

During the coming months, CAI data collection will be supported by regular reporting to the Connect Michigan team. The CAI data is proving an invaluable resource to all components of the Connect Michigan effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on August 9, 2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.

Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the state of Michigan.

Inventory of Deliverables, Connect Michigan: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the state of Michigan have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Michigan as a polygon of the state boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development is underway at CN as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

MICHIGAN FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets and Trips;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and
- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff conducted on-site validation tests in Michigan on the following providers: 2020 Communications LLC (d.b.a. 123 Net); ACD Net; Ace Telephone Company of Michigan Inc. (also d.b.a. Peninsula Telephone Company).; Agri-Valley Communications Inc.(also d.b.a. Pigeon Telephone Company); Air Advantage (also d.b.a. Bigtube Wireless, Great Lakes Internet, and Internet 123.net); AIRGRANT; Allendale Telephone Company; AT&T; Azulstar Inc.; Banyon Online Services LLC; Baraga Telephone; Barry County Telephone; Bitwise Wireless; Bloomingdale Communications Inc.; Boardman River Communications LLC; Cable America Michigan LLC; Camp Communication Services Inc.; Carr Communications; CenturyLink; Charter Communications; Cherry Capital Connection LLC; Clearwire Corporation; CMS Internet LLC; COLI Inc.; Comcast Cable Communications LLC; Crystal Automation Systems Inc. (d.b.a. Casair); Custom Software Inc.; D&P Communications Inc.; DMCI Broadband LLC; Dreamscape Communications; Drenthe Telephone Co.; Fourway Computer Products Inc. (d.b.a. Fourway.net); FreedomNet Solutions; Frontier Communications Corporation; Halo Wireless Inc.; Hiawatha

Telephone (d.b.a. Jamdots and Chippewa Valley Telephone); Hidden Lake Wireless Inc.; I-2000 Inc.; Interlink Computers Technology Inc.; Iron Bay Computer and Design; ISP Management; KEPS Technologies Inc. (d.b.a. ACD.Net); LakeNet LLC; Leap Wireless International Inc.; Lennon Telephone; Lighthouse Computers; M3 Wireless; M33 Access; Martell Cable Services Inc.; Merit Network; MetaLINK Technologies Inc.; MetroPCS Wireless Inc.; Michigan Cable Partners; Michwave Technologies Inc.; Microtech Services Inc.; Mutual Data Services; NCATS; Network Computers LLC.; Nodin Communications; Ogden Communications Inc.; Packerland Broadband; PAETEC Communications Inc. (d.b.a. Talk America Inc.); Parish Communications; Pasty.Net Inc.; Peninsula Fiber Network LLC; Reliable Internet; Rural Communications Inc.; Sister Lakes Cable TV; Skyweb Network Inc.; Small Business Solutions Group (d.b.a. RuralReach.com); SMR Communications Inc. (d.b.a. Michiana Supernet); SpeedNet LLC; Springcom Inc.; Sprint Nextel Corporation; T2 Communications LLC; TC3Net; TDS Telecommunications Corporation; The ISERV Company; Time Warner Cable; T-Mobile; Town & Country CATV; Tri-County Wireless Inc.; Tucker Communications Inc.; Upper Peninsula Telephone (d.b.a. LIPC and Alphacomm.net); Verizon North Inc.; Vision Quest Technology Solutions; Vogtmann Engineering; Waldron Telephone Company; West Michigan Broadband; Wide Open West (d.b.a. Broadstripe); Winn Telephone Company; Wireless Technology Solutions; Wyandotte Municipal Services; Xyotek; and Zing Networks Inc.

In addition to the field verification tests that have been conducted, Connected Nation has also conducted work in the field to collect information for the non-participating providers (NPP), Bitwise Wireless LLC and Dreamscape Communications, which, by nature of the methodology required for this collection, are also included in the above list.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 97 companies (out of a universe of 137 viable providers) totaling 70.80 percent within the state of Michigan. This percentage also considers the non-participating provider records submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Providers" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on August 9, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

AIRGRANT.COM, INC.

Issue: Fixed wireless platform with maximum advertised download and upload speeds in tier 7, higher than expected value range for the technology.

Resolution: Provider website advertises 10 Mbps service; screenshot below. In addition, provider confirmed that tier 7 upload speeds are available.

Residential as of 7/2012

$45.00 768Kbps

$55.00 1.5Mbps

$65.00 3Mbps

$75.00 6Mbps

$85.00 10Mbps

AT&T, Inc.

Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.

Resolution: Provider website advertises download speed of up to 24 Mbps; screenshot below.

Compare Internet Packages

	Pro	Elite	Max	Max Plus	Max Turbo
Standard Monthly Rate	$38*	$43*	$48*	$53*	$63*
Downstream Speed	Up to 3 Mbps	Up to 6 Mbps	Up to 12 Mbps	Up to 18 Mbps	Up to 24 Mbps

Barry County Telephone Company

Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.

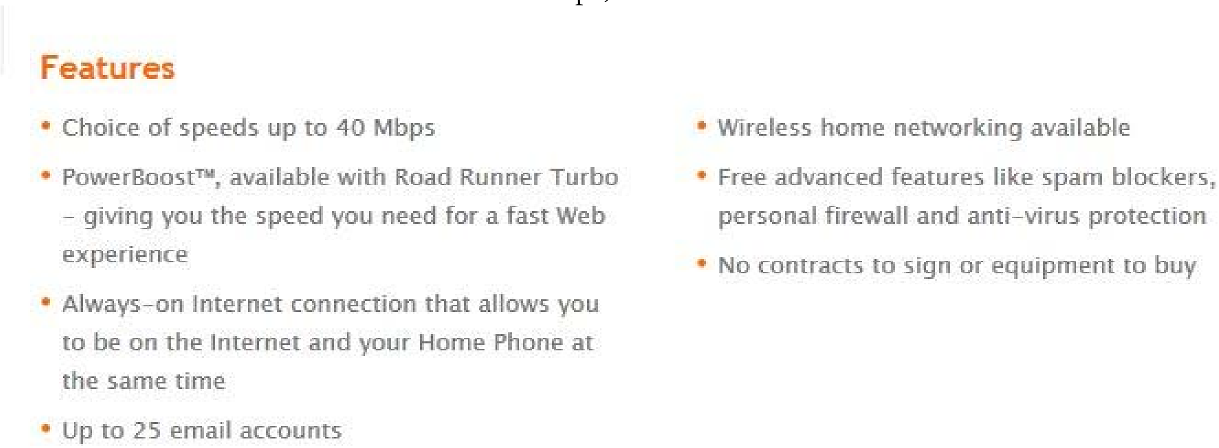
Resolution: Provider website advertises 10 Mbps; screenshot below.

10Mb/1Mb † 150 X's FASTER than Dial up... $99.00 * per month 7 hours free USA long distance! (select MEI Long Distance as your carrier)	10Mb/1Mb † + 5 Features + Unlimited Long Distance 150 X's FASTER than Dial up... (select MEI Long Distance as your carrier) $79.90 * per month Call Waiting, Caller ID, Voicemail, 3-way calling, and Call Forwarding

Bright House Networks, LLC

Issue: Technology of transmission code 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.

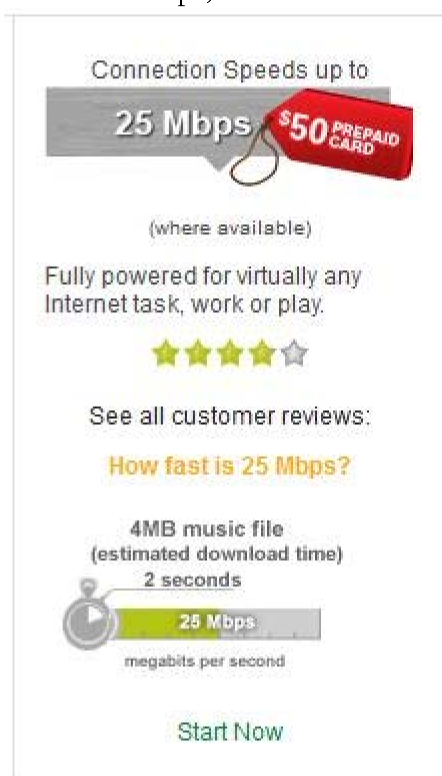
Resolution: Provider website advertises 40 Mbps; screenshot below.



CenturyLink

Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.

Resolution: Provider website advertises 25 Mbps; screenshot below.



Hiawatha Communications, Inc.
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below.

KEPS Technologies, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps; screenshot below.

ACD.net 20Mbps ADSL2+ Broadband	$59.95
1st 3 Months @ $39.95*	

Benefits:
- Up to 20Mbps download and 1.5Mbps upload speeds
- Email Virus Scanning
- Email Spam Filters - User Configurable
- Online Web Interface Email
- Free Dialup Account
- CustomerAccount access for online billing & support
- **Phone Service Not Required!**

MegaPath, Inc.
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps and 45 Mbps service; screenshots below.

DSL service provides download speeds up to 20 Mbps over a nationwide, multi-redundant private network that optimizes performance and security. DSL is an ideal broadband solution for small and medium-sized businesses that download large files or use the Internet extensively.

For maximum connectivity at a minimum cost, there's no greater value than MegaPath Business Ethernet. Choose the bandwidth—2 Mbps up to 45 Mbps—that best fits your business' needs.

Newaygo County Advanced Technology Services
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

Broadband:
$45 768 Kbps
$55 1.5 Mbps
$65 3 Mbps
$75 6 Mbps
$85 10 Mbps

SpeedNet, LLC
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps; screenshot below.

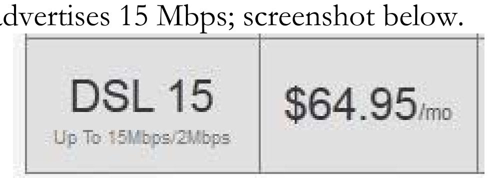
Saginaw, MI – SpeedConnect, a premium wireless broadband provider offering services designed to support high usage demands, announced today it will launch a 4G network, providing up to 10Mbps x 2Mbps connections, throughout Michigan. The new network, deployed by Huawei using the company's SingleRAN solution, will offer comprehensive and secure fixed and mobile broadband solutions for homes and businesses in the Thumb of Michigan.

T-Mobile USA, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises download speeds greater than tier 6; screenshot below.

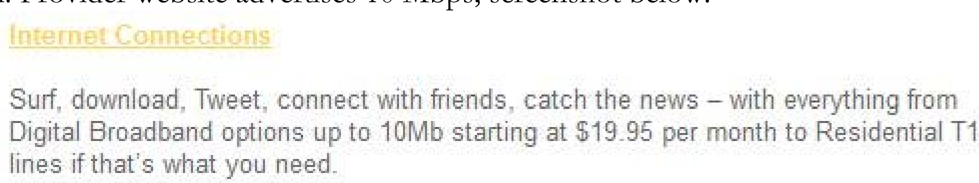
T-Mobile customers with 4G phones are already experiencing data speeds that are comparable to or faster than the speed of a home broadband network. And with recent improvements to our 4G network-doubling our theoretical download speeds-we're giving our customers enhanced 4G data speeds. We've seen average download speeds on our HSPA+ 42 Mbps-capable data stick approaching 10 Mbps with peak speeds of 27 Mbps, and download speeds approaching 8 Mbps with peak speeds of 20 Mbps on our upcoming HSPA+ 42 Mbps-capable smartphones.

TDS Telecom
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider website advertises 15 and 25 Mbps; screenshot below.

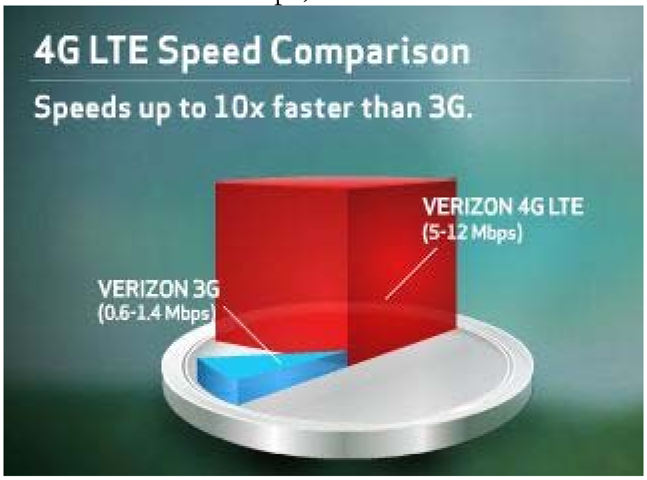
The Computer Care Company, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps; screenshot below.



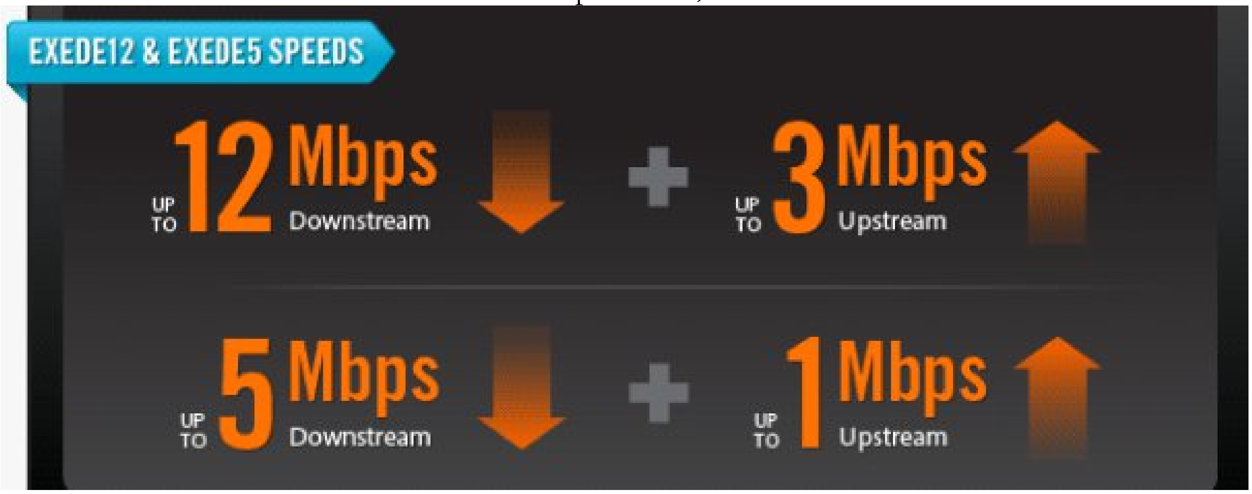
The Iserv Company, LLC
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps; screenshot below.



Verizon North, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps; screenshot below.



ViaSat, Inc.
Issue: Satellite platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.



Vision Quest Technology Solutions
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider advertises 12 Mbps service on their direct mail pieces, but has not yet updated their website.

DATA SUBMISSION AND COVERAGE ESTIMATION OF NON-PARTICIPATING PROVIDERS

As part of its ongoing broadband mapping efforts, CN has developed a series of processes with the goal of submitting coverage estimation mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of platform type (cable modem, DSL, fixed wireless, etc.). This state specific collection of coverage estimation methodology papers (see Appendix A) demonstrates the estimated broadband service territory for the providers in this state that have either been non-responsive or that have refused to participate in the SBI mapping initiative.

ACCURACY AND VERIFICATION: PROVIDER VALIDATION METHODOLOGY

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a statewide level, static maps of statewide and county-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Additionally, NPP narratives that were submitted in previous mapping cycles are subjected to the same level of scrutiny. Occasionally, a provider may elect to voluntarily participate (thus eliminating the need for future data estimation activities in the field). However, more often than not, the NPP narrative is updated with a combination of data gleaned from the provider's website, data obtained through FCC research and/or data collected/verified in the field by a CN staff engineer.

Estimates derived from provider-validated data indicate that approximately 1.29 percent of Michigan households do not have terrestrial fixed broadband service available, and approximately 0.09 percent of Michigan households have neither mobile nor fixed broadband service available.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 2.20 percent of rural Michigan households do not have terrestrial fixed broadband service available, and approximately 0.16 percent of rural Michigan households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information. `

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard. This research often proves to be exceptionally effective when estimating the coverage area of an NPP.
6. The primary population center(s) being served (for geopolitical boundary reference).

7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. omni-directional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).
15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).
23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hillshade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

BROADBAND INQUIRIES METHODOLOGY

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connect Michigan website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information requested by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at other such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,600 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connect Michigan project has received a total of 101 inquiries (1,477 grant inception to date). As more inquiries are submitted to Connect Michigan, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

My ConnectView Methodology

My ConnectView is an online, interactive mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connect Michigan project launched My ConnectView on April 2, 2012, and has received 2,956 visits this reporting period; to date the interactive mapping applications have received 11,300 visits.

Speed Test Methodology

The 6,855 speed tests that are represented in the Connect Michigan Speed Test Report during this reporting period (18,239 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Michigan speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connect Michigan project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connect Michigan with the information on where broadband services are available. Second, unlike theoretical speed information which was received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the state of Michigan.

Providers Deemed Non-Viable

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the October 2012 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	20/20 Communications, LLC	n/a	Company has been sold to another area WISP.
2	21Globe, Inc.	n/a	Company is no longer in business.
3	650Net	http://www.650net.net/	This company provides dial-up only in Michigan.
4	A 007 Access	n/a	Acquired by another company.
5	Aaccess Network Communications	n/a	Not a broadband provider.
6	Access123.net	http://www.access123.net/	Not a broadband provider.
7	ACERX.NET	n/a	Not a broadband provider.
8	Airbaud, Inc	http://www.airbaud.net/	No longer a fixed wireless provider in Michigan.
9	Airespring, Inc.	http://www.airespring.com	Nonfacilities-based reseller.
10	Airewaves Broadband, LLC	n/a	Company is no longer in business.
11	Airmail247.com	n/a	Company is no longer in business.
12	All-In-One Wireless, Inc.	n/a	No longer in business; acquired by another company.
13	Antioch Wireless Broadband	www.antiochwirelessbroadband.com/	Not a broadband provider.
14	Arrowheadnet.com	http://www.arrowheadnet.com/	Not a broadband provider
15	bargainisp.net	http://www.bargainisp.net/	Not a broadband provider.
16	Bayville Wireless	n/a	Company is no longer in business.
17	Beanstalk Internet	n/a	Company is no longer in business.
18	Beaver Island Broadband, Inc.	n/a	Not a broadband provider.
19	BlazeConnect, Inc.	n/a	Company is no longer in business.
20	Blue Communications, LLC	http://www.bluecommunicationsllc.com	Not a broadband provider.
21	Broadband National	http://www.broadbandnational.com	Nonfacilities-based reseller.
22	Broadview Networks Holdings, Inc.	http://www.broadviewnet.com	Not a Michigan provider.
23	BullsEye Telecom, Inc.	http://bullseyetelecom.com	Nonfacilities-based reseller.
24	Cable Vision, Inc.	n/a	Company is no longer in business.
25	Cablemax Communications	n/a	Company is no longer in business.

26	CAC MediaNet, Inc.	n/a	Not a broadband provider.
27	Camino-Net Internet Services	http://www.camino-net.com	This company provides dial-up only in Michigan.
28	Caspian Community TV Corporation	n/a	Not a broadband provider.
29	CCIS.net	http://www.ccis.net	Not a Michigan provider.
30	Celito Communications	http://www.celito.net/	Nonfacilities-based reseller.
31	CIMCO Communications, Inc.	n/a	This company is not a broadband provider.
32	City of Crystal Falls	http://www.crystalfalls.org/Electric%20Department.htm	This company is not a broadband provider.
33	City of Negaunee	http://cityofnegaunee.com/Cable.html	This company is not a broadband provider.
34	Clear Rate Communications, Inc.	http://clearrate.com/	This company provides dial-up only in Michigan.
35	Cleartouch.Com	n/a	Company is no longer in business.
36	CMC Telecom, Inc.	http://cmctelecom.net	Nonfacilities-based reseller.
37	Deltaforce	http://www.deltaforce.net	Nonfacilities-based reseller.
38	deluxehost.com	http://deluxe-host.com	This company is not a broadband provider.
39	DGUI	n/a	Company is no longer in business.
40	Dial National	n/a	Company is no longer in business.
41	Dialer.net	http://www.dialer.net	Nonfacilities-based reseller of mobile 3G services.
42	DIECA Communications, Inc.	http://www.covad.com/	Company has been acquired by another company.
43	DSTech	http://www.dstech.us/	They only provide wireless hotspots for the City of Escanaba and are not a fixed wireless provider.
44	DTS-NET.COM	http://www.dts-net.com/	Nonfacilities-based reseller.
45	Dundee Internet Services, Inc.	n/a	Company is no longer in business.
46	Eagles Internet Services	n/a	Company is no longer in business.
47	Enventis Telecom Inc.	http://www.enventis.com	Company does not provide broadband services in Michigan.
48	ETI - Connecting Your World	http://www.cyberenet.net/	Nonfacilities-based reseller.
49	Fast Dependable Access	n/a	Company is no longer in business.
50	First Communications,	www.firstcomm.com	Company has been non-responsive.

	LLC		
51	Global Crossing Telecommunications, Inc.	http://www.globalcrossing.com/	Acquired by another company.
52	Grid4 Communications, Inc.	http://www.grid4.com	Nonfacilities-based reseller; company has refused to participate.
53	Holland Board of Public Works	http://www.hollandbpw.com	This company is not a broadband provider.
54	Hubwest Protected Networks LLC	http://www.hubwest.com	Company does not provide broadband services in Michigan.
55	Imbris, Inc.	http://www.imbris.com	Company does not provide broadband services in Michigan.
56	IMGISP.NET	http://www.imgisp.net/	This company is not a broadband provider.
57	Incredible Networks	n/a	Company is no longer in business.
58	Industrial Grade Broadband, LLC	n/a	This company is not a broadband provider.
59	Inercom Communications Inc.	http://www.inercom.com	Company is no longer in business.
60	Interactiveinfo.com Inc	http://www.rocketbroadband.com	Company does not provide broadband services in Michigan.
61	International Broadband Electric Communications, Inc.	http://ibec.net	This company is not a broadband provider.
62	Intouch Internet Services, Inc.	http://www.intouchmi.com	Nonfacilities-based reseller.
63	iRadical	n/a	Company is no longer in business.
64	ISG	http://www.leapfrogbroadband.com	This company is not a broadband provider.
65	ISPartner.net	n/a	Company is no longer in business.
66	ITWifi, Inc.	http://www.fnw.us/	Company has been sold to another area WISP.
67	Jackpine Internet	http://www.jackpine.com	Nonfacilities-based reseller.
68	Jenco Speed Web	http://www.jencospeed.net	Company does not provide broadband services in Michigan.
69	LARIAT.NET	http://www.lariat.net/	Company does not provide broadband services in Michigan.
70	LCSisp.com	http://www.lcsisp.com/index.cfm	This company provides dial-up only in Michigan.

71	Lightyear Network Solutions, LLC	http://lightyear.net	Nonfacilities-based reseller.
72	LinkAmerica.Net	n/a	Company is no longer in business.
73	Local Exchange Networks of Michigan, Inc.	n/a	Company is no longer in business.
74	M55 WiFi Wireless Internet Service	http://www.m55wifi.net/	No longer in business.
75	MainBoard, LLC	http://www.mainboard.cc/internet.htm	Company does not provide broadband services in Michigan.
76	Maine Cable and Wireless	n/a	Company is no longer in business.
77	Maple River Networks, LLC	n/a	Company is no longer in business.
78	Marcin Company	n/a	Company is no longer in business.
79	MediaNet	n/a	Company is no longer in business.
80	Metropolitan Telecommunications Holding Company	http://www.mettel.net	Non-facilities based reseller.
81	Mich1 Internet, Inc.	http://www.mich1.net	Nonfacilities-based reseller.
82	Michiana Wireless, Inc.	http://www.michianawireless.com	Company does not provide broadband services in Michigan.
83	Michigan Department of Information Technology	http://www.michigan.gov/dit/	This company is not a broadband provider.
84	Microwave Communications, Inc.	n/a	This company is not a broadband provider.
85	Midwest Communications Services, Inc.	http://mwcomm.com	This company is not a broadband provider.
86	Midwest Energy Cooperative	http://teammidwest.com/	No longer a broadband provider.
87	Millenicom Inc.	http://www.millenicom.com	Oregon-based reseller of mobile broadband plans.
88	MIMesh	http://www.mimesh.com	This company is not a broadband provider.
89	Nanomega.Com	n/a	Company is no longer in business.
90	NetAccess, Inc.	http://www.nas.net/	This company is not a broadband provider.
91	NetSpeed Online	n/a	Company is no longer in business.
92	New Edge Network,	www.newedgenetworks.co	Acquired by another company.

	Inc.	m	
93	Nextlink Wireless, Inc.	n/a	Company does not provide broadband services in Michigan.
94	Northern Michigan Online	http://www.nmo.net	This company is not a broadband provider.
95	Northwest ISP	www.northwestisp.com/	Company is no longer in business.
96	NSIGHTTEL WIRELESS, LLC	www.nsighttel.com	Company does not provide broadband services in Michigan.
97	Overarch Broadband	www.overarch.com	Company does not provide broadband services in Michigan.
98	Pacific Internet Exchange	n/a	Company does not provide broadband services in Michigan.
99	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company.
100	Paknet Limited	n/a	This company is not a broadband provider.
101	Planet Online	www.planetonline.net/	This company is not a broadband provider.
102	PremoWeb	n/a	This company is not a broadband provider.
103	Raser, Inc.	http://www.wmis.net/	Company has been non-responsive.
104	Renaissance Networks	www.renaissancenetworks.com/	This company is not a broadband provider.
105	Rural Communications, Inc.	http://www.ruralcommunications.net/	No longer in business.
106	Saturn Telecommunication Services, Inc.	n/a	Acquired by another company.
107	Seneca Communications	www.senecacommunications.com	This company is not a broadband provider.
108	Simply Dialup A Metrogeek Company	www.simplydialup.com/	This company is not a broadband provider.
109	Sling Broadband	www.slingbroadband.com/	Company does not provide broadband services in Michigan.
110	Star Video	n/a	Company is no longer in business.
111	State of Michigan	n/a	Not a broadband provider.
112	StoneBridge Wireless Broadband	n/a	Acquired by another company.
113	Surferz.Net	www.surferz.net/	This company is not a broadband provider.

114	T1 Shopper	www.t1shopper.com	Non-facilities based reseller.
115	Talk America Inc.	n/a	Acquired by another company.
116	Telefonica USA, Inc.	www.telefonica.com/	Company does not provide broadband services in Michigan.
117	TelNet Worldwide, Inc.	www.telnetww.com	Company has been non-responsive.
118	Telovations, Inc.	www.telovations.com	Company does not provide broadband services in Michigan.
119	Thumbnet	n/a	Acquired by another company.
120	Total Access Networks, Inc	n/a	Not a broadband provider.
121	TRANSWORLD NETWORK, CORP	n/a	Not a broadband provider.
122	True Connections, LLC	n/a	Company is no longer in business.
123	TSISP.NET	n/a	Company is no longer in business.
124	TVC Inc.	www.tvcinc.com	Not a broadband provider.
125	University Corporation for Advanced Internet Development	n/a	Not a broadband provider.
126	UNUM Telecommunications, Inc.	n/a	Company does not provide broadband services in Michigan.
127	WilTel Communications, LLC.	n/a	Acquired by another company.
128	WingsComm Communications	n/a	Company is no longer in business.
129	Wireless First LLC	n/a	Acquired by another company.
130	Wireless Roanoke, Inc.	n/a	Company is no longer in business.
131	Wireless Ypsi	www.wireless.ypsi.com	Company provides free hotspots in Ypsilanti area.
132	wisbin	www.wisbin.com/	Company does not provide broadband services in Michigan.
133	www.AmericanAngel.us	www.AmericanAngel.us	Company is no longer in business.
134	YEYZOO.NET	www.yeyzoo.net/	Not a broadband provider.
135	YLISP (Your Local ISP)	www.itsyournet.com	Not a broadband provider.
136	YourT1Wifi.com	www.yourt1wifi.com/	Company does not provide broadband services in Michigan.
137	Z-Comm, LLC	n/a	Company is no longer in business.
138	ZOOM Internet Services, LLC	n/a	Acquired by another company.

APPENDIX A: ESTIMATION OF NON-PARTICIPATING PROVIDERS

Bitwise Wireless, LLC

Dreamscape

BITWISE WIRELESS, LLC

As part of its ongoing broadband mapping efforts, Connected Nation has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) mapping program.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to Bitwise Wireless, LLC, a wireless Internet service provider (WISP), located in Davison, Michigan, with a service area around Genesee and Lapeer counties. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation and site verification techniques that support the underlying data.

Background

Historically, CN staff members have continued trying to obtain the participation of the provider with 18 instances of communication via telephone and e-mail sessions since May 24, 2011, through February 21, 2012. Telephone discussions were held with a company representative June 13, 2011, and January 3, 2012, with a response of wanting to participate, but too busy to collect the data necessary to develop propagation maps on its own. Additionally, a CN staff member visited the business office of Bitwise Wireless, LLC on January 25, 2012, to discuss the broadband mapping project in person with Bitwise Wireless staff. A company representative provided certain transmit site locations and broadcast frequencies.

Recently, a CN staff member spoke with a company representative on June 6, 2012, and August 29, 2012. The company representative stated they would like to participate in the Connect Michigan broadband mapping program, but they simply do not have the time to accumulate their tower site information for reporting purposes. They appreciate the propagation coverage maps that CN has provided as part of the last coverage estimation document and feel that the propagation studies are accurate. In fact, Bitwise Wireless, LLC has posted the CN produced map on their website to show prospective customers the broadband coverage area (see second illustration under Exhibit B – note the CN embedded "Confidential" watermark clearly present on the illustration).

The Issue

CN staff e-mailed technical data and propagation maps to Bitwise Wireless, LLC, though its lack of responsiveness since January 25, 2012, has predicated its inability to participate in the Connect Michigan broadband mapping initiative simply because of a lack of resources.

Though Bitwise Wireless, LLC has indicated they want to participate in the Connect Michigan broadband mapping program, they have yet to submit the necessary tower site information needed to produce propagation modeling.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN has built a file based on research information and, as time progressed, enriched the file with information obtained through the public domain and on-the-ground data collection and site verification. For example, CN reviewed the provider's website (http://www.bitwisewireless.com) to determine the residential service plans **(Exhibit A)** and the service areas **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0019402494 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any spectrum authorizations that may be held by the provider that could supplement the dataset of estimated coverage by isolating and identifying active wireless access points for the service area. This process yielded license WQLJ361 **(Exhibit D)**, Radio Service: NN - 3650-3700 MHz with 0 active locations.

Exhibit A: Service Plans

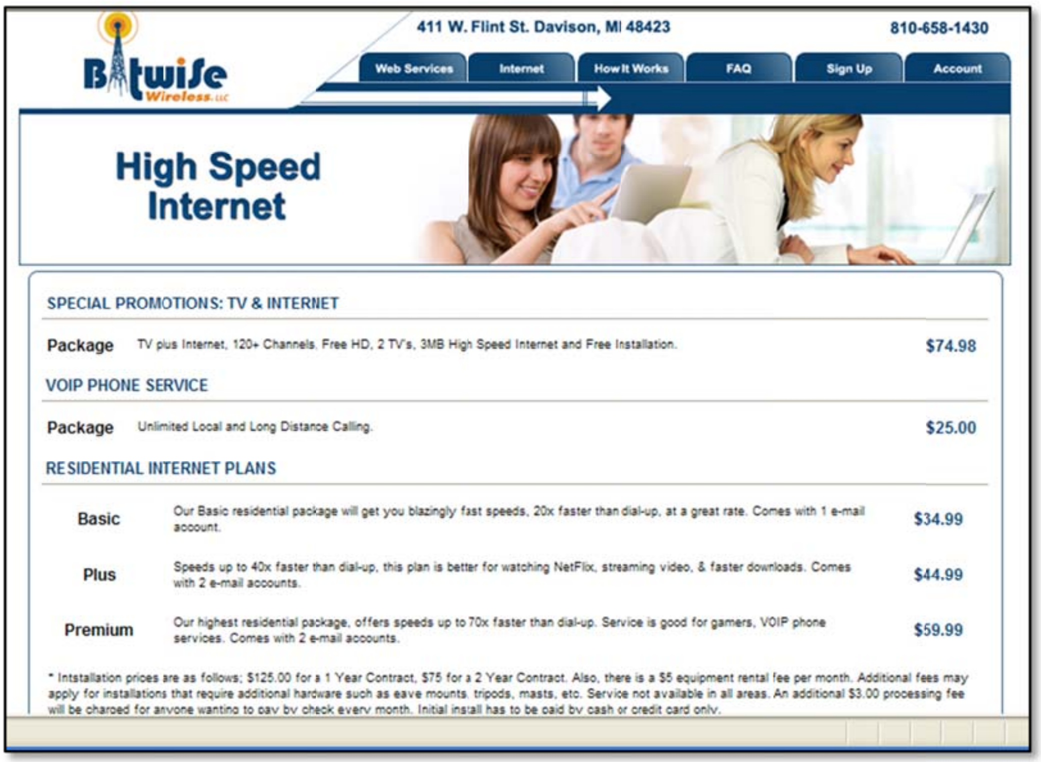
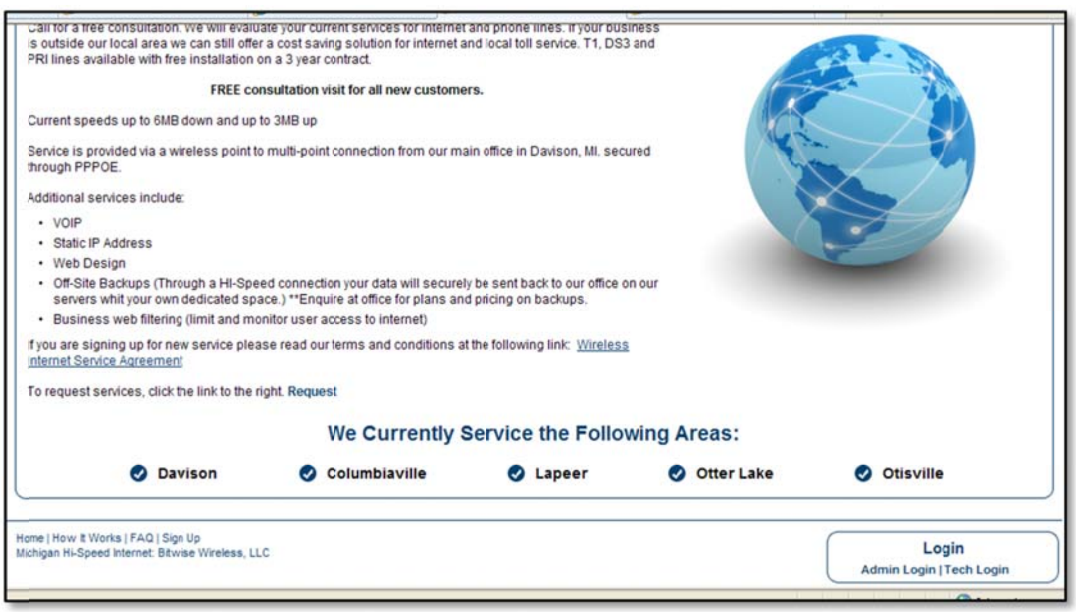


Exhibit B: Service Area



Bitwise Wireless, LLC now displays the broadband coverage map produced by Connect Michigan on their website as their service coverage map:

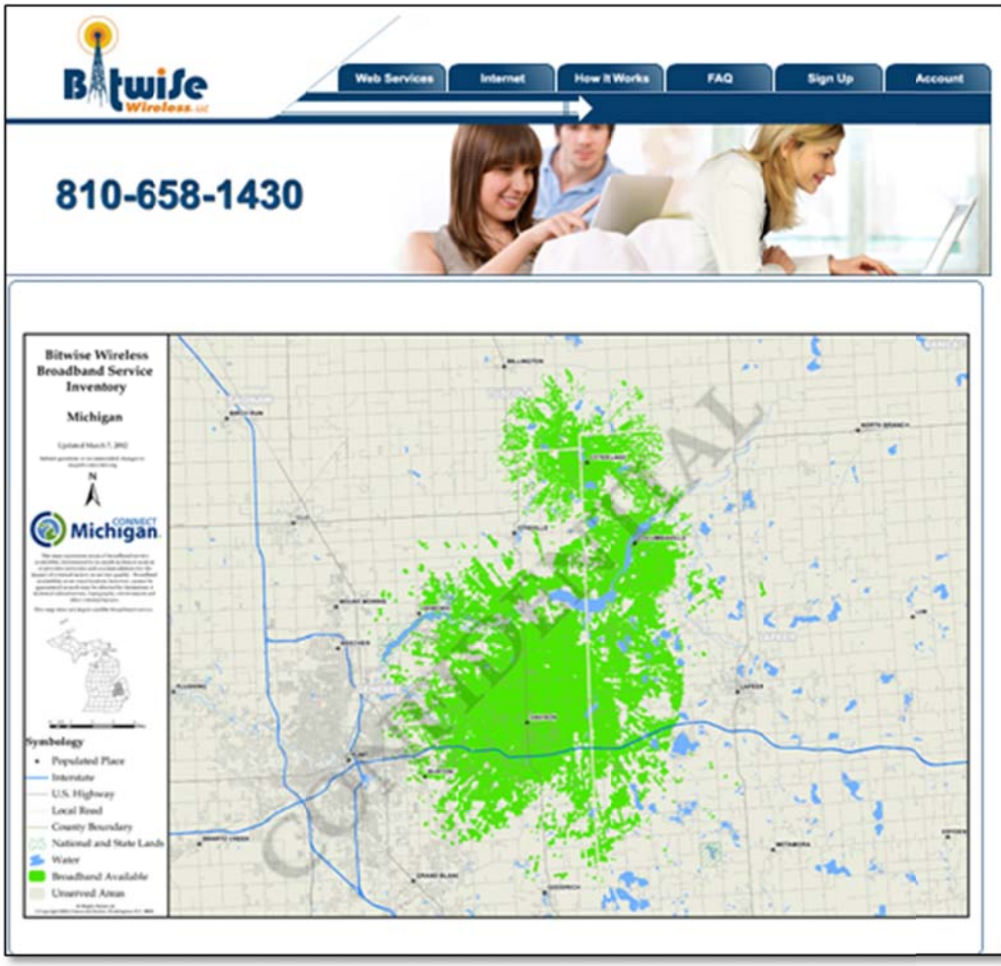
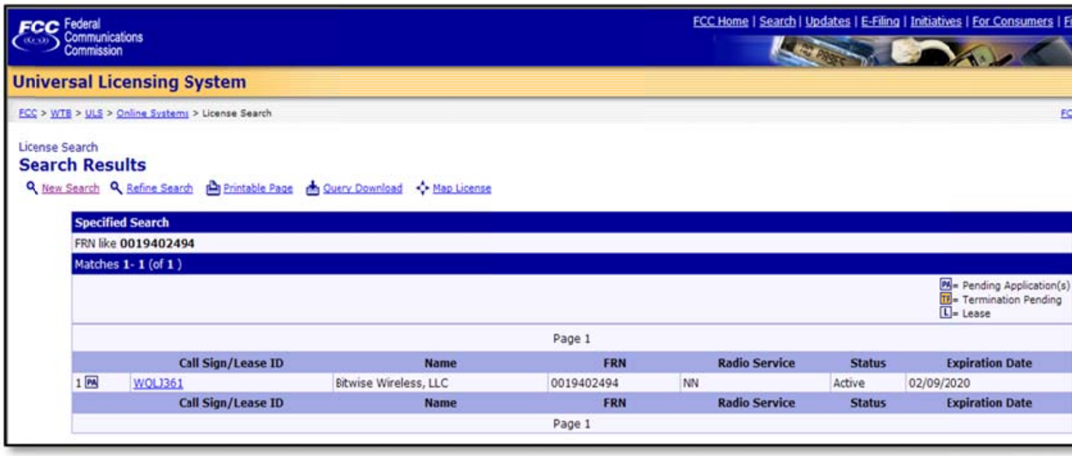
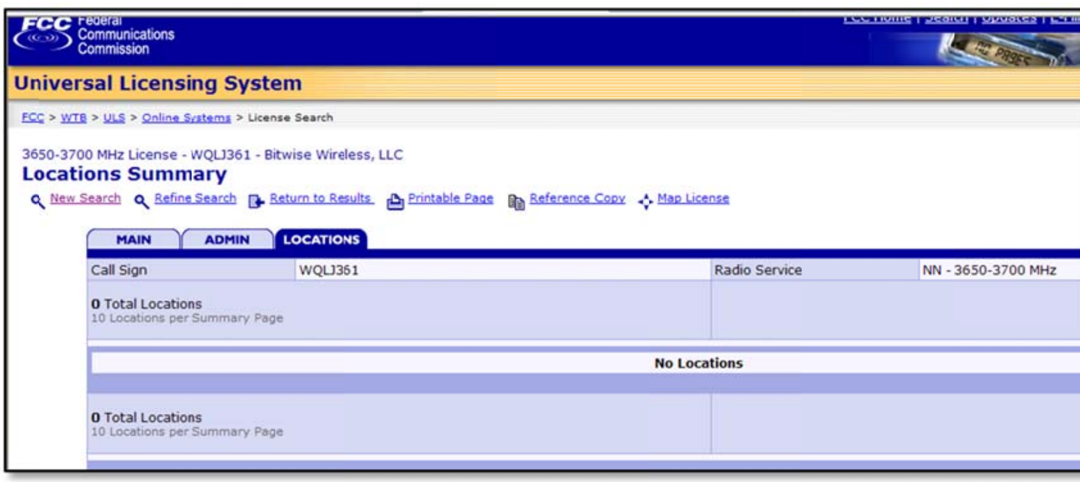


Exhibit C: Federal Registration Number

Registration Detail	
FRN:	0019402494
Registration Date:	12/13/2009 09:27:00 PM
Last Updated:	04/10/2010 10:27:59 AM
Business Name:	Bitwise Connection, LLC
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	Bitwise Connection, LLC
Contact Position:	Owner
Contact Name:	Mr Brian Wills
Contact Address:	410 West Flint Street Davison, MI 48423 United States
Contact Email:	bwills@bitwiseconnection.com
ContactPhone:	(810) 658-6476 22
ContactFax:	

Exhibit D: WQLJ361 License Reference





<u>Preliminary Identification of Provider's Coverage Area</u>

The CN engineer, using the information provided by Bitwise Wireless, drove to the four disclosed transmit locations and confirmed coordinates and the existence of fixed wireless equipment. The website service area was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The provider's service area depiction is represented by tower symbols as shown in **Exhibit E**. The four referenced locations were identified in Google Earth and examined utilizing the zoom option of the aerial imagery. All four location structures were identified as matching the descriptions provided by company representative as can be seen in the Google Earth screen shot of the water tower in Columbiaville, Michigan **(Exhibit F)**, identified as a transmit site. This provided a means of establishing coordinates for the all wireless access point locations and these coordinates were then entered into Microsoft *Streets & Trips* mapping application **(Exhibit G)** to develop a route for the validation process.

Exhibit E: Google Earth: Provider's Service Area Image Overlay

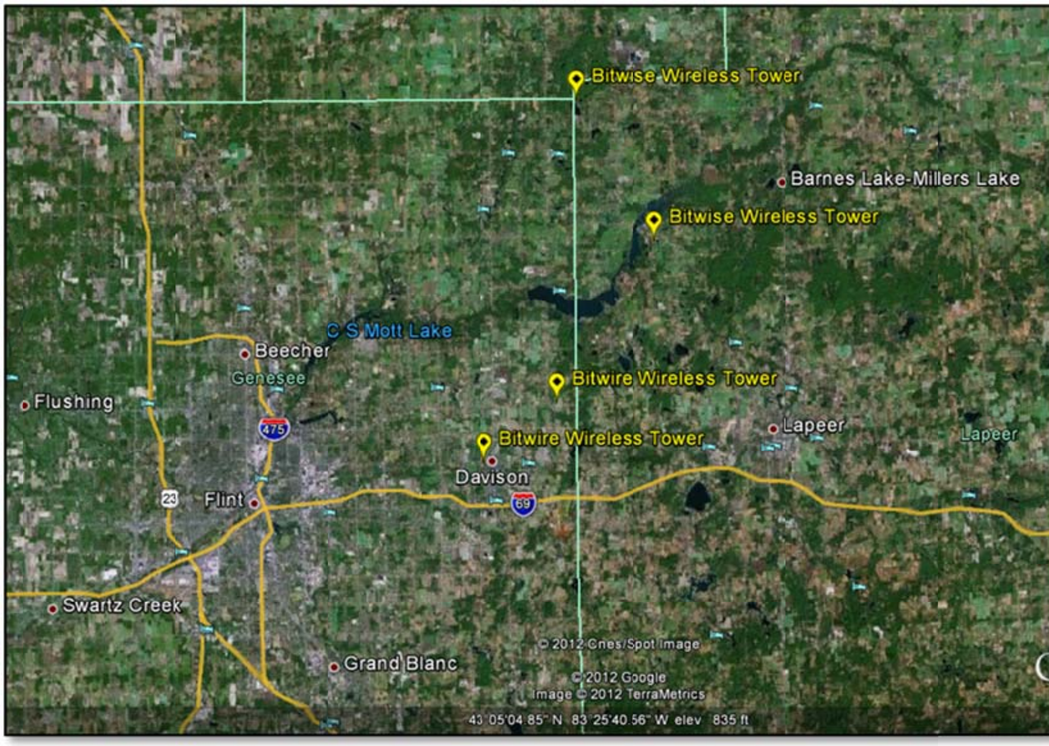
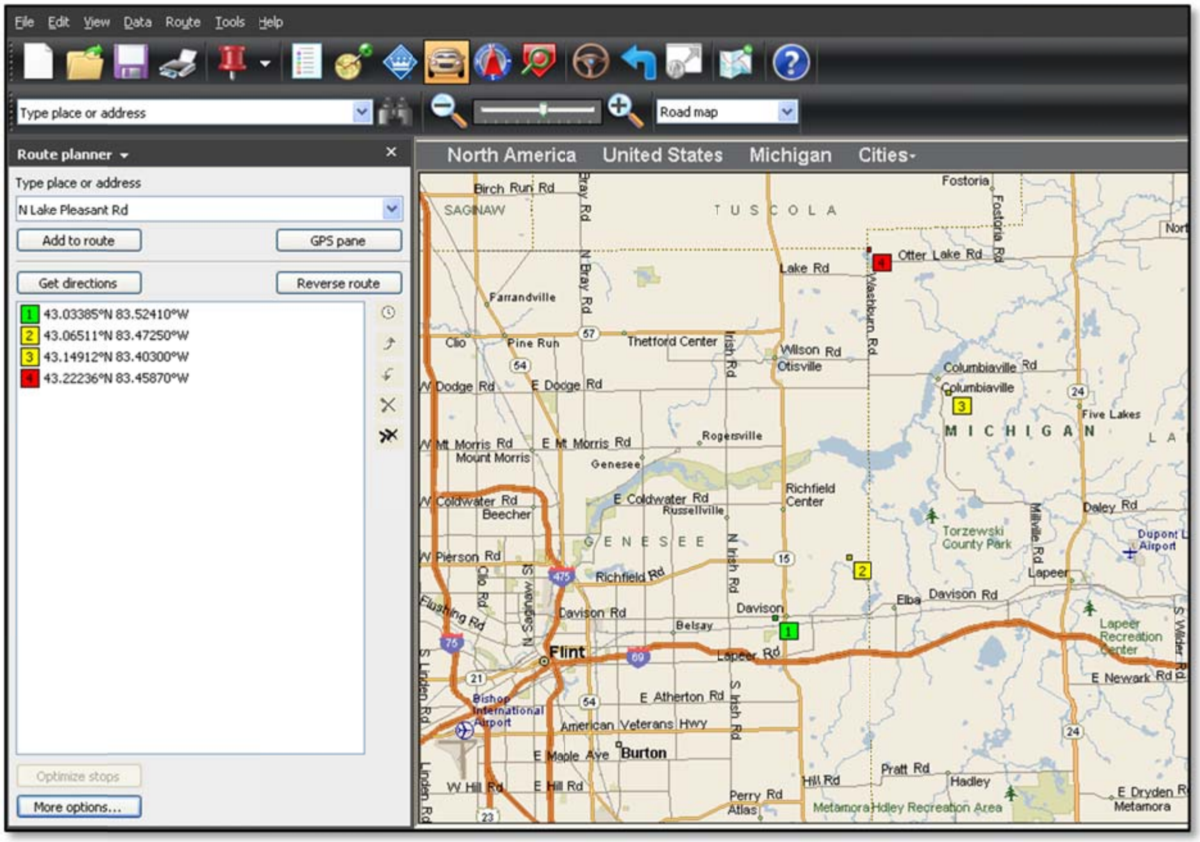


Exhibit F: Google Earth Screenshot of Columbiaville, MI Water Tower

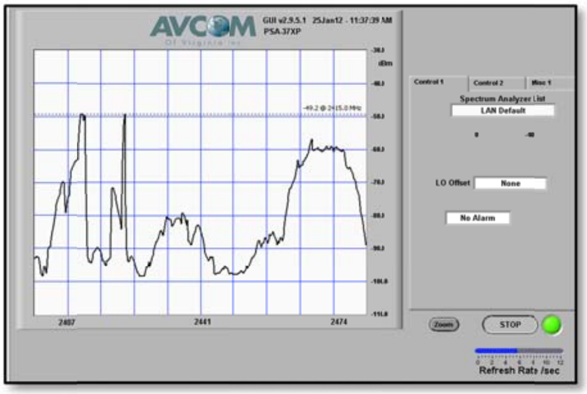
Exhibit G: Validation Points for AP Structures

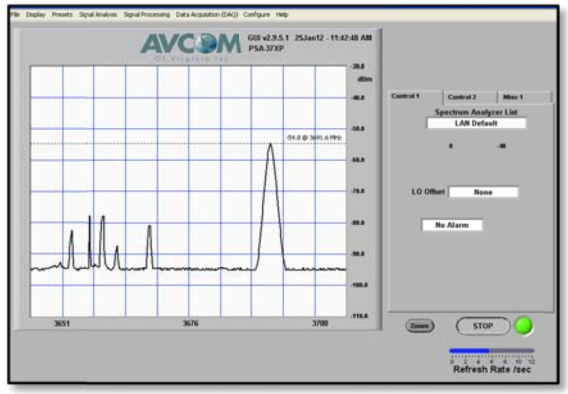


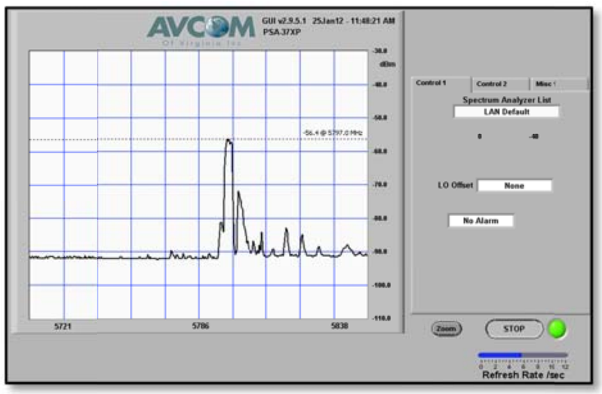
Testing Techniques

Connected Nation staff developed a data collection and site validation route based on data provided by Bitwise Wireless representative, derived from the Google Earth image overlay and the sites selected in *Streets and Trips*. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands as can be seen from the screen shots taken at the Davison tower site **(Exhibit H)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or directional antenna), and photographs were taken of the wireless transmit site and related access points.

Exhibit H: Field Data for Bitwise Wireless Davison Tower Location







<u>Results and Submission for October 2012</u>

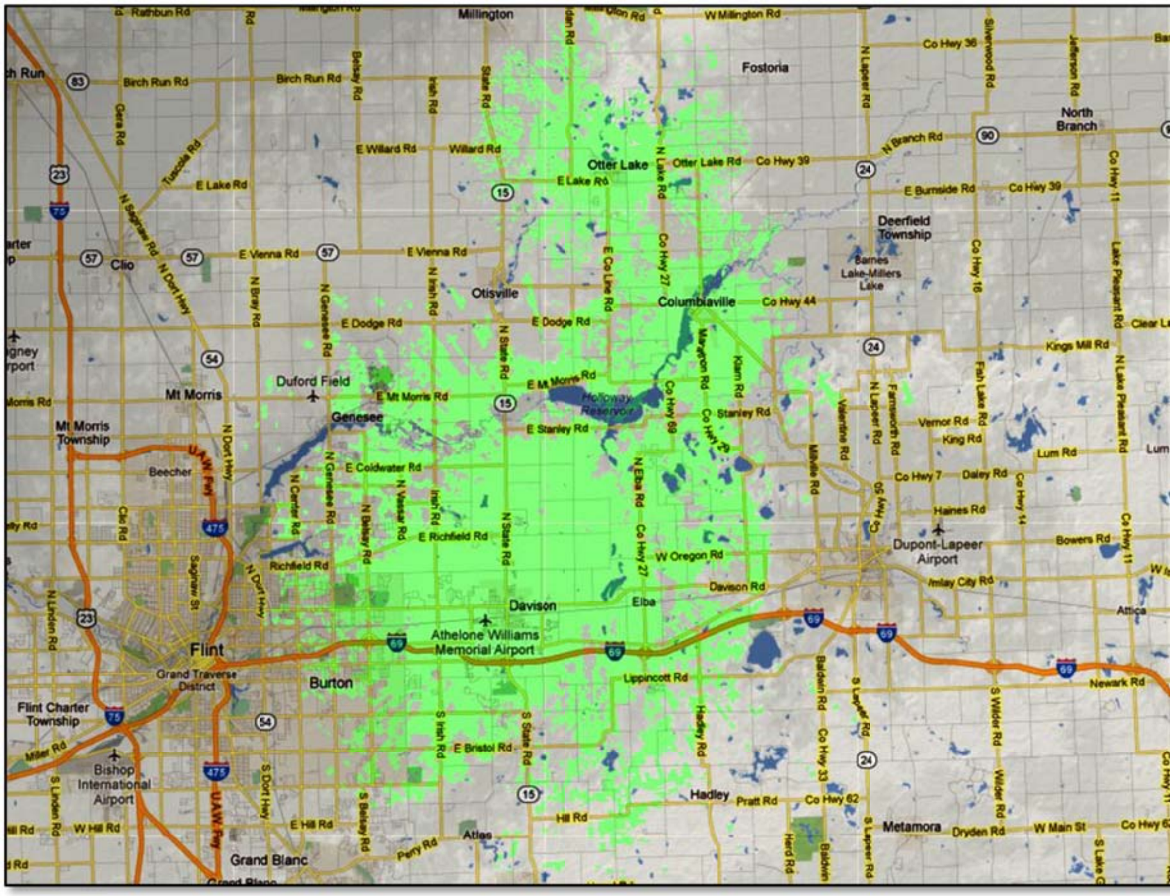
Of the 4 locations visited during the April 2012 validation point route, 10 access points were identified and relative information was logged into the Bitwise Wireless field validation notes file **(Exhibit I)**. The field and the publicly available data were transferred to the CN Provider Information file. A composite propagation study was completed based on the field data **(Exhibit J)**. Although Bitwise Wireless, LLC has indicated they want to participate in the Connect Michigan broadband mapping program, they have yet to submit the necessary tower site information needed to produce propagation modeling. For that reason, CN staff has determined that an update of "No Change" should be filed for this submission cycle and immediate attempts are underway to work with this provider to secure future date updates for propagation modeling and broadband coverage mapping.

Exhibit I: Field Validation Notes

Site #	Date	Provider	(N) Lat Decimal	(-)(W) Long Decimal	Platform Type: Type	Platform Type: Presence Confirmed	Test Data: Type	Test Data: Pass or Fail?
1	1/25/12	Bitwise Wir	43.0339	-83.5241	Fixed Wir	Yes	Signal Ver	Pass
2	1/25/12	Bitwise Wir	43.0339	-83.5241	Fixed Wir	Yes	Signal Ver	Pass
3	1/25/12	Bitwise Wir	43.0339	-83.5241	Fixed Wir	Yes	Signal Ver	Pass
4	1/25/12	Bitwise Wir	43.0651	-83.4725	Fixed Wir	Yes	Signal Ver	Pass
5	1/25/12	Bitwise Wir	43.0651	-83.4725	Fixed Wir	Yes	Signal Ver	Pass
6	1/25/12	Bitwise Wir	43.0651	-83.4725	Fixed Wir	Yes	Signal Ver	Pass
7	1/25/12	Bitwise Wir	43.1491	-83.403	Fixed Wir	Yes	Signal Ver	Pass
8	1/25/12	Bitwise Wir	43.1491	-83.403	Fixed Wir	Yes	Signal Ver	Pass
9	1/25/12	Bitwise Wir	43.2224	-83.4587	Fixed Wir	Yes	Signal Ver	Pass
10	1/25/12	Bitwise Wir	43.2224	-83.4587			Signal Ver	Pass
11			0	0				
12			0	0				
13			0	0				
14			0	0				
15			0	0				
16			0	0				
17			0	0				
18			0	0				
19			0	0				
20			0	0				

Site #	Speed Test Data: Utility	Time	Ping Time (ms)	Upload Speed (kbps)	Download Speed (kbps)	Min Speed Met?	Images	Visual Confirmation: Type	Visual Confirmation: Images	Signal Verification/Spectrum Analyzer: Peak Freq	Peak Sig Strength	Spectrum Analyzer	Time	Imag
1								Wireless C	Yes	2415	-49.2	Avcom PS	11:37 AM	Yes
2								Wireless (	Yes	3691.6	-54.8	Avcom PS	11:42 AM	Yes
3								Wireless (	Yes	5797	-54.4	Avcom PS	11:48 AM	Yes
4								Wireless (	Yes	912.1	-66.8	Avcom PS	1:07 PM	Yes
5								Wireless (	Yes	2408.1	-62.4	Avcom PS	1:05 PM	Yes
6								Wireless (	Yes	5761.1	-58.8	Avcom PS	1:10 PM	Yes
7								Wireless (	Yes	2432.8	-48	Avcom PS	1:39 PM	Yes
8								Wireless (	Yes	5842.3	-73.2	Avcom PS	1:36 PM	Yes
9								Wireless (	Yes	2413.7	-47.6	Avcom PS	2:02 PM	Yes
10								Wireless (	Yes	5749.8	-63.6	Avcom PS	2:09 PM	Yes
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														

Exhibit J: Bitwise Composite Coverage



DREAMSCAPE COMMUNICATIONS

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying "last-mile" broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) mapping program.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to Dreamscape Communications (Dreamscape), a Michigan wireless Internet service provider (WISP), with an advertised service area in Stephenson, Ingalls and Wallace, Michigan. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

Background

From May 26, 2011, to July 9, 2012, CN staff members attempted to obtain the participation of the provider with 11 instances of communication (via telephone and e-mail sessions). On January 3, 2012, the provider answered the call from a CN staff member and stated that they were not interested. On July 11, 2012, a CN staff member was sent into the field to independently gather the data and to conduct site verification activities. In a last attempt effort to obtain "maximum advertised speeds," a CN staff member called Dreamscape on September 6, 2012, and was informed by a customer service representative that (i) she did not know what the maximum speeds were, (ii) that only the Stephenson tower was operational; and (iii) that the provider intends to decommission that tower "sometime next month" also noting that the company is moving.

Accordingly, while CN is pleased to submit this coverage estimation narrative on Dreamscape and confirmed operational status as of June 30, 2012, (pursuant to NTIA criteria) this provider's status will most likely be changed to "Out of Business" for subsequent SBI submissions.

The Issue

On January 3, 2012, Dreamscape Communications predicated its unwillingness to participate in the Connect Michigan broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research available through the public domain, such as the provider's website (http://www.dreamscp.com) and, as time progressed, enriched the file with information obtained through the public domain (e.g. Federal Communications Commission (FCC) **CO**mmission **RE**gistration **S**ystem (CORES), FCC Universal Licensing System, etc.) prior to conducting in-field spectrum testing. Despite the fact that Dreamscape Communications displays the towns where it says it has coverage, it offers no service plans publicly **(Exhibit A).** The provider has refused to offer any data that could be used for the construction of a dataset for submission to NTIA (including refusal to discuss maximum advertised speeds).

A search for a Federal Registration Number (FRN) on the FCC CORES system yielded "no match" **(Exhibit B)**. Additionally, the FCC ULS was searched to determine if the provider was the authorization holder of any spectrum (such as a 3650 MHz license); this search also yielded "no match" **(Exhibit C)**.

Exhibit A: Service Area (as of July 11, 2012)

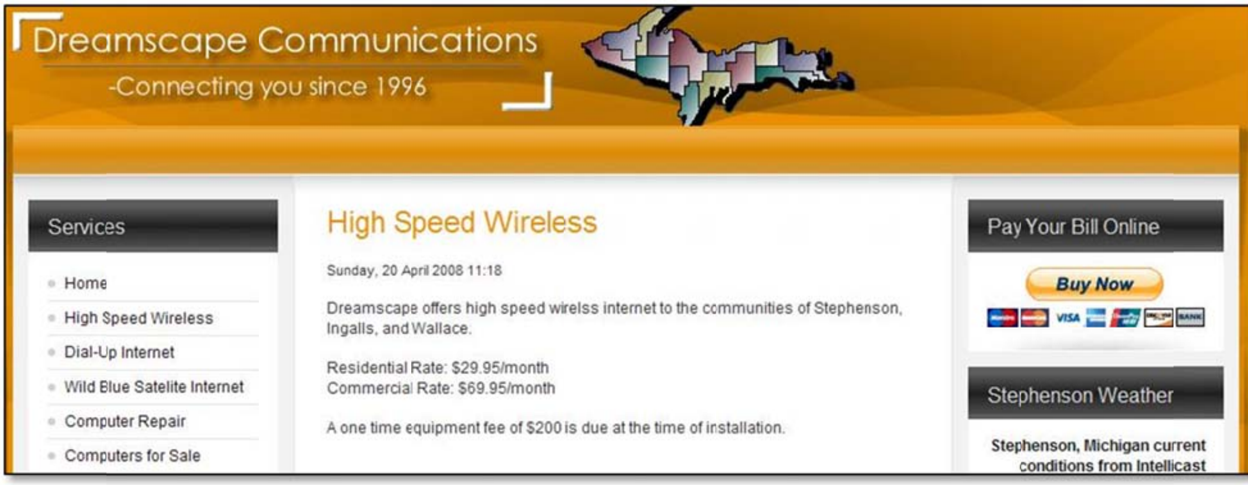


Exhibit B: Federal Registration Number

Exhibit C: License Reference

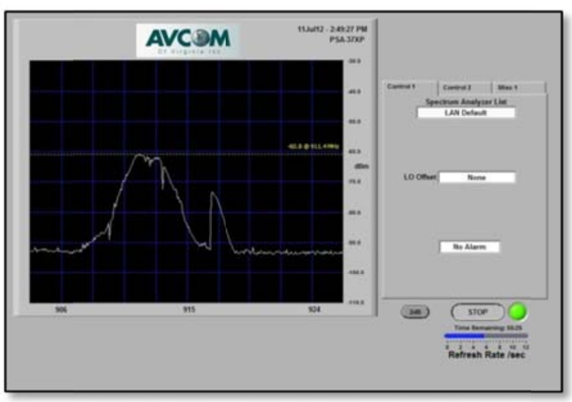
Preliminary Identification of Provider's Coverage Area: Only one of the three advertised transmit sites was verified as operational during the course of the field research and its location was captured in a GPS route using Microsoft *Streets and Trips* **(Exhibit D).**

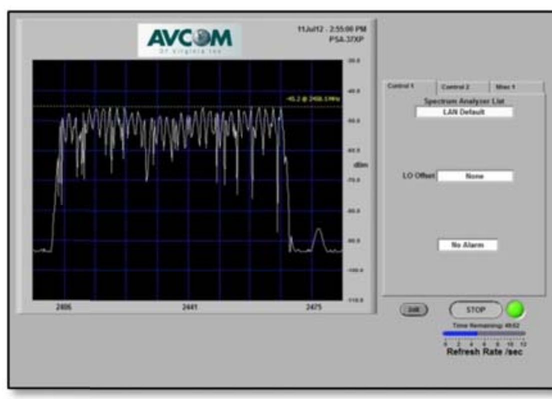
Exhibit D: Validation Points for AP Structures

Testing Techniques

CN staff developed a data collection and site verification and validation route based on information as outlined above. To ensure accuracy of coverage estimates, the CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or directional antenna) and photographs were taken of the single wireless access point. The result of tests conducted at the central office location is depicted below in **(Exhibit E)**.

Exhibit E: Field Data for Dreamscape Communications





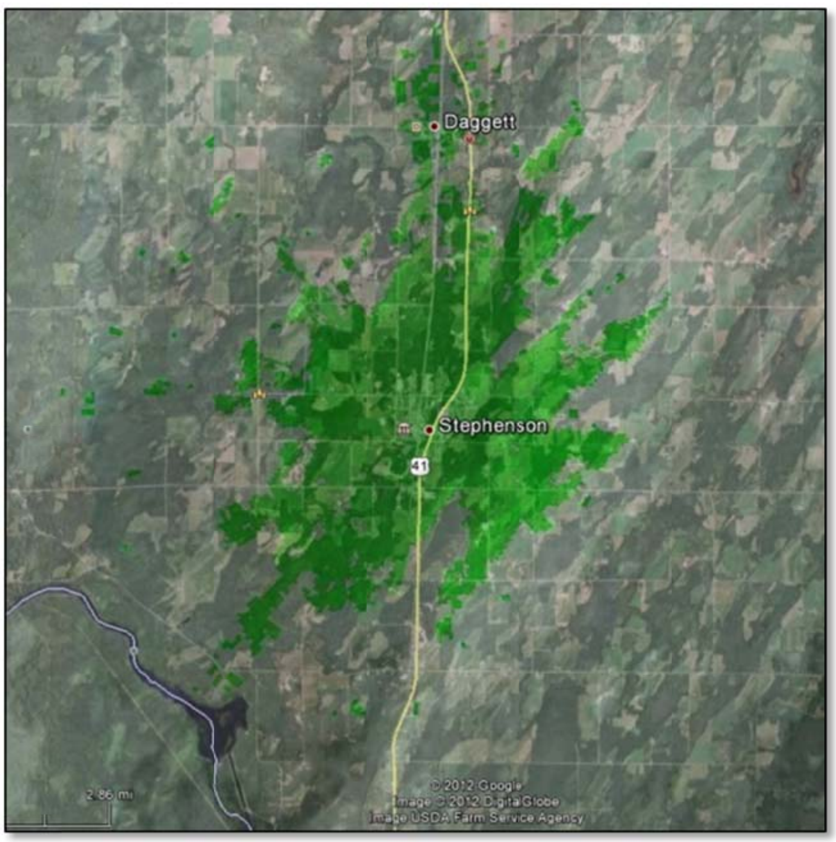
<u>Results and Submission for October 2012</u>

Through the analysis of the locations tested, two of the wireless access points were deemed "non-operational" and the single transit tower located at the central office was verified as "operational." Accordingly, relative information was logged into the Dreamscape field validation file **(Exhibit F)**. The CN engineer was able to create a composite propagation study based on the information in hand and collected during the field validation **(Exhibit G)**.

Exhibit F: Field Validation Notes

		Provider				Test Data		Signal Verification/Spectrum Analyzer			
Site #	Date	Provider	Physical Address	(N) Lat Decimal	(-)(W) Long Decimal	Type	Pass or Fail?	Peak Freq	Peak Sig Strength	Spectrum Analyzer	Time
1	7/11/12	Dreamscape Communications	US-41, Stephenson, MI	45.41802	-87.60470	Signal Verification	Pass	2458 MHz	-45	Avcom PSA-37XP	2:55 PM
1	7/11/12	Dreamscape Communications	US-41, Stephenson, MI	45.41802	-87.60470	Signal Verification	Pass	911 MHz	-60	Avcom PSA-37XP	2:49 PM
2	7/11/12	Dreamscape Communications	17.5 Ln, Wallace, MI	45.37033	-87.60941	Signal Verification	Fail				
3	7/11/12	Dreamscape Communications	CRF-342, Wallace, MI	45.32615	-87.61404	Signal Verification	Fail				

Exhibit G: Composite Propagation Study



APPENDIX B: BROADBAND PROVIDER LOG

Broadband Provider Log

Complete	180
Non-Responsive/Refused	11
In Progress	2
Count of Datasets by Status	**193**
Total Unique Providers Represented	**137**

Provider Name	Platform	Status	NDA Execution Date	Notes
Air Advantage, LLC	Fixed Wireless	Data Added to Statewide Inventory	3/15/2010	[SEP-10-12 Sarah Finne] Change and Correction: Provider supplied their own propagation coverage that includes Great Lakes Internet acquisition. They also acquired two additional WISPs: BigTube Wireless and 5 towers from 123.Net (the rest went commercial only), which have also been added to Air Advantage's total coverage.
AIRGRANT.COM, INC.	Fixed Wireless	Data Added to Statewide Inventory		[AUG-24-12 Brian Dudek] Change: Provider expanded and upgraded their fixed wireless network in Kent, Muskegon, and Newaygo counties.
AT&T Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[AUG-21-12 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission. Increased speeds to tier 5 in HSPA+ areas.
AT&T Inc.	DSL	Data Added to Statewide Inventory	12/16/2009	[AUG-27-12 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Banyan OnLine Services, LLC.	Fixed Wireless	Data Added to Statewide Inventory		[AUG-17-12 Brian Dudek] Correction: New provider for October 2012 submission that was previously non-responsive.
Big Bay Broadband, Inc	Fixed Wireless	Data Added to Statewide Inventory		[AUG-28-12 Brian Dudek] Correction: Initial submission of provider's coverage, but they were in service previously.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[AUG-06-12 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission. Increased max advertised download speed to tier 7 across the state.
Charter Communications, Inc.	Cable	Data Added to Statewide Inventory	12/15/2009	[AUG-24-12 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Comcast Cable Communications, LLC	Cable	Data Added to Statewide Inventory	12/7/2009	[SEP-06-12 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Crystal Automation Systems, Inc	Fixed Wireless	Data Added to Statewide Inventory	6/25/2010	[AUG-31-12 Brian Dudek] Change: Provider upgraded infrastructure on multiple towers, added transmission points and also removed some transmission locations.
Custom Software Inc.	Fiber	Data Added to Statewide Inventory	2/3/2010	[AUG-13-12 Brian Dudek] Change: New provider platform for the October 2012 submission.
DMCI Broadband, LLC	Fixed Wireless	Data Added to Statewide Inventory	2/3/2010	[AUG-27-12 Brian Dudek] Change: New transmission locations in operation increasing coverage in Branch, Calhoun, Hillsdale, and Jackson counties. Also disabled some other transmission points.
FNW, LLC	Fixed Wireless	Data Added to Statewide Inventory	2/12/2010	[AUG-07-12 Brian Dudek] Change/Correction: Provider upgraded infrastructure on multiple towers, but also refined coverage area and removed towers.
Frontier Communications Corporation	DSL	Data Added to Statewide Inventory	1/22/2010	[AUG-22-12 Brian Dudek] Change: Provider expanded DSL territory by adding additional remote terminals.
Hidden Lake Wireless, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/12/2010	[SEP-04-12 Brian Dudek] Change: Provider added an additional transmission point providing service to rural Cohoctah and rural Fowlerville.
I-2000, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/7/2011	[AUG-28-12 Brian Dudek] Change: Provider upgraded infrastructure on multiple towers, added five transmission points and also removed some towers.
Invisalink Wireless Enterprises LLC	Fixed Wireless	Data Added to Statewide Inventory	4/13/2010	[AUG-28-12 Brian Dudek] Change: Provider expanded coverage by adding 11 transmission points.
ISP Management, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/22/2010	[AUG-28-12 Brian Dudek] Change: Provider expanded coverage NE of Harrison and W of Rosebush by adding 6 transmission points.
Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/5/2010	[JUL-17-12 Brian Dudek] Change/Correction: Provider altered coverage SW of Three Oaks.
Lighthouse Computers, Inc.	Fixed Wireless	Data Added to Statewide Inventory	2/17/2011	[JUN-25-12 Brian Dudek] Change: New fixed wireless tower in operation in Newberry with higher speed capabilities.
Lighthouse Computers, Inc.	Cable	Data Added to Statewide Inventory	2/17/2011	[JUN-22-12 Brian Dudek] Change: New cable provider for the October 2012 submission.
Martell Cable Services, Inc.	Cable	Data Added to Statewide Inventory		[JUN-21-12 Brian Dudek] Correction: Initial data submission for this provider, who has been in service previously.
MegaPath Inc.	DSL	Data Added to Statewide Inventory	2/15/2010	[AUG-30-12 Brian Dudek] Correction: Service was offered previously, but data is being submitted for the first time in the October 2012 submission.

MetaLINK Technologies, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/22/2010	[AUG-28-12 Brian Dudek] Change: Provider added two transmission points increasing coverage into Deerfield and Petersburg area. Additionally, deactivated Lyons tower from IA reducing portion of MI coverage.
MetroPCS Wireless, Inc.	Mobile Wireless	Data Added to Statewide Inventory	2/10/2012	[AUG-30-12 Brian Dudek] Change/Correction: Added coverage south of Rockford. Decreased coverage south of Schoolcraft. Increased max advertised download and upload speed tier to 4.
Network Computers, LLC	Fixed Wireless	Data Added to Statewide Inventory		[AUG-28-12 Brian Dudek] Correction: Initial submission of provider's coverage, but they were in service previously.
Newaygo County Advanced Technology Services	Fixed Wireless	Data Added to Statewide Inventory		[JUL-12-12 Brian Dudek] Change: Provider increased coverage area (W of Fremont, S of Newaygo) and modified some prior reported coverage areas. Increased maximum advertised download speed to tier 7 and upload to tier 4.
Ogden Communications, Inc.	Fixed Wireless	Data Added to Statewide Inventory	1/19/2010	[JUN-27-12 Brian Dudek] Change: New fixed wireless tower (3650) in operation increasing coverage in a number of townships.
Parish Communications	Cable	Data Added to Statewide Inventory	7/1/2010	[JUL-17-12 Brian Dudek] Change: Provider expanded cable territory in the area of Hope and Fraser. Upload speeds also increased in two other service areas.
Scott Cook, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[AUG-29-12 Brian Dudek] Change: New transmission locations in operation increasing coverage in rural areas of the towns of Petoskey and Harbor Springs.
Spacenet Inc.	Satellite	Data Added to Statewide Inventory		[SEP-04-12 Brian Dudek] Correction: Initial submission of provider's coverage, but they were in service previously.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[JUL-12-12 Brian Dudek] Change: Provider expanded mobile territory in a couple small areas.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[AUG-08-12 Brian Dudek] Change/Correction: Expansions and corrections to previous dataset; entirely new dataset provided for October 2012 submission. Expansions in S-SW Michigan.
TDS Telecommunications Corporation	DSL	Data Added to Statewide Inventory	1/27/2010	[AUG-20-12 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Verizon North Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[JUL-18-12 Brian Dudek] Change/Correction: Provider increased 3G mobile territory in the upper peninsula. Increased LTE coverage in state and refined existing LTE coverage.
ViaSat, Inc.	Satellite	Data Added to Statewide Inventory	1/8/2010	[AUG-08-12 Brian Dudek] Change: Provider added speed boundaries according to their Exede and ProPlus services.
Vision Quest Technology Solutions	Fixed Wireless	Data Added to Statewide Inventory		[AUG-02-12 Brian Dudek] Change: Provider is now participating in project and indicated additional transmission locations. As advertised, max download is now tier 7.
Vogtmann Engineering, Inc.	Fiber	Data Added to Statewide Inventory		[JUN-28-12 Brian Dudek] Correction: Initial submission of provider's coverage, but they were in service previously.
Vogtmann Engineering, Inc.	Cable	Data Added to Statewide Inventory		[JUN-28-12 Brian Dudek] Correction: Initial submission of provider's coverage, but they were in service previously.
WideOpenWest Michigan, LLC	Cable	Data Added to Statewide Inventory		[SEP-02-12 Sarah Finne] Change: WideOpenWest acquired Broadstripe, therefore their service territory has been expanded.
Conterra Ultra Broadband, LLC	Backhaul	Backhaul Provider Only Processing Complete		
MegaPath Inc.	Backhaul	Backhaul Provider Only Processing Complete	2/15/2010	
Merit Network, Inc.	Backhaul	Backhaul Provider Only Processing Complete	6/21/2010	
T-Mobile USA, Inc.	Backhaul	Backhaul Provider Only Processing Complete	1/8/2010	
TDS Telecommunications Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/27/2010	
Verizon North Inc.	Backhaul	Backhaul Provider Only Processing Complete	12/14/2009	
Blanchard Telephone Association, Inc.	DSL	Speed Only Update; Data Processing Complete	6/17/2010	[JUN-22-12 Brian Dudek] Change: Provider upgraded infrastructure and can now offer maximum speed tier 7 download speeds.
Fast-Air Internet, Inc.	Fixed Wireless	Speed Only Update; Data Processing Complete		[JUN-22-12 Brian Dudek] Change: Provider upgraded infrastructure and can now offer max advertised speeds of tier 6 download and tier 5 upload.
Hiawatha Communications, Inc.	DSL	Speed Only Update; Data Processing Complete	2/2/2010	[AUG-06-12 Brian Dudek] Change: Provider upgraded infrastructure and can now offer maximum speed tier 8 download and 5 upload.
Hiawatha Communications, Inc.	DSL	Speed Only Update; Data Processing Complete	2/2/2010	[AUG-06-12 Brian Dudek] Change: Provider upgraded infrastructure and can now offer maximum speed tier 8 download and 5 upload.
Lennon Telephone Company	Cable	Speed Only Update; Data Processing Complete	1/25/2010	[AUG-20-12 Sarah Finne] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds.
Time Warner Cable LLC	Cable	Speed Only Update; Data Processing Complete	12/21/2009	[AUG-17-12 Brian Dudek] Change: Provider upgraded infrastructure and can now offer DOCSIS 3.0 maximum speed tier 9 download in southern MI.
Bitwise Wireless, LLC	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
Dreamscape Communications	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[SEP-07-12 Brian Dudek] Correction: Estimated coverage created and submitted for non-participating provider.
2125 Cable Company, LLC	Cable	No Update to Provide	3/22/2010	
Ace Telephone Company of Michigan Inc.	DSL	No Update to Provide	1/12/2010	
Agri-Valley Communications, Inc.	Backhaul	No Update to Provide	1/22/2010	
Agri-Valley Communications, Inc.	DSL	No Update to Provide	1/22/2010	
Agri-Valley Communications, Inc.	Fixed Wireless	No Update to Provide	1/22/2010	
Agri-Valley Communications, Inc.	Mobile Wireless	No Update to Provide	1/22/2010	
AT&T Inc.	Backhaul	No Update to Provide	12/16/2009	
Azulstar, Inc.	Fixed Wireless	No Update to Provide	1/27/2010	
Baraga Telephone Company	DSL	No Update to Provide	1/14/2010	

Baraga Telephone Company	Fiber	No Update to Provide	1/14/2010	
Barry County Telephone Company	DSL	No Update to Provide		
Barry County Telephone Company	Fiber	No Update to Provide		
Barry County Telephone Company	Fixed Wireless	No Update to Provide		
Blanchard Telephone Association, Inc.	Backhaul	No Update to Provide	6/17/2010	
Block Communications, Inc.	Cable	No Update to Provide	4/12/2010	
Bloomingdale Telephone Company, Inc.	DSL	No Update to Provide	1/25/2010	
Bloomingdale Telephone Company, Inc.	Fiber	No Update to Provide	1/25/2010	
Bloomingdale Telephone Company, Inc.	Fixed Wireless	No Update to Provide	1/25/2010	
Cable America Michigan, LLC	Cable	No Update to Provide	3/9/2011	
Carr Communications, Inc.	DSL	No Update to Provide	1/15/2010	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Cherry Capital Connection, LLC	Fixed Wireless	No Update to Provide	12/28/2009	
City of Norway	Cable	No Update to Provide	3/14/2011	
Clearwire Corporation	Mobile Wireless	No Update to Provide	3/17/2011	
Climax Telephone Company	Backhaul	No Update to Provide	1/14/2010	
Climax Telephone Company	DSL	No Update to Provide	1/14/2010	
Climax Telephone Company	Fiber	No Update to Provide	1/14/2010	
Coldwater Board of Public Utilities	Cable	No Update to Provide	3/1/2010	
Crystal Automation Systems, Inc	Backhaul	No Update to Provide	6/25/2010	
Custom Software Inc.	DSL	No Update to Provide	2/3/2010	
Custom Software Inc.	Fixed Wireless	No Update to Provide	2/3/2010	
Farmers Mutual Telephone Company of Chapin, Inc.	DSL	No Update to Provide	10/26/2010	
Frontier Communications Corporation	Backhaul	No Update to Provide	1/22/2010	
Great Lakes Comnet, Inc.	Backhaul	No Update to Provide		
Hiawatha Communications, Inc.	DSL	No Update to Provide	2/2/2010	
Hiawatha Communications, Inc.	DSL	No Update to Provide	2/2/2010	
Hiawatha Communications, Inc.	Fiber	No Update to Provide	2/2/2010	
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
Interlink Computers Technology, Inc.	Fixed Wireless	No Update to Provide	3/12/2010	
Internet 123, Inc.	Backhaul	No Update to Provide		
Iron Bay Computer & Design	Fixed Wireless	No Update to Provide	1/14/2010	
Iron River Cooperative TV Antenna Corp	Cable	No Update to Provide	7/27/2010	
Kaltelco, LLC	DSL	No Update to Provide	3/5/2010	
Lennon Telephone Company	DSL	No Update to Provide	1/25/2010	
Ligonier Telephone Company, Inc.	Fixed Wireless	No Update to Provide	3/31/2010	
Mercury Network Corporation	Backhaul	No Update to Provide	3/9/2011	
Mercury Network Corporation	Fixed Wireless	No Update to Provide	3/9/2011	
Niagara Telephone Company	Backhaul	No Update to Provide	1/22/2010	
Niagara Telephone Company	DSL	No Update to Provide	1/22/2010	
Ogden Communications, Inc.	DSL	No Update to Provide	1/19/2010	
Peninsula Fiber Network, LLC	Backhaul	No Update to Provide	1/14/2010	
RACC Enterprises, LLC	Fixed Wireless	No Update to Provide		
Sand Creek Communications Company	Backhaul	No Update to Provide	3/2/2010	
Sand Creek Communications Company	DSL	No Update to Provide	3/2/2010	
Sister Lakes Cable TV	Cable	No Update to Provide		
Small Business Solutions Group L.L.C.	Fixed Wireless	No Update to Provide	7/20/2010	
SMR Communications, Inc.	Cable	No Update to Provide		
SMR Communications, Inc.	Fixed Wireless	No Update to Provide		
SonicNet, Inc	Fixed Wireless	No Update to Provide	8/4/2011	
SpeedNet, LLC	Backhaul	No Update to Provide	1/7/2010	
Springcom, Inc.	Cable	No Update to Provide	2/25/2010	
Springcom, Inc.	DSL	No Update to Provide	2/25/2010	
T2 Communications, LLC	Backhaul	No Update to Provide	3/10/2010	
The Computer Care Company, Inc.	Backhaul	No Update to Provide	3/8/2011	
The Computer Care Company, Inc.	DSL	No Update to Provide	3/8/2011	
The Computer Care Company, Inc.	Fixed Wireless	No Update to Provide	3/8/2011	
The Iserv Company, LLC	Backhaul	No Update to Provide	6/21/2010	
The Iserv Company, LLC	DSL	No Update to Provide	6/21/2010	
The Iserv Company, LLC	Fiber	No Update to Provide	6/21/2010	
Town & Country Cable and Telecommunications, LLC	Cable	No Update to Provide	6/18/2010	
Tri-County Wireless, Inc.	Fixed Wireless	No Update to Provide		[MAY-01-12 Terry Holmes] Received email from company representative stating their company declines to participate. [JUN-08-12 Terry Holmes] Received call from company representative. He acknowledged receipt of NPP report and stated we accurately captured his coverage area. He has no updates to provide at this time.
United States Cellular Corporation	Mobile Wireless	No Update to Provide	2/15/2011	
Upper Peninsula Telephone Company	DSL	No Update to Provide	1/11/2010	
US Signal Company, LLC	Backhaul	No Update to Provide	2/25/2010	
Waldron Communication Company	DSL	No Update to Provide	1/12/2010	
Waldron Communication Company	Fixed Wireless	No Update to Provide	1/12/2010	
Winn Telephone Company	DSL	No Update to Provide	6/28/2010	
Winn Telephone Company	Fiber	No Update to Provide	6/28/2010	
Winn Telephone Company	Fixed Wireless	No Update to Provide	6/28/2010	
Wyandotte Municipal Services	Cable	No Update to Provide	3/23/2010	
XO Communications, LLC	Backhaul	No Update to Provide	2/12/2010	
Allband Communications Cooperative	Fiber	No Update Provided - Use Last Submission Data	2/2/2010	
Allendale Telephone Company	DSL	No Update Provided - Use Last Submission Data	2/4/2010	
Allendale Telephone Company	Fiber	No Update Provided - Use Last Submission Data	2/4/2010	
Boardman River Communications, LLC	Cable	No Update Provided - Use Last Submission Data	2/10/2010	
Bright House Networks, LLC	Cable	No Update Provided - Use Last Submission Data	4/26/2010	
Camp Communication Services, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
CCI Systems, Inc.	Cable	No Update Provided - Use Last Submission Data	6/29/2010	
Charter Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data	12/15/2009	
CMS Internet LLC	Fixed Wireless	No Update Provided - Use Last Submission Data	3/11/2010	

Cogent Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data		
COLI, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
CSInet Internet Access Corp.	Fixed Wireless	No Update Provided - Use Last Submission Data	3/31/2010	
D&P Communications, Inc.	Cable	No Update Provided - Use Last Submission Data	3/8/2011	
D&P Communications, Inc.	Fiber	No Update Provided - Use Last Submission Data	3/8/2011	
D&P Communications, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	3/8/2011	
Daystarr Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data		
Daystarr Communications, LLC	DSL	No Update Provided - Use Last Submission Data		
Daystarr Communications, LLC	Fiber	No Update Provided - Use Last Submission Data		
Drenthe Telephone Company	DSL	No Update Provided - Use Last Submission Data	2/4/2010	
Endless Journey, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
Fourway Computer Products, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
Great Lakes High Speed, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data		
Ideal Wireless, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
KEPS Technologies, Inc.	DSL	No Update Provided - Use Last Submission Data		
KEPS Technologies, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
LakeNet LLC	Fixed Wireless	No Update Provided - Use Last Submission Data	12/27/2011	
Level 3 Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
Michigan Cable Partners Inc.	Cable	No Update Provided - Use Last Submission Data	6/18/2010	
Michwave Technologies, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	3/12/2010	
Nodin Communications, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data	4/22/2010	
Northside TV Corporation	Cable	No Update Provided - Use Last Submission Data		
Pasty.Net, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	1/6/2010	
SpeedNet, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data	1/7/2010	
Sprint Nextel Corporation	Backhaul	No Update Provided - Use Last Submission Data	1/14/2010	
Summit Digital Holdings, Inc.	Cable	No Update Provided - Use Last Submission Data		
Summit Digital Holdings, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
Tucker Communications, Inc	Fixed Wireless	No Update Provided - Use Last Submission Data	2/17/2011	
West Michigan Broadband, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data		
Westphalia Telephone Company	DSL	No Update Provided - Use Last Submission Data	1/20/2010	
Windstream Communications	Backhaul	No Update Provided - Use Last Submission Data		
Windstream Communications	Backhaul	No Update Provided - Use Last Submission Data		
Windstream Communications	DSL	No Update Provided - Use Last Submission Data		
Xyotek, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data		
Zayo Bandwidth, LLC	Backhaul	No Update Provided - Use Last Submission Data		
Zing Networks, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
Windstream Communications	DSL	Solicited Initial Data		
EarthLink Business	Backhaul	Other		[AUG-08-12 Wes Kerr] A company representative noted that they do not currently have what is necessary to accurately report this data.
M3 Wireless	Fixed Wireless	Refused to Participate		[AUG-09-12 Terry Holmes] Spoke with company representative who stated they do not want to participate.
Boardman River Communications, LLC	Fixed Wireless	Non-Responsive to Multiple Attempts	2/10/2010	In addition to numerous contact attempts made during past mapping submission periods, 4 contact attempts were made this period.
FiberTower Corporation	Backhaul	Non-Responsive to Multiple Attempts		4 contact attempts were made this period between May 2, 2012 and August 7, 2012.
Lewiston Communications	Cable	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 contact attempts were made this period.
Lynx Network Group, LLC	Backhaul	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during the last mapping submission period, 5 contact attempts were made this period.
Microtech Services, Inc.	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 contact attempts were made this period.
Mutual Data Services, Inc.	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 contact attempts were made this period.

Niagara Wireless, LLC	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to multiple contact attempts made during the last mapping submission period, 4 contact attempts were made this period.
Reliable Internet, LLC	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 contact attempts were made this period.
Sky Web Network, Inc	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 5 contact attempts were made this period.
Wireless Technology Solutions	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 contact attempts were made this period.

OFFICIAL OCTOBER 2012 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE STATE OF MINNESOTA

October 1, 2012

Table of Contents

October 1, 2012

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

As the State Broadband Designated Entity, in partnership with the Minnesota Department of Commerce, please accept this submission from Connected Nation on behalf of the state of Minnesota's State Broadband Initiative (SBI) Grant Program, known as Connect Minnesota.

The Connect Minnesota program and its collective stakeholder community continue to be faithful and energized contributors to the National Telecommunications and Information Administration's (NTIA) SBI program. Now more than ever, the significance of complete and validated data as compiled through the Federal Communications Commission's (FCC) National Broadband Map is instrumental in forging the innovation economy of the 21st century. As the Commission relies upon this unique resource to distribute monies under the Connect America Fund, through the Universal Service Fund reform, the Connect Minnesota program equally values this data in informing meaningful program interventions relating to broadband access, adoption, and use initiatives. Truly, this coordination embodies the spirit of the SBI and demonstrates the joint effort of the NTIA, FCC, state governments, industry, and non-profits like Connected Nation as it continues to serve as a key tool for the American public and policymakers. We are proud of the role that Connect Minnesota has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit broadband providers, consumers, and businesses nationwide.

The artifacts that comprise this submission should be found to be compliant with the October 1, 2012, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connect Minnesota: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area

Appendix A:	1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles
Appendix A:	1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A:	3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A:	4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A:	4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)		n/a	Accuracy and Verification Report
n/a		DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a		n/a	List of Changes and Corrections to the Dataset
n/a		n/a	Non-Participating Provider (NPP) Narratives
n/a		n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the April 2012 SBI data submission for the Connect Minnesota program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on August 9, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance
New to the semi-annual submission for October 2012 is a more robust version of the ReadMe text file. As per the template released on the Grantee Workspace on May 18, 2012, this file contains a high-level summary of the items contained within the submission, including the exact file deliverables, a description of the errors and warnings from the Check Submission report, and extraneous information of which the NTIA and other users of the dataset should be made aware.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the April 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That practice continues in this submission as technology and speed combinations are reviewed and scrutinized; any questionable information supplied by providers is reviewed more in depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

Also in this submission are narratives describing the data and coverage estimation of non-participating providers. While Connect Minnesota continues outreach to all providers prior to each submission period, the need to submit broadband service data for all providers regardless of their participation is evident as the SBI program continues into this sixth round of data submissions. The submission of this estimated broadband service area for providers that have not supplied data to Connect Minnesota is essential in being able to portray a more accurate depiction of the current broadband landscape.

In addition to the requirements mentioned above, please find this methodology paper to be inclusive of the ongoing section pertaining to industry mergers and acquisitions – specifically this section details any and all mergers or acquisitions that have taken place in Minnesota since the April 2012 submission. The intent of this updated section is to provide a better understanding of how the broadband provider landscape has changed since the last submission cycle.

This October 2012 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for approximately 97.52 percent of the Minnesota provider community, or 118 of 121 total providers. There are 115 participating providers and 3 additional non-participating providers whose estimated coverage areas have been submitted. Of the 115 participating providers, 46 supplied an update to their network or coverage area(s), while 61 have reported no change. The remaining 8 represent providers who previously supplied data but were non-responsive in the October 2012 update effort; therefore their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact record is contained herein. Of the 3 providers that are not represented in the attached datasets, one has refused to participate in the voluntary program, and 2 providers are currently in some form of progress toward data submission but were not able to submit coverage areas at the time of this submission.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connect Minnesota principals that all commercially reasonable efforts were made to account for 100 percent of the known Minnesota broadband provider community, pursuant to this semi-annual data update submission.

Connect Minnesota has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Minnesota conducts field validation efforts. To date, 89(73.55 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connect Minnesota website, (www.connectmn.org), continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connect Minnesota website encountered 5,073 unique visits during this reporting period (23,835 total to date for the life of the grant awarded on December 20, 2009). Additionally, this pronounced Web activity netted 19 broadband inquiries over this same reporting period (169 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connect Minnesota website and the Connect Minnesota interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connect Minnesota mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Minnesota to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connect Minnesota has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

In conjunction with the Minnesota Department of Commerce, outreach was conducted during this data update reporting period by Connect Minnesota to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect Minnesota website. During this reporting period Connect Minnesota has developed a number of new relationships with statewide associations such as the following:

Minnesota Department of Education
Minnesota Department of Health Rural Health Policy

Minnesota Department of Public Safety
Minnesota Health Association
Minnesota State Colleges and Universities
Minnesota's Private Colleges
Office of Rural Health and Primary Care
University of Minnesota

Building relationships with entities such as these yields a positive impact in promoting the importance of broadband connectivity at anchor institutions and participation in this data collection process. It became apparent that these relationships are beneficial to the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connect Minnesota will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connect Minnesota has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connect Minnesota is also working hard to clarify CAI information associated with wireless broadband. NTIA has requested in-depth questioning of CAI listing a wireless broadband service as their sole form of connectivity. This follow-up allows us to better understand the reason for adopting the wireless broadband service.

From our work in Minnesota, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connect Minnesota efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connect Minnesota program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Minnesota, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,

Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

DATA ACQUISITION: MINNESOTA COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this sixth reporting period of the SBI, Connect Minnesota, working in close coordination with the state of Minnesota, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connect Minnesota has continued to identify and process CAI data obtained through an ongoing statewide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connect Minnesota through Esri ArcGIS software.

Connect Minnesota continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connect Minnesota website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the state as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the state client. Connect Minnesota will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link:
http://www.surveymonkey.com/s/RFNMFVK

In addition to the survey, Connect Minnesota has developed a number of new relationships with statewide associations such as: Minnesota Department of Education, Minnesota Department of Health Rural Health Policy, Minnesota Department of Public Safety, Minnesota Health Association, Minnesota State Colleges and Universities, Minnesota's Private Colleges, Office of Rural Health and Primary Care, and University of Minnesota to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connect Minnesota will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connect Minnesota has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connect Minnesota conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect Minnesota continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect Minnesota works with the Minnesota Department of Commerce to identify existing relationships that can support CAI outreach.

Connect Minnesota has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Minnesota project as well as self-awareness of their own CAI connectivity (specifically upload and download speeds). Connect Minnesota will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the Minnesota Department of Commerce will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the state.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	3,592	3,592	3,564	703	611	155
Libraries	1,207	1,207	1,128	265	490	11
Healthcare	192	192	191	57	56	56
Public Safety	1,558	1,558	1,553	60	49	49
Higher Ed Institutions	271	271	267	83	82	83
Other Government	139	139	135	34	32	32
Other Non-Government	141	141	127	32	32	31
Total	7,100	7,100	6,965	1,234	1,352	417

During the coming months, CAI data collection will be supported by regular reporting to the Connect Minnesota team. The CAI data is proving an invaluable resource to all components of the Connect Minnesota effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on August 9, 2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.

Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the state of Minnesota.

Inventory of Deliverables, Connect Minnesota: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the state of Minnesota have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Minnesota as a polygon of the state boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development is underway at CN as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

MINNESOTA FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets and Trips;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and
- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff conducted on-site validation tests in Minnesota on the following providers: A Better Wireless NISP LLC; Ace Telephone Association; Airlink; Albany Mutual Telephone Association; Alliance Communications; Arrowhead Communications Corporation (also d.b.a. Hector Communications Corporation); Arvig Communications Systems (d.b.a. East Ottertail Telephone and ACS Communications); AT&T; Barnesville Municipal Telephone; Benton Cooperative Telephone Company; Bevcomm (also d.b.a. Blue Earth Valley Telephone Company); Bradco-WISP Inc.; Broadband Corp.; CenturyLink (formerly d.b.a. Qwest Corporation); Charter Communications; Chaska Net; Christensen Communications Company; CitEscape

Communications; City of Detroit Lakes ; City of Windom; Clear Choice; Clearwire Corporation; Cloudnet Inc.; Comcast Cable Communications LLC; Cross Lake; CTC Telecom; diversiCOM; Emily Cooperative Telephone Company; Enterpoint; Evertek Enterprises LLC; Farmers Mutual Telephone; Fibernet Monticello; Frontier Communications Corporation; FTTH Communications; Garden Valley Telephone Company; Gardonville Cooperative Telephone Association (also d.b.a. Wisper Wireless); Genesis Wireless; Granada Telephone Company; Halsted Telephone; Harmony Telephone Company; Hickory Tech Corporation (also d.b.a. IdeaOne); Info Link Wireless Inc.; Interstate Telecommunications Cooperative Inc.; Invisimax; JAB Wireless (formerly d.b.a. KeyOn Communications); Jaguar Communications; Johnson Telephone Company; Kassor and Manterville Telephone Company; Lonsdale Telephone; Loretel Systems Inc.; Mabel Cooperative Telephone Company; Manchester Hartland Telephone; Mediacom; Midcontinent Communications (d.b.a. US Cable); Mille Lacs Electric Cooperative; Minnesota Valley Telephone Company; Minnesota Valley TV Improvement Corporation; New Ulm Telecom Inc.; Nextera Communications; Northfield Wireless; Park Region Mutual Telephone (d.b.a. Otter Tail Telecom); Paul Bunyan Telephone; Pine Island Telephone Company; Polar Telcom Inc.; Red River Rural Telephone Association; River Valley Telecommunications Cooperative; Rothsay Telephone; SCI Cable; Scott Rice Telecommunications Cooperative; Sioux Valley Wireless; Sleepy Eye Telephone Company; SMBS (Southwest Minnesota Broadband Services); Southern Cablevision; Spring Grove Cooperative Telephone Company; Sprint; Starpoint Communications Inc. (d.b.a. Netpoint); TDS Telecommunications Corporation; T-Mobile USA; TotheHome; U.S. Internet Corporation (d.b.a. USI Wireless); Upsala Cooperative Telephone Company; VAL-ED Joint Venture; Verizon Communications; Western Telephone Company; Wide Open West (formerly d.b.a. Knology of the Plains); Windstream Communications (acquired Lakedale LINK); Winnebago Cooperative Telephone Association; Wolverton Telephone; and Woodstock Telephone Company.

In addition to the field verification tests that have been conducted, Connected Nation has also conducted work in the field to collect information for the non-participating providers (NPP), A Better Wireless NISP LLC, Nextera, and TotheHome which, by nature of the methodology required for this collection, are also included in the above list.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 89 companies (out of a universe of 121 viable providers) totaling 73.55 percent within the state of Minnesota. This percentage also considers the non-participating provider records submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Providers" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on August 9, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

Ace Telephone Association

Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.

Resolution: Provider website advertises 15 Mbps service; screenshot below.

If you have Ace Digital TV–Expanded package:

Ace High-speed – up to 8Mbps	**$34.95 per month**

If you have Ace High-speed by itself:

Ace High-speed (basic) – up to 1Mbps	**$39.95 per month**
Ace High-speed – up to 15Mbps	**$49.95 per month**

Arvig Communication Systems

Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.

Resolution: Provider website advertises 20 Mbps service; screenshot below.

Lightning, up to 20Mb/512Kb

- with Arvig Phone and Digital TV $79.95
- with Arvig Phone or Digital TV $85.95
- without Arvig Phone or Digital TV $154.95

Blue Earth Valley Telephone Company

Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.

Resolution: Provider website advertises 15 Mbps service; screenshot below.

Surf the Internet at speeds from 1Mb to 15Mb/second. All plans allow for multiple users at the same location, business or residential. Stop wasting time waiting for web sites and files to download and see the benefits of BEVCOMM High Speed Internet today!

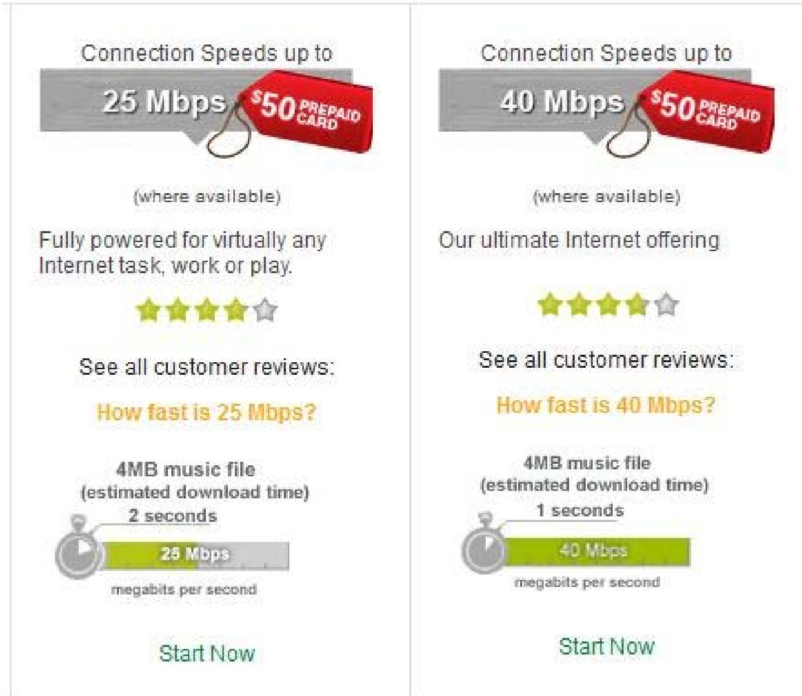
Broadband Corp

Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.

Resolution: The equipment being used for the 3650 MHz spectrum allows for 14 Mbps speeds. Provider website advertises 10 Mbps service and custom plans with higher bandwidth; screenshot below.

MAXX Premium - Up to 10mb/1mb* *Includes 100GB of usage, $1.50 per gb of over usage.*	***$99.95 per month***
Custom Service Level Agreement *Custom Plan with Performance Guarantees (call for info)*	***Starting at $199.95***

CenturyLink
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider website advertises 25 and 40 Mbps service; screenshot below.



Christensen Communications Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

CitEscape Wireless Internet, LLC
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: The documentation on the equipment being used indicates that 16.5 Mbps is achievable speed depending on the settings. Provider website advertises 10 Mbps service; screenshot below.

Plan	Download*	Upload*	Price Per month
Silver	1.5 Mbps	512 Kbps	$39.99
Gold	2.5 Mbps	768 Kbps	$49.99
Platinum**	5.0 Mbps	768 Kbps	$69.99
Ruby**	7.5 Mbps	1 Mbps	$89.99
Titanium**	10 Mbps	1.5 Mbps	$129.99

Clara City Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Confirmed with provider that 12 Mbps service is available, but speeds are not advertised.

Crosslake Telephone Company
Issue: Technology of transmission 40 with maximum advertised download speed in tier 7, lower than expected value range for the technology.
Resolution: Provider representative indicated that DOCSIS 3.0 has been installed, but speeds across their service area have not been bumped up yet. That will occur after the connectivity to fiber backbone is complete and middle-mile bandwidth is increased.

Crosslake Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative indicated that tier 7 speeds are indeed available to all customers.

Frontier Communications of Minnesota
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

High-Speed Internet Max

With Max speeds as high as 12 Mbps, get the reliability, security and ease of installation with Frontier's acclaimed customer service.

Garden Valley Telephone Company

Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps service; screenshot below.

Internet service is available in 100% of Garden Valley's service area, allowing access to streaming video, email, and all you favorite sites, with fast and reliable speeds up to 20 MB.

Granada Telephone Company

Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

Plan	Speed	Monthly Fee
Basic	1 Mb	$74.95
Silver	5 Mb	$94.95
Gold	15 Mb	$114.95

Hiawatha Broadband Communications, Inc.

Issue: Technology of transmission 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below.

Digital Value: $114.84/month

TV –	Internet –	Phone –
Expanded Plus Lineup	25 Mbps	Local Service
Music Choice	6 E-mails	60 min. Long Distance
VOD (Where Available)	100 MB Server Space	2 Features
	SpamCu s	

Hickory Tech Corporation

Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps service; screenshot below.

Plans:	Lite	Prime	Pro	Premium
Download Speeds:	1 Mbps*	6 Mbps*	9 Mbps*	20 Mbps*
Emails:	5	5	5	5
Web Space:	20 MB	30 MB	40 MB	50 MB

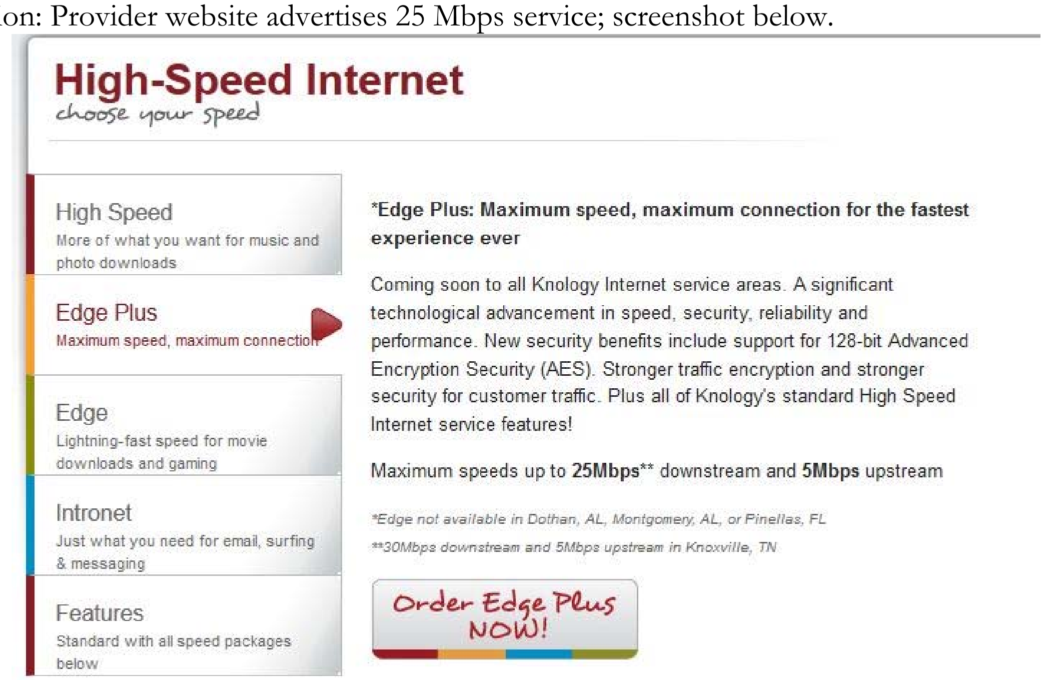
Hutchinson Telecommunications, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

10 Mbps	$66.95
10 Mbps + NU-Basic TV	$82.90
10 Mbps + NU-Entertainment TV	$103.90
10 Mbps + NU-Variety TV	$116.90

InvisiMax, Inc.
Issue: Fixed wireless platform with maximum advertised download and upload speeds in tier 7, higher than expected value range for the technology.
Resolution: Provider confirmed that tier 7 download and upload speeds are indeed available.

Jaguar Communications
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative confirmed that 10 Mbps service is available.

Knology of the Plains, Inc.
Issue: Technology of transmission 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below.



MegaPath Inc.
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps and 45 Mbps service; screenshots below.

DSL service provides download speeds up to 20 Mbps over a nationwide, multi-redundant private network that optimizes performance and security. DSL is an ideal broadband solution for small and medium-sized businesses that download large files or use the Internet extensively.

For maximum connectivity at a minimum cost, there's no greater value than MegaPath Business Ethernet. Choose the bandwidth—2 Mbps up to 45 Mbps—that best fits your business' needs.

Midcontinent Communications
Issue: Technology of transmission 41 with maximum advertised download speed in tier 8, higher than expected value range for the technology.
Resolution: Provider website advertises 30 Mbps service; screenshot below.

Speed things up!

MidcoNet Xstream® Wideband 1.0

Remember the files that normally took minutes to download over a typical dial-up or DSL connection? With MidcoNet Xstream® Wideband 1.0, you've got them in just seconds! MidcoNet Xstream® Wideband 1.0 packs your computer with download speeds up to 30 Mbps and uploads up to 5 Mbps.* It's amazing speed at a very affordable price – and backed by our friendly, 24/7 customer service.

Minnesota Valley Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider confirmed that 10 Mbps service is available.

New Ulm Telecom, Inc.
Issue: Technology of transmission 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps; screenshot below.

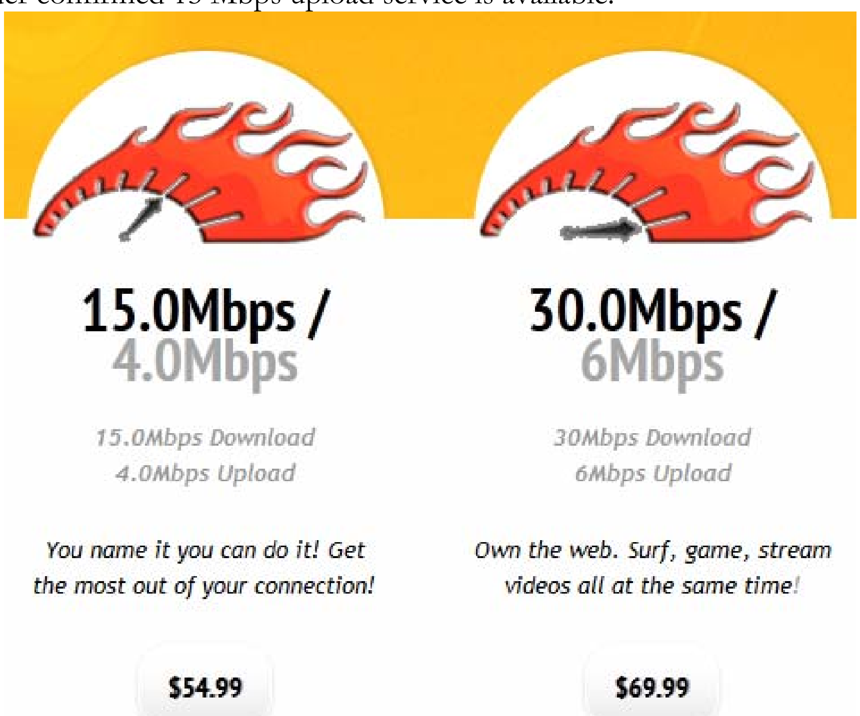
Internet Pricing

Download speeds up to 1 mbps	\$29.95
Download speeds up to 15 mbps	\$44.95
Download speeds up to 25 mbps	\$64.95

New Ulm Telecom Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

10 Mbps	$59.95
10 MBps + NU-Basic TV	$71.90
10 Mbps + NU-Entertainment TV	$104.90
10 Mbps + NU-Variety TV	$109.90

NorthfieldWiFi LLC
Issue: Fixed wireless platform with maximum advertised download speed in tiers 7 and 8, as well as maximum advertised upload speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps and 30 Mbps service; screenshot below. In addition, provider confirmed 15 Mbps upload service is available.



Park Region Mutual Telephone Company
Issue: DSL platform with maximum advertised download speed in tiers 7 and 9, higher than expected value range for the technology.
Resolution: Provider website advertises 16, 25, and up to 50 Mbps service; screenshot below.

Up to 16Mb	$59.95
Up to 25Mb	$74.95
Up to 50Mb	$149.95

Paul Bunyan Rural Telephone Cooperative
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below.

Broadband Service Plans	Fee
Up to 10 Mb	$44.95/mo.
Up to 15 Mb	$54.95/mo.
Up to 20 Mb	$64.95/mo.
Up to 25 Mb	$74.95/mo.

Pine Island Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

High Speed Internet - Residential

Plan	Speed	E-Mail Boxes	Monthly Fee
Silver DSL*	1 Mb	5	$49.95
Platinum DSL*	5 Mb	5	$59.95
Platinum Plus*	15 Mb	5	$64.95

Polar Telcom, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative indicated that tier 7 speeds are indeed available to all customers.

Radio Link Internet
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps service; screenshot below.

20 mbps down, 4 mbps up

$85.00/month

Runestone Telecom Association
Issue: DSL platform with maximum advertised download speed in tier 8, higher than expected value range for the technology.
Resolution: Provider website advertises 30 Mbps service; screenshot below.

- 15 Mbps - 20 Mbps........$68.95/month
- 25 Mbps - 30 Mbps........$78.95/month

Sacred Heart Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Confirmed with provider that 12 Mbps service is available, but speeds are not advertised.

Scott Rice Telephone Co.
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider representative confirmed that 10 Mbps service is available in some areas and 30 Mbps service is also available in some areas.

Sjoberg's Inc.
Issue: Technology of transmission 40 with maximum advertised download speed in tiers 7 and 8, lower than expected value range for the technology.
Resolution: Provider representative confirmed that 40 Mbps service is available to all customers using DOCSIS 3.0. Provider website advertises 11 Mbps and 40 Mbps service; screenshot below.

Platinum - $49.95 with cable - $56.95 without cable – (11 Meg) 11 MEG dowload/1024 upload – **

Extreme - $119.95 with cable - $126.95 without cable – (40 Meg) 40 MEG dowload/6 MEG upload – ** (only available in Roseau & Warroad)

Sleepy Eye Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

Residential Rates
Various options for Internet speeds are available.

- 256k DSL $39.95
- 2Mbps DSL $44.95
- 5Mbps DSL $59.95
- 10Mbps DSL $79.95

Southern Cablevision, Inc.
Issue: Technology of transmission 40 with maximum advertised download speed in tier 7, lower than expected value range for the technology.
Resolution: Provider representative confirmed that service area is DOCSIS 3.0, but lower speeds are still advertised and in use while customers move modems up to DOCSIS 3.0.

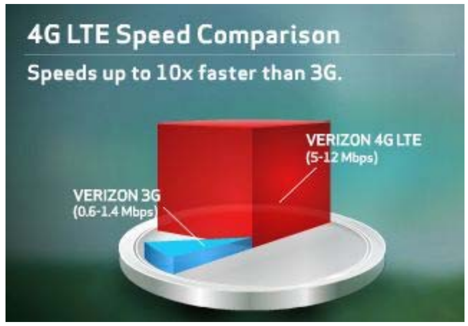
TDS Telecommunications Corporation
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

T-Mobile USA, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website confirms that service greater than speed tier 6 is available; screenshot below.

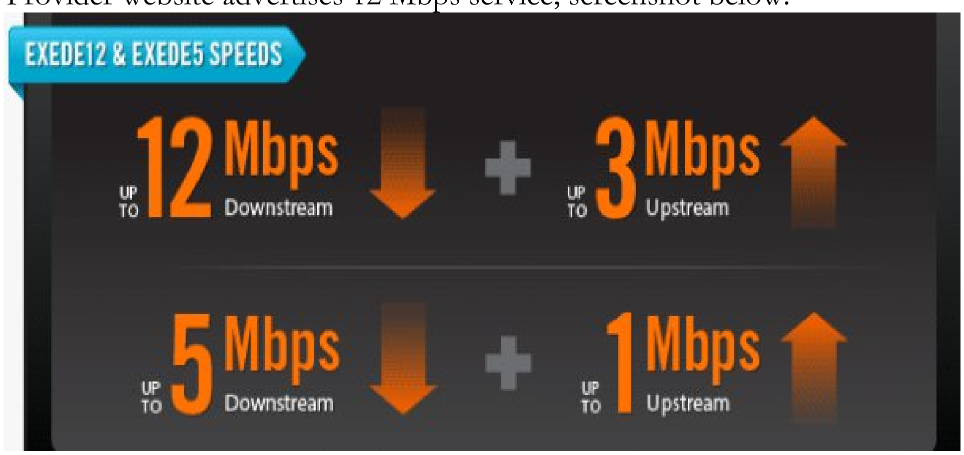
T-Mobile customers with 4G phones are already experiencing data speeds that are comparable to or faster than the speed of a home broadband network. And with recent improvements to our 4G network-doubling our theoretical download speeds-we're giving our customers enhanced 4G data speeds. We've seen average download speeds on our HSPA+ 42 Mbps-capable data stick approaching 10 Mbps with peak speeds of 27 Mbps, and download speeds approaching 8 Mbps with peak speeds of 20 Mbps on our upcoming HSPA+ 42 Mbps-capable smartphones.

VAL-ED Joint Venture, LLP
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: The equipment being used allows for 14 Mbps speeds.

Verizon Communications, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.



ViaSat, Inc.
Issue: Satellite platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.



Western Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

10 Mbps	$59.95
10 MBps + NU-Basic TV	$71.90
10 Mbps + NU-Entertainment TV	$104.90
10 Mbps + NU-Variety TV	$109.90

Wikstrom Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider confirmed that tier 7 service is available to customers that want it within the allowable distance.

Windstream Communications
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

Wolverton Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative indicated that tier 7 speeds are indeed available to all customers.

Data Submission and Coverage Estimation of Non-Participating Providers

As part of its ongoing broadband mapping efforts, CN has developed a series of processes with the goal of submitting coverage estimation mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of platform type (cable modem, DSL, fixed wireless, etc.). This state specific collection of coverage estimation methodology papers (see Appendix A) demonstrates the estimated broadband service territory for the providers in this state that have either been non-responsive or that have refused to participate in the SBI mapping initiative.

Accuracy and Verification: Provider Validation Methodology

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a statewide level, static maps of statewide and county-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Additionally, NPP narratives that were submitted in previous mapping cycles are subjected to the same level of scrutiny. Occasionally, a provider may elect to voluntarily participate (thus eliminating the need for future data estimation activities in the field). However, more often than not, the NPP narrative is updated with a combination of data gleaned from the provider's website, data obtained through FCC research and/or data collected/verified in the field by a CN staff engineer.

Estimates derived from provider-validated data indicate that approximately 2.01 percent of Minnesota households do not have terrestrial fixed broadband service available, and approximately 0.08 percent of Minnesota households have neither mobile nor fixed broadband service available.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 4.66 percent of rural Minnesota households do not have terrestrial fixed broadband service available, and approximately 0.18 percent of rural Minnesota households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard. This research often proves to be exceptionally effective when estimating the coverage area of an NPP.
6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. omni-directional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).
15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).

23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hillshade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

Broadband Inquiries Methodology

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connect Minnesota website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information requested by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at other such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,600 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connect Minnesota project has received a total of 19 inquiries (169 grant inception to date). As more inquiries are submitted to Connect Minnesota, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

My ConnectView Methodology

My ConnectView is an online, interactive mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connect Minnesota project launched My ConnectView on April 2, 2012, and has received 1,461 visits this reporting period; to date the interactive mapping applications have received 5,340 visits.

Speed Test Methodology

The 1,244 speed tests that are represented in the Connect Minnesota Speed Test Report during this reporting period (11,143 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Minnesota speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connect Minnesota project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connect Minnesota with the information on where broadband services are available. Second, unlike theoretical speed information which was received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the state of Minnesota.

Providers Deemed Non-Viable

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the October 2012 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	360networks	http://www.360networks.com/	Acquired by another company.
2	Access Media 3, Inc.	http://www.am3inc.com	Company is a bulk reseller to MDU and commercial properties.
3	Airespring, Inc.	http://www.airespring.com	Company is a nonfacilities-based reseller.
4	Akeva	n/a	Reseller of Verizon Mobile phones in mall kiosk.
5	Arrowhead Electric Cooperative, Inc.	http://www.aecimn.com/	Construction is underway; may need to indicate provider viable for April 2013 Submission.
6	Boreal Access	http://boreal.org/drupal/	Provider does not meet minimum speed requirements for participation.
7	Broadcore, Inc.	www.broadcore.com/	Broadcore is a national provider of business-class hosted unified communications services and has no ISP offerings.

8	BullsEye Telecom, Inc.	http://www.bullseyetelecom.com	Company is a nonfacilities-based reseller.
9	Carver County Fiber Initiative	www.co.carver.mn.us	Construction underway for middle mile project. Request for Bid on Equipment expected 3rd quarter 2012.
10	Cbeyond Communications, LLC	http://www.cbeyond.net/index.htm	Company is a nonfacilities-based reseller.
11	City of Bagley	http://www.bagleymn.us/	Cable system does not offer Internet service currently. City has released an RFP to get their HFC Plant upgrade to include ISP services.
12	Cloudnet Inc.	http://www.cloudnet.com	Nonfacilities-based reseller for DSL services and wireless coverage upgrading to meet minimum speed requirements. Will make viable April 2013 Submission.
13	Computer Pro Inc.	www.hickorytech.com	Company reporting data is provided by Hickory Tech.
14	Delavan Telephone Company	http://www.bevcomm.net/	Company reporting data is provided by Blue Earth Valley Telephone Company (BEVCOMM).
15	Digital Telecommunications, Inc	http://www.pickdti.com/	No longer in business.
16	Dunnell Telephone Company	http://bevcomm.net/	Provider does not meet minimum speed requirements for participation.
17	EN-TEL Communications, LLC	http://www.en-tel.com/	Acquired by another company.
18	Enventis Telecom, Inc.	http://www.enventis.com/	Provider does not offer broadband in Minnesota.
19	Global Crossing Telecommunications, Inc.	http://www.globalcrossing.com/	Acquired by another company.
20	GN Wireless	n/a	Local phone disconnected and website not located; provider no longer in business.
21	Home Telephone Company	http://www.hmtel.com	Company reporting data is provided by Arvig Communications Services.

22	Lake County Fiber Network	http://www.co.lake.mn.us/	Phase-One construction underway with service being offered as Lake Connections to select areas in late 2012. Will be Viable next submission.
23	Lakedale LINK	http://www.lakedaletelephone.com/	Acquired by another company.
24	Lakedale Telephone	http://www.lakedaletelephone.com/	Acquired by another company.
25	LightEdge Solutions, Inc.	http://www.lightedge.com	Provider does not offer residential broadband service in Minnesota.
26	Lightyear Network Solutions, LLC	www.lightyear.net	Nonfacilities-based reseller for DSL services.
27	Lowry Telephone LLC	www.home.runestone.net/rta	Company acquired by Runestone Telecom Association.
28	Maple Leaf Networks	http://www.mleaf.net/	No longer in business.
29	Merit Network, Inc.	www.merit.edu	Provider has operations in Michigan; no operations in Minnesota completed to date.
30	Metropolitan Telecommunications Holding Company	n/a	Nonfacilities-based reseller for DSL services.
31	MLM Project Services, Inc.	http://www.mlmpsinc.com	Company does not offer residential broadband service in Minnesota.
32	M-Tek Systems	www.mteksystems.com	Company does not offer residential broadband service in Minnesota.
33	Nates Net	http://www.natesnet.com/	Wireless services upgrading to meet minimum speed requirements. Will make viable April 2013 Submission.
34	New Edge Network, Inc.	http://www.newedgenetworks.com/	Nonfacilities-based backhaul reseller.
35	North American Communications Corp (NACC)	http://www.jaguarcommunications.com	Maps and data are supplied by d.b.a. Jaguar Communications.
36	Northeast Service Cooperative	http://www.nesc.k12.mn.us/	Middle mile fiber construction is underway; expect data for April 2013 submission.

37	OrbitCom, Inc.	http://www.orbitcom.biz	Reseller of Qwest Services and has been non-responsive to multiple contact attempts.
38	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company.
39	Popp.com, Inc.	http://www.popp.com/	Provider is a supplier of business services only.
40	Reliance Globalcom Services, Inc.	http://www.relianceglobalcom.com/	Wholesale reseller of backhaul and managed B2B circuits.
41	Renville-Sibley Fiber to the Farm	http://www.scfiber.com/Sibley_County_Fiber/Home.html	Fiber to the Farm project still seeking funding.
42	Ridge Runner Internet Services Inc.	http://www.ridge-runner.com/index.html	No longer in business.
43	Sihope Communications	http://www.sihope.com/	Facilities-based company offering B2B solutions and reseller of circuits (non-residential).
44	Sioux Valley Rural Television, Inc.	n/a	Company does not offer broadband services; affiliate Sioux Valley Wireless coverage and data is provided.
45	St. Olaf College Telecommunications	http://www.stolaftelephone.com/	Company does not offer broadband services.
46	Tekstar Communication Systems, Inc.	n/a	Company reporting data is provided by Arvig Communications Services.
47	Telefonica USA, Inc.	http://www.us.telefonica.com/	Provider does not offer services in Minnesota.
48	Terril Telephone Cooperative	http://www.terril.com	Provider does not offer services in Minnesota.
49	The City of Boyd, Minnesota	n/a	The City of Boyd offers cable television only over cable plant; leases cable spectrum to ISP, MVTV Wireless.
50	United States Cellular Corporation	http://www.uscellular.com/uscellular/index.jsp	Provider does not offer broadband services in Minnesota.
51	University Corporation for Advanced Internet Development	n/a	Nationwide Gbit network for anchor institutions; under construction utilizing existing fiber and new installations.

52	US Cable Corporation	http://www.uscablegroup.com/	Acquired by another company.
53	US Family Internet	http://www.usfamily.net/	Nonfacilities-based reseller of Qwest Services.
54	US Internet of Minnetonka	http://www.usiwireless.com/	Provider coverage and data is reported by d.b.a. USI Wireless.
55	Velocity Telephone, Inc.	http://www.velocitytelephone.com	Nonfacilities-based reseller of Qwest Services.
56	WilTel Communications, LLC.	n/a	As of December 23, 2005, WilTel Communications Group Inc. operates as a subsidiary of Level 3.

APPENDIX A: ESTIMATION OF NON-PARTICIPATING PROVIDERS

A Better Wireless

Nextera Communications

TotheHome.com

A BETTER WIRELESS

As part of its ongoing broadband mapping efforts, Connected Nation has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the SBI mapping initiative.

The following narrative provides detail regarding the recent data collection activities related to A Better Wireless, a wireless Internet service provider (WISP), located in Henning, MN, with a service area around Henning, Deer Creek, and Leaf Lakes. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 27 instances of communication via telephone and e-mail sessions since January 26, 2010, through August 10, 2012. Communication replies were received from a company representative on July 19, 2011, with the response of electing not to participate. Additionally, a CN staff member visited the website of A Better Wireless on August 10, 2012 and could not identify any changes to the service area or maximum advertised speeds. Additionally, a CN engineer attempted an unannounced office visit (September 21, 2011) to discuss the broadband mapping project in person with A Better Wireless staff but no one was available.

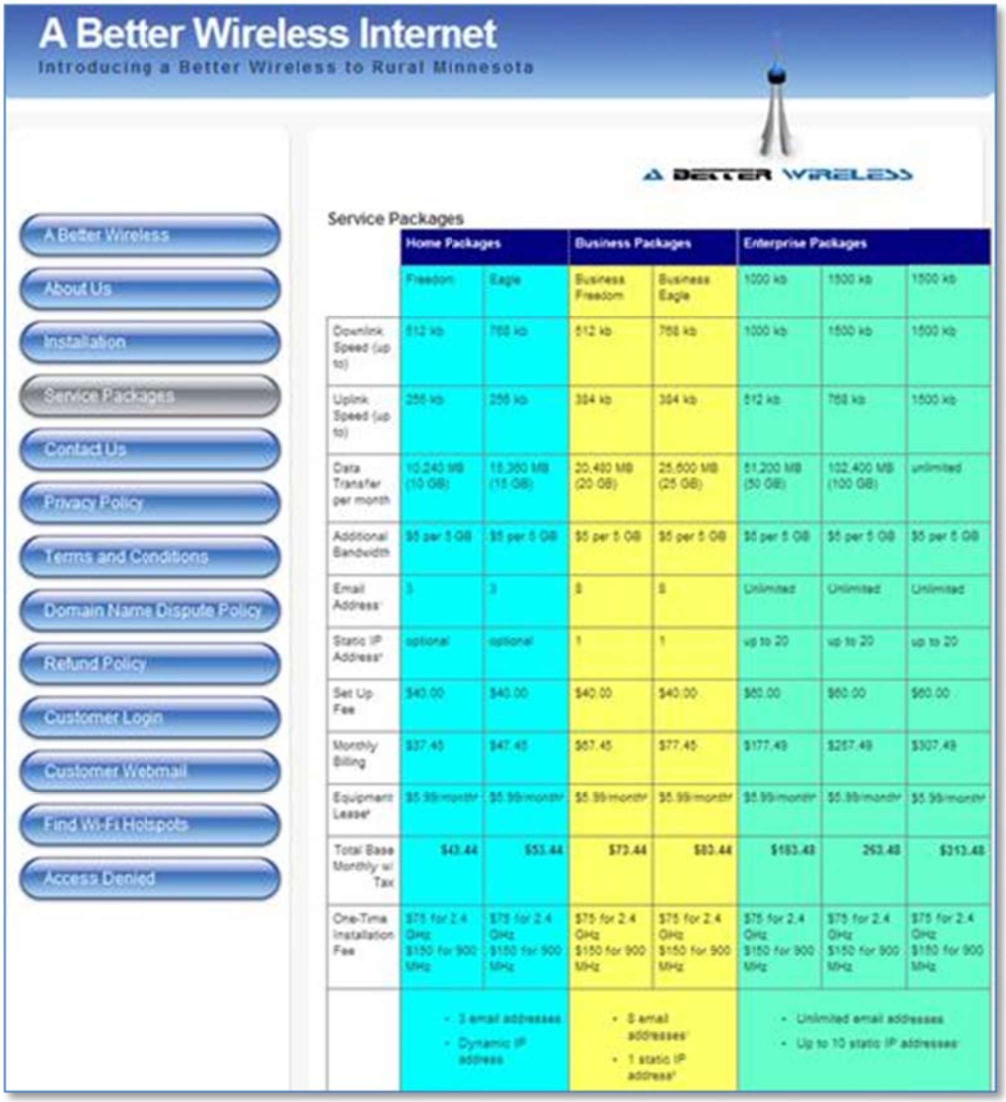
The Issue

A Better Wireless, by its lack of responsiveness since January 26, 2010, has predicated its unwillingness to participate in the Connect Minnesota broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN has built a file for this non-participating provider based on data collected through the public domain (such as the provider's website), through anecdotal discussions with citizens in the area and enriched by on-the-ground research. For example, CN reviewed the provider's website (www.abetterwireless.com) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0015093073 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced to the FCC Universal Licensing System (ULS) to identify any licenses the provider may hold which could possibly enhance locating active access points for the service area. This process yielded license WQKB862 **(Exhibit D)**, Radio Service: WQKB862 with 0 unique locations. As of August 28, 2012, a more extensive search of the FCC ULS demonstrates the variety of application amendments that have been filed by the provider and either dismissed by the FCC or set aside as inactive (see third illustration under Exhibit D).

Exhibit A: Service Plans



A Better Wireless Internet

Introducing a Better Wireless to Rural Minnesota

- A Better Wireless
- About Us
- Installation
- Service Packages
- Contact Us
- Privacy Policy
- Terms and Conditions
- Domain Name Dispute Policy
- Refund Policy
- Customer Login
- Customer Webmail
- Find Wi-Fi Hotspots
- Access Denied

A BETTER WIRELESS

Service Packages

	Home Packages		Business Packages		Enterprise Packages		
	Freedom	Eagle	Business Freedom	Business Eagle	1000 kb	1500 kb	1500 kb
Downlink Speed (up to)	512 kb	768 kb	512 kb	768 kb	1000 kb	1500 kb	1500 kb
Uplink Speed (up to)	256 kb	256 kb	384 kb	384 kb	512 kb	768 kb	1500 kb
Data Transfer per month	10,240 MB (10 GB)	15,360 MB (15 GB)	20,480 MB (20 GB)	25,600 MB (25 GB)	51,200 MB (50 GB)	102,400 MB (100 GB)	unlimited
Additional Bandwidth	$5 per 5 GB	$5 per 5 GB	$5 per 5 GB	$5 per 5 GB	$5 per 5 GB	$5 per 5 GB	$5 per 5 GB
Email Address'	3	3	5	5	Unlimited	Unlimited	Unlimited
Static IP Address'	optional	optional	1	1	up to 20	up to 20	up to 20
Set Up Fee	$40.00	$40.00	$40.00	$40.00	$60.00	$60.00	$60.00
Monthly Billing	$37.45	$47.45	$67.45	$77.45	$177.49	$257.49	$307.49
Equipment Lease'	$5.99/month'	$5.99/month'	$5.99/month'	$5.99/month'	$5.99/month'	$5.99/month'	$5.99/month'
Total Base Monthly w/ Tax	$43.44	$53.44	$73.44	$83.44	$183.48	263.48	$313.48
One-Time Installation Fee	$75 for 2.4 GHz $150 for 900 MHz	$75 for 2.4 GHz $150 for 900 MHz	$75 for 2.4 GHz $150 for 900 MHz	$75 for 2.4 GHz $150 for 900 MHz	$75 for 2.4 GHz $150 for 900 MHz	$75 for 2.4 GHz $150 for 900 MHz	$75 for 2.4 GHz $150 for 900 MHz
	• 3 email addresses • Dynamic IP address		• 5 email addresses' • 1 static IP address'		• Unlimited email addresses • Up to 10 static IP addresses'		

Exhibit B: Service Area

Exhibit C: Federal Registration Number

Registration Detail	
FRN:	0015093073
Registration Date:	05/24/2006 10:32:00 PM
Last Updated:	10/16/2009 11:27:17 AM
Business Name:	A Better Wireless, NISP, LLC
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	A Better Wireless, NISP, LLC
Contact Position:	Consultant
Contact Name:	Mr Mitchell D Koep
Contact Address:	25215 480 AVE Henning, MN 56551 United States
Contact Email:	support@abetterwireless.com
ContactPhone:	(218) 583-2234
ContactFax:	(218) 583-2234

Exhibit D: WQKB862 License Reference

ULS License - 3650-3700 MHz License - WQKB862 - A ... Page Safety

ULS License

3650-3700 MHz License - WQKB862 - A Better Wireless, NISP, LLC

New Search | Refine Search | Return to Results | Printable Page | Reference Copy | Map License

MAIN | ADMIN | LOCATIONS

Call Sign	WQKB862	Radio Service	NN - 3650-3700 MHz
Status	Active	Auth Type	Regular
Dates			
Grant	03/24/2009	Expiration	12/29/2018
Effective	03/24/2009	Cancellation	

Area of Operation: N

Operating Nationwide including Hawaii, Alaska, and US Territories.

Frequency Bands

003650.00000000-003700.00000000

Licensee

FRN	0015093073 (View Ownership Filing)	Type	Limited Liability Company

Licensee

A Better Wireless, NISP, LLC 25215 480 AVE Henning, MN 56551 ATTN Lillian Koep	P:(218)583-2234 F:(218)583-2234 E:support@abetterwireless.com

Contact

A Better Wireless, NISP, LLC 25215 480 AVE Henning, MN 56551 ATTN Lillian Koep	P:(218)583-2234 F:(218)583-2234 E:support@abetterwireless.com

3650-3700 MHz License - WQKB862 - A Better Wireless, NISP, LLC

Locations Summary

New Search | Refine Search | Return to Results | Printable Page | Reference Copy | Map License

MAIN | ADMIN | **LOCATIONS**

Call Sign	WQKB862	Radio Service	NN - 3650-3700 MHz

0 Total Locations
10 Locations per Summary Page

No Locations

0 Total Locations
10 Locations per Summary Page

MAIN | **ADMIN** | LOCATIONS

Call Sign	WQKB862	Radio Service	NN - 3650-3700 MHz

Return to Admin

Applications

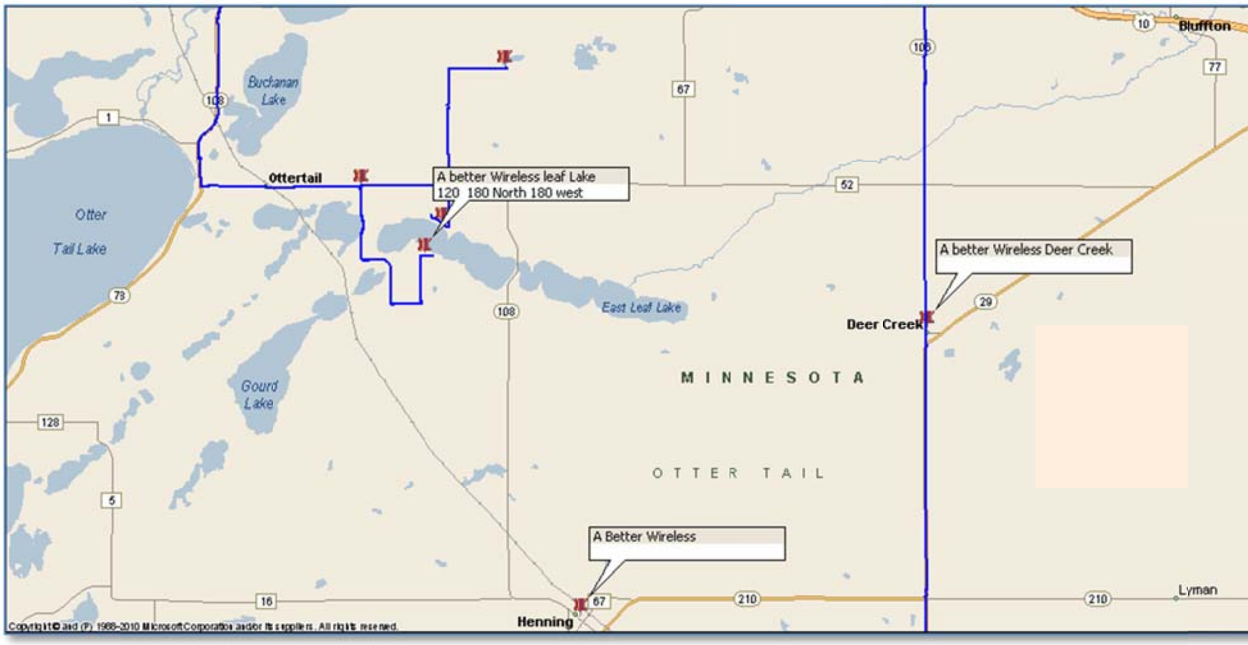
Date	File Number and Type	Status
11/10/2009	0004011785 AM - Amendment	Dismissed
11/10/2009	0004011786 AM - Amendment	Dismissed
10/28/2009	0004011786 RL - Register Link/Location	Inactive
10/28/2009	0004011785 RL - Register Link/Location	Inactive
10/28/2009	0004011784 RL - Register Link/Location	Dismissed
10/28/2009	0004011781 RL - Register Link/Location	Dismissed
10/28/2009	0004011778 RL - Register Link/Location	Dismissed
10/28/2009	0004011773 RL - Register Link/Location	Dismissed
10/28/2009	0004011772 RL - Register Link/Location	Dismissed
10/28/2009	0004011770 RL - Register Link/Location	Dismissed
10/28/2009	0004011768 RL - Register Link/Location	Dismissed
10/28/2009	0004011767 RL - Register Link/Location	Dismissed
10/28/2009	0004011766 RL - Register Link/Location	Dismissed

Preliminary Identification of Provider's Coverage Area

Connected Nation extracted the A Better Wireless service area locations from its website and the information through the FCC ULS database in reference to license WQKB862. The website service area locations were utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than 1 mile (5280 ft.) to establish a minimum search criteria of a given access point. The provider's service area depiction is represented by tower symbols as shown in **Exhibit B**. Using the coordinates determined to be center coordinates, search rings were created with the image overlay to determine the feasibility of locating the Structures to identify coordinates of the locations. The location's center coordinates were inputted into Google Earth and examined utilizing the zoom option of the aerial imagery. A portion of the Transmitting locations structures were identified. This resulted in the means of establishing coordinates for the access point locations. A site validation trip was also planned and executed to the area. All 3 locations were entered into the Microsoft *Streets and Trips* mapping application **(Exhibit F)** to develop a route for the validation process.

Exhibit E: Google Earth: Provider's Service Area Image Overlay

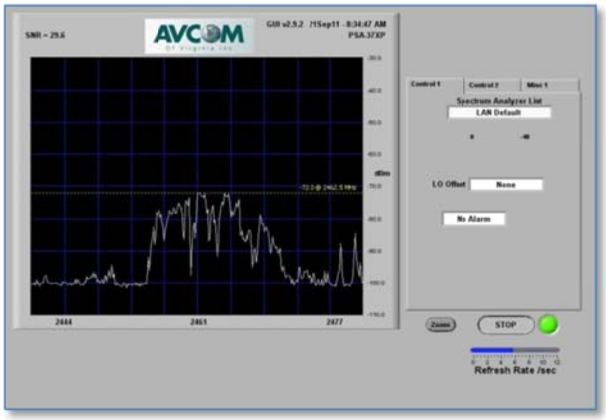
Exhibit F: Validation Points for AP Structures

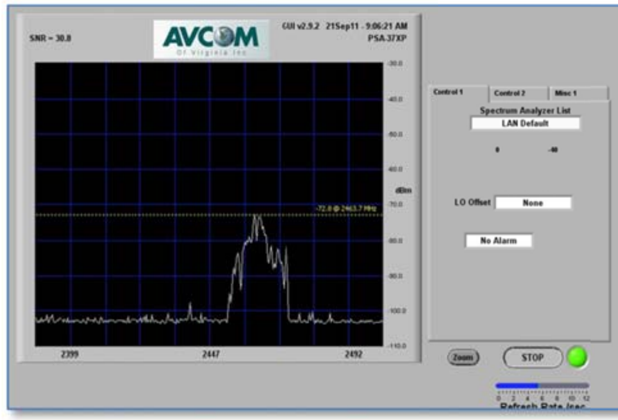


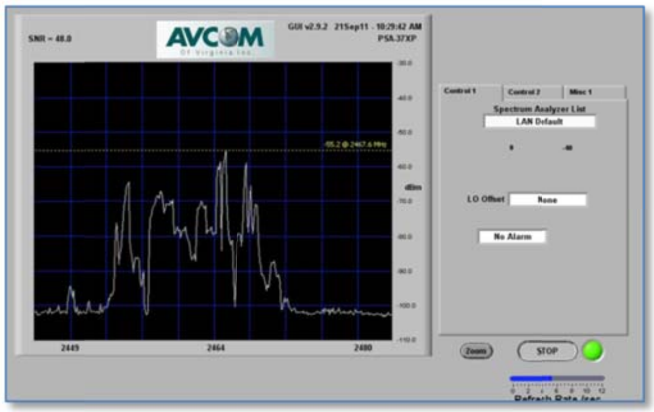
<u>Testing Techniques</u>

Connected Nation staff developed a site validation route based on data established with the Google Earth image overlay and publicly available data through the FCC ULS database for A Better Wireless WQKB862 radio service. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored), and photographs were taken of the access points.

Exhibit G: Field Data for A Better Wireless Hub Location







Provider	Area Covered	Structure type	Longitude	Latitude	Frequency Band	TX Ant Height	Notes
A Better Wireless	Henning	Water Tower	46.31916667	-95.44777778	2400 Mhz	120 feet	Ant Ht 120' Omni
A Better Wireless	Deer Creek	Water Tower	46.39138889	-95.32666667	2400 Mhz	120 feet	Ant Ht 120' Omni
A Better Wireless	Leaf Lake Area	Grain Silo's	46.41001000	-95.50138889	2400 Mhz	120 feet	120' 180 North 180 west Farm 2 silos

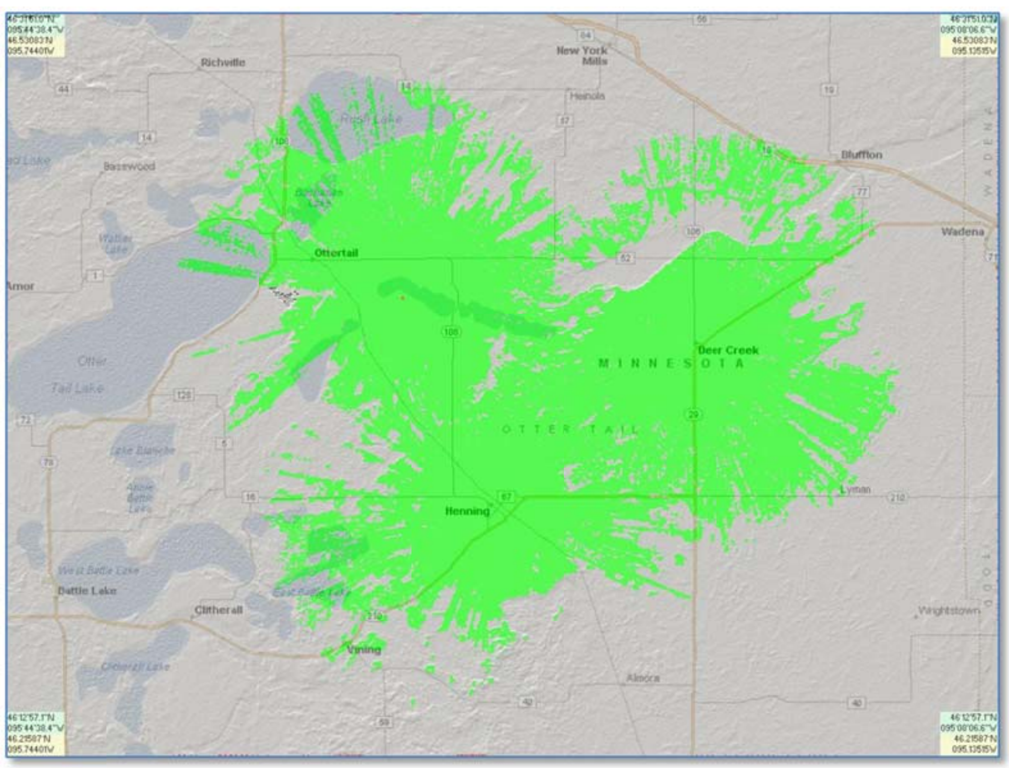
Results and Submission for October 2012

Of the 3 locations visited during the validation point route, 3 access points were identified and relative information was logged into the A Better Wireless field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the Connected Nation Provider Information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to A Better Wireless and advised the information will be submitted to Connect Minnesota and the NTIA broadband mapping project for processing if there are no discrepancies of the estimated coverage received from the provider within a 48-hour period. On August 23, 2012, a resprentative of the company responded by e-mail and, in a brief but caustic e-mail, refused to participate in this (and future) mapping cycles.

Exhibit H: Field Validation Notes

Provider		Test Site Info		Coordinates NAD 83		Platform Type		Test Data	
Provider	FRN Validation	Test City	Location Description	Lat Decimal	Long Decimal	Type	Presence Confirmed	Type	Pass or Fail?
A Better Wireless	Yes	Henning	South edge town	46.319167	-95.447778	Fixed Wireless	Yes	Signal Verification	Pass
A Better Wireless	Yes	Deer Creek	West Part of Town	46.391389	-95.326667	Fixed Wireless	Yes	Signal Verification	Pass
A Better Wireless	Yes	Leaf Lake	Leaf Lake area	46.410000	-95.501389	Fixed Wireless	Yes	Signal Verification	Pass

Exhibit I: A Better Wireless Composite Coverage



NEXTERA COMMUNICATIONS

As part of its ongoing broadband mapping efforts, Connected Nation has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) mapping program.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to Nextera Communications, a wireless Internet service provider (WISP), located in Baxter, Minnesota, with a service area around Minneapolis, St. Paul, and the surrounding areas. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation and site verification techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 27 cumulative instances of communication via telephone and e-mail messages from February 8, 2010 through August 14, 2012. Ultimately, CN flagged this provider record indicating that a coverage estimation document would like be required given the provider's unwillingness to participate. On March 16, 2010 a CN staff member visited the Nextera Communications office on to discuss the broadband mapping project in person with Nextera Communications staff, but the appropriate contact person was unavailable at the time of the visit.

The Issue

Nextera Communications, by its lack of responsiveness since February 8, 2010, has predicated its unwillingness to participate in the Connect Minnesota broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN has built a file based on research information and, as time progressed, enriched the file with information obtained through the public domain, on-the-ground site verification and data collection activities. As a starting point, CN reviewed the provider's website (http://nextera.net/) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0012927992 **(Exhibit C)** with contact information relative to the owner of the company. Recent review of the FCC CORES sites yielded additional information identifying multiple FRNs for this provider as follows: 0012927992 (Nextera Communications), 0018152579 (Nextera Holdings LLC), and 0017230699 (Nextera Wireless) as illustrated on (**Exhibit D**). Also, to support field validation of access points, these FRNs were referenced against the FCC Universal Licensing System (ULS) to identify any licenses the provider may hold which could possibly enhance locating active access points for the service area. This process yielded an FCC authorization for Stations WQLV608 (3 locations), WQIR453 (27 locations) and WQJG250 (37 locations) **(Exhibit E)**.

Exhibit A: Service Plans

NEXTERA HIGH SPEED INTERNET ACCESS

Nextera is poised and ready to act as your primary access point or to supplement your current Internet connection over our wireless backbone. As a Nextera customer, you receive carrier class service with access to three Central Offices.

Symmetrical Speed (Upload/Download)	Email Addresses Included	Scalable	1 Static IP	Price
Burstable T-1 (1.544Mbps) upload & download	10	Yes	Yes	$189 **New Customers Only!**
Burstable 3000Kbps (3.0Mbps) upload & download	10	Yes	Yes	$399 **New Customers Only!**

Exhibit B: Service Area As Submitted in April 2012

Exhibit C: Originally Identified Federal Registration Number

Registration Detail	
FRN:	0012927992
Registration Date:	03/04/2005 12:19:12 PM
Last Updated:	08/31/2009 04:36:54 PM
Business Name:	Nextera Communications
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	Nextera Communications
Contact Position:	President
Contact Name:	Mr Greg G Arvig
Contact Address:	619 Maple Street Brainerd, MN 56401 United States
Contact Email:	garvig@nextera.net
ContactPhone:	(218) 824-6400
ContactFax:	(218) 824-6401

Exhibit D: Recently Identified FRNs

FRN	Registrant	Contact	Address
0007186513	NextEra Energy Seabrook, LLC	Dunstan, Andrew F	700 Universe Blvd.
0009729534	NextEra Energy Operating Services, LLC	Dunstan, Mr. Andrew F	700 Universe Blvd, Maile Stop FEI/J8
0012927992	Nextera Communications	Arvig, Mr. Greg G	619 Maple Street
0013826037	NextEra Energy Duane Arnold, LLC	Dunstan, Mr. Andrew F	700 Universe Blvd.
0016057101	NextEra Energy Point Beach, LLC	Dunstan, Mr. Andrew F	700 Universe Blvd.
0017230699	Nextera Wireless	Arvig, Mr. Greg G	7115 Forthun Rd, Suite 100
0018152579	Nextera Holdings LLC	Arvig, Mr. Greg G	7115 Forthun Rd, Suite 100

Exhibit E: WQLV608 License Reference

MAIN | ADMIN | LOCATIONS

Call Sign	WQLV608	Radio Service	NN - 3650-3700 MHz

3 Total Locations
10 Locations per Summary Page

	Location	Latitude,Longitude	Transmitter Azimuth
1	NDT1	46-47-14.0 N, 092-06-54.0 W	45.0 degrees
2	Not Assigned	46-47-14.0 N, 092-06-54.0 W	165.0 degrees
3	Not Assigned	46-47-14.0 N, 092-06-54.0 W	285.0 degrees

3 Total Locations
10 Locations per Summary Page

MAIN | ADMIN | LOCATIONS

Call Sign	WQJG250	Radio Service	NN - 3650-3700 MHz

37 Total Locations
10 Locations per Summary Page

1 2 3 4 [Next >>]

	Location	Latitude,Longitude	Transmitter Azimuth
1	BLMN1	44-51-23.3 N, 093-19-41.6 W	45.0 degrees
2	BLMN1	44-51-23.3 N, 093-19-41.6 W	135.0 degrees
3	BLMN1	44-51-23.3 N, 093-19-41.6 W	225.0 degrees
4	BLMN1	44-51-23.3 N, 093-19-41.6 W	315.0 degrees
5	LKVN	44-42-04.5 N, 093-15-26.2 W	0.0 degrees
6	ARLK	44-38-24.5 N, 093-13-32.8 W	360.0 degrees
7	WING	44-44-02.1 N, 093-12-56.0 W	0.0 degrees
8	WING	44-44-02.1 N, 093-12-56.0 W	90.0 degrees
9	WING	44-44-02.1 N, 093-12-56.0 W	180.0 degrees
10	WING	44-44-02.1 N, 093-12-56.0 W	270.0 degrees

MAIN | ADMIN | LOCATIONS

Call Sign	WQIR453	Radio Service	NN - 3650-3700 MHz

27 Total Locations
10 Locations per Summary Page

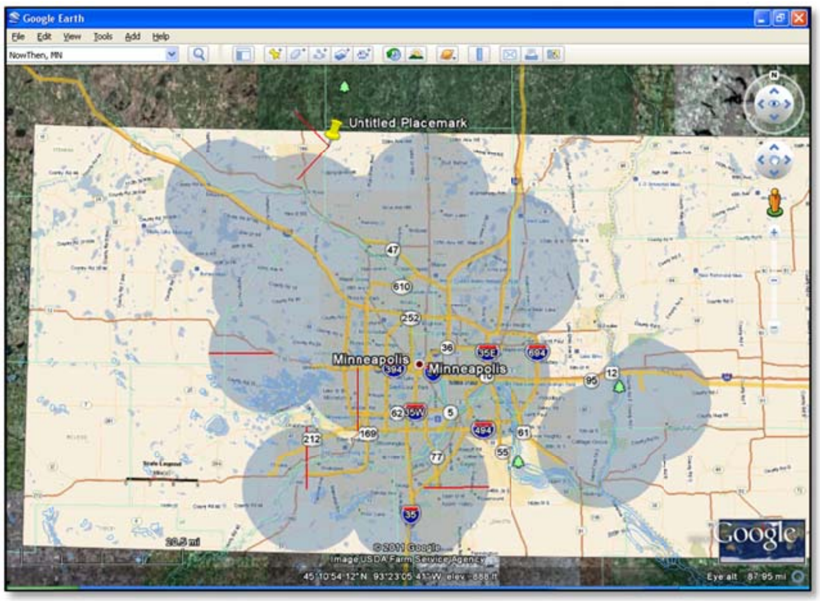
1 2 3 [Next >>]

	Location	Latitude,Longitude	Transmitter Azimuth
1	IDS	44-58-34.0 N, 093-16-21.0 W	348.0 degrees
2	Heather Hills	44-45-34.0 N, 093-15-29.0 W	180.0 degrees
3	Colonial Hills	44-45-11.5 N, 093-17-28.0 W	315.0 degrees
4	IDS	44-58-34.0 N, 093-16-21.0 W	348.0 degrees
5	IDS	44-58-34.0 N, 093-16-21.0 W	168.0 degrees
6	IDS	44-58-34.0 N, 093-16-21.0 W	168.0 degrees
7	Buck Hill Burnsville	44-43-21.5 N, 093-17-18.5 W	180.0 degrees
8	Arden Hills	45-03-47.0 N, 093-09-19.0 W	225.0 degrees
9	River Falls	44-54-10.0 N, 092-41-28.0 W	315.0 degrees
10	Interchange	44-58-31.0 N, 093-24-11.0 W	30.0 degrees

Preliminary Identification of Provider's Coverage Area

Connected Nation extracted the Nextera Communications service area map from its website. The website service area was utilized to create a Google Earth image overlay **(Exhibit F).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .2 mile (1058 ft.) to establish a minimum search criteria of a given access point. The provider's service area depiction is represented by polygons as shown in Exhibit B. Using the coordinates determined to be center coordinates a search ring was created with the image overlay to determine the feasibility of locating the towers to identifying coordinates of the locations. The centerline coordinates for the initial 16 locations displayed on the provider's website were then entered into Google Earth and examined utilizing the zoom option of the aerial imagery. Then, the data from the recently identified 3650 licenses were added to the review process. This exercise allowed the CN engineer to establish approximate coordinates for the remaining access point locations. A site validation trip was planned and executed to the area. All 16 locations were entered into the Microsoft *Streets & Trips* mapping application to develop a route for the validation process.

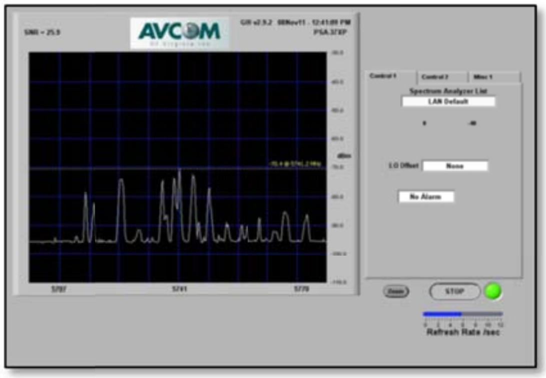
Exhibit F: Google Earth - Provider's Service Area Image Overlay

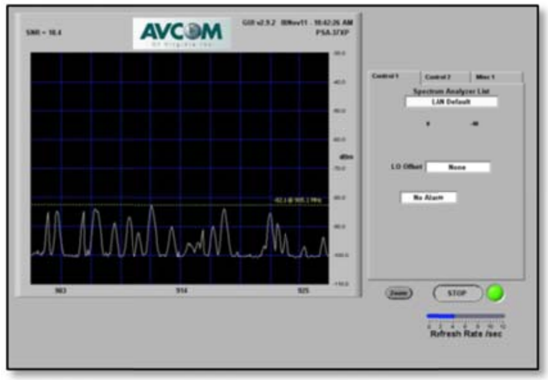


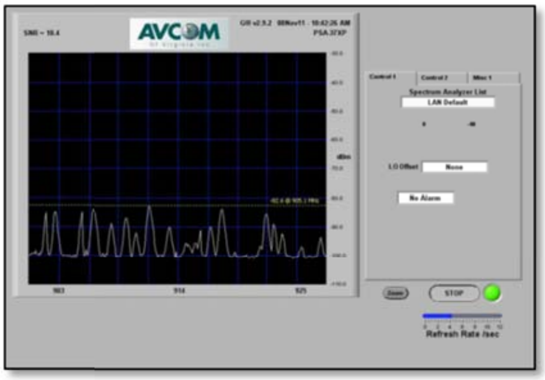
Testing Techniques

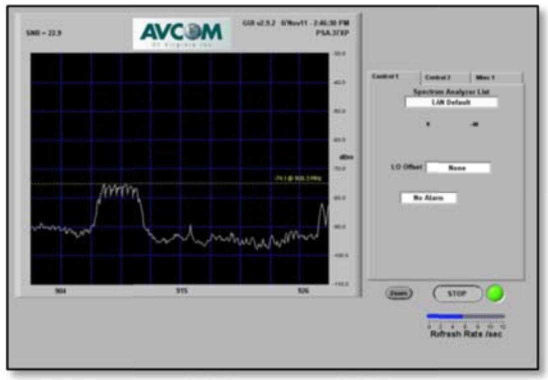
Connected Nation's staff developed a site validation route based on this original data and created a Google Earth image overlay for Nextera Communications' transmit sites. A CN wireless engineer was then dispatched into the service area equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit H)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored), and photographs were taken of the access points.

Exhibit H: Field Data for Nextera Communications









Test Site Info	Coordinates NAD 83 REQUIRED		Platform Type		Visual Confirmation		Signal Verification/Spectrum Analyzer		Notes
Test City	(N) Lat Decimal	(-)(W) Long Decimal	Type	Presence Confirmed	Type	Images	Peak Freq	Peak Sig Strength	
Monticello	45.279167	-93.768333	Fixed Wireless	Yes	Headend	Yes	914	-71	On tower Approx 220 Feet Sectors 900 Mhz
Hanover	45.124167	-93.633333	Fixed Wireless	Yes	Headend	Yes	2400	-70	On tower 280' 260 feet Sectors
Ostego	45.254722	-93.652500	Fixed Wireless	Yes	Headend	Yes	914	-65	180' 3 sectors on watertower
Maple Plain	45.003333	-93.652500	Fixed Wireless	Yes	Headend	Yes	914	-71	300' 3 sectors 900 Mhz on Tower no access
Chaska	44.751111	-93.553056	Fixed Wireless	Yes	Headend	Yes	914	-72	250' 3 sectors 900 Mhz FCC ID 1200989
Cedar	45.345140	-93.233990	Fixed Wireless	Yes	Headend	Yes	5741	-71	160' 3 sectors 5700 Mhz Tower
Hugo-LinoLakes	45.182510	-93.000900	Fixed Wireless	Yes	Headend	Yes	5742	-72	140' 3 Sectors 5750 Mhz Watertower
Hugo-WhiteBearLake	45.138579	-93.005850	Fixed Wireless	Yes	Headend	Yes	2467	-61	140' 3 sectors 900 Mhz/2400 Mhz Watertower
St Paul	44.950880	-93.096760	Fixed Wireless	Yes	Headend	Yes	2484	-74	250' 3 sectors 2400 mhz Building
Burnsville-AppleValley	44.752680	-93.291370	Fixed Wireless	Yes	Headend	Yes	914	-74	80 feet 3 sectors 900 Mhz Watertower/Tower near
Hastings-Afton	44.826990	-92.796690	Fixed Wireless	Yes	Headend	Yes	2434	-63	180 Omni 2400Mhz Tower
River Falls-Lakeland	44.902600	-92.689890	Fixed Wireless	Yes	Headend	Yes	5756	-63	200 feet 3 sectors 5700 Mhz tower
Medicine Lake	44.929770	-93.223220	Fixed Wireless	Yes	Headend	Yes	2434	-73	140' 2400 Mhz sectors Elevator
Powderhorn Park	44.937860	-93.231520	Fixed Wireless	Yes	Headend	Yes	2462	-59	180' Sectors 24090 mhz building
Ankoa	45.208130	-93.384420	Fixed Wireless	Yes	Headend	Yes	5743	-56	140' sectors 5700 Mhz tower
Spring Lake Park	45.118200	-93.231990	Fixed Wireless	Yes	Headend	Yes	5755	-64	140' Sectors' 5700 Mhz Watertower

TOTHEHOME.COM

As part of its ongoing broadband mapping efforts, Connected Nation has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the SBI program.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to TotheHome.com a wireless Internet service provider (WISP), located in Carver County, Minnesota, with a service area around Cologne. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 5 instances of communication via telephone and e-mail sessions since June 1, 2012, through August 20, 2012. None of the attempts at communication with a company representative have received a reply. Additionally, a CN staff member reviewed the TotheHome.com website on June 11, 2012, and there were no changes to the service area or the maximum advertised speeds. On August 20, 2012, a CN engineer again visited the website of TotheHome.com website and, while no changes to the service area were identified, a change was noted for the maximum advertised speeds (the maximum advertised speed listed as of April 2012 mapping submission was 2 Mbps and the current maximum advertised speed, for this October 2012 mapping submission, is listed as 3 Mbps). See comparison of website data at Exhibit A.

The Issue

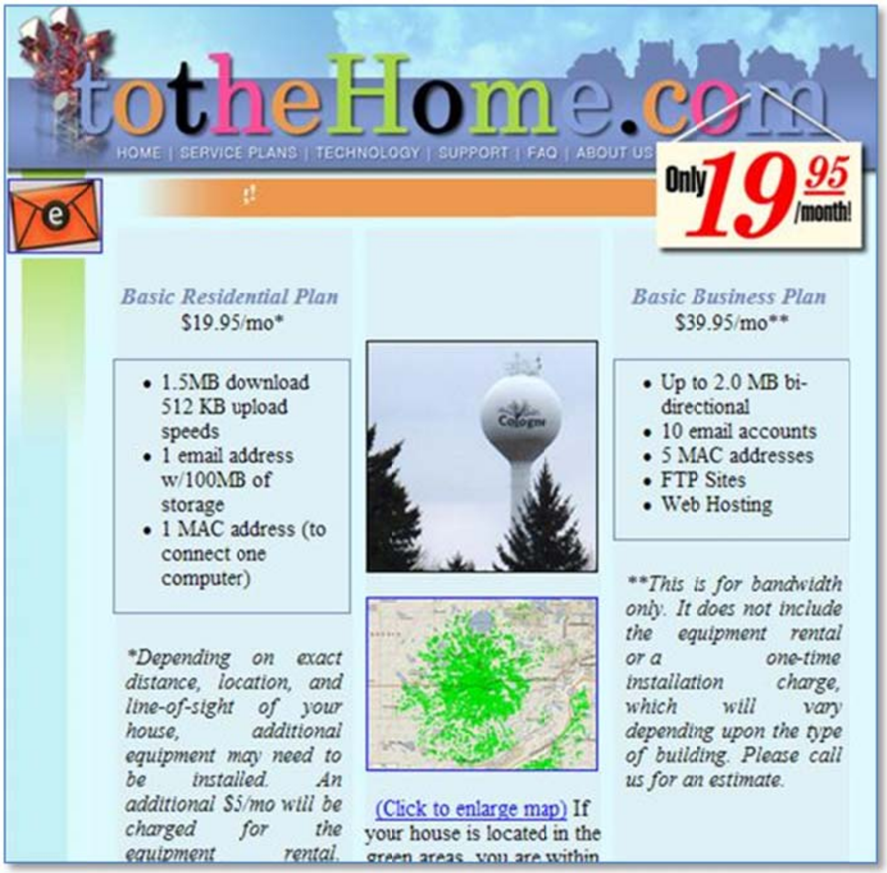
TotheHome.com, by its lack of responsiveness since June 1, 2012, has predicated its unwillingness to participate in the Connect Minnesota broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (www.tothehome.com) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0021284443 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of wireless access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any spectrum authorizations that may be held by the provider that could supplement the dataset of estimated coverage by isolating and identifying active wireless access points for the service area. This process yielded no licenses through the FCC ULS search **(Exhibit D)**.

Exhibit A: April 2012 and October 2012 Service Plans

April 2012



Pricing & Plans

Plan	Internet Only	Internet + Phone
Basic (1.5Mb/s)	$19.95/mo	$29.99/mo
Standard (3.0Mb/s)	$24.95/mo	$39.99/mo
Add-On Services: (not available in all locations)		
Online Storage(unlimited)	$2.95/mo	
Home Video Surveillance	$9.95/mo	

totheHome.com is a broadband Internet provider bringing High Speed Broadband Internet and Home Phone Service to communities through the use of the latest 4G wireless technology. These communities will be among the first in the country to receive totheHome.com's fast, affordable, reliable and local service. While other companies sell fixed-line internet service, we free communities from wires with cutting-edge wireless broadband technology. Fast and reliable service is only part of the story with totheHome.com. Residents will also be able to take advantage of totheHome.com's innovative Wi-Fi technology.

totheHome.com can save customers hundreds of dollars a year with no contracts, cancellation fees or long term commitments. We offer a fast and reliable choice for High Speed Wireless Internet at a lower price than other cable and DSL providers. totheHome.com's high speed wireless Internet covers rural areas and provides service that is portable within coverage areas.

totheHome.com is so confident of their fast and reliable service that they offer a 30-day Money back guarantee. Customers can download music, shop online and make unlimited local/long distance calls. Those who try it will lower their monthly bill. That is our bottom line.

Exhibit B: Service Area

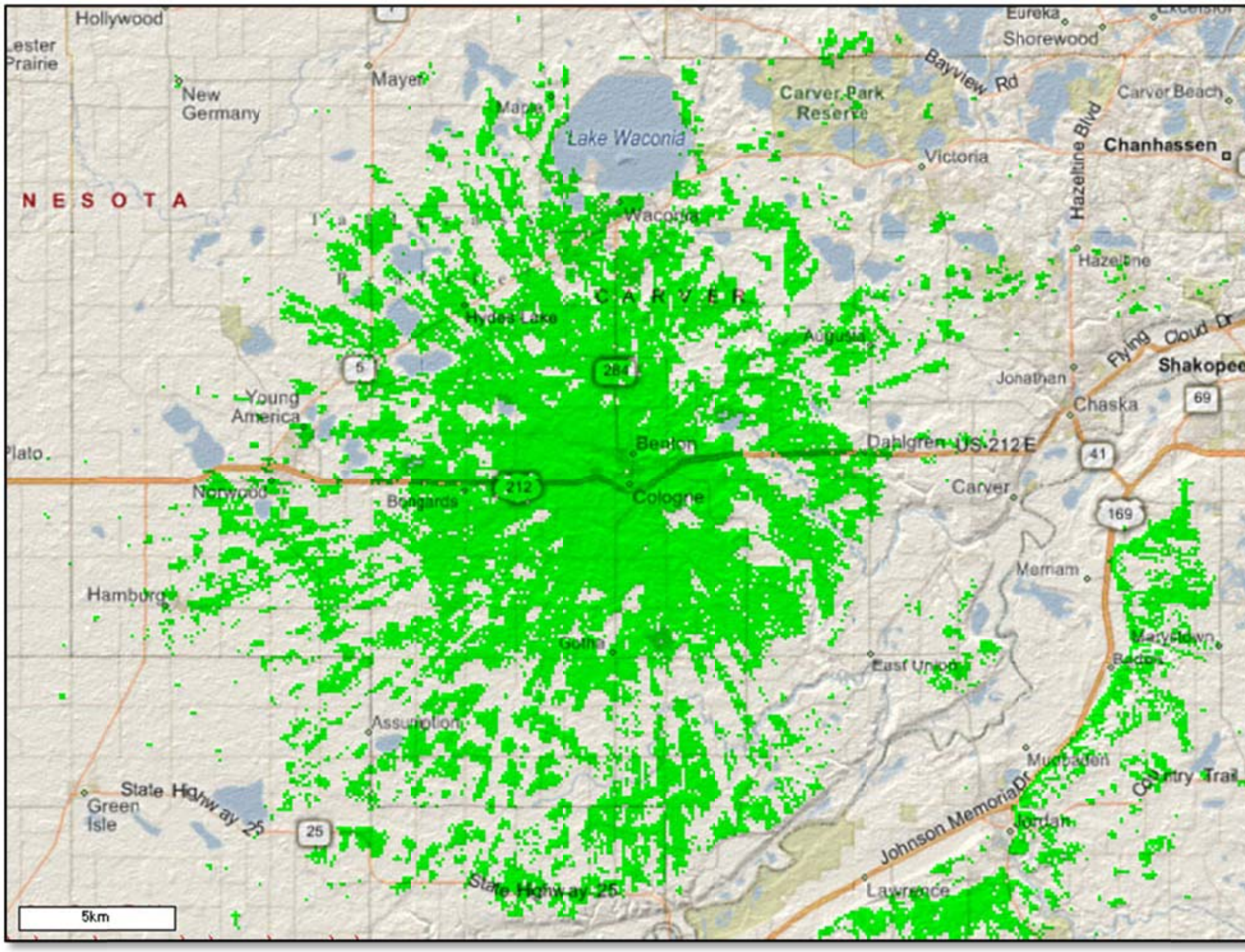
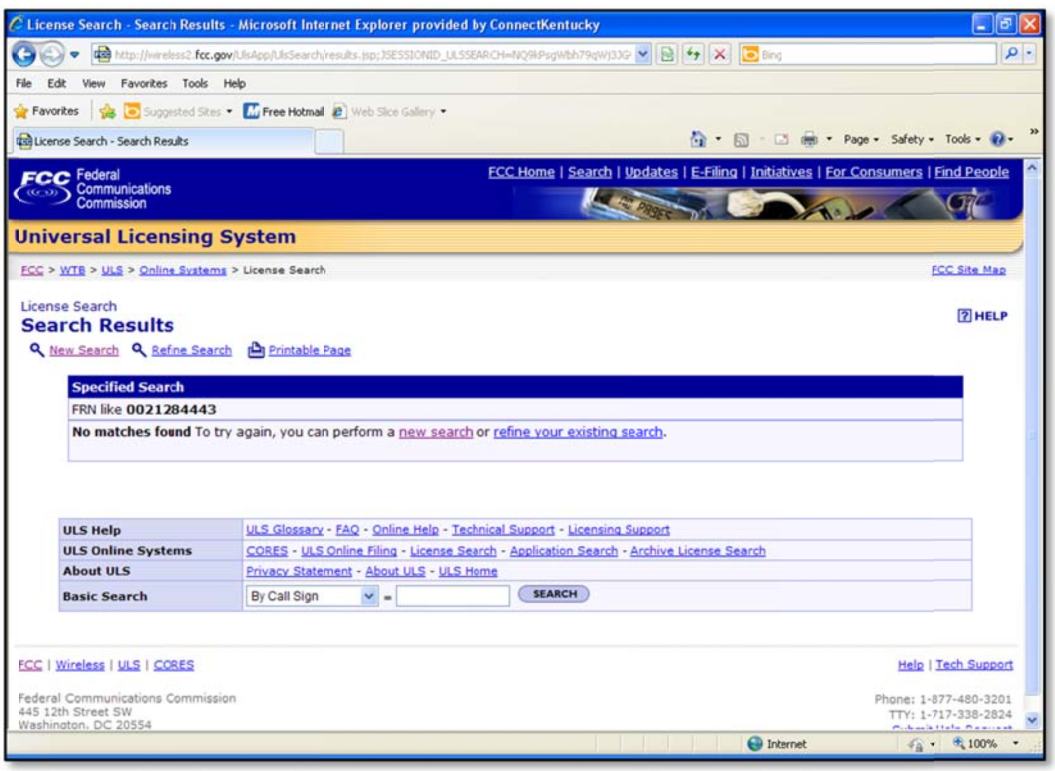


Exhibit C: Federal Registration Number

Registration Detail	
FRN:	0021284443
Registration Date:	11/11/2011 12:22:00 PM
Last Updated:	
Business Name:	totheHome.com, LLC
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	totheHome.com, LLC
Contact Position:	President
Contact Name:	Mr Shawn L Sprengeler
Contact Address:	2195 Grimm Rd Chaska, MN 55318 United States
Contact Email:	
ContactPhone:	(952) 454-0716
ContactFax:	

Exhibit D: License Search Reference


License Search - Search Results - Microsoft Internet Explorer provided by ConnectKentucky

File Edit View Favorites Tools Help

FCC Home | Search | Updates | E-Filing | Initiatives | For Consumers | Find People

FCC Federal Communications Commission

Universal Licensing System

FCC > WTB > ULS > Online Systems > License Search   FCC Site Map

License Search

Search Results   HELP

New Search   Refine Search   Printable Page

Specified Search
FRN like **0021284443**
No matches found To try again, you can perform a new search or refine your existing search.

ULS Help	ULS Glossary - FAQ - Online Help - Technical Support - Licensing Support
ULS Online Systems	CORES - ULS Online Filing - License Search - Application Search - Archive License Search
About ULS	Privacy Statement - About ULS - ULS Home
Basic Search	By Call Sign = SEARCH

FCC | Wireless | ULS | CORES   Help | Tech Support

Federal Communications Commission
445 12th Street SW
Washington, DC 20554

Phone: 1-877-480-3201
TTY: 1-717-338-2824

Internet 100%

<u>Preliminary Identification of Provider's Coverage Area</u>

CN extracted the TotheHome.com service area map directly from the provider's website. Information from that website was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .2 mile (1058 ft.) to establish a minimum search criteria of a given wireless access point. The provider's estimated service area depiction is represented by the wireless propagation model as shown in Exhibit B. The location's center coordinates were populated into Google Earth and examined utilizing the zoom option of the aerial imagery. An on-site trip was conducted in the area utilizing Microsoft *Streets & Trips* mapping application **(Exhibit F)** to develop a route for the coverage estimation and validation process.

Exhibit E: Google Earth: Provider's Service Area Image Overlay

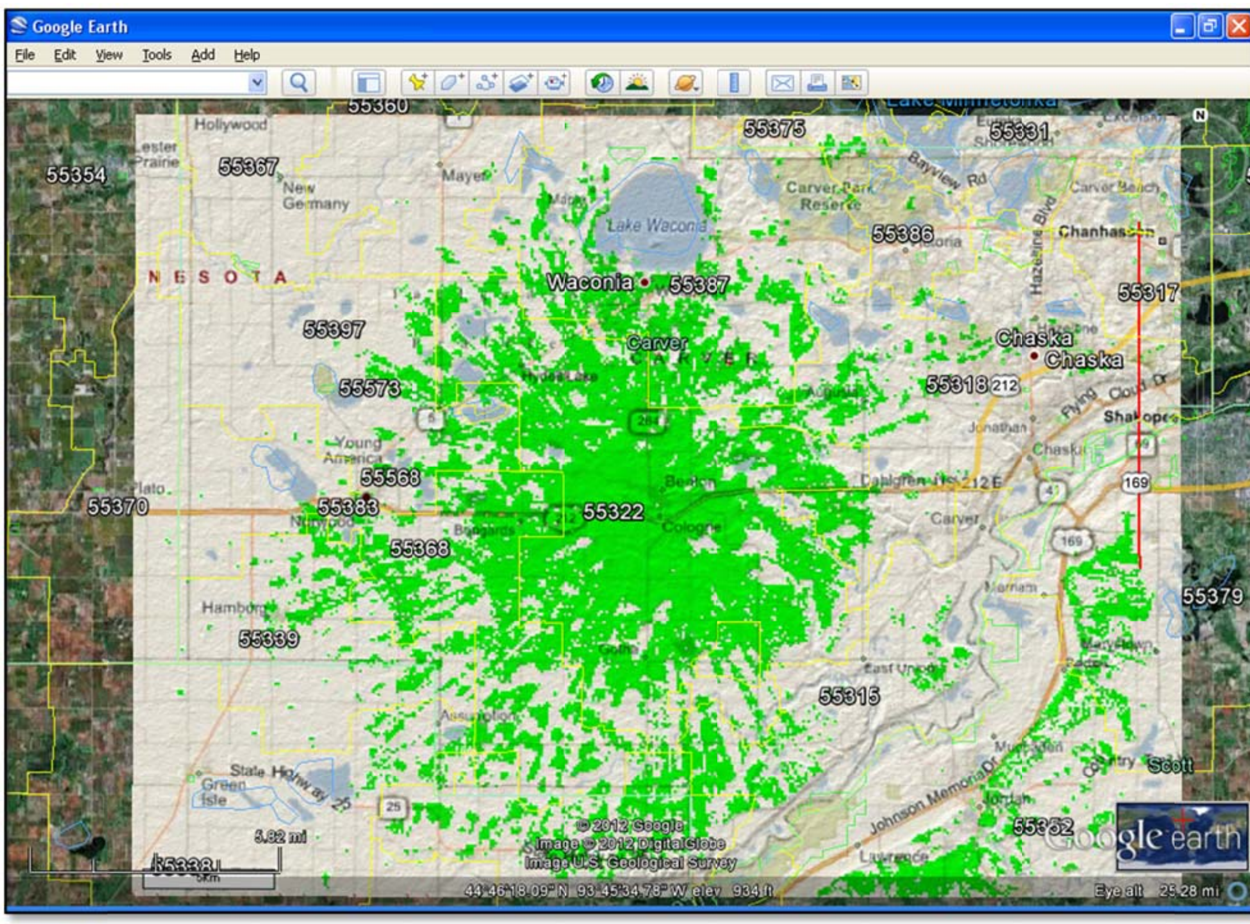
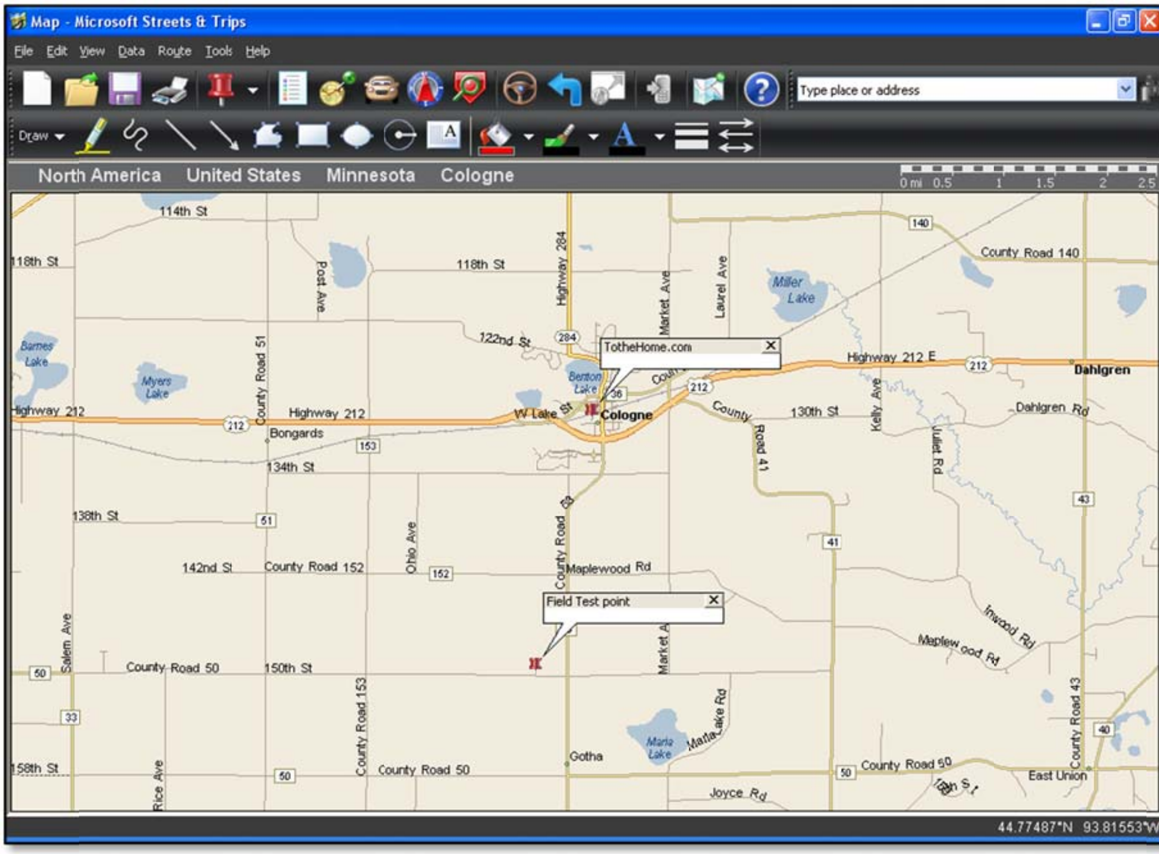


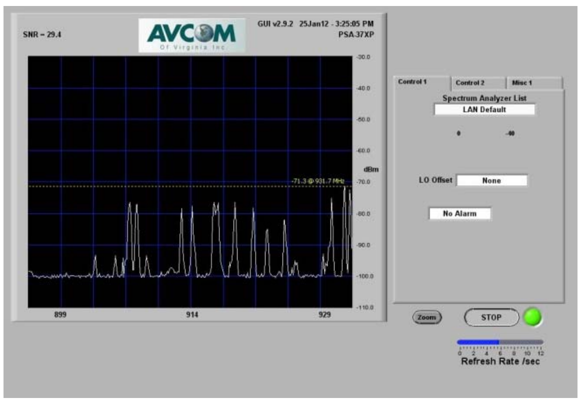
Exhibit F: Validation Points for AP Structures

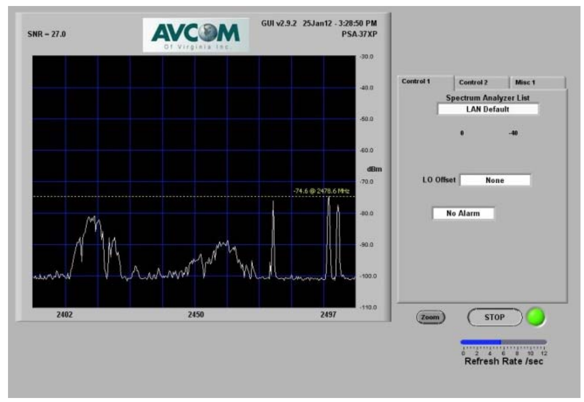


Testing Techniques

CN staff developed a data collection and site validation route based on information derived from the Google Earth image overlay and from data gleaned from the provider's website. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Two validation points were scrutinized for frequency of operation. General notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored), and photographs were taken of the access points.

Exhibit G: Field Data for TotheHome.com Hub Location





Name of Access Point/Transmission Location:	DL Speeds	UL Speeds	lat	Long	Frequency	Ant type	Antenna Height
Cologne	1.5 Mbps	512 Mbps	44.7701	-93.7829	2400	120 Deg	140 feet

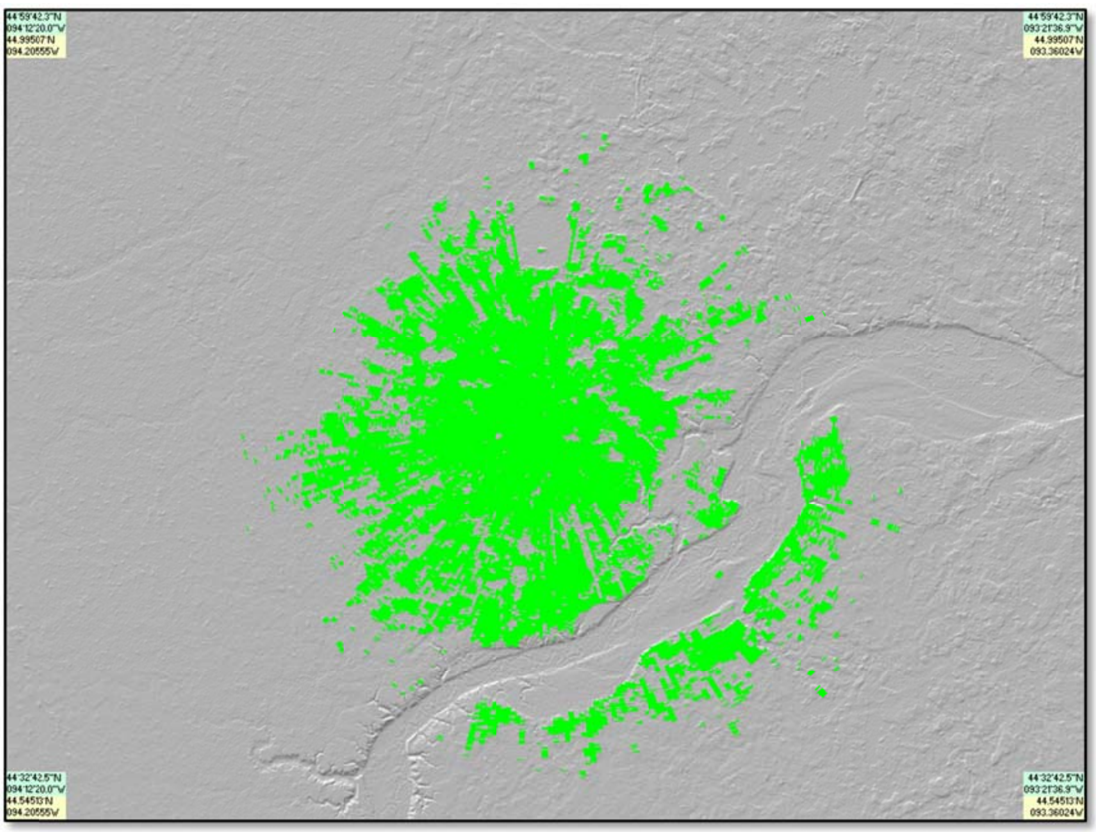
Results and Submission for October 2012

Of the 2 locations visited during the validation point route, 1 access point was identified and relative information was logged into the TotheHome field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the Connected Nation Provider Information file. A composite propagation study was completed based on the field data and goggle earth overlay information. **(Exhibit I)**. Both documents were forwarded to TotheHome.com and advised the information will be submitted to Connect Minnesota and the NTIA broadband mapping project for processing if there are no discrepancies of the estimated coverage received from the provider within a 48-hour period.

Exhibit H: Field Validation Notes

	Provider	Test Site Info							Platform Type		Test Data		Visual Confirmation		
Date	Provider	Test City	Test State	Test County	Physical Address	Location Description	Lat Decimal	Long Decimal	Type	Presence Confirmed	Type	Pass or Fail?	Type	Images	
1/25/12	TotheHome	Cologne	MN	Carver	111 Village Parkway	Security bank	44.764080	-93.783070	Fixed Wireless	Yes	Signal Verification	Pass	Wi-Fi/AP	Yes	Security Bank Parking lot
1/25/12	TotheHome	Cologne	MN	Carver	124 S Market Lane	Watertower	44.770100	-93.782900	Fixed Wireless	Yes	Signal Verification	Pass	Wi-Fi/AP	Yes	140' sectors 3 120 degree 2400 Mhz

Exhibit I: TotheHome.com Composite Coverage



APPENDIX B: BROADBAND PROVIDER LOG

Broadband Provider Log

Complete	186
Non-Responsive/Refused	2
In Progress	4
Count of Datasets by Status	**192**
Total Unique Providers Represented	**121**

Provider Name	Platform	Status	NDA Execution Date	Notes
Arvig	Fiber	Data Added to Statewide Inventory	4/20/2010	[MAY-30-12 Brian Dudek] Change: Provider has decided to move away from the diversiCOM name after purchase from Arvig Communications Systems. Provider name and DBA names have changed, but spatial data remains the same.
Arvig	Cable	Data Added to Statewide Inventory	4/20/2010	[MAY-30-12 Brian Dudek] Change: Provider has decided to move away from the diversiCOM name after purchase from Arvig Communications Systems. Provider name and DBA names have changed, but spatial data remains the same. Max advertised download speed increased to tier 6 and upload decreased to tier 2.
Arvig	DSL	Data Added to Statewide Inventory	4/20/2010	[JUN-14-12 Brian Dudek] Change: Provider expanded DSL territory in their Greenwald, Richmond and St. Martin exchanges. Now also reporting symmetrical offering.
Arvig Communication Systems	Fiber	Data Added to Statewide Inventory	2/2/2011	[JUL-18-12 Brian Dudek] Change/Correction: Provider expanded fiber territory slightly to the south of Flom. Provider indicated fiber is not present in Flom, Ogema, Osage, Waubun, and White Earth cities.
Arvig Communication Systems	DSL	Data Added to Statewide Inventory	2/2/2011	[JUL-18-12 Brian Dudek] Change: Provider removed DSL areas where fiber to the home infrastructure is in place.
AT&T Corp, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[AUG-21-12 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission. Noticeable expansion in NE Minnesota. Also increased speeds to tier 5 in HSPA+ areas.
Benton Cooperative Telephone Company	Mobile Wireless	Data Added to Statewide Inventory	6/16/2010	[AUG-24-12 Brian Dudek] Change: Provider expanded mobile territory into west Saint Stephen and Royalton.
Blue Earth Valley Telephone Company	Fiber	Data Added to Statewide Inventory	6/16/2010	[JUN-12-12 Brian Dudek] Change: Provider expanded fiber territory within the towns of Blue Earth and New Prague.
Blueprint America, Inc.	Fixed Wireless	Data Added to Statewide Inventory	8/16/2012	[AUG-31-12 Brian Dudek] Correction: Initial submission of provider's coverage, but they were in service previously.
Broadband Corp	Fixed Wireless	Data Added to Statewide Inventory	5/11/2010	[AUG-08-12 Brian Dudek] Change: Provider added 5 transmission points. Coverage expanded into towns of Blomkest and Svea.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[AUG-22-12 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.

Charter Communications, Inc.	Cable	Data Added to Statewide Inventory	12/15/2009	[AUG-01-12 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
CitEscape, LLC	Fixed Wireless	Data Added to Statewide Inventory	1/25/2010	[AUG-17-12 Brian Dudek] Change: Provider added 2 transmission points. Coverage expanded into Crown, Saint Francis, and rural areas.
Comcast Cable Communications, LLC	Cable	Data Added to Statewide Inventory	12/7/2009	[AUG-17-12 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Consolidated Telephone Company	Fixed Wireless	Data Added to Statewide Inventory	3/1/2012	[JUL-11-12 Brian Dudek] Change: New fixed wireless service areas offered. Purchased from Windstream Lakedale Inc.
Fallsnet	Fixed Wireless	Data Added to Statewide Inventory		[AUG-09-12 Brian Dudek] Change: Provider added an additional transmission point to cover rural Little Falls. Increased maximum advertised upload speed to tier 3.
Federated Telephone Cooperative	Fiber	Data Added to Statewide Inventory	4/1/2010	[MAY-11-12 Brian Dudek] Change: Provider expanded fiber coverage in two exchanges. Completed fiber rollout in Morris exchange and rural Appleton exchange.
Frontier Communications of Minnesota, Inc.	DSL	Data Added to Statewide Inventory	1/22/2010	[AUG-13-12 Brian Dudek] Change/Correction: Provider expanded DSL territory by adding additional remote terminals. Also fixed a few locations with incorrect DSLAM coordinates.
Garden Valley Telephone Company	Fiber	Data Added to Statewide Inventory	2/17/2010	[JUL-31-12 Brian Dudek] Change: Provider expanded fiber coverage into Mentor exchange.
Garden Valley Telephone Company	DSL	Data Added to Statewide Inventory	2/17/2010	[JUL-31-12 Brian Dudek] Change: Provider converted DSL infrastructure in Mentor exchange to fiber.
Gardonville Cooperative Telephone Association	Fixed Wireless	Data Added to Statewide Inventory	2/23/2010	[AUG-16-12 Brian Dudek] Change: Gardonville Telephone purchased diversiCOM's wireless facilities operating under DBA Wisper Wireless and provides this data going forward.
Gardonville Cooperative Telephone Association	Fiber	Data Added to Statewide Inventory	2/23/2010	[AUG-09-12 Brian Dudek] Change: Provider expanded fiber territory.
Gardonville Cooperative Telephone Association	DSL	Data Added to Statewide Inventory	2/23/2010	[AUG-09-12 Brian Dudek] Change: Provider changed to asymmetrical service and converted some infrastructure to fiber.
Genesis Wireless	Fixed Wireless	Data Added to Statewide Inventory		[AUG-30-12 Brian Dudek] Change: Provider added 6 transmission locations increasing coverage in the Kroschel and Pine Lake townships. Increased max advertised download tier to 5.
Halstad Telephone Company	Fiber	Data Added to Statewide Inventory	6/16/2010	[JUL-13-12 Brian Dudek] Change: New provider platform in service for October 2012 submission.
Hutchinson Telecommunications, Inc.	DSL	Data Added to Statewide Inventory	4/14/2010	[JUL-12-12 Brian Dudek] Change/Correction: Provider now submitted symmetrical offerings for same coverage area. Reduced upload speed of asymmetrical offering to tier 3. Increased download to tier 7. Symmetrical is tier 7.
Lonsdale Telephone Company, Inc.	Fiber	Data Added to Statewide Inventory		[AUG-03-12 Brian Dudek] Change: Provider increased fiber territory to the entire Lonsdale exchange that was converted from prior DSL.

MegaPath Inc.	DSL	Data Added to Statewide Inventory	2/15/2010	[AUG-30-12 Brian Dudek] Correction: Service was offered previously, but data is being submitted for the first time in the October 2012 submission.
Mille Lacs Energy Cooperative	Fixed Wireless	Data Added to Statewide Inventory		[AUG-08-12 Brian Dudek] Change: Provider expanded territory with unlicensed towers primarily in Aitkin, Crow Wing, and Mille Lacs Counties.
Minnesota Valley TV Improvement Corporation	Fixed Wireless	Data Added to Statewide Inventory	4/13/2010	[JUL-17-12 Brian Dudek] Change: Provider added additional transmission points in the 3650 and BRS spectrum.
New Ulm Telecom, Inc.	DSL	Data Added to Statewide Inventory	2/25/2010	[JUL-12-12 Brian Dudek] Change/Correction: Provider now submitted symmetrical offerings for same coverage area. Reduced upload speed of asymmetrical offering to tier 3. Symmetrical is tier 7.
NorthfieldWiFi LLC	Fixed Wireless	Data Added to Statewide Inventory	2/4/2011	[AUG-21-12 Brian Dudek] Change: Provider added a transmission point expanding into Cannon Falls and Miesville. Advertising tier 8 download speeds.
Park Region Mutual Telephone Company	Fiber	Data Added to Statewide Inventory	3/18/2010	[SEP-11-12 Brian Dudek] Change/Correction: Provider indicated they needed to correct a provider name to match the corresponding Provider DBA of Ottertail Telcom. Also upgraded speed capabilities and expanded fiber into Valley Telephone exchange area.
Park Region Mutual Telephone Company	Fixed Wireless	Data Added to Statewide Inventory	3/18/2010	[SEP-11-12 Brian Dudek] Change: New provider platform that previously did not meet broadband requirements.
Park Region Mutual Telephone Company	DSL	Data Added to Statewide Inventory	3/18/2010	[SEP-11-12 Brian Dudek] Change/Correction: Provider indicated they needed to correct two of their provider names to match the corresponding Provider DBAs of Ottertail Telcom and Valley Telephone. Also upgraded speed capabilities.
Paul Bunyan Rural Telephone Cooperative	Fiber	Data Added to Statewide Inventory	6/24/2010	[JUL-25-12 Brian Dudek] Change: Provider expanded fiber territory in and around Grand Rapids.
Paul Bunyan Rural Telephone Cooperative	DSL	Data Added to Statewide Inventory	6/24/2010	[JUL-25-12 Brian Dudek] Change: Provider expanded DSL territory in and around Grand Rapids.
Polar Telcom, Inc.	Fiber	Data Added to Statewide Inventory	2/11/2010	[AUG-20-12 Brian Dudek] Change: New provider platform for the October 2012 submission.
Polar Telcom, Inc.	DSL	Data Added to Statewide Inventory	2/11/2010	[AUG-20-12 Brian Dudek] Change: Provider converted some infrastructure over to fiber.
Radio Link Internet	Fixed Wireless	Data Added to Statewide Inventory		[AUG-07-12 Brian Dudek] Correction: Initial submission of provider coverage, but they have been in service previously.
RRC Net	Fixed Wireless	Data Added to Statewide Inventory		[AUG-09-12 Brian Dudek] Change: New provider for October 2012 submission that previously did not reach broadband speeds.
Runestone Telecom Association	Fiber	Data Added to Statewide Inventory	4/14/2010	[JUN-12-12 Brian Dudek] Change/Correction: Provider expanded fiber territory and increased maximum speed to tier 8. Provider corrected coverage related to issues with past CAD files.

Runestone Telecom Association	DSL	Data Added to Statewide Inventory	4/14/2010	[JUL-03-12 Brian Dudek] Change/Correction: Provider's expanded fiber territory affected their DSL territory. Increased maximum download speed to tier 8. Provider corrected coverage related to issues with past CAD files.
Savage Communications Inc.	Cable	Data Added to Statewide Inventory	2/19/2010	[JUL-31-12 Brian Dudek] Change: Provider expanded cable territory to the east of the town of Hinckley.
Scott Rice Telephone Co.	Fiber	Data Added to Statewide Inventory	2/15/2010	[JUN-14-12 Brian Dudek] Change: Provider increased fiber territory slightly.
Sjoberg's Inc.	Cable	Data Added to Statewide Inventory	12/21/2009	[JUL-03-12 Brian Dudek] Change/Correction: Provider expanded cable coverage into Red Lake Falls. Speeds increased to tier 8 download, tier 6 upload in Thief River Falls, Warren, and Viking. Corrected speeds in Warroad and Roseau as indicated by provider.
Spacenet Inc.	Satellite	Data Added to Statewide Inventory		[SEP-04-12 Brian Dudek] Correction: Initial submission of provider's coverage, but they were in service previously.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[JUL-12-12 Brian Dudek] Change: Provider expanded mobile territory in multiple regions.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[AUG-09-12 Brian Dudek] Change/Correction: Expansions and corrections to previous dataset; entirely new dataset provided for October 2012 submission. Expansions in Morrison County and the town of Emily.
TDS Telecommunications Corporation	Fiber	Data Added to Statewide Inventory	1/27/2010	[AUG-20-12 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
TDS Telecommunications Corporation	DSL	Data Added to Statewide Inventory	1/27/2010	[AUG-20-12 Brian Dudek] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Verizon Communications, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[JUL-18-12 Brian Dudek] Change: Provider increased 3G mobile territory in SW Minnesota. Increased LTE coverage in state from Albany west to Alexandria.
ViaSat, Inc.	Satellite	Data Added to Statewide Inventory	1/8/2010	[AUG-08-12 Brian Dudek] Change: Provider altered speed boundaries significantly according to their Exede and ProPlus services.
Western Telephone Company	DSL	Data Added to Statewide Inventory	4/14/2010	[JUL-12-12 Brian Dudek] Change/Correction: Provider now submitted symmetrical offerings for same coverage area. Reduced upload speed of asymmetrical offering to tier 3. Symmetrical is tier 7.
Wolverton Telephone Company	Fiber	Data Added to Statewide Inventory	6/22/2010	[AUG-20-12 Brian Dudek] Change: New provider platform for the October 2012 submission.
Wolverton Telephone Company	DSL	Data Added to Statewide Inventory	6/22/2010	[AUG-20-12 Brian Dudek] Change: Provider converted some infrastructure over to fiber.
TDS Telecommunications Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/27/2010	
Verizon Communications, Inc.	Backhaul	Backhaul Provider Only Processing Complete	12/14/2009	
HomeTown Solutions LLC	Fiber	Speed Only Update; Data Processing Complete	4/1/2010	[MAY-11-12 Brian Dudek] Change: Provider increased maximum advertised download/upload speed to tier 8.

Minnesota Valley Telephone Company	DSL	Speed Only Update; Data Processing Complete	4/29/2010	[JUL-24-12 Brian Dudek] Change: Provider increased download and upload speeds in their four exchanges covering MN Valley Telephone and Winthrop Telephone.
Rothsay Telephone Company Inc.	DSL	Speed Only Update; Data Processing Complete	2/18/2010	[AUG-08-12 Brian Dudek] Change: Provider increased maximum advertised upload speed to tier 3 in entire exchange.
Scott Rice Telephone Co.	DSL	Speed Only Update; Data Processing Complete	2/15/2010	[JUN-14-12 Brian Dudek] Change: Provider increased maximum advertised download and upload speeds within their existing service area.
A Better Wireless, NISP, LLC	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
tothehome.com, LLC	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
Nextera Communications	Fixed Wireless	Updated-Estimated Coverage Submitted for Non-Participating Provider		[AUG-30-12 Brian Dudek] Change: Received word that the provider launched 3650 sites. Connected Nation estimated coverage for this provider.
Ace Telephone Association	Backhaul	No Update to Provide	8/3/2010	
Ace Telephone Association	DSL	No Update to Provide	8/3/2010	
AirLink Broadband, LLC	Fixed Wireless	No Update to Provide		
Albany Mutual Telephone Association	DSL	No Update to Provide	3/4/2010	
Albany Mutual Telephone Association	Fiber	No Update to Provide	3/4/2010	
Alliance Communications Cooperative, Inc.	Backhaul	No Update to Provide	3/2/2012	
Alliance Communications Cooperative, Inc.	Fiber	No Update to Provide	3/2/2012	
Arrowhead Communications Corporation	DSL	No Update to Provide	4/14/2010	
Arvig Communication Systems	Fixed Wireless	No Update to Provide	2/2/2011	
AT&T Corp, Inc.	Backhaul	No Update to Provide	12/16/2009	
Barnesville Municipal Telephone	DSL	No Update to Provide	3/4/2010	
Benton Cooperative Telephone Company	Cable	No Update to Provide	6/16/2010	
Benton Cooperative Telephone Company	Cable	No Update to Provide	6/16/2010	
Benton Cooperative Telephone Company	DSL	No Update to Provide	6/16/2010	
Benton Cooperative Telephone Company	Fiber	No Update to Provide	6/16/2010	
Blue Earth Valley Telephone Company	Cable	No Update to Provide	6/16/2010	
Blue Earth Valley Telephone Company	DSL	No Update to Provide	6/16/2010	
Cable ONE Inc.	Cable	No Update to Provide	12/7/2009	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Christensen Communications Company	Backhaul	No Update to Provide	2/2/2010	
Christensen Communications Company	DSL	No Update to Provide	2/2/2010	
City of Chaska	Fixed Wireless	No Update to Provide		[AUG-15-12 Brian Dudek] Provider has approved the Connected Nation coverage estimation from last submission; also indicated there are no updates for that estimation.
City of Detroit Lakes	Fixed Wireless	No Update to Provide	5/10/2010	
City of Windom	Fiber	No Update to Provide		
Clara City Telephone Company	DSL	No Update to Provide	2/5/2010	
Clear Choice Communications	Fixed Wireless	No Update to Provide		
Clearwire Corporation	Fixed Wireless	No Update to Provide	3/3/2010	
Clearwire Corporation	Mobile Wireless	No Update to Provide	3/3/2010	
Consolidated Telephone Company	DSL	No Update to Provide	3/1/2012	
Consolidated Telephone Company	Fiber	No Update to Provide	3/1/2012	
Consolidated Telephone Company	Fixed Wireless	No Update to Provide	3/1/2012	
Crosslake Telephone Company	Cable	No Update to Provide	6/16/2010	
Crosslake Telephone Company	DSL	No Update to Provide	6/16/2010	
Crosslake Telephone Company	Fiber	No Update to Provide	6/16/2010	
Eagle Valley Telephone Company	DSL	No Update to Provide	4/14/2010	
Emily Cooperative Telephone Company	Fiber	No Update to Provide	6/24/2010	
Enterpoint Wireless	Fixed Wireless	No Update to Provide		
Evertek Enterprises, Inc.	Fixed Wireless	No Update to Provide	6/17/2010	
Farmers Mutual Telephone Company	Fiber	No Update to Provide	4/1/2010	
Farmers Mutual Telephone Company	Fixed Wireless	No Update to Provide	4/1/2010	
Federated Telephone Cooperative	Fixed Wireless	No Update to Provide	4/1/2010	
Felton Telephone Company	DSL	No Update to Provide	4/14/2010	
Fibernet Monticello	Fiber	No Update to Provide		
Frontier Communications of Minnesota, Inc.	Backhaul	No Update to Provide	1/22/2010	
FTTH Communications	Fiber	No Update to Provide		
Granada Telephone Company	DSL	No Update to Provide	4/14/2010	
Halstad Telephone Company	DSL	No Update to Provide	6/16/2010	
Halstad Telephone Company	Fixed Wireless	No Update to Provide	6/16/2010	
Harmony Telephone Company	Fiber	No Update to Provide	1/12/2010	
Hiawatha Broadband Communications, Inc.	Cable	No Update to Provide	3/8/2010	
Hiawatha Broadband Communications, Inc.	Fiber	No Update to Provide	3/8/2010	
Hiawatha Broadband Communications, Inc.	Fixed Wireless	No Update to Provide	3/8/2010	
Hickory Tech Corporation	DSL	No Update to Provide		
Hickory Tech Corporation	DSL	No Update to Provide		
Hickory Tech Corporation	Fixed Wireless	No Update to Provide		

Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
Hutchinson Telecommunications, Inc.	Fixed Wireless	No Update to Provide	4/14/2010	
Info Link Wireless, Inc.	Fixed Wireless	No Update to Provide	4/19/2010	
Interstate Telecommunications Cooperative, Inc.	DSL	No Update to Provide	2/10/2010	
Interstate Telecommunications Cooperative, Inc.	Fiber	No Update to Provide	2/10/2010	
InvisiMax, Inc.	Fixed Wireless	No Update to Provide	2/29/2012	
Jab Wireless, Inc.	Fixed Wireless	No Update to Provide	6/14/2010	[JUL-10-12 Dwayne Goodman] Jab Wireless acquired all KeyOn Communications, Inc. assets; now becoming a broadband provider for the state.
Johnson Telephone Company	DSL	No Update to Provide		
Kasson & Mantorville Telephone Company	DSL	No Update to Provide	6/30/2010	
Lismore Cooperative Telephone Company	Fiber	No Update to Provide		
Loretel Systems, Inc.	DSL	No Update to Provide	4/14/2010	
Mabel Cooperative Telephone Company	DSL	No Update to Provide	4/7/2010	
Manchester-Hartland Telephone Company	Fiber	No Update to Provide	4/14/2010	
MegaPath Inc.	Backhaul	No Update to Provide	2/15/2010	
Midcontinent Communications	Backhaul	No Update to Provide	12/9/2009	
Midcontinent Communications	Cable	No Update to Provide	12/9/2009	
Minnesota Valley TV Improvement Corporation	Cable	No Update to Provide	4/13/2010	
New Ulm Telecom, Inc.	Cable	No Update to Provide	2/25/2010	
Pine Island Telephone Company	DSL	No Update to Provide	4/14/2010	
Red River Rural Telephone Association	DSL	No Update to Provide	3/17/2010	
Red River Rural Telephone Association	Fiber	No Update to Provide	3/17/2010	
Red River Rural Telephone Association	Fixed Wireless	No Update to Provide	3/17/2010	
River Valley Telephone Coop.	Fixed Wireless	No Update to Provide	4/28/2010	
Sacred Heart Telephone Company	DSL	No Update to Provide	2/5/2010	
Savage Communications Inc.	Backhaul	No Update to Provide	2/19/2010	
Sheehan Gas	Fixed Wireless	No Update to Provide		
Sioux Valley Rural Television, Inc.	Fixed Wireless	No Update to Provide	4/21/2010	
Sleepy Eye Telephone Company	DSL	No Update to Provide	4/14/2010	
SMBS	Fiber	No Update to Provide		
Southern Cablevision, Inc.	Cable	No Update to Provide	3/30/2010	
Spring Grove Cooperative Telephone Co.	Fiber	No Update to Provide	1/12/2010	
Starbuck Telephone Company	DSL	No Update to Provide	2/5/2010	
Starpoint Communications, Inc.	Fixed Wireless	No Update to Provide	2/18/2011	
T-Mobile USA, Inc.	Backhaul	No Update to Provide	1/8/2010	
tw telecom of minnesota, llc	Backhaul	No Update to Provide	4/20/2010	
Upsala Cooperative Telephone Association	DSL	No Update to Provide	2/29/2012	
Upsala Cooperative Telephone Association	Fiber	No Update to Provide	2/29/2012	
US Internet of Minnetoka	Fixed Wireless	No Update to Provide	2/29/2012	
VAL-ED Joint Venture, LLP	DSL	No Update to Provide	4/21/2010	
VAL-ED Joint Venture, LLP	Fixed Wireless	No Update to Provide	4/21/2010	
West Central Telephone Association	DSL	No Update to Provide	2/18/2010	
West Central Telephone Association	Fiber	No Update to Provide	2/18/2010	
Wikstrom Telephone Company	DSL	No Update to Provide	4/12/2010	
Wikstrom Telephone Company	Fixed Wireless	No Update to Provide	4/12/2010	
Winnebago Cooperative Telecom Association	Backhaul	No Update to Provide	6/17/2010	
Winnebago Cooperative Telecom Association	DSL	No Update to Provide	6/17/2010	
Winnebago Cooperative Telecom Association	Fiber	No Update to Provide	6/17/2010	
Winnebago Cooperative Telecom Association	Fixed Wireless	No Update to Provide	6/17/2010	
Woodstock Telephone Company	DSL	No Update to Provide	2/18/2010	
Woodstock Telephone Company	Fiber	No Update to Provide	2/18/2010	
XO Communications, LLC	Backhaul	No Update to Provide	2/12/2010	
Zumbrota Telephone Company	DSL	No Update to Provide	2/5/2010	
Bradco-Wisp, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
Charter Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data	12/15/2009	
Cogent Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data		
Jaguar Communications	DSL	No Update Provided - Use Last Submission Data	4/12/2010	
Jaguar Communications	Fiber	No Update Provided - Use Last Submission Data	4/12/2010	
Jaguar Communications	Fixed Wireless	No Update Provided - Use Last Submission Data	4/12/2010	
Knology of the Plains, Inc.	Cable	No Update Provided - Use Last Submission Data	7/13/2011	
Level 3 Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
Mediacom Communications Corporation	Backhaul	No Update Provided - Use Last Submission Data	1/12/2010	
Mediacom Communications Corporation	Cable	No Update Provided - Use Last Submission Data	1/12/2010	
Sprint Nextel Corporation	Backhaul	No Update Provided - Use Last Submission Data	1/14/2010	
Windstream Communications	Backhaul	No Update Provided - Use Last Submission Data		
Windstream Communications	DSL	No Update Provided - Use Last Submission Data		
Zayo Group, LLC	Backhaul	No Update Provided - Use Last Submission Data		
Access Broadband	Fixed Wireless	Solicited Initial Data		

Superior Broadband	Backhaul	Solicited Initial Data		
Windstream Communications	DSL	Solicited Initial Data		
River Valley Telephone Coop.	Mobile Wireless	Other	4/28/2010	[JUL-24-12 Brian Dudek] Provider has ownership in I-Wireless (T-Mobile) Mobile system that is currently in the process of being upgraded to 4G multi-meg services. Currently under test. Will seek to obtain data for the April 2013 submission.
Reliance Globalcom Services, Inc.	Backhaul	Refused to Participate		[JUN-08-12 Wes Kerr] A company Representative responded "no thank you" when asked if they would be participating this round.
Knology of the Plains, Inc.	Backhaul	Non-Responsive to Multiple Attempts	7/13/2011	In addition to numerous contact attempts made during past mapping submission periods, 5 contact attempts were made this period.

Submitted to:

National Telecommunications and Information Administration

Data Collection and Processing

Missouri

Broadband Data and Development

Submitted by:

GeoDecisions®
A Division of Gannett Fleming

MISSOURI

October 1, 2012

Table of Contents

1 Introduction

This document provides background for the ongoing data collection and processing phases of the Missouri Broadband Data and Development Project. It covers the initial processing of data to meet specific requirements defined by the National Telecommunications and Information Administration (NTIA), governed by the Notice of Funds Availability (NOFA) first published in volume 74, number 129, at page 32545 of the Federal Register and subsequently clarified in volume 74, number 154, at page 40569 of the Federal Register. It also covers the quality control aspects of the project, including back lab, field, and independent verification.

2 Non-Disclosure Agreement Development Process

The State Parties to the Non-Disclosure Agreement (NDA) process include the State of Missouri, the University of Missouri, GeoDecisions, and CBG Communications. Each party, along with the individual broadband service provider, is a signatory of each NDA.

A standard NDA was developed using an initial template provided by CBG, existing templates from providers, and was subsequently edited with inputs from all state parties. This NDA was then vetted with representatives from the Missouri broadband provider community in order to develop a data sharing document that reflected the concerns of both the state and industry.

The state drafted, signed, and distributed an initial letter to providers; including data collection guidelines and a draft of the standard NDA (see Attachment A). This letter was initially sent to 129 providers initially in late March 2010. Most partners to the NDA signed this initial NDA as provided. Some providers have asked for some changes to this NDA which then require legal review by all 5 parties to the agreement. These negotiations have taken some time to complete for individual providers.

We have also found that having a signed NDA does not ensure the State that data will be forthcoming as we have a few providers with signed NDAs that we have not received data for. These are still being pursued.

3 Identifying Providers

The state parties used multiple methodologies to: a) identify broadband providers potentially offering service in the State of Missouri, and b) to acquire contact information for each of the providers.

Identification of providers began by accessing the FCC's Form 477 publically available data.
This data provides the Holding Company Name, the FCC Registration number (FRN), and the filing company name of all broadband providers in the state that completed the Form 477. We began with this information and performed research tasks, including internet research of each of the companies to obtain a high-level contact within the company, as well as their phone and e-mail contact information. If some of this information was not obtainable via Internet research, CBG made initial contact with the company, primarily through phone, to further explore the most pertinent contact.

In addition, we performed research of various websites to determine if there are providers that had not filed a Form 477 with the FCC that should be included in the data collection process. We researched these companies again for the best contact information through various public records including, but not limited to, Missouri Public Service Commission databases, State Telecommunications Industry Association memberships, FCC Cable TV Community Unit and Physical System ID databases, FCC telephone company databases, business licenses, state and local tax records, etc., as well as various state, local and other departments and agencies, including Division of Corporations, Division of Revenue, Local Franchise Authorities, Chambers of Commerce, etc.

We also continue to identify additional potential providers during our field verification processes. This list of potential providers is comprised of business names advertised (signage/trucks etc.), labeled infrastructure observed, or are mentioned by Missouri citizens through an interview.

As new providers are identified, the contact information is given to MU for delivery of initial contact letters to identified providers. These documents are mailed out by MU via e-mail, in order to expedite the process, and through the USPS as a formal notification. Based on input from providers in other states, these documents were sent by the State in order to show the importance that the State places on the project. All correspondence with the providers, including clarification of the NDA or Data Request, data formatting issues, and data submission by the providers, was then handled by GeoDecisions and CBG personnel unless the provider required interaction with state personnel (ie. negotiation of NDA).

Due to the initial timeframe for completion (May 31, 2010) for Missouri's first version of the statewide map of broadband provision, the providers were requested to return the signed NDAs within five (5) business days of receipt and submit their data, in as usable a format as possible, by April 15, 2010.

The state parties performed follow-up with the providers on an as-needed basis. This included making contact with a provider if we did not hear from them after sending out the NDA and Data Request, following up to receive initial data sets, clarification regarding data sets, etc. Contact with the providers included phone calls, voicemail, and e-mail. In the case where a provider did not respond after numerous attempts, we also followed up with USPS mail as well as through their affiliated associations.

A spreadsheet was utilized to keep track of all contact information that was developed and contacts that were made to ensure the accuracy of each provider's pertinent contacts for the statewide project. These have been maintained as contacts and personnel change within the provider's industry.

4 Requested Data Format

The overarching goal of the data collection was to satisfy the requirements of the State Broadband Data and Development (SBDD) grant program, which is governed by the Notice of Funds Availability (NOFA) first published in volume 74, number 129, at page 32545 of the Federal Register and subsequently clarified in volume 74, number 154, at page 40569 of the Federal Register. Both the NOFA and subsequent discussions with the NTIA have indicated that time is of the essence, and strict deadlines are in place for the delivery of data to the NTIA. As such, timely, accurate data collection was of primary concern. GeoDecisions requested that broadband providers submit data in a timely manner in whatever format the information was currently available to eliminate the lag that can be expected with the providers attempting to meet NOFA formatting compliance themselves; however, it was determined that many national providers, having gone through this process in other states, could deliver NOFA compliant data as part of their data submittal.

To assist in the NDA execution process and to further facilitate the timely delivery of data from the providers, GeoDecisions and CBG reviewed the State's NOFA cover letter. The cover letter provided background on the project and the contacts to project team members from the State, GeoDecisions, and CBG. The cover letter stressed the incredibly short initial project timeline and specified the requirement to collect this data on an ongoing basis – every 6 months.

In addition to the cover letter, GeoDecisions and CBG developed a separate attachment to the NDAs. This *Data Collection Guidelines* was reviewed by the State and provided further background and project goals associated with Missouri's State Broadband Data and Development project. The document also specified the guidelines to which the project would abide. The *Data Collection Guidelines* informed providers of the intended use of the data that they would be submitting. The intended uses included delivery of NOFA-compliant data to the NTIA, data dictionary, the intention of generating static maps, as well as the creation of a Missouri-specific interactive broadband mapping website. Finally, the *Data Collection Guidelines* specified the NOFA data and format standards that were required of the State for delivery to the NTIA.

GeoDecisions also developed a provider data request spreadsheet template document that was distributed upon request and allowed the providers to enter NOFA compliant data as they chose to do so. It included mock-up sample data as reference for their own data entry. GeoDecisions, under the guidance of the State, also developed a preliminary Missouri-centric web site that displayed census blocks, census tracts, counties, and major roads in order to assist providers in correlating their service areas to census blocks. Providers could access this site and zoom, pan and print census block maps as needed.

Spatial data was requested from the providers in the following hierarchy of data format preferences.

1) Shapefiles or Geodatabase (personal or file)
2) CAD files with embedded attributes included
3) Text-based data (MS Access, spreadsheets, comma-delimited files, etc.)
4) Paper maps
5) Any method in which the provider could readily submit the required data

5 Data Processing

Because of the variety of ways providers could submit their data, one of the major challenges of this project was to consolidate and then integrate this data into a common model. For each provider, the work was divided into three main steps:

1. Capture the supplied data into a provider-specific staging geodatabase

2. Process and QA features in the provider's staging geodatabase
3. Move the data from the provider's staging geodatabase into the final deliverable geodatabase model.
4. Final QA of all features and associated attribute data.

The first step was the most involved and time consuming. Regardless of the type of data provided, the base-level data (the 2010 census blocks, the 2010 TIGER street segments, and the county boundaries), all came from a single source, so are therefore consistent across all providers. A number of different processes were developed for loading the staging geodatabase, depending on the type and form of data supplied. Each process was extensively documented through a process checklist to ensure accuracy and consistency. A description of these different processes used to load data into the provider specific staging geodatabase follows:

<u>Availability Area</u>
If a provider supplied their availability area as a single boundary or multiple boundaries drawn on a paper map or image file, those area(s) were geo-referenced and digitized into a shape file. If the boundary was provided as a CAD drawing or arose from another GIS system, it was also converted to a shape file format. Some wireless providers defined their area of availability as their wireless coverage area. This may be a supplied boundary, but it may also have been defined using the location of the wireless tower, the angle of coverage, and the coverage distance. This would result in a sector of a circle, which was then used as the availability area.

Once a shape file of the boundary was created, interpreted, and available, all census blocks intersecting that boundary were collected. Those census blocks less than two square miles were assembled into one feature class. For census blocks greater than two square miles, all street segments that overlapped both the census blocks and the availability area were collected into another feature class. Along with the availability area, the providers were also to supply the technology of transmission and speed information. These attributes were assigned to either the census blocks or street segments. Additional provider information including Name, DBA, and FRN, were also added as attributes.

<u>Census Blocks</u>
Some providers submitted a list of census blocks for their area of availability, along with technology of transmission and speed information specified for each census block. In these cases, the census block polygon was selected for each listed census block. If the census block's area was less than two square miles, it was added to the census block feature class and the technology of transmission and speed information were assigned from the provided list. If the census block's area was greater than two square miles, all street segments that overlapped it were added to the street segment feature class and the technology of transmission and speed information were assigned from the associated census block on the list.

The 2010 census block dataset was used for our data processing however a few providers submitted data using 2000 or 2009 vintage census blocks. When a provider submitted in a vintage other than 2010, the 2010 census blocks for the corresponding availability area were coded for that provider. Thus the true coverage of the census blocks were maintained and consistent with the provider's list but represented in the 2010 block structure.

Address Information
If a list of addresses was provided as the availability area, the first step was to obtain the coordinates of these addresses. When geocoded successfully, this resulted in a point for each address located. The census blocks intersecting all the points were collected. If the block's area was greater than two square miles it was treated separately. If a census block contained address locations with different technologies of transmission, the census block was duplicated, and a distinct technology of transmission assigned to each duplicated census block. For different locations in a census block with the same technology of transmission, the maximum value for each speed was obtained and that maximum assigned to the census block.

If the geocoded point lay within a census block with an area greater than two square miles, the nearest street segment was located and the technology of transmission and speed assigned to that segment. As with census blocks, if there were several locations with different technologies of transmission along the same street segment, the street segment was duplicated and each segment assigned a different technology of transmission. The speed assigned to that segment was the maximum speed for all locations along the segment sharing that segment's technology of transmission.

Wireless Boundary
In most cases, wireless providers supplied a boundary, either in electronic format or as a paper map. These were converted to a shape file either by digitizing or by performing a data conversion as appropriate. Some providers supplied tower locations, the angle of coverage, and the distance. In these cases the wireless boundary was constructed from this. Other providers defined their wireless boundary using an exchange boundary or as an aggregate of their customers. Although these boundaries may not accurately represent the wireless availability area, they were initially included in the dataset in order for the providers to submit feedback and more accurately specify boundaries of availability in future iterations. Finally, some wireless providers have recently taken advantage of websites offering wireless propagation service. Providers can enter key data into the site and a propagation raster image is developed more accurately representing their wireless availability. The output raster image is typically imbedded in a Google Earth format .kml or .kmz file which led to our team needing to create a new process flow.

Middle Mile Points
If middle mile points were supplied on a hardcopy or image file map, the point was digitized. Usually these points were provided with latitude and longitude, so it was a simple matter to add them to the feature class. The elevation data was not always supplied due to the provider not having this information available, but when it was, it was often given as feet above sea level. The model requires elevation to be feet above (or below) grade. In these cases, a digital terrain model was used to obtain the ground elevation at the middle mile structure location, which was subtracted from the height above sea level to obtain the height above grade.

The above processes were used to capture the provider-supplied data into provider-specific individual staging geodatabases using the current version of the common National States Geographic information Council (NSGIC) data model suggested for use by the NTIA. Once this was completed, the data could be updated or modified and Quality Checked (QC) using the same processes regardless of how it was originally submitted.
One such process was the creation of overview areas. The census blocks and street segments for a provider were collected and grouped by technology of transmission. County boundaries that overlapped each of these groups were then collected. The technology of transmission of all census blocks and street segments for the group was then assigned to the county. *The assignment of maximum speed within the group to the county has been discontinued per NTIA's request.*

At this point the dataset for a particular provider was complete. An extensive QC checklist was used to examine the dataset, verify consistency, and ensure that it matched the data submitted by the provider. Once the dataset was passed the quality check, the features were appended into final database model along with all data from other completed providers. Both the *Validate Topology* and *Validate Features* ESRI tools were run, any corrections necessary were made, and the Tools were re-run until they processed without error. As individual provider data sets were appended into the master database and again when all data sets were appended, the NTIA supplied 'SBDD Check Submission' tool was also run against the data. Any errors detected were corrected and the tool re-run. A final manual QC review was performed to ensure that all the provider data is present and consistent. This was then followed by a final run of the SBDD Check Submission tool against the master data model to determine if any further corrections / changes were necessary.

Public Data Sources

The University of Missouri (UM) was in charge of the process to obtain and compile cable strand maps, as well as maps of service / coverage areas obtained from the service provider's public offices directly or from their Web sites and advertising materials. This was particularly true in cases where no other authoritative source was available for the given provider. Websites were collected and inventoried through the use of a 'surveymonkey' instrument to standardize and assemble the database from the webcrawling activities. All files and maps found through the webcrawling were then either imported, scanned, or screen-captured to create a digital representation or image of the associated service area. These files were then georeferenced to a common Missouri base map. The spatial transformation methodology used was determined by the image type, confidence in a real representation, and scale of source materials. In addition, maps of telephone company exchange areas and cable franchise areas from their respective associations were digitized and attributed to provide additional points of reference as well. These files were then held as elements of independent validation for the GeoDecision/CBG files created from Provider sources.

Community Anchor Institutions

The University of Missouri (UM) was lead on the development of the Community Anchor Institution database. Many elements of the Community Anchor Points were initially compiled by the UM in coordination with the Department of Public Safety (SEMA and OHS) providing a starting point for this data collection. The list of Anchor Institutions inventoried and monitored in this project include: Police, Fire, Hospitals, EOC, PSAPs, Municipal Courthouses, Libraries, K-12, Higher Education, Extension Offices, Correctional Facilities, Government Buildings, Community Centers, County Courthouses, and Armories.

The community anchor attribute information was gathered by the University through phone calling and site visits by UM students and staff. These efforts were coordinated with respective state agencies / associations with jurisdiction over these sites. For example, the State Fire Marshall's Office sent out a memo under their letterhead informing their constituency of the inventory and assessment so that the student callers and those conducting site visits would be received positively. UM also used their ongoing local data review, validation, and verification processes in partnership with Regional Planning Councils, Regional Homeland Security Oversight Committees, and associated local governments to assemble and verify data for some counties within Missouri. This process of data development had already been deployed in some areas of Missouri in association with the development and review of public safety structure-based information and has proven to work well.

6 Data Accuracy – Back Lab Verification Methods

Throughout the project, GeoDecisions and CBG performed numerous verification tasks to determine the level of accuracy of the information gathered from the broadband providers in the State. The initial verification methods were called back lab verification tasks by the NTIA. Unlike the field verification processes (described below), these tasks were performed in a lab or office setting. Each of the following GeoDecisions/CBG back lab processes was utilized to validate the data collected from some or all of the providers:

After the data from a given provider was captured into the geodatabase, the mapped data was then compared against information gleaned from various sources. The FCC had documentation that was used such as the Form 320 (Basic Signal Leakage Performance Report), which is filled out by cable television providers on an annual basis, and Cable TV Community Unit and Physical System databases. These information databases provided high-level information of geographic areas served by cable TV and other broadband providers. This information alerted our team to areas not included in gathered data from a broadband provider.

Additional sources of information utilized during the back lab verification process included franchise and exchange boundaries, cable strand maps, media prints, as well as business and taxation licenses. These sources varied in value to the project, depending on the level of information gathered and maintained by local franchising authorities and state agencies such as the PSC. Telecommunications associations were also queried for information regarding providers and system boundaries or areas of the state where specific providers offer service.

The above processes primarily relate to wireline broadband providers. For wireless broadband providers, we compared information gathered from the providers against FCC and FAA tower databases and private tower databases, as needed.

Independent Validation and Assessment: The UM also performed similar verification tasks as listed above to determine the level of accuracy and confidence in the information delivered by GeoDecisions/CBG as assembled from the broadband providers in the State. Again, these verification methods were called back lab verification tasks by the NTIA as these tasks were performed in a lab or office setting.

In addition to the above, the UM back lab processes took the assembled public sourced data for all providers (where this type of information could be found) and intersected it with the supplied GeoDecisions / CBG provider service areas. As well, Ookla site data, survey data, and presence/absence data assembled were also used to assess these data. From these data, additional analyses were performed to create measures of agreement, confidence indexes, spatial confidence indexes, and to visualize patterns of service and gaps in service.

These gaps and patterns of service are currently being examined to determine common threads for the State of Missouri across socio-economic, demographic, density of CAI, and other measurable elements of this mapping. We hope to use these data to inform the Regional Technology Planning Teams of opportunities and impediments.

The results of the independent assessment and validation were then combined with findings from GeoDecisions/CBG to form a report that then was delivered back to the provider to initiate the 'provider feedback' element (see Section 19 of this report) of the assessment and to validate/verify the assessments of these data and their extents by both UM and GeoDecisions/CBG with the respective provider.

7 Development/Implementation of a field verification guide and checklist

Prior to beginning field verification activities, CBG Communications, Inc. (CBG) worked with GeoDecisions to developed a field verification guide for use by each member of the field verification team. The guide included systematic instructions and a checklist related to verification of each broadband system and service type. The guide and checklist were drafted, reviewed and finalized prior to the beginning of field verification activities.

As we continue to move forward with each submission, our field verification efforts continue to advance. Provider data is used to determine higher success areas having overlapping or common areas as well as including providers not able to be thoroughly verified from prior rounds. Those areas are the initial focus, medium priority areas are determined using similar stepped-down criteria. Lower priority areas are for providers thoroughly verified in past rounds but current data is needed. This also includes locations in between the higher and medium priority areas. Provider data is loaded on laptops or Garmin units for use by field verification personnel.

8 Field verification team training

To ensure uniformity of the team's approach to field verification, field team training was held immediately prior to the beginning of field verification activities. Training was conducted for GeoDecisions, CBG, and University students and staff. The training covered all field verification activities, including:

- Use of the guide, instructions and checklist
- Understanding of each system and service types
- Understanding of coverage characteristics

- Understanding of service attributes, including system technology type, upstream and downstream connection speeds, and other attributes required (by the NTIA) to be documented and verified
- Use of the equipment needed for field verification activities
- Proper documentation of field verification activities

The office tutorial lasted ½ day. An additional field-based ½ day session was utilized for actual demonstration of field verification activities. New team members are trained in a similar manor.

9 Team Assignments

Two person teams were utilized the next 2 days after office and field training in order to work together and become more comfortable with the process. Eventually, field verification team members were expected to perform field verification activities on their own, with the exception of University student teams, who continued to participate in pairs of two for safety and security reasons. The State was divided into five (5) large areas encompassing Northwest, Northeast, Southwest, Southeast and Central Missouri. The contractor assembled ten (10) team members, and assigned two for each area. Initially the UM team assembled eight (8) team members to form four (4) teams, and assigned them to certain counties and particular census blocks within those counties. In subsequent iterations the UM team assembled 6 team members to form two (2) 2-3 person teams that reviewed targeted areas within counties and larger census blocks. As well, these teams conducted the surveys and interaction at the Missouri State Fair and other regional fairs as discussed in Section 13 of this report.

Each team member was provided an official-looking ID card and a letter of certification on Missouri State letterhead in order to mitigate findings early-on that residents were suspicious of individuals asking unsolicited questions. These two items proved very effective in minimizing these concerns.

10 Verifying Coverage

Broadband system coverage was verified by sampling whether services were available at various locations shown on the providers' system coverage maps randomly chosen from all of the census blocks that are at the ends of the providers' systems. The random sample was developed separately by the UM and contractor teams.

The contractor team initially verified availability by looking for a mixture of large and small providers across the state, being sure to hit each of the 19 Regions which would form the basis for the Regional Technology Planning Teams involved in the state broadband planning process. Efforts were made to locate and verify all providers that had submitted data. Verifying the large providers, especially, in each of these regions was a priority. Each contractor team member collected field gathered data in an MS Access database. The data included: Lat/Lon of verification point, provider name, technology type, speed test results if available, customer comments and notes from team member. All data was compiled and used to not only validate provider submitted data as mapped, but for providing feedback to the providers.

As a cross check, the UM team sampled a selection of counties, looking for more detailed coverage in a subset of the state's counties.

As we continue to move forward with each submission, our field verification efforts, as with all other aspects of the project, continue to advance. Providers are now categorized from prior verification rounds as unverified, high, medium or low priority. Unverified are new providers or one not able to be verified in previous attempts. High are providers with minimal verification in previous attempts. Medium are providers fairly thoroughly verified in previous verification and low are providers heavily verified in prior verification. Provider data is also used to determine highest provider concentration areas having overlapping or common areas. Those areas are the initial focus for unverified and high priority providers. Medium and lower priority providers and areas are secondary and my include locations between the unverified and high priority areas. Provider data is loaded on laptops or Garmin units for use by field verification personnel.

11 Ookla Speed Test Web Site

As part of the field verification process, State residents and businesses interviewed or visited were given a card briefly explaining the project and directed them to the State's designed speed test website. These cards were broadly distributed at the State Fair and other regional fairs as well. This has led to more responses on the Speed Test. This project specific Ookla speed test web site was set up to collect information on providers, users, as well as the upstream and downstream speeds associated with their broadband connection.

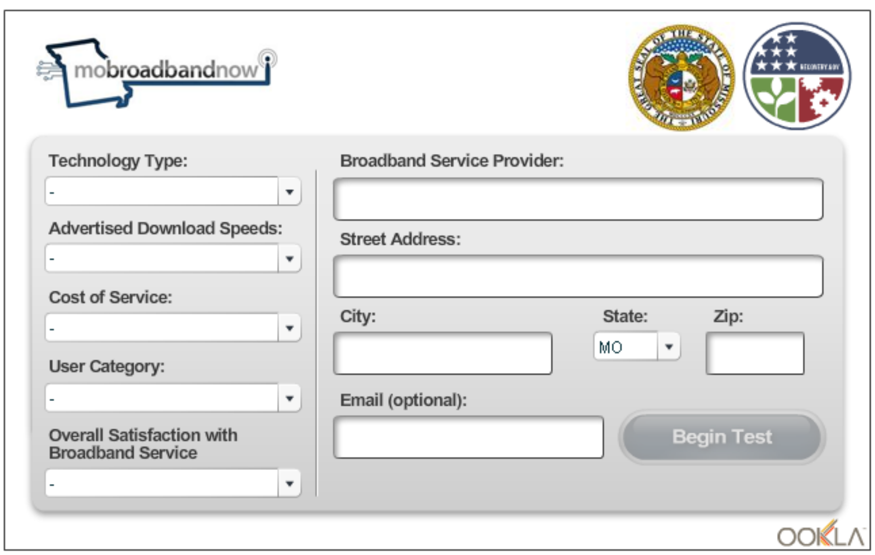


Figure 1: Depiction of Ookla Speed Test Site

12 Equipment Utilized for Field Verification Activities

Each team member carried the following equipment in order to perform field verification activities for the various types of services:

a. Laptop with Wi-Fi capability and provider GIS data installed
b. Cellular 3G/4G and WiMAX aircards (independent card for each provider) for use with laptop
c. Binoculars, as needed
d. GPS for verifying and documenting exact locations
e. Hardcopy forms and electronic database for documenting verification data
f. Cell phone with 3G or 4G used in lieu of laptop for certain types of wireless broadband services
g. Digital recorder for aural field notes, as needed
h. Identification documents (business cards, State or other ID badges, letter from the State acknowledging that the team member is part of the verification team, for those with questions)
i. Car chargers and/or DC to AC Inverters for equipment chargers
j. Census block maps (boundary details shown) and other maps as needed
k. Garmin GPS unit.
l. Postcards advertising the Ookla web site for distribution, as shown below

Figure 2: Postcards Distributed to Residents

13 Other Verification Methods

In addition to utilizing the above mentioned equipment and the methodologies listed below for verifying coverage and characteristics, team members entered into discussions with residents in the various areas. Residents were asked questions such as: Do they currently have broadband service?, Who their provider is?, If they know what speeds they could achieve, and if they knew of other provider's services being available in the area. This information needed to be confirmed by multiple residents before being considered accurate. Residents often did not know what their service level was nor what their speed of service was. Questions such as how much were they paying for the service led to a better understanding of their service level. Residents were encouraged to visit the Ookla speed test site to assist in gathering actual speed data. To date, over 8200 results have been received.

Missouri State Fair: In order to collect a large amount of information from Missouri residents for verification, the Broadband Mapping Team (BB Team) visited the Missouri State Fair in Sedalia, Missouri. The 2010 Missouri State Fair had an estimated attendance of over 330,000 people. With such a high attendance, it was determined that this event would be useful for data collection. For the 2012 Missouri State Fair, attendance exceeded that of the previous year, estimated at 330,000 to 350,000 attendees. The BB Team had two locations at the fair. The first was in the Mizzou Central Building in the MO-AG Theater organized by the College of Agriculture, Food and Natural Resources. This was the main location for the BB Team, where an informational slide show continuously played and signage was displayed throughout the booth area. At this location, Missouri residents were asked to fill out a survey regarding their internet service. A total of 699 surveys were completed at the 2011

Missouri State Fair, an increase of 117 surveys from the previous year, and were later geocoded to be used as verification and validation for UMs independent assessments.

The second BB Team location was on the lawn outside of the MO-AG Theater, where a Mizzou Tent was assembled daily and tables were set displaying a large Missouri map divided into four quadrants. Each of the four quadrants represented different regions of Missouri, northwest, northeast, southwest and southeast. At this station, Missouri residents were able to physically place a colored pin on their home location. The color of the pins was used to differentiate whether or not broadband was available. A total of 320 pins were placed by Missouri residents, denoting presence or absence of broadband. The 2010 Missouri State Fair pin total was 880, a difference of 560 pins down from the previous year due to severe weather that occurred two out of the four days the team was present at the fair.

In addition to the 2011 Missouri State Fair, the BB Team also visited three regional fairs and an extra state fair, the Boone County Regional Fair, Phelps County Regional Fair, the Shelby County Regional Fair and the Southeast Missouri District Fair in the city of Cape Girardeau. The three regional fairs, all located near the University, were chosen specifically to increase the amount of broadband data for the Mid-Missouri region. The Southeast Missouri District Fair was selected because the 2010 Missouri State Fair results displayed little or no data in the southeast Missouri region. In total, 1053 surveys were completed and approximately 390 pins were placed during this verification phase.

For 2012, the BB Team was deployed only to the Missouri State Fair in Sedalia. Unlike previous years, however, the BB Team was able to be present for every day of the event, which ran from Aug 09 to Aug 19. Thanks to favorable weather and the addition of new team members, the BB Team was also able to remain at the fair for more hours during each day, resulting in a significantly increased overall presence. By the end of the 2012 event, the team had collected 2,154 broadband surveys and Missouri residents had placed 1,090 presence/absence pins on the regional maps.

At all of the fairs, the broadband speed test cards for the Missouri Ookla site were handed out to residents after filling out a survey or placing a pin on one of the four maps. The BB Team also distributed drinking cups, refrigerator magnets, and pens with the State Broadband speedtest site on them.

In terms of verifying provider coverage, the state and regional fairs have provided valuable data that could not have been otherwise obtained. The color-coded push pin maps have been converted to point-based shape files. Combined with additional information collected from the fair attendees while interacting with the push pin maps, the resulting shape file has provided a statewide, grassroots survey of internet service provider, type of internet service (broadband, dial-up, etc.), technology of transmission, subscribed speed, and customer satisfaction. This data has been used in the verification process as a visual comparison to census block provider footprints. The results, so far, have been very positive and the fair points have displayed a high spatial correlation with the census blocks. More data collection will be required before this verification method can be formalized, but the results are very promising.

14 Verifying Wireline Broadband Coverage Characteristics

Using the specified random sampling technique, field team members searched for the physical endpoints of cable systems, telephone/DSL and fiber optic infrastructure and noted when additional infrastructure was not seen moving outward from the core either in an aerial (overhead) or underground manner. These areas were targeted for discussions with residents and to perform speed tests. Observations and findings were documented accordingly.

15 Wireless Broadband Coverage

Verification team members reviewed the provider's information and looked for network availability near the antenna site or in the middle of the provider's service area to confirm network and test equipment compatibility. Using the specified random sampling technique, the team member tested with pertinent gear to determine when service could and couldn't be achieved by the laptop, cell phone, or other wireless broadband-enabled device. These locations were documented accordingly.

16 Upstream and Downstream Connection Speeds for Wireline Providers

The field verification team member:

a. *For cable modem* – Upstream and downstream connection speeds were verified using the Ookla speed test at locations within the providers' coverage area using the specified random sampling technique. An already installed cable modem connection was utilized, as available. These included both preselected points with arrangements made for testing (such as at local libraries or at public facilities utilizing cable modem service) and at randomly chosen business and homeowner locations where the business or homeowner consented to test the service. Findings were documented accordingly on electronic or paper forms. In addition, the speed test was documented via the Ookla site.

b. *For DSL connection speed testing* –The same procedures were used as for cable modem testing. Findings were documented accordingly on paper or electronic forms.

c. *For fiber optic connection speeds* – For services to homes and small businesses the same procedures were used as above for cable modem and DSL. For higher speed services to larger businesses, institutional network connections, enterprise/wide area network connections, etc., the team member worked with the business or institutions' IT group to perform connection speed testing. If actual testing could not be performed, team members attempted to gain existing end user documentation tests and performance documentation related to speeds of the network. Findings were documented accordingly on paper or electronic reports.

17 Wireless Broadband Service Connection Speed Testing

For cellular broadband 3G and 4G testing – A provider specific air card was needed in order to enable the laptop to access the Ookla speed test to determine the speed of connection. Some service providers provided air cards to conduct this testing. All teams also used both personal and corporate cards to assist in the testing. The speed of connection was tested at randomly selected points beginning close to the providers' tower/antenna infrastructure, at a mid-point and then at the ends of the verified coverage area. Findings were documented accordingly on paper or electronic reports. Documentation was uploaded daily by the team members to ensure timely and uniform oversight and modifications of the processes.

The MU BB team also conducted a more detailed test of fixed mobile wireless coverage areas throughout Boone County using high-speed wireless broadband air cards. For wireless broadband testing purposes, the top five providers, AT&T, US Cellular, T-Mobile, Sprint/Virgin Mobile and Verizon were tested to understand how mobile broadband varies in different locations by collecting information such as: signal strength, speed, as well as the latitude and longitude coordinates of where the test was performed.

To gather upload and download speed information for each air card, the team members used the MOBroadbandNow Speed Test website on Ookla. During the speed testing it was not uncommon that the speeds varied at a specific point for each air card, therefore the air card was tested a total of three times for analysis and comparison. The signal strength was determined by how many "bars" were displayed for each provider. The bars would vary depending on if the team was in a mobile coverage area or not. The latitude and longitude coordinates were recorded using a GPS unit. The speed, signal strength, and coordinates were tested and recorded in ½ mile increments along selected urban and/or rural routes throughout Boone County.

Additional air card testing and verification was completed over since the last submission in various counties such as: Howard, Callaway, Cooper, Moniteau, Cole, Morgan, Miller and Camden using specific provider footprints. For this testing method, random locations were chosen within the provider footprint and air cards were tested to see how each provider varied in strength and signal.

18 Coordination of Contractor and State Parties' Field Verification

The state and contractor utilized the process in the diagrams below to coordinate field verification activities:

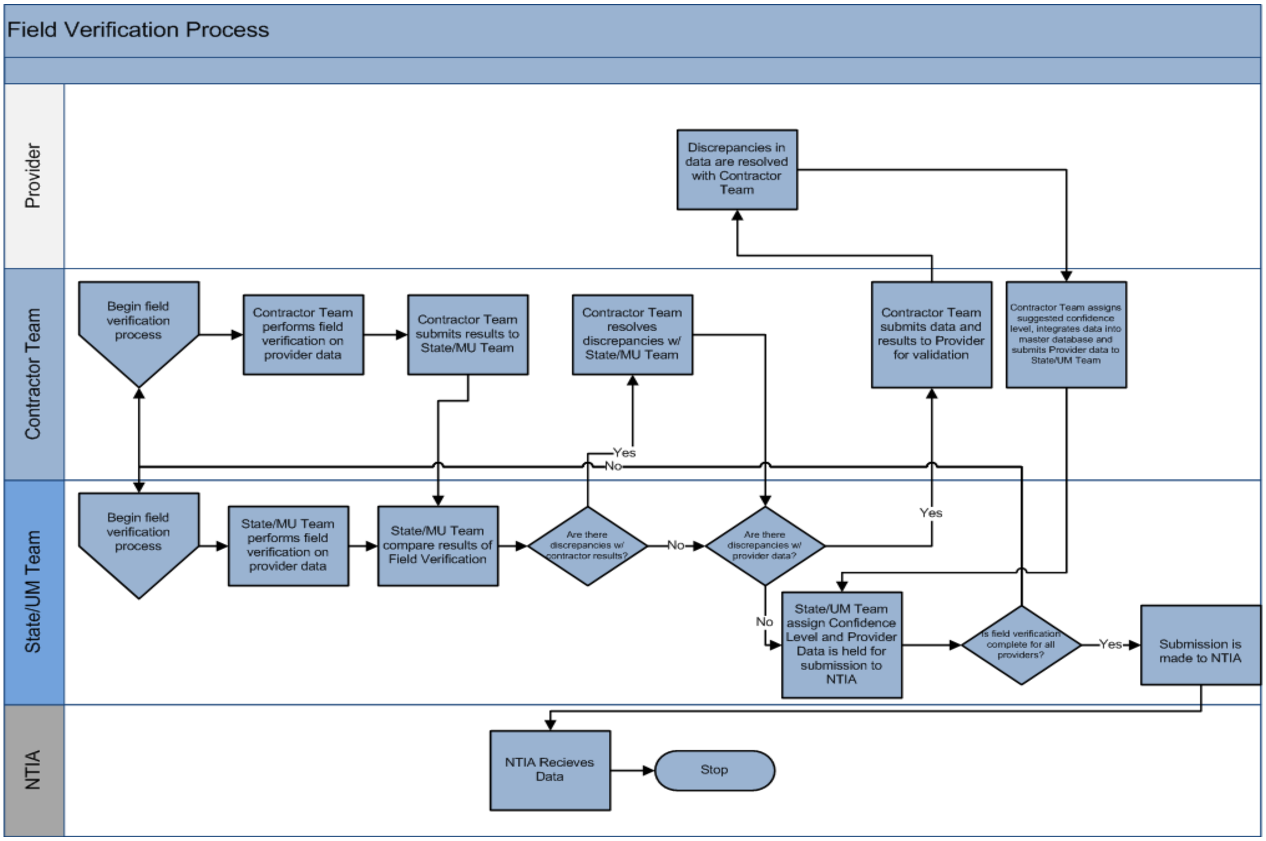


Figure 3: Field Verification Coordination Process

19 Provider Feedback Reporting

Upon completion of the provider submitted data, feedback information was supplied to each of the 101 providers that had submitted data as of Submission 5. This feedback was presented in the following forms:

1. A detailed Data Review Report in MS Word format,
2. All provider attribute data exported into MS Excel format, and
3. Multiple Overview, Wired and Wireless GIS exported image files in pdf format.

This information would allow each provider to review our validation findings, as well as check their submitted data as depicted in the GIS data model, both in a graphical and tabular form.

The Data Review Report detailed the usability and completeness of their submitted data as well as an estimate of our confidence in their submitted data based on field verification efforts and back lab verification steps as detailed above. The report also requested feedback on the accuracy of how we characterized their availability areas, technologies, speeds etc. Based on the provider's feedback, the data was adjusted and refined accordingly.

Field verification and back lab verification processes and procedures were utilized, as available and as needed, to ensure the highest level of confidence that the information gleaned from the providers was as accurate as possible. During this process, GeoDecisions contacted providers when we found instances that appeared to conflict with the information they initially provided and worked with the providers to adjust the maps accordingly.

20 Statistics

File Type	Number of Records
Total Records in all Files	**712,480**
Census Block < 2 sq. miles	493,507
Address-Level	Not Required
Street Segment	212,061
Wireless Shape File	81
BB Service Overview	568
Community Anchor Institution	5,332
Middle Mile	930
State Boundary	1
Metadata Provided for Geospatial Data	Yes
Number of ISP's Provided in Submission	110

Providers Completed	110
Pending Additional Data	13
Non-Responsive/Refused	20
Researching	54
Non-Facilities Based	83
Out of Business	8
TOTAL	288

Provider Name	Status	FRN	NDA Execution Date	Notes/Comments
Adams Networks	Data Included in Missouri State Submission	0011616356	5/18/2010	No updates submitted in Sixth data call response.
Alma Communications Company	Data Included in Missouri State Submission	0007196207	5/18/2010	No updates submitted in Sixth data call response.
Alsat Wireless	Data Included in Missouri State Submission	0021067509	8/3/11	Sixth data call updates included.
Holway Telephone Company	Data Included in Missouri State Submission	0004746863	4/5/2010	Sixth data call updates included.
KLM Telephone Company	Data Included in Missouri State Submission	0003772274	4/5/2010	Sixth data call updates included.
N. W. Communications	Data Included in Missouri State Submission	0003772290	4/5/2010	Sixth data call updates included.
American Fiber Systems, Inc. – Zayo Group	Data Included in Missouri State Submission	0006651202	4/27/2010	No response to Sixth data call.

AT&T Corp.	Data Included in Missouri State Submission	0004496774	4/7/2010	Sixth data call updates included.
AT&T Mobility, LLC.	Data Included in Missouri State Submission	0004979233	4/7/2010	Sixth data call updates included.
AT&T Southwest	Data Included in Missouri State Submission	0016657918	4/7/2010	Sixth data call updates included.
Bay's Internet	Data Included in Missouri State Submission	0018912576	Not Req'd by Provider	No updates submitted in Sixth data call response.
Big River Telephone, LLC	Data Included in Missouri State Submission	0018520320	Not Req'd by Provider	No response to Sixth data call.
BlueBird Network, LLC.	Data Included in Missouri State Submission	0018995944	Not Req'd by Provider	No response to Sixth data call.
Boycom Cablevision, Inc.	Data Included in Missouri State Submission	0007630791	Not Req'd by Provider	Sixth data call updates included.
Boycom Cablevision, Inc. – Partel Broadband Telecom Inc.	Data Included in Missouri State Submission	0020795449	Not Req'd by Provider	Sixth data call updates included.
Cable One, Inc.	Data Included in Missouri State Submission	0003474327	4/5/2010	No updates submitted in Sixth data call response.
Cable America Missouri, LLC	Data Included in Missouri State Submission	0015466766	6/10/2010	Sixth data call updates included.
Carthage Water & Electric	Data Included in Missouri State Submission	0007147143	Not Req'd by Provider	No response to Sixth data call.
Suddenlink Communications – Cebridge	Data Included in Missouri State Submission	0014367650	6/12/2010	Sixth data call updates included.
Suddenlink Communications – Friendship Cable	Data Included in Missouri State Submission	0004999025	6/12/2010	Sixth data call updates included.
Suddenlink Communications – Cequel III Communications II	Data Included in Missouri State Submission	0009725870	6/12/2010	Sixth data call updates included.
CenturyLink	Data Included in Missouri State Submission	0018626853	4/20/2010	Sixth data call updates included.
Chariton Valley Telephone Corporation	Data Included in Missouri State Submission	0002549392	5/26/2010	No updates submitted in Sixth data call response.
Chariton Valley Telecom Corporation	Data Included in Missouri State Submission	0008437147	5/26/2010	No updates submitted in Sixth data call response.
Charter Communications	Data Included in Missouri State Submission	0017179383	6/10/2010	Sixth data call updates included.
Citizens Telephone Company of Higginsville Missouri	Data Included in Missouri State Submission	0002504298	4/5/2010	No updates submitted in Sixth data call response.
LiNKCity	Data Included in Missouri State Submission	0016051450	Not Req'd by Provider	No updates submitted in Sixth data call response.
City Utilities Springfield (SpringNet)	Data Included in Missouri State Submission	0004759411	3/23/2011	No updates submitted in Sixth data call response.
Cogent Communications, Inc.	Data Included in Missouri State Submission	0019898303	Not Req'd by Provider	No updates submitted in Sixth data call response.
Comcast	Data Included in Missouri State Submission	0004441663	5/27/2010	Sixth data call updates included.
Co-Mo Comm, Inc. (Co-Mo Connect)	Data Included in Missouri State Submission	0021854278	Not Req'd by Provider	Sixth data call updates included.
Covad Communications Company	Data Included in Missouri State Submission	0003753753	5/18/2010	Sixth data call updates included.
Wireless Investments, LLC. (Easy Net)	Data Included in Missouri State Submission	0020526265	Not Req'd by Provider	Sixth data call updates included.
Craw-Kan Telephone	Data Included in Missouri State Submission	0002334225	4/5/2010	Sixth data call updates included.
T-Mobile	Data Included in Missouri State Submission	0006945950	5/4/2010	Sixth data call updates included.
Ellington Telephone Company	Data Included in Missouri State Submission	0003741956	4/5/2010	No updates submitted in Sixth data call response.
FairPoint Communications Missouri, Inc.	Data Included in Missouri State Submission	0014710388	9/1/2010	No updates submitted in Sixth data call response.
FairPoint Kearney	Data Included in Missouri State Submission	0004969697	9/1/2010	No updates submitted in Sixth data call response.
Farber Telephone Company	Data Included in Missouri State Submission	0003748043	4/5/2010	No updates submitted in Sixth data call response.
BPS Telephone Company	Data Included in Missouri State Submission	0003730835	4/5/2010	Sixth data call updates included.
BPS Networks	Data Included in Missouri State Submission	0016026965	4/5/2010	No updates submitted in Sixth data call response.
Brown Dog Networks	Data Included in Missouri State Submission	0009254095	Not Req'd by Provider	No response to Sixth data call.
Fidelity Cablevision, Inc	Data Included in Missouri State Submission	0000013326	4/5/2010	Sixth data call updates included.
Fidelity Communications Services I, Inc.	Data Included in Missouri State Submission	0004351722	4/5/2010	Sixth data call updates included.
Fidelity Telephone Company	Data Included in Missouri State Submission	0002550309	4/5/2010	Sixth data call updates included.
Granby Telephone Company	Data Included in Missouri State Submission	0005061189	4/5/2010	No updates submitted in Sixth data call response.
Grand River Mutual Telephone Corp.	Data Included in Missouri State Submission	0002505519	4/7/2010	No updates submitted in Sixth data call response.
Green Hills Technologies	Data Included in Missouri State Submission	0003736246	4/5/2010	Sixth data call updates included.
Green Hills Telephone ILEC	Data Included in Missouri State Submission	0003736238	4/5/2010	Sixth data call updates included.
Green Hills Telecommunications Services	Data Included in Missouri State Submission	0003736253	4/5/2010	Sixth data call updates included.
Haug Communications, Inc.	Data Included in Missouri State Submission	0004711735	Not Req'd by Provider	Sixth data call updates included.
Hughes Network Systems, LLC	Data Included in Missouri State Submission	0017434911	Not Req'd by Provider	No updates submitted in Sixth data call response.
KC Coyote – Isotech	Data Included in Missouri State Submission	0014669097	Not Req'd by Provider	No updates submitted in Sixth data call response.
KTIS (Kingdom Telephone Company)	Data Included in Missouri State Submission	0002212314	4/5/2010	No updates submitted in Sixth data call response.
Cricket Communications, Inc. (Leap Wireless International)	Data Included in Missouri State Submission	0002963528	4/20/2010	Sixth data call updates included.
Le-Ru Telephone Co.	Data Included in Missouri State Submission	0002490472	4/7/2010	No updates submitted in Sixth data call response.
Level 3 Communications, LLC	Data Included in Missouri State Submission	0003723822	4/27/2010	No updates submitted in Sixth data call response.
LTO Communications, LLC	Data Included in Missouri State Submission	0019008036	Not Req'd by Provider	No updates submitted in Sixth data call response.
Mark Twain Communications Company	Data Included in Missouri State Submission	0002531879	4/5/2010	Sixth data call updates included.
Mark Twain Rural Telephone Co	Data Included in Missouri State Submission	0002549228	4/5/2010	No updates submitted in Sixth data call response.
McDonald County Telephone Co	Data Included in Missouri State Submission	0002504058	4/5/2010	Sixth data call updates included.
MCM Systems, LLC	Data Included in Missouri State Submission	0010662484	Not Req'd by Provider	Sixth data call updates included.
MCC Missouri LLC (Mediacom)	Data Included in Missouri State Submission	0005184247	9/1/2010	Sixth data call updates included.
Mid States Services, LLC.	Data Included in Missouri State Submission	0018511303	5/26/2010	Sixth data call updates included.
MyChoice Network LLC	Data Included in Missouri State Submission	0000000000	Not Req'd by Provider	No response to Sixth data call.
New Florence Telephone Company, Inc.	Data Included in Missouri State Submission	0004374047	4/5/2010	No response to Sixth data call.
Northeast Missouri Rural Telephone Company	Data Included in Missouri State Submission	0004337044	4/20/2010	Sixth data call updates included.
Northwest Missouri Cellular	Data Included in Missouri State Submission	0002534618	Not Req'd by Provider	No updates submitted in Sixth data call response.
Oregon Farmers Mutual Telephone Company	Data Included in Missouri State Submission	0003733847	4/5/2010	No updates submitted in Sixth data call response.
New Wave Communications	Data Included in Missouri State Submission	0001202938	Not Req'd by Provider	No updates submitted in Sixth data call response.
Iland Internet Services	Data Included in Missouri State Submission	0017606898	Not Req'd by Provider	Sixth data call updates included.
Mid Missouri Telephone Co.	Data Included in Missouri State Submission	0002509040	4/5/2010	Sixth data call updates included.
Ozark Computers	Data Included in Missouri State Submission	0018658179	Not Req'd by Provider	No updates submitted in Sixth data call response.
Peace Valley Telephone Co., Inc.	Data Included in Missouri State Submission	0018539742	4/5/2010	Sixth data call updates included.
Poplar Bluff, City of	Data Included in Missouri State Submission	0002514529	Not Req'd by Provider	No response to Sixth data call.
ProTronics Technologies, Inc.	Data Included in Missouri State Submission	0010790061	Not Req'd by Provider	Sixth data call updates included.
Radio Wire, Inc.	Data Included in Missouri State Submission	0018912626	Not Req'd by Provider	No updates submitted in Sixth data call response.
Ralls Technologies (Ralls County Electric Cooperative)	Data Included in Missouri State Submission	0018539916	Not Req'd by Provider	Sixth data call updates included.
Midwest Data Center – Subsidiary of Rock Port Telephone	Data Included in Missouri State Submission	0004362505	4/7/2010	No updates submitted in Sixth data call response.
Rock Port Cablevision	Data Included in Missouri State Submission	0004362505	4/7/2010	No updates submitted in Sixth data call response.
Goodman Telephone Company, Inc.	Data Included in Missouri State Submission	0004269775	4/12/2010	No updates submitted in Sixth data call response.
Ozark Telephone Company	Data Included in Missouri State Submission	0004269817	4/12/2010	No updates submitted in Sixth data call response.
Seneca Telephone Company	Data Included in Missouri State Submission	0004269809	4/12/2010	No updates submitted in Sixth data call response.
Sho-Me Technologies, LLC	Data Included in Missouri State Submission	0008875890	Not Req'd by Provider	No updates submitted in Sixth data call response.
Skycasters	Data Included in Missouri State Submission	0018756155	Not Req'd by Provider	Sixth data call updates included.
Socket Telecom, LLC	Data Included in Missouri State Submission	0008515595	Not Req'd by Provider	Sixth data call updates included.

Sprint Nextel Corporation	Data Included in Missouri State Submission	0003774593	6/11/2010	Sixth data call updates included.
StarBand Communications Inc.	Data Included in Missouri State Submission	0005087457	4/5/2010	No updates submitted in Sixth data call response.
Steelville Telephone Exchange Inc	Data Included in Missouri State Submission	0002549665	4/5/2010	No response to Sixth data call.
Miller Telephone Company	Data Included in Missouri State Submission	0004269528	4/5/2010	No updates submitted in Sixth data call response.
TDS Telecommunications Corporation – Stoutland	Data Included in Missouri State Submission	0002502243	4/26/2010	Sixth data call updates included.
TDS Telecommunications Corporation – New London	Data Included in Missouri State Submission	0002529733	4/26/2010	Sixth data call updates included.
TDS Telecommunications Corporation – Orchard Farm	Data Included in Missouri State Submission	0003767340	4/26/2010	Sixth data call updates included.
Time Warner Cable	Data Included in Missouri State Submission	0013430244	6/21/2010	Sixth data call updates included.
Total Highspeed Internet Service	Data Included in Missouri State Submission	0017633405	Not Req'd by Provider	Sixth data call updates included.
Townes Tele-Comm, Inc. – Choctaw Telephone Company	Data Included in Missouri State Submission	0004928792	Not Req'd by Provider	No updates submitted in Sixth data call response.
Townes Tele-Comm, Inc. – MoKan Dial, Inc.	Data Included in Missouri State Submission	0004928750	Not Req'd by Provider	No updates submitted in Sixth data call response.
Tw telecom	Data Included in Missouri State Submission	0017348061	4/27/2010	Sixth data call updates included.
United Services, Inc. (United Sky Wireless)	Data Included in Missouri State Submission	0016087876	4/5/2010	No updates submitted in Sixth data call response.
Verizon Wireless – Cellco Partnership	Data Included in Missouri State Submission	0003290673	5/26/2010 & 7/19/2012	Sixth data call updates included.
WildBlue Communications, Inc.	Data Included in Missouri State Submission	0007843766	5/4/2010	Sixth data call updates included.
Windjammer Communications LLC	Data Included in Missouri State Submission	0017915182	Not Req'd by Provider	No response to Sixth data call.
Windstream Corporation	Data Included in Missouri State Submission	0014400220	6/10/2010	Sixth data call updates included.
YHTI	Data Included in Missouri State Submission	0014205504	4/5/2010	No updates submitted in Sixth data call response.
Lathrop Telephone Company	Data Included in Missouri State Submission	0003737376	4/7/2010	No updates submitted in Sixth data call response.
NPG Cable, Inc. (St. Joseph Cablevision)	Data Included in Missouri State Submission	0002508687	Not Req'd by Provider	Sixth data call updates included.
United States Cellular Corporation	Data Included in Missouri State Submission	0004372322	8/21/2010	No updates submitted in Sixth data call response.
Video Direct Satellite & Entertainment	Data Included in Missouri State Submission	0021009246	Not Req'd by Provider	Sixth data call updates included.
WIFI Midwest, Inc.	Data Included in Missouri State Submission	0018247908	Not Req'd by Provider	Sixth data call updates included.
Wisper ISP Inc.	Data Included in Missouri State Submission	0016278970	Not Req'd by Provider	Sixth data call updates included.
KC Web Internet Services, LLC	Compiling Data – No Data Submitted	0011513751	Not Req'd by Provider	No source data received to date.
KEI Internet Service	Compiling Data – No Data Submitted	0000000000	Not Req'd by Provider	No source data received to date.
Wisper ISP, INC	Compiling Data – No Data Submitted	0016278970	Not Req'd by Provider	No source data received to date.
AccuBak Data Systems, Inc.	Data Compiled But Not Submitted By Provider	0018543744	Not Req'd by Provider	Owner still having trouble seeing the benefit to submitting data.
Ritter Cable Corporation	NDA Fully Executed – No Data Submitted	0014054449	4/20/2010	No source data received to date.
IAMO Telephone Company	NDA Fully Executed – No Data Submitted	0014067565	4/7/2010	No source data received to date.
SureWest Kansas, LLC – Everest Midwest LLC	NDA Fully Executed – No Data Submitted	0004069035	4/12/2010	No source data received to date.
Blue Mule Wireless	Data Not Submitted By Provider	0000000000	Not Req'd by Provider	No source data received to date.
TA Highspeed	Data Not Submitted By Provider	0000000000	Not Req'd by Provider	No source data received to date.
Tower Internet	Data Not Submitted By Provider	0000000000	Not Req'd by Provider	No source data received to date.
US Cable of Coastal-Texas, L.P.	Data Not Submitted By Provider	0000000000	Not Req'd by Provider	No source data received to date.
Crystal Broadband	Data Not Submitted By Provider	0000000000	Not Req'd by Provider	No source data received to date.
Finally Broadband, LLC.	Working Toward Signed NDA			Not fully operational as of 8/31/11
Iowa Telecommunications Services, Inc.	Non-Responsive	0003911385		
Mo-Ark Communications – (Wasp Wireless)	Non-Responsive	0004376919		NDA Sent
CorpraNet	Non-Responsive			NDA Sent
Cox Communications	Non-Responsive			NDA Sent
True Broadband Networks	Non-Responsive			No answer at phone numbers and e-mails kick-back
Enventis Telecom Inc.	Non-Responsive	0008394322		NDA Sent
Dexter Broadband	Non-Responsive		NA	Phones disconnected and e-mails are unanswered
St Joe Wireless	Non-Responsive	0002545929		Attempting to make initial contact.
First Cable of MO (Mississippi Valley)	Non-Responsive			
Galactic Broadband	Non-Responsive			No contact information found
SES Americom	Non-Responsive			Attempting to make initial contact.
Verizon Business Global LLC dba Verizon Business	Non-Responsive	0010856284		Submitted data with wireless company only.
Momentum	Non-Responsive			
Mid Missouri Broadband & Cable LLC	Non-Responsive			
St Louis Broadband	Refused to participate at this time			Does not see benefit
Birch Telecom of Missouri, Inc.	Refused to Participate	0003732294	NA	Refuse to sign NDA or participate
Ionex Communications, Inc.	Refused to Participate	0005027453	NA	Refuse to sign NDA or participate - Birch Communications
Pixius Communications	Refused to Participate	0010480176	NA	Refuse to sign NDA or participate at this time
Poplar Bluff Internet, Inc (SEMO)	Refused to Participate	0013662408	NA	Refuse to sign NDA or participate at this time
Semo Communications Inc.	Refused to Participate	0003788775	NA	Poplar Bluff Internet - refuse to sign NDA or participate at this time
NuVox, Inc.	Researching - Acquired By Windstream	0004319414	6/10/2010	No source data received to date.
Stouffer Communications	Researching - Included as Granby Telephone	0005061189		
CenturyTel Fiber Co. II, LLC dba LightCore, a CenturyTel Co	Researching Included in CenturyLink submission	0008612293	4/20/2010	
Falcon Cablevision	Researching Acquired By Charter Comm		NA	Data included in Charter submission.
New Cingular Wireless Services, Inc.	Researching – Purchased by AT&T	0003766532	4/7/2010	Included in AT&T submissions
City Light Gas & Water Office – City of Kennett	Researching To Determine If Broadband Provider			
City of Marshall	Researching To Determine If Broadband Provider			
Fidelity Communication Services II, Inc.	Researching To Determine If Broadband Provider	0005918503	4/5/2010	Researching inclusion with other Fidelity Provider submissions.
Fidelity Networks, Inc.	Researching To Determine If Broadband Provider	0004312963	4/5/2010	Researching inclusion with other Fidelity Provider submissions.
Excel Telecommunications – SureWest	Researching To Determine If Broadband Provider		4/12/2010	
TDS Metrocom	Researching To Determine If Broadband Provider		4/26/2010	Researching inclusion with other TDS Provider submissions.
TDS Missouri	Researching To Determine If Broadband Provider		4/26/2010	Researching inclusion with other TDS Provider submissions.
Telephone and Data Systems	Researching To Determine If Broadband Provider		4/26/2010	Researching inclusion with other TDS Provider submissions.
Aurora Communications, Inc.	Researching To Determine If Broadband Provider	0015696180	4/5/2010	Researching inclusion with other YHTI Provider submissions.
Full Stream Wireless	Researching To Determine If Broadband Provider			
Broadview Networks Holdings, Inc.	Researching To Determine If Broadband Provider	0010296853		
Broadwing Communications, LLC	Researching To Determine If Broadband Provider	0008599706	4/27/2010	Researching inclusion with other Level 3 Provider submission
WilTel Communications, LLC.	Researching To Determine If Broadband Provider	0003716511	4/27/2010	Researching inclusion with other Level 3 Provider submission
AT&T Services, Inc.	Researching To Determine If Broadband Provider	0008644056	4/7/2010	Researching inclusion with other AT&T Provider submission.
Advanced Digital LLC	Researching To Determine If Broadband Provider			
BMU Internet	Researching To Determine If Broadband Provider			
Computer Magic Internet LLC	Researching To Determine If Broadband Provider			

DNG Electronics	Researching To Determine If Broadband Provider			
Extreme	Researching To Determine If Broadband Provider			
Green City Electric Utility	Researching To Determine If Broadband Provider			
Human Span	Researching To Determine If Broadband Provider			
Insight Cable	Researching To Determine If Broadband Provider			
Jaguar Technologies Inc (JagTec)	Researching To Determine If Broadband Provider			
Jobe Internet Services	Researching To Determine If Broadband Provider			
Keno Telephone	Researching To Determine If Broadband Provider			
LocalNet	Researching To Determine If Broadband Provider			
MCM System Wireless	Researching To Determine If Broadband Provider			
MHE Net	Researching To Determine If Broadband Provider			
Midwest Internet Technologies (MITI)	Researching To Determine If Broadband Provider			
Midwest Telecommunications	Researching To Determine If Broadband Provider			
Mist Valley	Researching To Determine If Broadband Provider			
Momentum	Researching To Determine If Broadband Provider			
MoreNet	Researching To Determine If Broadband Provider			
NetZero	Researching To Determine If Broadband Provider			
North Missouri Internet Services	Researching To Determine If Broadband Provider			
Optimum Cablevision	Researching To Determine If Broadband Provider	0003301363		
Pacific Wireless Internet	Researching To Determine If Broadband Provider	0018044297		
PIP Internet	Researching To Determine If Broadband Provider			
Primary Networks	Researching To Determine If Broadband Provider			
Regis	Researching To Determine If Broadband Provider			
Sikeston Internet	Researching To Determine If Broadband Provider	0018375808		
Suddenlink Communications - Cequel Communications	Researching To Determine If Broadband Provider	0015784663	6/12/2010	
Superior Cable	Researching To Determine If Broadband Provider			
Tri-Lakes Internet	Researching To Determine If Broadband Provider			
Turbo Net	Researching To Determine If Broadband Provider			
Utopian Wireless Corporation	Researching To Determine If Broadband Provider			
United Electric	Researching To Determine If Broadband Provider			
Vaughn's Computer Central	Researching To Determine If Broadband Provider	0019846674		
Wave Internet Technologies LLC	Researching To Determine If Broadband Provider	0020090023		
Access US	Not Facilities Based			
Board of Municipal Utilities	Not Facilities Based	0016073389		Discontinued offering service
McLeodUSA Telecommunications Services, Inc. (PaeTec)	Not Facilities Based	0003716073	NA	
XO Communications, LLC	Not Facilities Based	0006275945	NA	
Telnet Worldwide	Not Facilities Based		NA	
Terre Star	Not Facilities Based		NA	
TMC Communications	Not Facilities Based		NA	
TracFone	Not Facilities Based		NA	
Sofnet	Not Facilities Based		NA	
Clear Communications, Inc.	Not Facilities Based			Equipment seller
Superfone Inc.	Not Facilities Based	0008402202		
Tritel	Not Facilities Based		NA	
Missouri Broadband	Not Facilities Based		NA	
Mobilcom Pittsburg, Inc.	Not Facilities Based	0002324465	NA	
PneumaTek	Not Facilities Based		NA	Not responding to email
City of Newburg	Not Facilities Based		NA	
Qwest Communications Company, LLC	Not Facilities Based	0003605953	NA	
South Holt Cablevision	Not Facilities Based		NA	Offer Internet through Oregon Farmers Mutual Telephone Co
ADC	Not Facilities Based		NA	
Adva Optical Networking North America, Inc.	Not Facilities Based		NA	
AFL Communications	Not Facilities Based		NA	
Aircell	Not Facilities Based		NA	
Airdis Telecom	Not Facilities Based		NA	
Airespring, Inc.	Not Facilities Based	0006875322	NA	
ANPI	Not Facilities Based		NA	
Arch Communications	Not Facilities Based		NA	
Atlantis Holdings LLC	Not Facilities Based	0018587402	NA	
Bluegrass Cellular	Not Facilities Based		NA	
Boost Mobile	Not Facilities Based		NA	
Broadband National	Not Facilities Based		NA	
BullsEye Telecom, Inc.	Not Facilities Based	0004350930	NA	
Cellular one	Not Facilities Based		NA	
CHR Solutions	Not Facilities Based		NA	
Charles Industries	Not Facilities Based		NA	
Chillicothe Municipal Utilities	Not Facilities Based	0004192225	NA	
City of Newburg	Not Facilities Based		NA	
Cooperative Communications, Inc.	Not Facilities Based		NA	
Curt's Custom Cable	Not Facilities Based		NA	
DeSoto ISP	Not Facilities Based		NA	
Digital Landing	Not Facilities Based		NA	
DirecTV	Not Facilities Based		NA	
DSL,net, Inc. (Megapath)	Not Facilities Based	0004324851	NA	
Earthlink	Not Facilities Based		NA	
Extel	Not Facilities Based		NA	
Freedom Communications	Not Facilities Based		NA	
GlobalNet	Not Facilities Based		NA	
Golden State Cellular	Not Facilities Based		NA	

Granite Telecommunications	Not Facilities Based		NA	
Illinois Valley Cellular	Not Facilities Based		NA	
Innovative Systems	Not Facilities Based		NA	
Interglobe Communications, Inc.	Not Facilities Based	0005156229	NA	
Inter-Linc	Not Facilities Based		NA	
Jitterbug	Not Facilities Based		NA	
LightEdge Solutions, Inc.	Not Facilities Based	0015546443	NA	
Logix Communications	Not Facilities Based		NA	
Metropolitan Telecommunications Holding Company	Not Facilities Based	0009806019	NA	
Mid America Computer Corporation	Not Facilities Based		NA	
Mohave Wireless	Not Facilities Based		NA	
Netlogic, Inc.	Not Facilities Based	0006825954	NA	
New Edge Holding Company	Not Facilities Based	0003720471	NA	
Nex-Tech Wireless	Not Facilities Based		NA	
Nortel Solutions	Not Facilities Based		NA	
Open Range	Not Facilities Based		NA	
OFS	Not Facilities Based		NA	
Pacific Wireless	Not Facilities Based		NA	
Preferred Long Distance	Not Facilities Based		NA	
Protel	Not Facilities Based		NA	
Pulse Broadband	Not Facilities Based		NA	Reseller for Ralls Tech.
SkyTerra Communications	Not Facilities Based		NA	
SkyWay USA	Not Facilities Based		NA	
Spirit Telecom	Not Facilities Based		NA	
Stutler Technologies Corp	Not Facilities Based		NA	
Tablerock Net	Not Facilities Based		NA	
TCO Network, Inc.	Not Facilities Based		NA	
TCS Telecom, Inc.	Not Facilities Based		NA	
Telefonica Data Corp SA	Not Facilities Based	0018547828	NA	
Tellabs	Not Facilities Based		NA	
Toast.Net	Not Facilities Based		NA	
Tranquility Internet	Not Facilities Based		NA	
Video Direct	Not Facilities Based		NA	
Vonage	Not Facilities Based		NA	
Zone Telecom, Inc.	Not Facilities Based		NA	
WestLink	Not Facilities Based		NA	
Aero-Surf Wireless Internet	Out of Business			Appear to be out of business
Almega Cable	Out of Business		Not Req'd by Provider	Phone number no longer in service. Out of business?
Longview Cable and Data, LLC.	Out of Business	0013948609	NA	Sold off Assets
Total Wireless Communications	Out of Business	0018726729	Not Req'd by Provider	Acquired by Total Highspeed Internet Services
Missouri Network Alliance	Out of Business	0015540669	Not Req'd by Provider	Acquired by BlueBird Network
Worldcom Broadband Solutions	Out of Business		NA	
Global Crossing Telecommunications, Inc.	Out of Business	0002850519	NA	
Sikeston Board of Municipal Utilities	Out of Business	0016073389	NA	

Attachment A

NONDISCLOSURE AGREEMENT

THIS NONDISCLOSURE AGREEMENT ("Agreement"), dated and effective as of _________________, 2010, is made by and among the Parties to this Agreement, which are ___________________________________including its affiliates (collectively referred to hereinafter as "the Company"), and the State of Missouri, Office of Administration ("OA"), The Curators of the University of Missouri on behalf of the University of Missouri - Columbia ("MU"), GeoDecisions, a Division of Gannett Fleming, Inc. ("GeoDecisions"), and CBG Communications, Inc. ("CBG") (collectively referred to hereinafter as "the State Parties," except where otherwise indicated.)

WHEREAS:

I. The National Telecommunications and Information Administration (NTIA) has made available a grant program to fund broadband mapping known as the State Broadband Data and Development (SBDD) grant program, which is governed by the Notice of Funds Availability (NOFA) first published in volume 74, number 129, at page 32545 of the Federal Register and subsequently clarified in volume 74, number 154, at page 40569 of the Federal Register, both of which are incorporated fully herein; and

II. Both OA and MU have partnered with the mapping entities, GeoDecisions and CBG, to implement the SBDD grant program; and

III. The Company possesses confidential and proprietary information necessary to such implementation and acknowledges that it desires to share certain of that information with the State Parties and with the NTIA; and

IV. When the Company shares that information with the State Parties, the confidential and limited use conditions of this Agreement shall apply; and

V. Missouri law allows governmental entities to close records that: 1) relate to scientific and technological innovations in which the owner has a proprietary interest pursuant to §610.021(15); and 2) fall within the definition of "trade secret" pursuant to the Uniform Trade Secrets Act, §417.450, RSMo.; and 3) have been submitted to an institution of higher education in connection with a proposal to license intellectual property or perform sponsored research and which contains sales projections or other business plan information the disclosure of which may endanger the competitiveness of a business, §610.021(22) ; and

NOW THEREFORE, the Parties agree as follows:

TERMS:

a) "Confidential Information" shall be defined in identical terms to the SBDD NOFA and any subsequent SBDD NOFA Clarification(s).

b) All Confidential Information received by the State Parties from the Company may be used as follows:

   i) The State Parties may use the Company's information to derive maps, interactive websites and tabular data representations of the Company's broadband coverage area, network information, coverage attributes, and such other uses as may be required to implement the SBDD, referred to as the State Parties' Work Product; and

   ii) The State Parties may, at a given location, estimate broadband coverage and identify broadband providers within the associated census block or estimated area, including Company, if applicable; and

   iii) That State Parties may provide the NTIA with any such State Works as may be reasonably required by the terms and conditions as outlined in any applicable NOFA. The Company acknowledges that such provision may likely result in the disclosure of Confidential Information to governmental authorities and that, once such disclosures are made by the State Parties as required by a Project, the State Parties

1

Figure 4: Standard NDA pg 1

are fully released from any liability for the actions of the third party governmental authority regarding the disclosure, sharing or use of such Confidential Information; and,

iv) The State Parties may use the Confidential Information in any other way to the extent such use is consistent with this Agreement and the SBDD program, that does not result in disclosing it, and

v) The Company waives any claims of ownership to the State Parties' Work Products.

c) Per the terms of this Agreement, the State Parties will protect Confidential Information provided to it from any use, distribution or disclosure pursuant to §610.021 (14), (15) and (22) and §417.450, RSMo, except as permitted herein.

d) Confidential Information provided to Recipient in written or other tangible or electronic form shall be marked by Company with a confidential and proprietary notice prior to receipt by the State Parties.

e) Parties acknowledge that any discrepancy between the SBDD NOFA and the terms provided for herein shall be resolved in favor of the SBDD NOFA. Nothing contained herein shall be construed to limit the State Parties' reporting and data sharing obligations under the SBDD NOFA, including sharing of Company's Confidential Information with NTIA pursuant to the terms of the SBDD NOFA and Clarification.

f) The State Parties may provide Confidential Information only to those employees, consultants, independent contractors and agents who:

i) Have a substantive need to know such Confidential Information in connection with the State Parties' Work Product;

ii) Have been advised of the confidential and proprietary nature of such Confidential Information; and

iii) Have agreed in writing prior to disclosure to protect from unauthorized disclosure all confidential and proprietary information to which they have access in the course of their participation in the creation of the State Parties' Work Product in accordance with all the terms of this Agreement.

g) Confidential Information does not include information the State Parties lawfully obtain from any source other than Company, provided that such source lawfully disclosed such information.

h) If the State Parties are required to provide Confidential Information to any court, government agency or third party pursuant to written court order, subpoena, Missouri Sunshine Law request, or other process of law, they must provide the Company with prompt written notice of such requirement or request and cooperate with the Company to protect against or limit the scope of the disclosure.

i) All Confidential Information remains at all times the Company's property. Any State Party Recipient may make tangible or electronic copies and notes of Confidential Information only as necessary for use as authorized herein. All such copies or notes must be marked with the same confidential and proprietary notice as appears on the original. All such copies will be destroyed when the State Parties' Work Product is fully completed and finally approved, and all originals shall be either destroyed or returned to the Company, at the Company's option.

j) The State Parties may publicly identify the Company as a contributing broadband service provider, provided no information covered by this Agreement is revealed. No license for use, beyond that provided for herein, under any trademark, patent, copyright, trade secret or other intellectual property right is either granted or implied by disclosure of Confidential Information to the State Parties.

k) If and to the extent any provision of this Agreement is held invalid or unenforceable, all other provisions of this Agreement shall remain in full force and effect to the fullest extent permitted by law.

2

Figure 5: Standard NDA pg 2

l) This Agreement is binding upon and inures to the benefit of the Parties and their heirs, executors, legal and personal representatives, successors and assigns, as the case may be.

m) This Agreement is the entire agreement between the Parties hereunder and may not be modified or amended except by a written instrument signed by all Parties. Each Party has read this Agreement, understands it and agrees to be bound by its terms and conditions. There are no understandings or representations with respect to the subject matter hereof, express or implied, that are not stated herein. This Agreement may be executed in counterparts, and signatures exchanged by facsimile or other electronic means are effective for all purposes hereunder to the same extent as original signatures.

n) This Agreement shall be governed, construed, and enforced in accordance with the laws of the State of Missouri, without regard to its principles of conflict of law.

IN WITNESS WHEREOF, the Parties have read and agreed to this Nondisclosure Agreement as evidenced by the signatures of the Parties' authorized representatives below:

Company:

By: ______________________________
(Authorized Signature)

Name: ______________________________

Title: ______________________________

GeoDecisions, a Division of Gannett Fleming, Inc.:

By: ______________________________
(Authorized Signature)

Name: ______________________________

Title: ______________________________

State of Missouri, Office of Administration, Information Technology and Services Division:

By: ______________________________
(Authorized Signature)

Name: ______________________________

Title: ______________________________

The Curators of the University of Missouri:

By: ______________________________
(Authorized Signature)

Name: ______________________________

Title: ______________________________

CBG Communications, Inc:

By: ______________________________
(Authorized Signature)

Name: ______________________________

Title: ______________________________

3

Figure 6: Standard NDA pg 3

Commonwealth of the Northern Mariana Islands Broadband Mapping Project: Product Release White Paper

Contact Name Manager:	Ivan A. Blanco
Contact Phone Number:	(670) 664-3023
Contact E-mail:	**deputy.blanco@commerce.gov.mp**
Submitted By:	Kristin Rousseau
Contact E-mail:	**kristin.rousseau@broadmap.com**

Product Specification:	Fall 2012 NTIA Data Model
Product/Process:	NTIA—October 1, 2012 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's October 1st, 2012 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Providers Included
  - IT& E
  - MCV

- Non-Responsive/Non-Cooperative Providers
  - None

- Other Provider Comments
  - iConnect
    - Currently not a broadband service provider; however they are researching further on entering the Terrestrial Fixed Wireless market
  - GTA
    - Working towards becoming a reseller provider in this area

  - Docomo Pacific
    - Provided data required for mapping their wireless footprint; however it was removed as it does not meet the NOFA standards of broadband speeds
    - Just acquired MCV and we should updated accordingly in the subsequent data submission

COVERAGE AREA CHANGES

- Coverage Footprint Reductions/Map Refinement –
  - IT&E has updated their speeds for this data submission, including their AWNS

- Coverage Footprint Expansion –
  - No expansion for this data submission round

DATA CORRECTIONS

- There were no data corrections required for this data submission
  - There was also no NTIA 3rd Party data review results posted on the Broadband State Data Management Tool that could lead to potential data corrections.

COMMUNITY ANCHOR INSTITUION (CAI) DETIALS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	CAIID Count	Transmission Technology	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	19	17	0	0	0
Category 2 - Library	3	2	0	0	0
Category 3 - Medical/Healthcare	3	0	0	0	0
Category 4 - Public Safety	0	0	0	0	0
Category 5 - Universities/Colleges	1	1	0	0	0
Category 6 - Other: Government	7	0	0	0	0
Category 7 - Other: Non-Government	11	0	0	0	0
Total	**44**	**20**	**0**	**0**	**0**

CAI CHANGES

- The CAI's within the following categories were reviewed again against the below-mentioned databases to identify if any CAIID's need to be updated or added.
  - For K-12 institutions (CAI type 1) please add the NCES ID CCD ID value found here: **http://nces.ed.gov/ccd/bat/**
  - For Higher Education (CAI type 5) please add the NCES IPEDS ID value found here: **http://nces.ed.gov/ipeds/datacenter/**
  - For Libraries (CAI type 2) please. Combine (do not add) "FSCSKey" and "FSCs_SEQ" from the "puout08av2000" file and place them here: **http://harvester.census.gov/imls/data/pls/index.asp** (FYI the LIBID is your state's unique ID for libraries)

SUBMISSION RECEIPT

SUBMISSION RECEIPT RESULTS

- Attached are the results from the NTIA data submission receipt quality script.

MP_2012_9_17.txt

- Error Report

  The only items detected were for the TT-10 service coverage areas that have a maximum advertised download speed of 7 and the Middle Mile elevation check.

  The technology and speeds were validated by the provider and are within the ranges communicated in the NTIA data model.

  All items are included within the accompanying ReadMe file.

  Update: There was an update made to the submission receipt on 09/20/12 that introduced the longitude issue for Middle Mile layer.

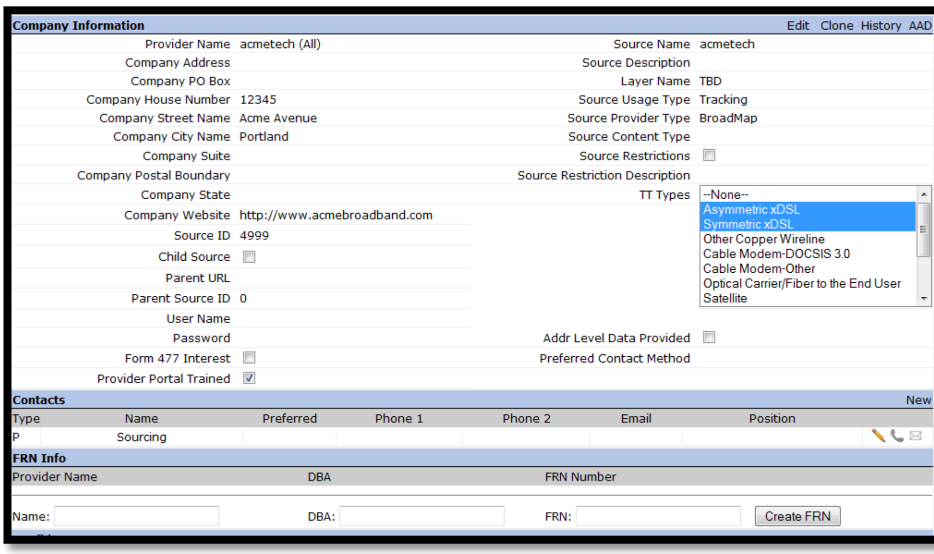
HIGH-LEVEL SUMMARY

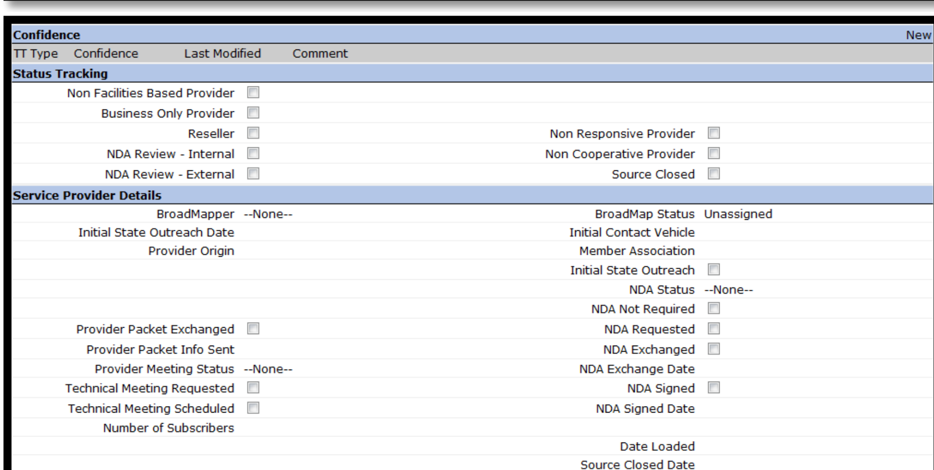
DATA GATHERING

BROADBAND SERVICE AREAS, MIDDLE MILE AGGREGATION POINTS AND BROADBAND SERVICE OVERVIEW

The collection of Broadband Service Areas, Middle Mile Aggregation Points and Broadband Service Overview information is handled through the following Provider Outreach Process:

- Build and maintain an inventory of Broadband providers through research and State inputs.
- The inventory and everyday interaction with providers is tracked using our Provider Catalog (PCat). Below are some examples of the web application, which has a shared access between our team and mapping partner (BroadMap).





BDIA Delivery 0412			Edit
Status	--None--	Provider Data Reviewed	☐
Outreach Date		Provider Data Reviewed Date	
Initial Response		FootPrint	
Meeting Date		MiddleMile	
No Update Date		Subscriber	
Waiting For Data Date		Provider Login	☐
Data Received Date		Provider Login Date	
Data Accepted Date			
Source Ingested		Source Ingested Date	
Additional Data			
Notes			
Next Steps			
Inactive	☐	Owner	briordan
Created By	briordan 2011-06-13 12:06:35	Last Modified By	krousseau 2012-03-16 13:41:58

- In order to encourage participation throughout the life of the program, we feel it's important to foster relationships with the providers and encourage a collaborative team effort between all parties for each data submission.

- Update provider material that describes the data requirements and logistics for data transfer.
- Update Non-Disclosure Agreement (NDA) for use in project, where applicable.
- Maintain multiple protocols for the provider to submit data, including Secure File Transfer Protocol (SFTP) technology when desired.
- Conduct one-on-one informational discussions with each provider to communicate the following:
  - Requirements of this project;
  - Broadband data required to support the product data model;
  - Submission protocols available;
  - Capability to validate how the supplied data is aggregated.
- Download/receive provider data.
- Establish a repeatable process with provider. Maintain provider communication, transaction and data handling records throughout the project (dates contacted, data received, etc.).

COMMUNITY ANCHOR INSTITUTION (CAI)

The collection of CAI information is handled through the following CAI Collection Process:

- Collect and maintain inventory of CAIs through data mining, research and State inputs.
- Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.
- Upload web-based data to Core Database for standardization.
- Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.
- Geocode CAI locations.
- Translate Core Database data to deliverable-ready format.
- Continue engagement with non-responsive institutions.

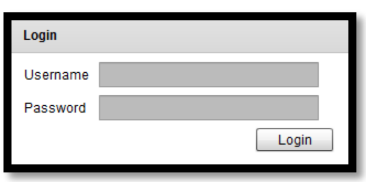
DATA INTEGRATION PROCESS

The data integration and processing mechanisms currently used allow for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

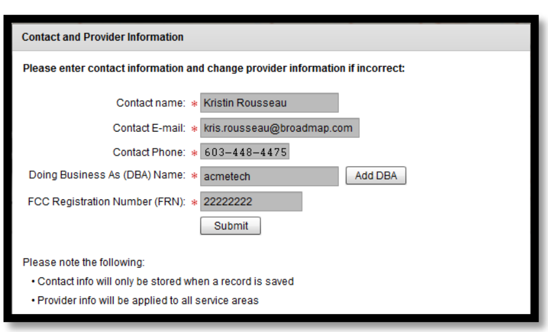
- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type category (addresses, block lists, paper maps, etc.).
- Standardize input based on data type within Staging Database.
- Create Compact Polygons (CP)—(internal methodology for generating area-based feature for coverage in Staging Database).
- Apply broadband attribution to CP; apply metadata to CP.
- Perform quality analysis of the CP against the source supplied to identify any completeness or accuracy issues.
- Request additional information from the provider if elements of coverage are missing or contain discrepancies. This is a second manual quality check to ensure data is complete.
    - Process coverage area to build the required NTIA data model layers.

With the deployment of the Provider Portal this round, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it's allows them more visibility into how their data is being represented and gives them knowledge and ownership of their coverage representation. Below are some bullet points and supporting screen shots on how the portal is used.

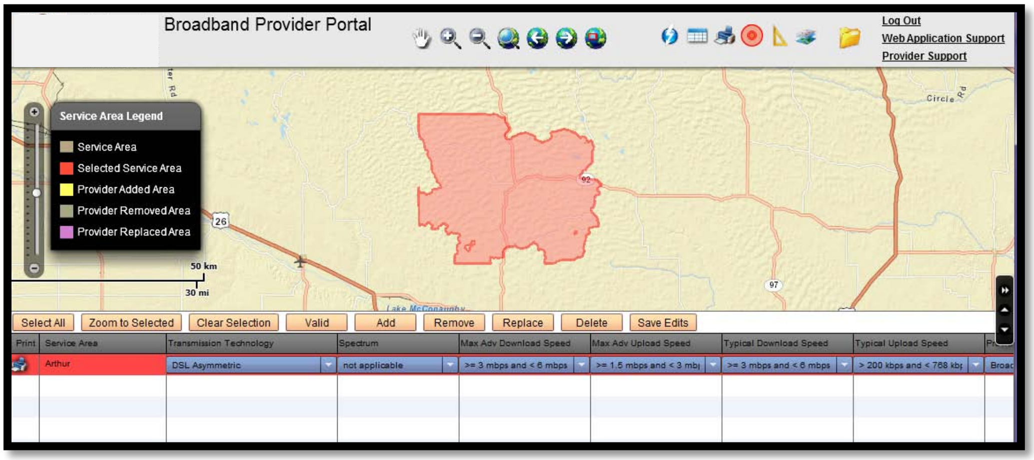
- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration



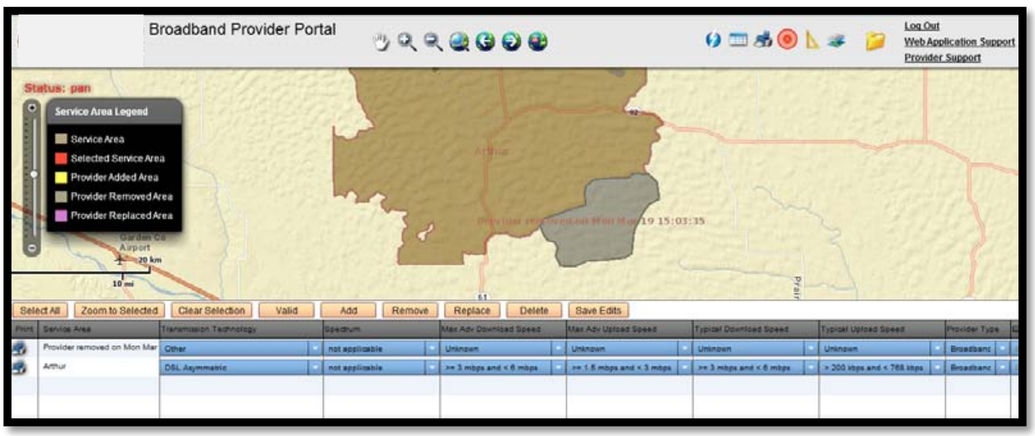
- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy



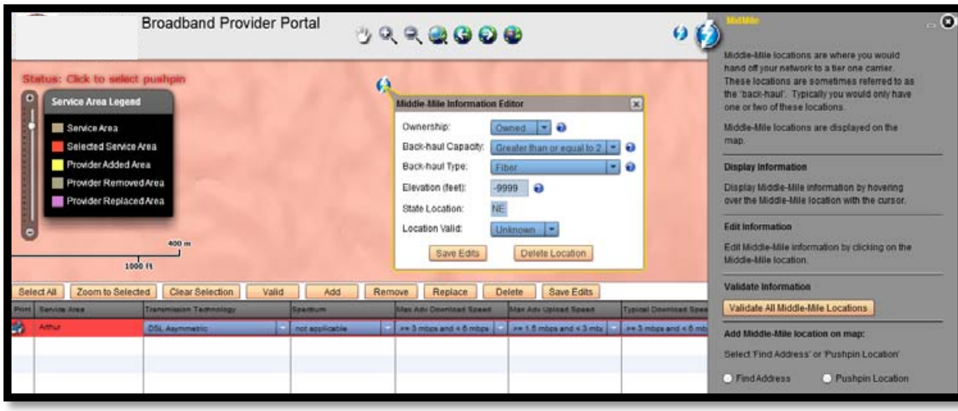
- Capability to review and request changes to the coverage footprint

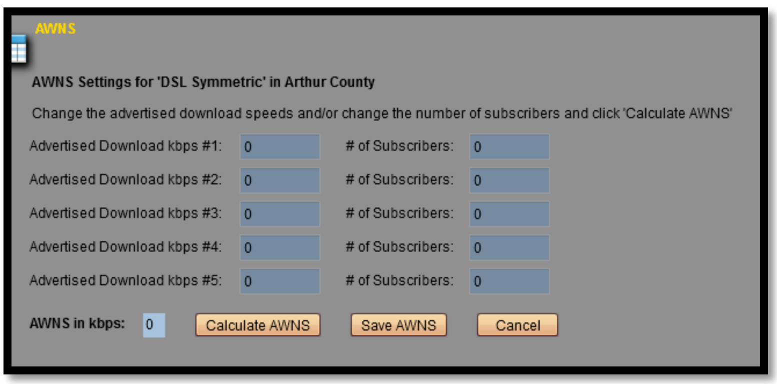


- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

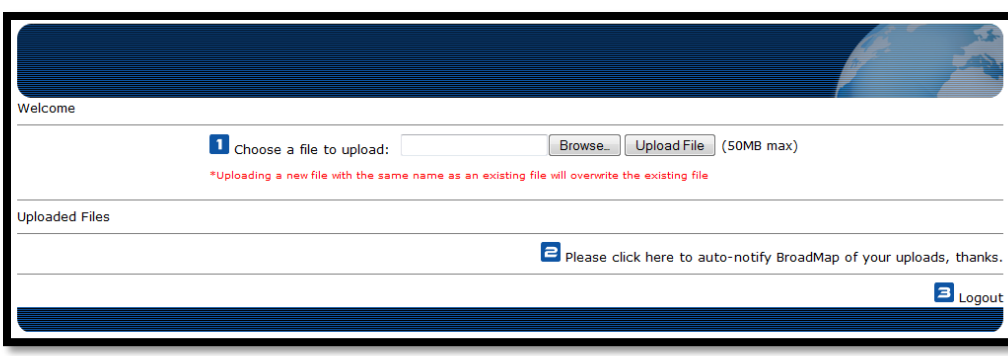


- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





- File upload functionality to support providers that would prefer a shapefile, spreadsheet, PDF, KMZ/KML file be used to reflect changes for the data round



- Once the provider has review completed changes to their coverage, middle mile and AWNS, then can validate them all signing off that everything is accurate.

DATA VALIDATION AND VERIFICATION

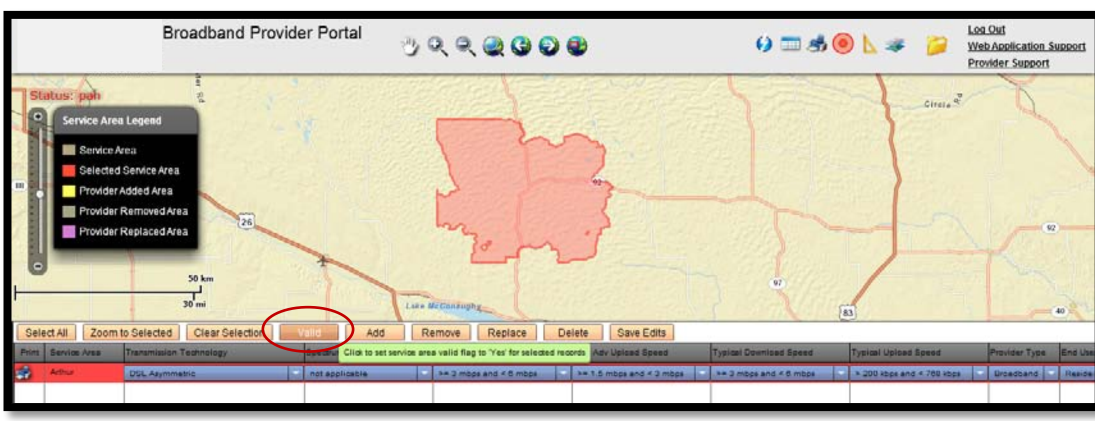
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage areas and serviceability claims, additional reviews are performed using the methods described in the subsections below in order of action (**Broadband Provider Validation**, **Third-Party Data Verification**, **Public Verification, and Confidence Values**).

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

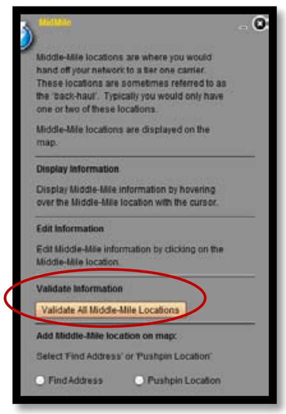
Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the **Data Integration Process** and are reviewed with the provider to complete validation.

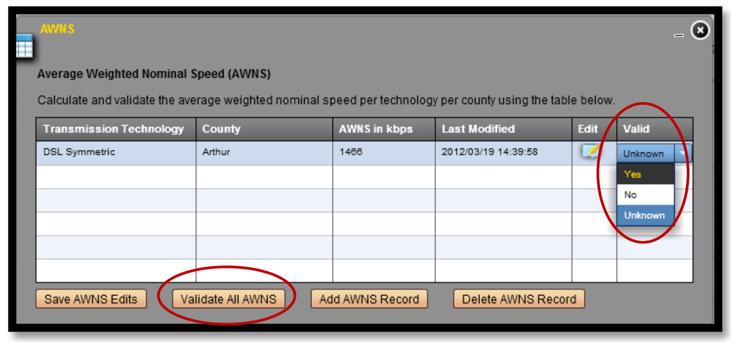
With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

- Coverage validation can be done on one record/footprint at a time or by selecting footprints and selecting the 'Valid' button. The provider could also print off their coverage for their own tracking purposes.



- Middle Mile & AWNS Validation





All validation results are tracked internally through our Validation Table, which also improves the overall **Confidence Value** as mentioned below.

THIRD-PARTY DATA VERIFICATION

For this submission, the NTIA 3rd Party Data summary was reviewed again to ensure any corrections required were represented in the final product and the supporting documentation. This includes additional feedback received directly from NTIA, prior to this data submission.

This submission was also compared to the previous data submission, April 2012, as a quality check to identify and resolve any potential erroneous discrepancies between the two products.

PUBLIC VERIFICATION

The broadband interactive map has been released to the public, which includes functionality to collect feedback on the provider's coverage areas, as well as running a speed test. The feedback and speed results continue to be collected and reviewed with the providers prior to the next data submission to identify if any map refinement is required.

The public website can be viewed at the following hyperlink:

http://cnmi-bb.broadmap.com/PublicMap/

CONFIDENCE VALUES

All verification, validation and manual quality review results are tracked by provider/technology type and stored and maintained within a **Validation table**. A confidence value is assigned, based on internal assessments of the collected information, to highlight the provider coverage areas and/or attributions that would benefit from further investigation and/or enhancements.

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention.

QUALITY CONTROL

Following collection, processing and analysis of the provider and CAI data, the product is checked manually and algorithmically against the NTIA data model. Some of the items included within these checks are:

- Format correctness;
- Table and field structure;
- Valid values, including default values, where applicable;
- Geographic extent and topology errors.

Prior to data submission, another quality control script supplied by NTIA is run. This script, SBDD_CheckSubmission.py, creates an output in text form that is required to be submitted along with the final deliverable. All errors must come up clean, unless otherwise specified by NTIA.

DETAILED PROCESS REVIEW

To review the detailed process, please review the attached object:

BMap_ProcessDetails_2012_10_01.docx

Mississippi Broadband Mapping Project: Product Release White Paper

Contact Name Manager:	Gary Rawson
Contact Phone Number:	601-432-8113
Contact E-mail:	**Gary.Rawson@its.ms.gov**
Submitted By:	Kristin Rousseau
Contact E-mail:	**kristin.rousseau@broadmap.com**
Product Specification:	Fall 2012 NTIA Data Model
Product/Process:	NTIA—October 1, 2012 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's October 1st, 2012 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Provider Participation Statistics Summary

Summary	Count
Total Providers Researched/Contacted (Includes Resellers)	222
Total Valid Broadband Providers	57
Non-Responsive Providers	2
Non-Cooperative Providers	1
Number of Providers – Represented in Data Submission	54
Number of Providers - Supplied Updates for this Submission	42
Number of Providers - Confirmed No Updates	12

- New Providers Since Last Data Submission
  - Buford Media Group/Alliance
  - Cable TV of Belzoni
  - Mediacom
  - Ripley Video Cable
  - Suddenlink Communications
  - Tristate Internet
  - Vance Wireless

- Existing Providers – Confirmed No Updates
  - Cable One
  - Delta Link Inc
  - EarthLink Business
  - Georgetown Telephone Company Inc.
  - HughesNet
  - Level 3 Communications, LLC

- StarBand Communications
    - ViaSat, Inc.
    - Xfone USA, Inc.

- Existing Providers – No Response/No Updates
    - Bailey Cable TV
    - Network Telephone corp.
    - New Edge Network, Inc. (EarthLink)

- Providers Included (listed by DBA name)

AT&T Mississippi	Megagate Broadband
Bailey Cable TV	MetroCast Communications of Mississippi, LLC
Bruce Telephone Company, Inc.	Mound Bayou Telephone and Communications, Inc
C Spire Wireless	NetWireless Solutions LLC
Cable One	Network Telephone corp.
Cable TV Of Belzoni, Inc	Noxapater Telephone Company
CenturyLink	Ripley Video Cable Co., Inc.
Charter Communications Inc.	Skycasters
Comcast	Sledge Telephone Co. Inc.
Covad Communications Company	Smithville Telephone Company, Incorporated
Cricket Communications, Inc.	Southern Light LLC
Decatur Telephone Co. Inc.	Sprint
Delta Link Inc	StarBand Communications
Delta Telephone Co. Inc.	Suddenlink Communications
Dixie-Net	TDS Telecom
EarthLink Business	TEC of Jackson, Inc
Firenet1.com	Telepak Networks, Inc.
Franklin Telephone Co. Inc.	T-Mobile
Frontier Communications of Mississippi, LLC	Tri State Internet, LLC
Fulton Telephone Company, Inc	tw telecom of mississippi llc
Georgetown Telephone Company Inc.	Vance Wireless
GulfPines Communications	Verizon Wireless
HughesNet	ViaSat, Inc.
InLine	Vicksburg Video, Inc.
Lakeside Telephone Company Inc.	Windstream Mississippi LLC
Level 3 Communications, LLC	Xfone USA, Inc.
Mediacom LLC	Zayo Group LLC

- Non-Responsive/Non-Cooperative Providers
    - New Edge Network, Inc. (EarthLink)

- Providers researched and identified as non-broadband providers can be viewed within the table at the end of this document.

COVERAGE AREA CHANGES

- Coverage Footprint Reductions/Map Refinement –
  - Covad Communications Company (TT-30)
  - New Edge Networks (TT-30)
    - This coverage was removed as they have been acquired by EarthLink and we're trying to get coverage information from them now.

- DBA Name Change –
  - WildBlue Communications, Inc. has been changed to ViaSat, Inc.
  - Trust Communication has been acquired by Bailey Cable TV.

- Coverage Footprint Expansion –
  - BellSouth/AT&T Mississippi (TT-10)
  - BellSouth/AT&T Mississippi (Introduction of TT-50)
  - AT&T Mobility LLC (TT-80)
  - CenturyLink (TT-10)
  - Charter Communications Inc. (TT-41)
  - Comcast (TT-40)
  - Cricket (TT-80)
  - Delta Telephone Co. Inc. (TT-50)
  - InLine (TT-50)
  - Southern Light LLC (TT-50)
  - TEC (TT_10)
  - Windstream Mississippi LLC (TT-10)
  - Zayo Group LLC (TT-50)

DATA CORRECTIONS

No data corrections were required for this data submission

COMMUNITY ANCHOR INSTITUTION (CAI) DETAILS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	CAIID Counts	Broadband Subscriber (1 or 2)	Trans Tech	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	697	277	502	502	502	55
Category 2 - Library	278	234	197	197	197	37
Category 3 - Medical/Healthcare	437	0	243	243	243	136
Category 4 - Public Safety	869	0	136	136	136	93
Category 5 - Universities/Colleges	40	40	0	0	0	0
Category 6 - Other: Government	409	0	335	335	335	142
Category 7 - Other: Non-Government	0	0	0	0	0	0
Total	**2730**	**551**	**1413**	**1413**	**1413**	**463**

CAI CHANGES

- No significant changes for the CAI layer this round.
- The CAI inventory was reviewed again against the database mentioned below for the following categories: Category 1: K-12 Schools, Category 2: Libraries and Category 5: Colleges
  These databases are as follows:
  - For K-12 institutions (CAI type 1) please add the NCES ID CCD ID value found here: **http://nces.ed.gov/ccd/bat/**
  - For Higher Education (CAI type 5) please add the NCES IPEDS ID value found here: **http://nces.ed.gov/ipeds/datacenter/**
  - For Libraries (CAI type 2) please. Combine (do not add) "FSCSKey" and "FSCs_SEQ" from the "puout08av2000" file and place them here: **http://harvester.census.gov/imls/data/pls/index.asp** (FYI the LIBID is your state's unique ID for libraries)

SUBMISSION RECEIPT

SUBMISSION RECEIPT RESULTS

- Attached are the results from the NTIA data submission receipt quality script.

MS_2012_9_21.txt

- Error Report

  All items flagged within the submission receipt where confirmed with the provider. We called each provider that was identified in the warnings due to Technology/Speed matches, and validated again that they were accurate. Some warnings identified were within the NTIA data model as well.

  All warnings were commented within the accompanying ReadMe file.

HIGH-LEVEL SUMMARY

DATA GATHERING

BROADBAND SERVICE AREAS, MIDDLE MILE AGGREGATION POINTS AND BROADBAND SERVICE OVERVIEW

The collection of Broadband Service Areas, Middle Mile Aggregation Points and Broadband Service Overview information is handled through the following Provider Outreach Process:

- Build and maintain an inventory of Broadband providers through currently known providers and research.
- The inventory and everyday interaction with providers is tracked using the Provider Catalog (PCat). Below are some examples of the web application, which has a shared access between our team and mapping partner (BroadMap).

Company Information

Edit Clone History AAD

Provider Name	acmetech (All)	Source Name	acmetech
Company Address		Source Description	
Company PO Box		Layer Name	TBD
Company House Number	12345	Source Usage Type	Tracking
Company Street Name	Acme Avenue	Source Provider Type	BroadMap
Company City Name	Portland	Source Content Type	
Company Suite		Source Restrictions	☐
Company Postal Boundary		Source Restriction Description	
Company State		TT Types	--None-- Asymmetric xDSL Symmetric xDSL Other Copper Wireline Cable Modem-DOCSIS 3.0 Cable Modem-Other Optical Carrier/Fiber to the End User Satellite
Company Website	http://www.acmebroadband.com		
Source ID	4999		
Child Source	☐		
Parent URL			
Parent Source ID	0		
User Name			
Password		Addr Level Data Provided	☐
Form 477 Interest	☐	Preferred Contact Method	
Provider Portal Trained	☑		

Contacts

New

Type	Name	Preferred	Phone 1	Phone 2	Email	Position
P	Sourcing					

FRN Info

Provider Name	DBA	FRN Number

Confidence

New

TT Type	Confidence	Last Modified	Comment

Status Tracking

Non Facilities Based Provider	☐		
Business Only Provider	☐		
Reseller	☐	Non Responsive Provider	☐
NDA Review - Internal	☐	Non Cooperative Provider	☐
NDA Review - External	☐	Source Closed	☐

Service Provider Details

BroadMapper	--None--	BroadMap Status	Unassigned
Initial State Outreach Date		Initial Contact Vehicle	
Provider Origin		Member Association	
		Initial State Outreach	☐
		NDA Status	--None--
		NDA Not Required	☐
Provider Packet Exchanged	☐	NDA Requested	☐
Provider Packet Info Sent		NDA Exchanged	☐
Provider Meeting Status	--None--	NDA Exchange Date	
Technical Meeting Requested	☐	NDA Signed	☐
Technical Meeting Scheduled	☐	NDA Signed Date	
Number of Subscribers			
		Date Loaded	
		Source Closed Date	

BDIA Delivery 0412

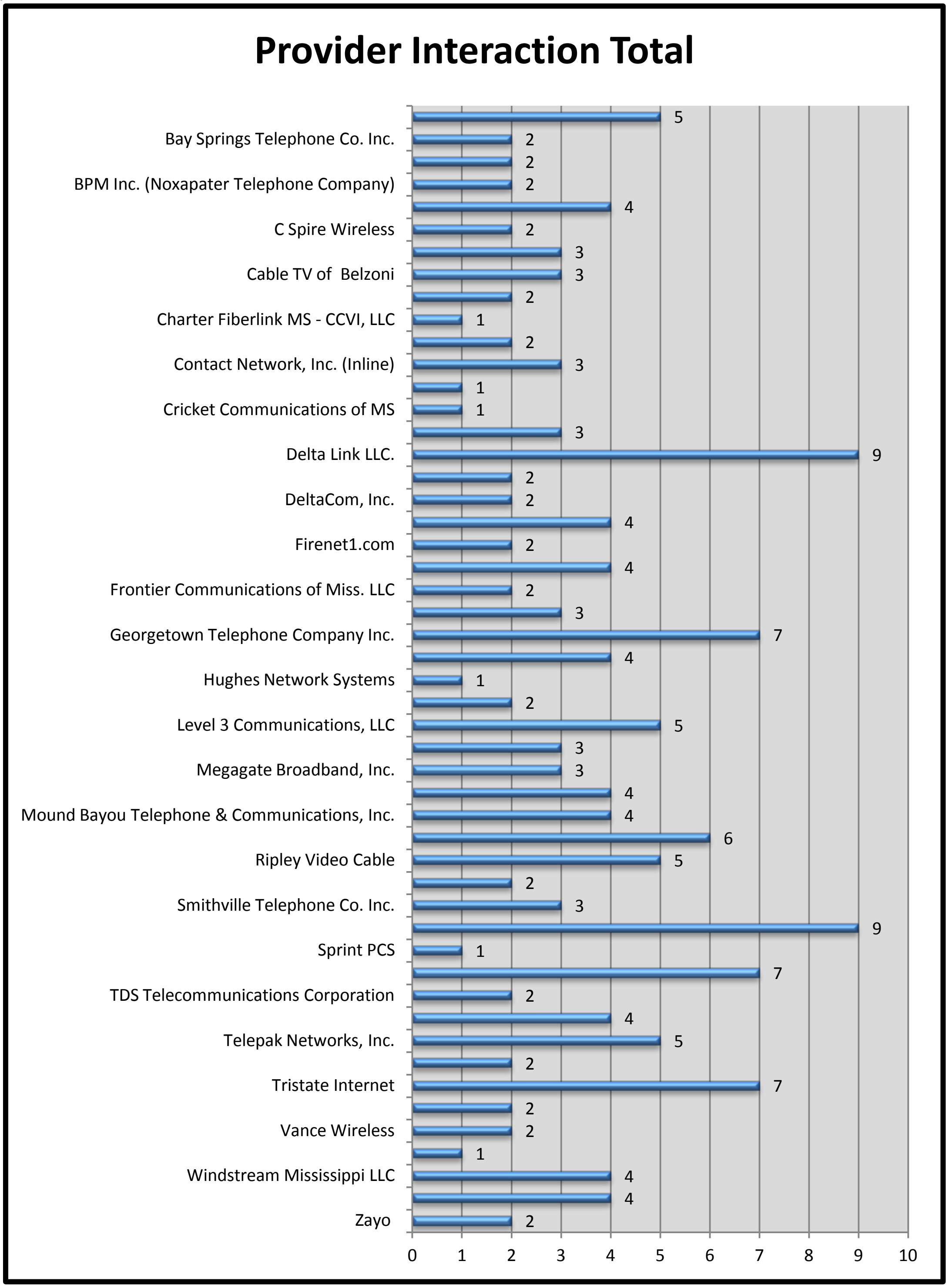
Edit

Status	--None--	Provider Data Reviewed	☐
Outreach Date		Provider Data Reviewed Date	
Initial Response		FootPrint	
Meeting Date		MiddleMile	
No Update Date		Subscriber	
Waiting For Data Date		Provider Login	☐
Data Received Date		Provider Login Date	
Data Accepted Date			
Source Ingested		Source Ingested Date	

Additional Data

Notes			
Next Steps			
Inactive	☐	Owner	briordan
Created By	briordan 2011-06-13 12:06:35	Last Modified By	krousseau 2012-03-16 13:41:58

- In order to encourage participation throughout the life of the program, we feel it's important to foster relationships with the providers and encourage a collaborative team effort between all parties for each data submission. The chart below represents the interaction count with each, by provider name.



- Update provider material that describes the data requirements and logistics for data transfer.
- Update Non-Disclosure Agreement (NDA) for use in the project, where applicable.
- Maintain multiple protocols for the provider to submit data, including Secure File Transfer Protocol (SFTP) technology when desired.
- Conduct one-on-one informational discussions with each provider to communicate the following:
  - Requirements of this project;
  - Broadband data required to support the product data model;
  - Submission protocols available;
  - Capability to validate how the supplied data is aggregated.
- Download/receive provider data.
- Establish a repeatable process with provider. Maintain provider communication, transaction and data handling records throughout the project (dates contacted, data received, etc.).

COMMUNITY ANCHOR INSTITUTION (CAI)

The collection of CAI information is handled through the following CAI Collection Process:

- Collect and maintain inventory of CAIs through currently known CAIs, data mining, and research.
- Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.
- Upload web-based data to Core Database for standardization.
- Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.
- Geocode CAI locations.
- Translate Core Database data to deliverable-ready format.
- Continue engagement with non-responsive institutions.

DATA INTEGRATION PROCESS

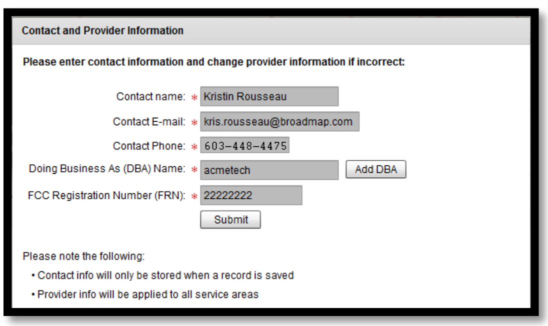
The data integration and processing mechanisms currently used allows for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type category (addresses, block lists, paper maps, etc.).
- Standardize input based on data type within Staging Database.
- Create Compact Polygons (CP)—(internal methodology for generating area-based feature for coverage in Staging Database).
- Apply broadband attribution to CP; apply metadata to CP.
- Perform quality analysis of the CP against the source supplied to identify any completeness or accuracy issues.
- Request additional information from the provider if elements of coverage are missing or contain discrepancies. This is a second manual quality check to ensure data is complete.
  - Process coverage area to build the required NTIA data model layers.

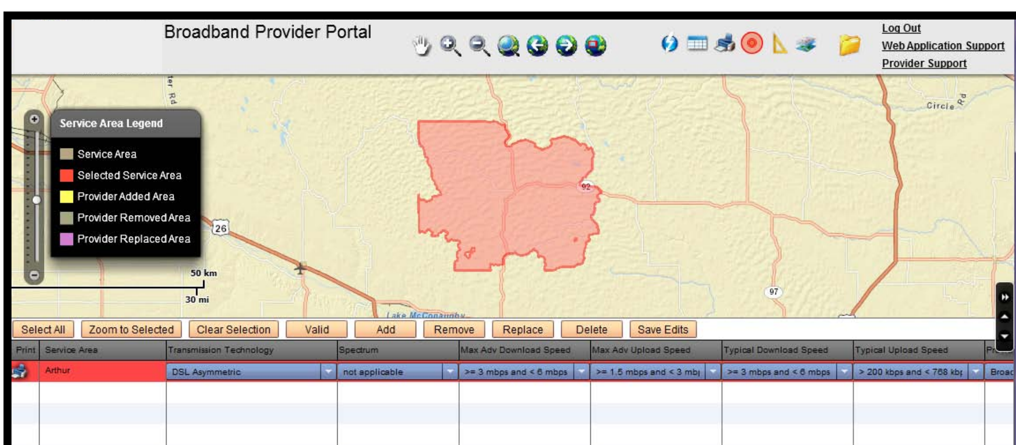
With the deployment of the Provider Portal this round, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it supplies them with more visibility into how their data is being represented and gives them knowledge and ownership of their coverage representation. Below are some bullet points and supporting screen shots on how the portal is used.

- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration

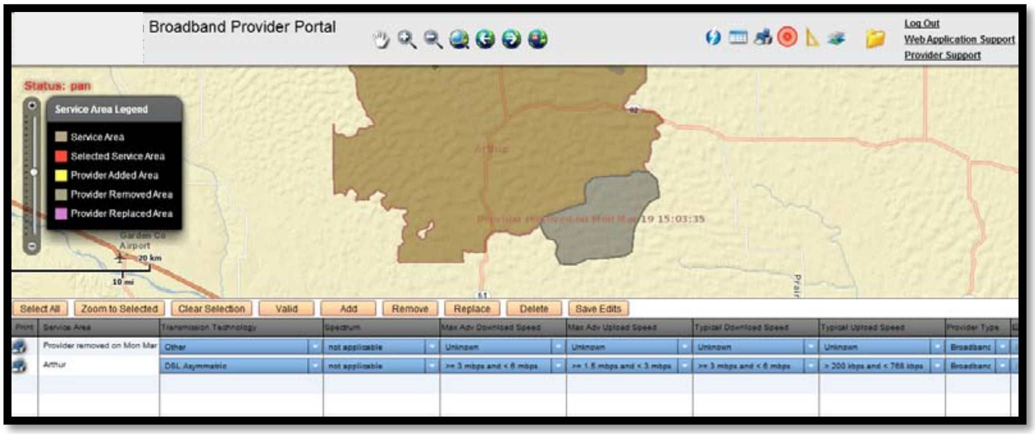
- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy



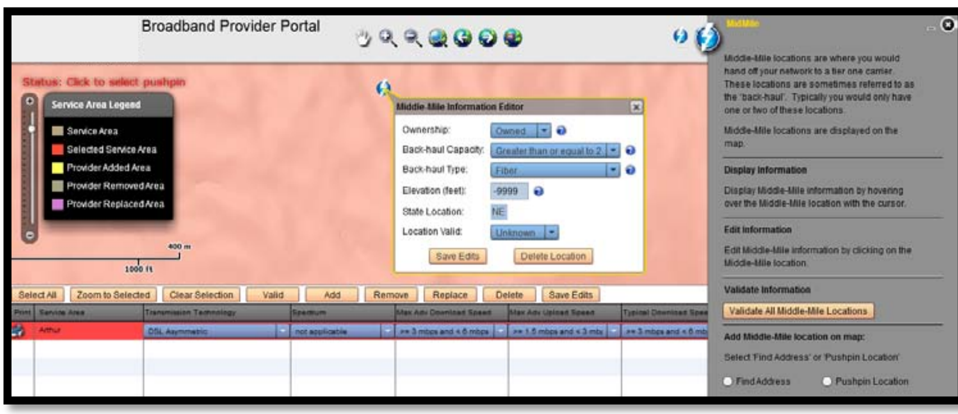
- Capability to review and request changes to the coverage footprint

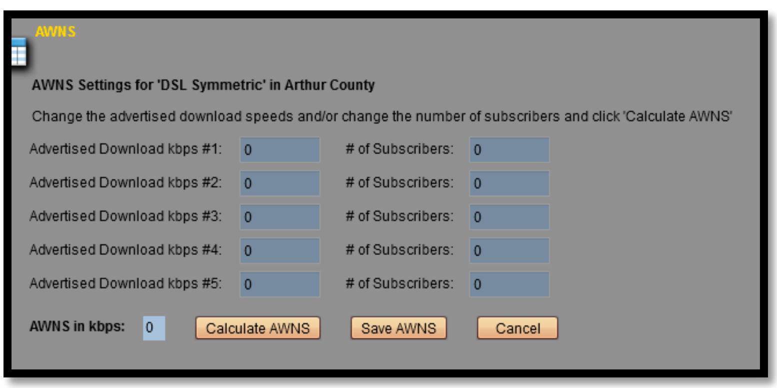


  - The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

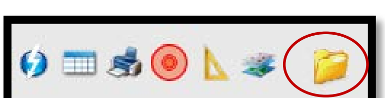


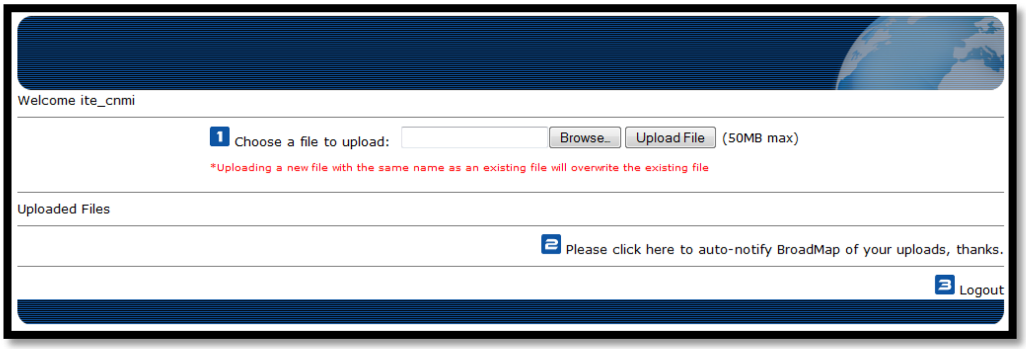
- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





- File upload functionality to support providers that would prefer a shapefile, spreadsheet, PDF, KMZ/KML file be used to reflect changes for the data round





- Once the provider has review completed changes to their coverage, middle mile and AWNS, then can validate them all by signing off that everything is accurate.

DATA VALIDATION AND VERIFICATION

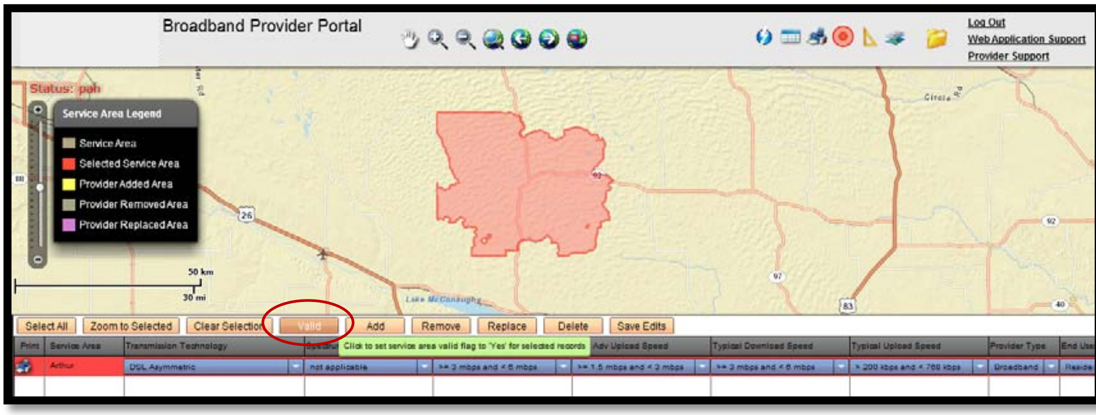
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage areas and serviceability claims, additional reviews are performed using the methods described in the subsections below in order of action (**Broadband Provider Validation**, **Third-Party Data Verification**, **Public Verification, and Confidence Values**).

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

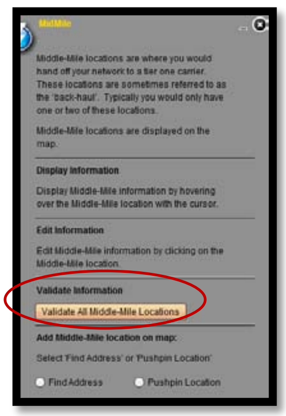
Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the **Data Integration Process** and are reviewed with the provider to complete validation.

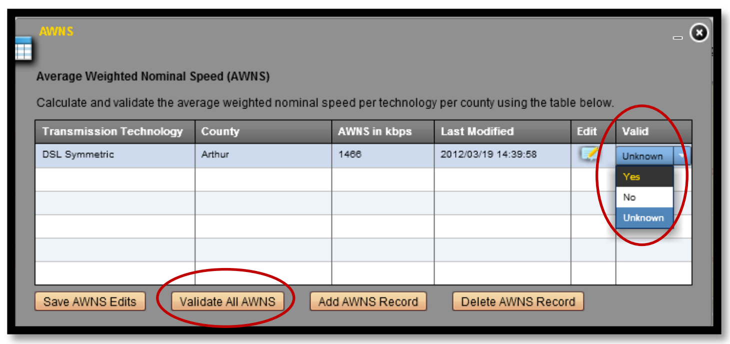
With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

- Coverage validation can be done on one record/footprint at a time or by selecting footprints and selecting the 'Valid' button. The provider could also print off or download their coverage for their own tracking purposes.



- Middle Mile & AWNS Validation





All validation results are tracked internally through our Validation Table, which also improves the overall **Confidence Value** as mentioned below.

THIRD-PARTY DATA VERIFICATION

The coverage is visually and programmatically compared against third-party data as new or updated coverage area information is received and ingested from providers. All anomalies identified during this analysis are reviewed with the providers.

3rd Party Source Name	Source Type	Verification Type
Pitney Bowes (PBBI)	Exchange Info Plus (Central Office Locations)	Exchange datasets are used to verify the following Transmission Technologies (TT): Asymmetric xDSL (10), Symmetric xDSL (20), Other Copper Wireline (30), and Optical Carrier/Fiber to the End User (50).
Media Prints	Cable Boundaries	Used to verify the following TT: Cable Modem—DOCSIS 3.0 (40) and Cable Modem—Other (41)
American Roamer	Wireless Coverage	Used to verify the following TT:

	Patterns (EVDO, GPRS, WISP, HSPA)	Terrestrial Fixed Wireless—Unlicensed (70), Terrestrial Fixed Wireless—Licensed (71) and Terrestrial Mobile Wireless (80)
Comsearch	Wireless Spectrum Holdings and Tower Data	Used to verify the following TT: Terrestrial Fixed Wireless—Unlicensed (70), Terrestrial Fixed Wireless—Licensed (71) and Terrestrial Mobile Wireless (80)

SME PROVIDER COVERAGE VERIFICATION

Prior to each data submission, a review is completed between the broadband mapping team and broadband subject matter experts. Each coverage footprints is review in detail, including any changes from the previous data submission.

Any questions that arise during this review are brought back to the mapping team for resolution and then signoff. Providers are contacted if the item indented is in response to the initial information they supplied.

PUBLIC VERIFICATION – CROWD SOURCING

Since the last data submission, we have improved the public website - interactive map to collect more detailed feedback on the represented broadband coverage areas. This data had been reviewed with providers during the outreach phase and during one-on-one provider meetings.

The State website can be reviewed at the following hyperlink:

http://msbb.broadmap.com/StateMap/

CONFIDENCE VALUES

All verification, validation and manual quality review results are tracked by provider/technology type and stored and maintained within a **Validation table**. A confidence value is assigned, based on internal assessments of the collected information, to highlight the provider coverage areas and/or attributions that would benefit from further investigation and/or enhancements.

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention. We're currently at the initial stages of this initiative, but will have a more complete picture in time for the next data submission.

QUALITY CONTROL

Following collection, processing and analysis of the provider and CAI data, the product is checked manually and algorithmically against the NTIA data model. Some of the items included within these checks are:

- Format correctness;
- Table and field structure;
- Valid values, including default values, where applicable;
- Geographic extent and topology errors.

Prior to data submission, another quality control script supplied by NTIA is run. This script, SBDD_CheckSubmission.py, creates an output in text form that is required to be submitted along with the final deliverable. All errors must come up clean, unless otherwise specified by NTIA.

DETAILED PROCESS REVIEW

To review the detailed process, please review the attached object:

BMap_ProcessDetails _2012_10_01.docx

PROVIDERS RESEARCHED

Below is a list of providers that were researched and contacted, but identified as non-broadband providers and didn't require inclusion within the data submission. Some may be due to different naming conventions or inaccurate FRN/DBA names and were therefore considered a closed source.

1-800-RECONEX, INC. -- TC-123-1525-01
5LINX Enterprises Inc. DBA Globalinx
8x8, Inc.
Access Point Inc.
Access Point, Inc. -- TC-123-1518-00
Accessline Communications Corporation
AccuTel of Texas, Inc. -- TC-123-1851-01
ACN Communication Services, Inc. -- TC-123-1793-00
ACN Digital Phone Service, LLC
Airespring, Inc.
Airespring, Inc. -- TC-123-2068-00
ALEC, Inc.
Alternative Phone, Inc.
Alternative Phone, Inc.
American Fiber Network, Inc. -- TC-123-2213-01
Apptix, Inc.

iNetworks Group, Inc. -- TC-123-2297-01
Infinity Networks, Inc. -- TC-123-1984-01
InPhonex.com, LLC
Intellicall Operator Services Inc. -- TC-123-1143-00
Interface Security Systems, LLC
Intrado Communications, Inc.
IP Communications, LLC.
IP Networked Services, Inc.
Kentucky Data Link, Inc. -- TC-123-2123-01
Kosmaz Technologies LLC
Level 3 Communications, LLC -- TC-123-1655-00
LightSquared LP
Lightyear Network Solutions, LLC
M5 Networks, Inc.
Madison River Communications, LLC -- TC-123-1835-01
Matrix Telecom Inc. -- TC-123-1045-00

Aptela, Inc.
AT&T Communications of the South
Baldwin County Internet/DSSI Serv., LLC -- TC-123-2091-01
Bandwidth.com CLEC, LLC -- TC-123-2262-01
BANDWIDTH.COM, INC.
Bay Springs Communications, Inc. -- TC-123-2147-01
BellSouth Long Distance, Inc. -- TC-123-1530-00
Benchmark Communications, L.L.C. -- TC-123-2185-01
Benchmark Communications, LLC d/b/a Com One
Big River Telephone Company, LLC
Big River Telephone Company, LLC -- TC-123-1923-00
Birch Communications, Inc.
Birch Telecom of the South, Inc.
BLC Management LLC
BLC Management LLC -- TC-123-2110-00
Broadstar, LLC
Broadview Networks, Inc. -- TC-123-2263-00
Broadvox-CLEC, LLC -- TC-123-2299-00
BroadvoxGo!, LLC
Broadwing Communications, LLC
Broadwing Communications, LLC -- TC-123-2047-00
Budget Prepay, Inc. -- TC-123-1668-01
Budget PrePay, Inc. d/b/a Budget Phone
BullsEye Telecom, Inc.
Business Telecom Inc. -- TC-123-1152-00
Cable tv of Belzoni Inc.
Call Catchers Inc.
Callis Communications, Inc.
Callis Communications, Inc. -- TC-123-2227-01
Cause Based Commerce Incorporated
Cellco Partnership
Cellular South, Inc. -- TC-123-0900-04
CenturyTel Acquisition LLC
Centurytel Fiber Company, II, LLC -- TC-123-2155-01
CenturyTel Solutions, LLC -- TC-123-1748-01
Charter Fiberlink MS - CCVI, LLC
Cincinnati Bell Any Distance, Inc. -- TC-123-2094-00
Columbia Telecommunications, Inc.
Comcast Phone of Mississippi, LLC -- TC-123-2196-01
CommPartners, LLC
Communication Lines, Inc.
ConnectMe, L.L.C.
Contact Network, Inc. -- TC-123-1993-01
Covista, Inc. -- TC-123-1646-00
Credit Loans, Inc. -- TC-123-1742-01
Crexendo Business Solutions, Inc. -- TC-123-2329-00
Cypress Communications, Inc.
DAVCO, INC. -- TC-123-1449-01
DeltaCom, Inc. -- TC-123-1076-00
Dialog Telecommunications Inc.
Dialog Telecommunications, Inc. -- TC-123-2070-01
Diamond Telephone Services, Inc.
DIECA Communications, Inc. -- TC-123-1775-01
Dixie Net Communications, Inc. -- TC-123-1634-01
Dixie-Net Fiber, Inc. -- TC-123-2026-01
dPI Teleconnect, L.L.C.
DSLnet Communications, LLC -- TC-123-1679-01
ECR Voice, LLC

Matrix Telecom, Inc.
MCC Telephony of the South, LLC
MCImetro Access Transmission Serv., LLC
McLeodUSA Telecomm. Services, Inc. -- TC-123-1452-00
Mediacom Southeast LLC
Megagate Broadband, Inc. -- TC-123-1058-02
Metropolitan Telecommun. of MS, Inc. -- TC-123-2174-00
Metropolitan Telecommunications Holding Company
Micro-Comm, Inc. -- TC-123-2084-01
Midwestern Telecommunications, Inc
Millicorp
Mitel NetSolutions, Inc. -- TC-123-2020-00
Momentum Telecom, Inc
Momentum Telecom, Inc. -- TC-123-1927-01
Navigator Telecommunications LLC
Network Telephone Corporation -- TC-123-1609-00
Network USA, LLC
Neutral Tandem-Mississippi, LLC -- TC-123-2236-00
New Edge Network, Inc.
Nextg Networks of Illinois, Inc.
NextGen Communications, Inc.
Nexus Communication, Inc. dba TSI
Nexus Communications, Inc.
nexVortex,Inc.
Norlight, Inc. -- TC-123-2247-01
Norris Telecom, LLC -- TC-123-2056-01
NOS Communications Inc. -- TC-123-1316-00
NOS Communications, Inc.
Ojo Service LLC
OnWav, Inc
Phone.com, LLC
PNG Telecommunications, Inc. -- TC-123-1716-00
Proximiti Technologies, Inc.
Quality Telephone, Inc.
QuantumShift Communications, Inc.
Qwest Communications Company, LLC
Razorline LLC
RING CONNECTION, INC.
Ring Connection, Inc. -- TC-123-1995-01
Ripley Video Cable, Inc.
RNK, Inc.
Rosebud Telephone, LLC
Select Connect Communications, LLC -- TC-123-1986-00
SinglePipe Communications
Smartresort Co, LLC dba Beyond Communications
Southern Communications Services, Inc., d/b/a Southern LINC
Southern Light, L.L.C. -- TC-123-2118-00
Southern Telecommunications Co. LLC -- TC-123-1600-01
Spectrotel, Inc. -- TC-123-2159-01
Sprint Communications Company L.P.
Stratos Offshore Services Company
Suddenlink
Suddenlink Communications
Talk America Inc.
TC Systems, Inc.
TEC of Jackson, Inc. -- TC-123-0820-00
TecInfo Communications, LLC -- TC-123-2050-01
TecInfo, Inc

EnTelegent Solutions, Inc.
Equinox, Inc.
Ernest Communications, Inc.
Etan Industries
EveryCall Communications, Inc.
EveryCall Communications, Inc. -- TC-123-2131-01
Evolve IP, LLC
Excel Home Phone, Inc.
Express Phone Service, Inc.
Fast Phones, Inc.
Fionda VOIP, LLC
Florida Multi-Media Services, Inc
Four Star Marketing, LLC -- TC-123-2324-00
France Telecom Corporate Solutions, LLC
Frontier Communications of America, Inc. -- TC-123-1853-01
Global Capacity Direct, LLC -- TC-123-2188-01
Global Capacity Group, Inc. -- TC-123-2259-01
Global Connection Inc. of America
GLOBAL CROSSING TELECOMMUNICATIONS, INC.
Go-Tel, LLC
GRANITE TELECOMMUNICATIONS LLC
Granite Telecommunications, LLC -- TC-123-2000-01
GreatCall, Inc.
GulfPines Communications, LLC -- TC-123-1664-01
Hypercube Telecom, LLC -- TC-123-1921-01
iCore Networks, Inc.
IDT America Corporation -- TC-123-1253-00
IDT Corporation
Image Access, Inc. -- TC-123-1638-01
iNETWORKS GROUP, INC

TelCove Operations, LLC
Telepak Networks, Inc. -- TC-123-1741-01
Telesphere Networks Ltd.
TelLan Network Technologies, Inc. DBA: VoIPnet Technologies
Tennessee Telephone Service, LLC -- TC-123-2125-01
Tennessee Telephone Service, LLC d/b/a Freedom Communications USA, LLC
The Other Phone Company, Inc. -- TC-123-1612-01
Thinking Phone Networks, LLC
Trans National Commun. Internat'l, Inc. -- TC-123-1750-00
Trans National Communications International, Inc.
tw telecom of mississippi llc -- TC-123-1991-01
UCN, Inc. -- TC-123-2052-00
Universal Telecom, Inc.
US LEC of Tennese Inc., d/b/a PAETEC Business Services
US LEC of Tennessee Inc. -- TC-123-1720-00
Velocity Networks Inc
Velocity The Greatest Phone Co. Ever Inc -- TC-123-2312-00
VoIPStreet, Inc.
Vonage Holdings Corp.
Wave2Wave Communications Inc.
WEHCO Video, Inc.
Wholesale Carrier Services, Inc. -- TC-123-1992-00
WiMacTel, Inc.
Windstream NuVox, Inc. -- TC-123-1606-00
WirelessLand Technologies, Inc.
XFone USA, Inc. -- TC-123-2121-01
XO Communications, LLC
YMax Communications Corp. -- TC-123-2203-01
Zayo Enterprise Networks, LLC

Montana Broadband Mapping
Methodology Report

Submitted To:
Chad Hultin
Montana Broadband Mapping Project Coordinator
State Information Technology Services Division

Submitted By:
Fred Gifford
Tetra Tech Inc.
and
Ken Wall
Geodata Services Inc.
October 24, 2012

Contents

Executive Summary

The following report describes methods and issues related to the October 1, 2012 deliverables to NTIA for Broadband Mapping in Montana. This data submission is compliant with all guidance and specifications provided by NTIA. As per NTIA guidance we are using the current versions of the Broadband data model and the validation script.

Montana has developed a robust operational data model, components of which are described in this report, to support our broadband mapping efforts. Our operational model supports current NTIA requirements and is specifically designed to support any new NTIA requirements. Our approach also allows us to take best practices recommendations from the NTIA and incorporate those into the final deliverable without major modifications of our work flow and operating rules.

Our mapping process started with infrastructure points (central offices, remote terminals, wireless towers and antenna locations, middle mile and backhaul), cable franchise areas, and anchor institution addresses. Those served an important role, especially with providers who have not actively participated in coverage mapping and those supplying broadband coverage for large generalized areas and larger geographic census units such as census tracts. When providers have not supplied detailed information of their service areas that can be mapped at the census block level, coverage models were derived dynamically from this infrastructure based on geoprocessing techniques specific to each broadband technology. Examples of geoprocessing techniques include using infrastructure points in conjunction with the road network to predict the area served for DSL coverage. The coverage for all providers of wired broadband services have been completed and remain static unless a provider chooses to participate with more detailed coverage mapping at a level of geography at or smaller than a census block.

The State of Montana Broadband Program has developed a web-based application for creating and maintaining broadband availability data. The Broadband Editing Tool is designed so that that non-technical staff can easily update both spatial and attribute data through using a simple -to -use web interface.

We also developed a system to quantify “validated” data for the purpose of determining what was suitable for delivery to NTIA. Our operational data model contains reliability and validity codes to support our validation efforts. As more data is obtained from providers in maintenance updates, the validity and reliability of infrastructure points has diminished, though they remain the only basis we have for non-participating broadband providers.

Provider Summary

Through extensive research we identified a master list of 160 potential providers in Montana with 55 companies identified as actual broadband providers. The Montana Broadband map includes 45 broadband providers. The full list of the potential providers researched but subsequently identified as not providing broadband service is included in Appendix A.

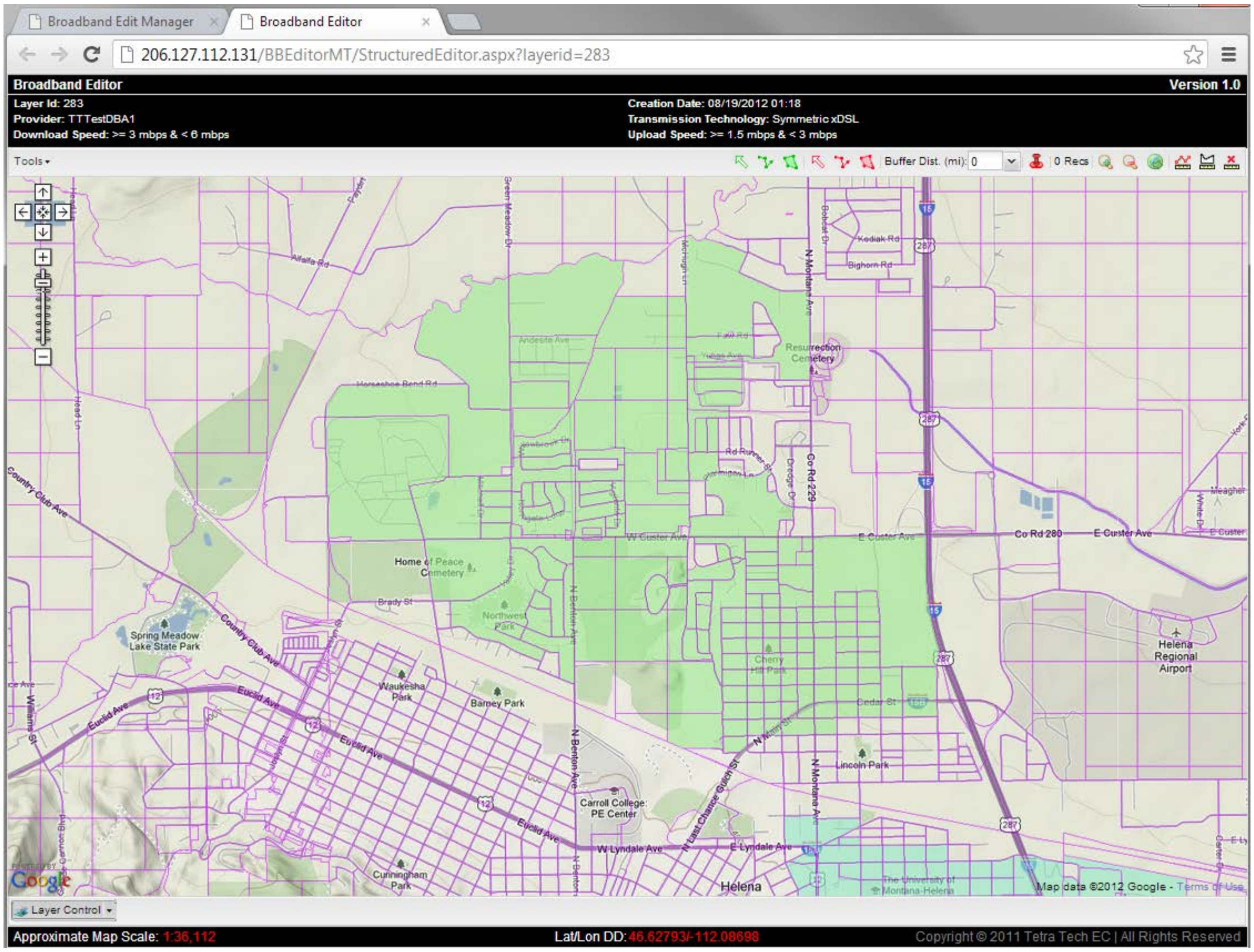
State Specific Issues

The most notable issue specific to Montana is the lack of non-disclosure agreements (NDAs) with the providers. To date no provider has agreed to sign an NDA in Montana due to open records laws in the State. However, the vast majority of broadband providers in the State have elected to cooperate with the project and have provided at least some information about their coverage areas. Where providers have not provided data, or not provided adequate data we have used a variety of methods including modeling, field mapping, and use of public sources to develop map data.

Web Based Editing Application

The State of Montana Broadband Program has developed a web-based application for creating and maintaining broadband availability data. The Broadband Editing Tool is designed so that that non-technical staff can easily update both spatial and attribute data through using a simple -to -use web interface (Figure 1). The tool's feature set gives editors fine-grained control over how broadband service areas are represented.

Figure 1. Broadband editing web map interface.



A significant advantage of using an application like the Broadband Editor is that all data updates are completed using structured data entry tools. This means data integrity is enforced during data entry and illegal attribute values cannot be input by the editor.

Editing Tool Components

The editing tool has five main components. A **Structured Editor** for wired broadband service edits, an **Unstructured Editor** for wireless service, a **Point Editor** for Middle-mile and Community Anchor Institution Edits, a **Management Console** for user and data administration, and an **Export Toolbox** for creating NTIA formatted data.

Structured Data Editor – The structured data editor allows coding of wired (land based) broadband service by census block (census blocks are used due to NTIA mapping requirements). For census blocks that are less than .25 square miles in size the editor is able to select the census block and indicate the type of service provided. For census blocks that are greater than .25 square miles the editor is able to select 500 square meter polygons that are nested within the census block where service is available. This gives users a more accurate depiction of broadband availability on the state broadband map and supports creation of the courser NTIA census block and street segment geography. The results are processed as census blocks and street segments for the national standardized submittal to NTIA.

Unstructured Data Submittal – For wireless coverage areas, which are not based on preexisting geographic features, users submit zipped GIS shapefile polygon layers through the web interface to indicate where service is available. The shapefile is converted into a geodatabase feature class and the user assigns the appropriate service attribute values.

Point Editor – The point editor allows users to add, delete, move, and edit attributes for the middle-mile and community anchor institution feature classes. The point editor uses a simple interface and enforces data integrity validation for all edits.

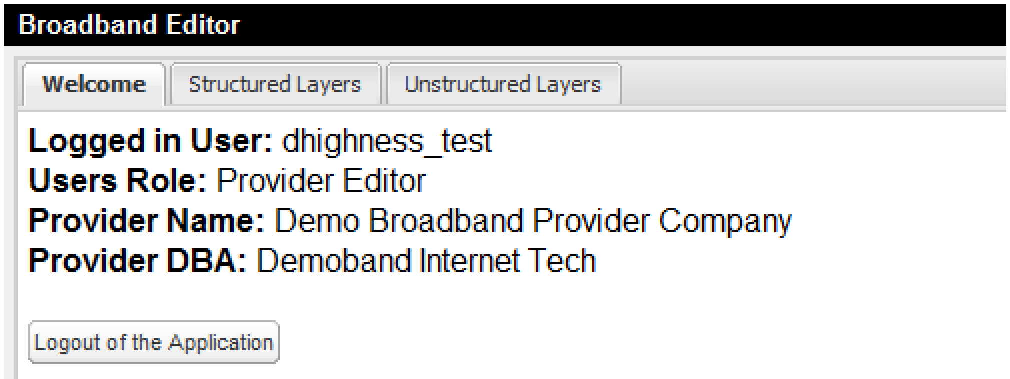
Management Console – The management console allows for full administration and management of data in the system. The management console is designed around three user roles. Each role has a different level of permissions and capabilities. The roles include:

> **State Administrator** – Full access to all system components, user administration, and editing capabilities.
>
> **Provider Administrator** – Access to providers' data layers for edit, review and submittal to the State for inclusion in the State Broadband Map.
>
> **Provider Editor** – Access to providers' data layers for edit.

The management console entry screen (Figure 2) shown below includes three tabs –

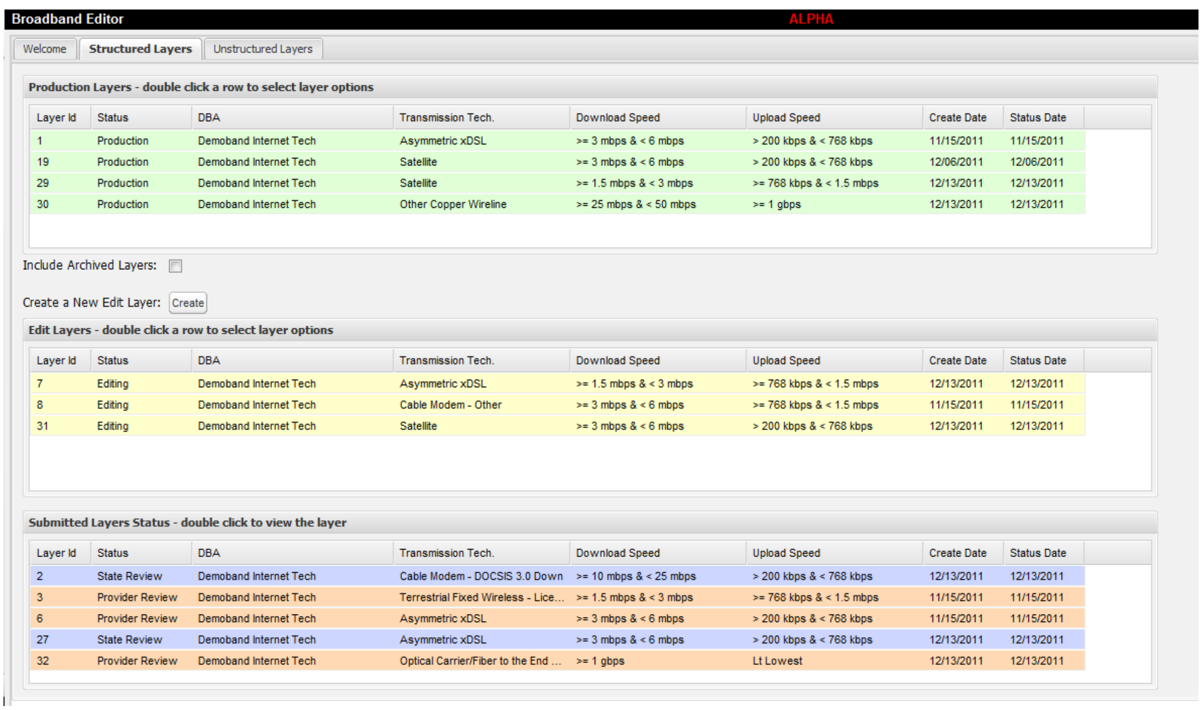
> **Welcome Tab** – Notes about the project, application revisions and links to help documents.
>
> **Structured Layers** – Editing and administration tools for broadband coverage based on census blocks.
>
> **Unstructured Layers** – Loading and administration tools for broadband coverage based on GIS shapefiles.

Figure 2. Management Console Entry Screen.



The structured and unstructured management tabs (Figure 3) allow for data management.

Figure 3. Structured and unstructured management tabs.



The data management tabs provides access to all edit and reviewing functionality for all data layers. The full list of layers in the system is only viewable by system administrators. Provider editors and administrators will only see and be able to access their specific data.

There are three lists of layers viewable to the user –

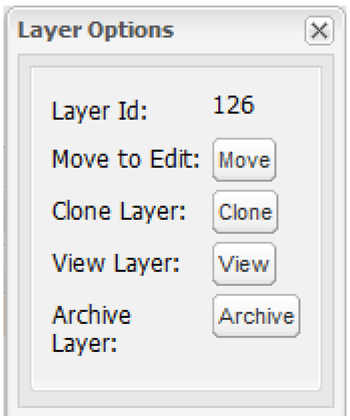
Production Layers – List of the current approved layers for the provider that are currently being reported to NTIA and shown on the State's broadband web map application.

Edit Layers – List of layers currently being edited by the provider.

Submitted Layers – List of layers that are in review by the Provider Administrator or the State Administrator.

Double clicking a row layer in a layer list brings up a context specific menu of options.

Figure 4. Production Layer List Options.



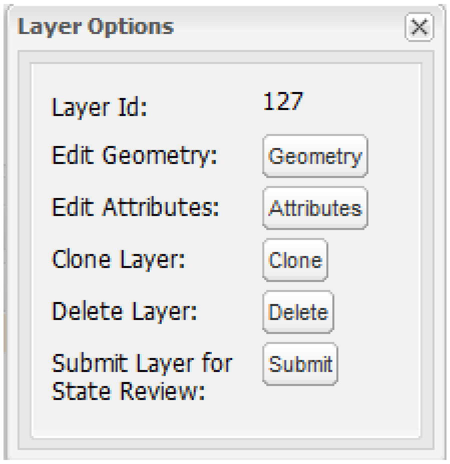
Move to Edit makes the layer available for editing.

Clone Layer makes a copy of the existing layer that can be edited.

View Layer launches the map viewer for a layer.

Archive Layer creates archive of layer and takes it out of production. (State Admin Only)

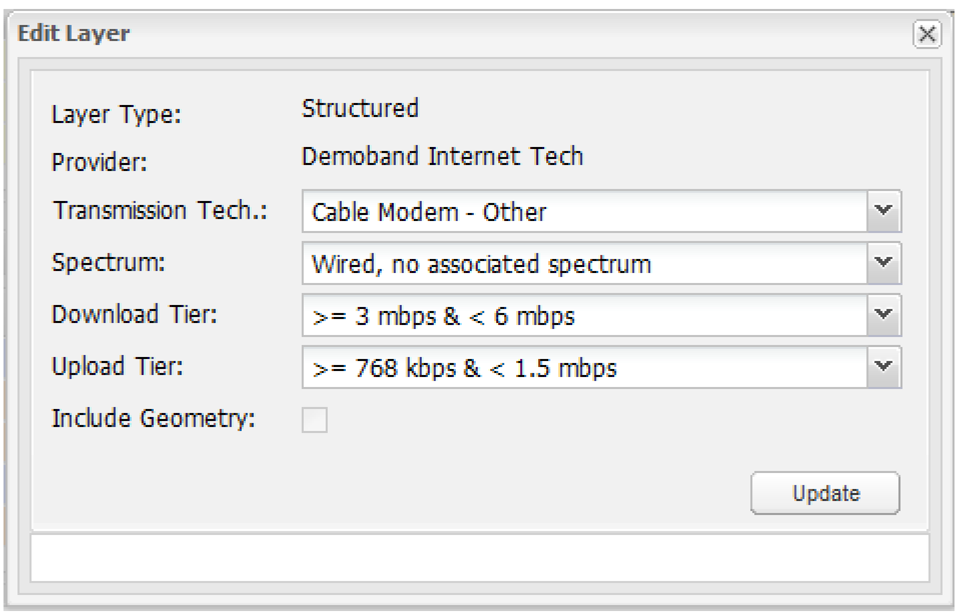
Figure 5. Edit layer list options.



Edit Geometry launches the map editing tool (discussed in next section).

Edit Attributes brings up an editor to allow changes to a layers properties including transmission technology, spectrum and others as shown below –

Figure 6. Edit Attributes Options.



Transmission Tech, Spectrum, Download Tier, Upload Tier are attributes specific to each broadband layer and adhere to NTIA data submittal standard.

Clone Layer makes a copy of the existing layer that can be edited.

Delete Layer completely deletes the current edit version of the layer.

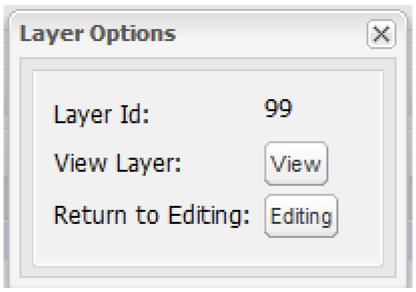
Submit Layer for State Review moves a layer to the Provider Admin list for review. (Provider Admin and State Admin only)

Submitted layer list options –

View Layer launces the map viewer for a layer.

Return to Editing moves a layer to the edit queue so that it may be edited.

Figure 7. Return to Editing screen.



Export Toolbox – The export toolbox is implemented as a set of geoprocessing tools that run within the ArcGIS desktop client. The toolbox includes a collection of tools that convert data created using the editor into the format required for NTIA. In addition the toolbox includes a variety of automated data integrity checks. The purpose for this separation of the editing tools from the data format and conversion tools is to support minor changes to the NTIA data model without having to make changes to the editing application – just the geoprocessing tools.

Data Sources

In the first rounds of broadband mapping, provider presence maps were developed for central office locations and incumbent local exchange carrier locations for all assumed providers in the state. These were identified through a commercial spatial database purchased from GeoTel Inc., and supplemented by other public data sources such as the State's Public Service Commission and DSLReports.com. These were intended to be "talking maps" and general intelligence on where providers have infrastructure for subsequent phone and written communications with providers. These maps were compared to counties served by providers in the state's telecommunications association directory.

Web site research, review of materials submitted to the state by providers, and public websites, such as the FCC were researched for each provider.

New providers are contacted to request data when a significant number of speed tests are recorded, or when we learn of their presence through ancillary sources. Providers that contact us directly and submit data are also included.

Broadband Coverage

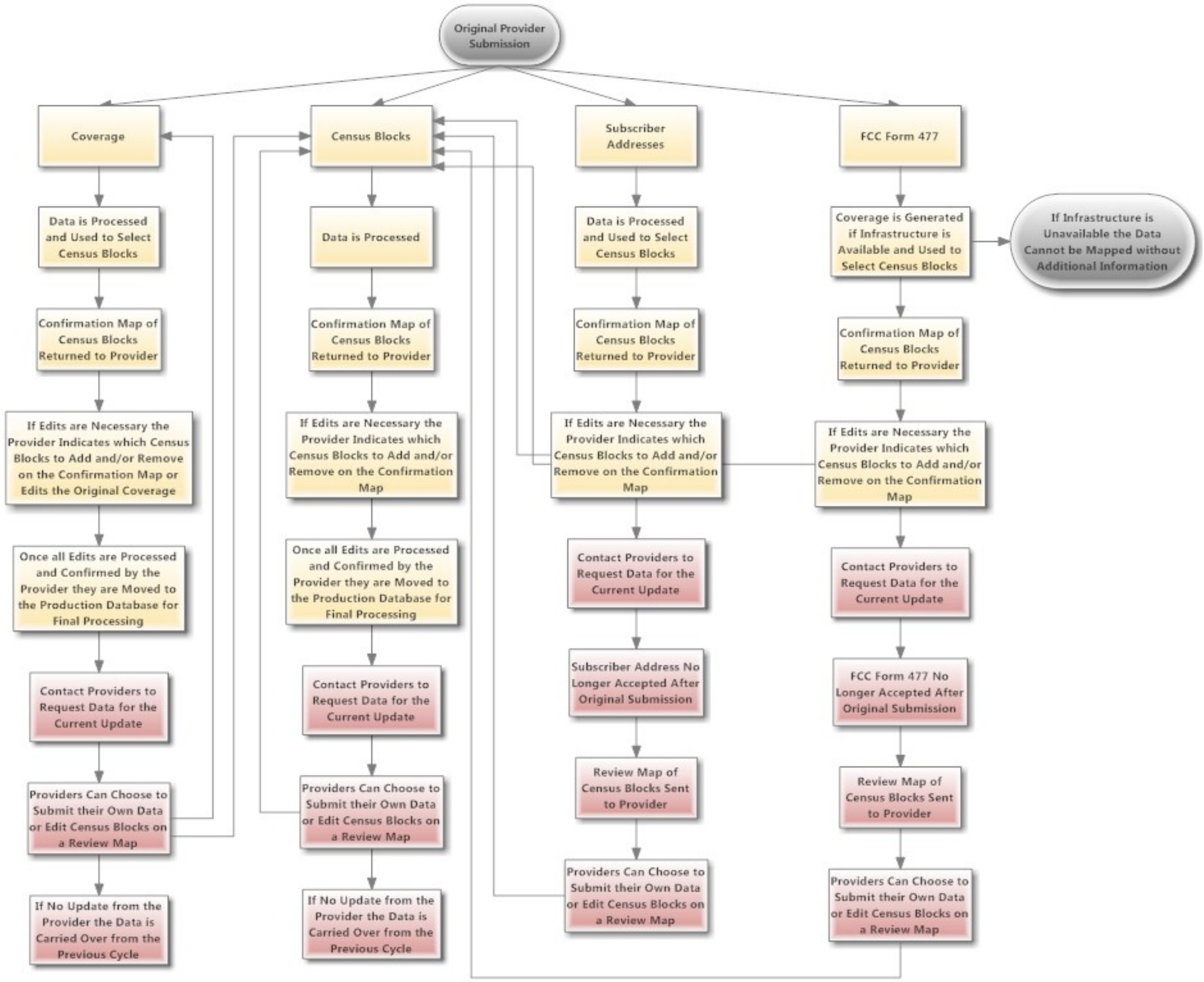
Data submitted by broadband providers was accepted as is and was mapped in complete form when provided as a broadband coverage at the same scale or larger scale than the census block level. Provider coverage submitted at a coarser geographic scale (e.g., census tracts, counties, zipcodes) was supplemented with public data, independent measurements and GIS modeling techniques. When provider submitted data appeared to be exaggerated or providers did not participate in the broadband mapping process, independent measurements and other data sources (e.g., state GIS framework structure locations, speed tests, survey results, website data and infrastructure) were used to override or supplement the provider data.

Broadband providers that chose to submit data did so in a wide variety of formats, levels of completeness, and at varying geographic scales including: the web-based application, narrative descriptions, analog and digital coverage maps, CAD files, GIS shapefiles and geodatabases, KMZ and KML files, FCC 477 reports, and data spreadsheets. All data formats were processed using the web-based application.

If data was submitted by a provider in a format that did not allow mapping at the census block level of geography, providers were sent standardized maps that included census blocks and a data spreadsheet in an attempt to standardize the inputs and increase the geographic granularity of the provider data submission.

Although each provider had individual characteristics and nuances in their data submissions, several data patterns can be described generalizing the provider submissions.

Figure 8 Provider Submission Types and Workflow



Providers Submitting FCC Form 477 Reports or Similar Format

Broadband providers are required to submit FCC Form 477 reports twice a year to the FCC; recently 477 submissions have been done using a structured web site maintained by the FCC. The 477 reports require broadband providers to submit a list of census tracts with the number of subscribers based on maximum advertised downstream and upstream speed tiers. Several providers submitted their actual FCC 477 report or a modified version in analog or digital format.

Figure 9 FCC Form 477 Example

Upload	>200<768	>200<768	>200<768	>3m<6m	
Download	>768<1.5m	>1.5m<3m	>3m<6m	>6m<10m	
Census Tract					Total
MT-[redacted]	60	-	-	-	60
MT-[redacted]	60	3	-	1	64
MT-[redacted]	27	1	-	-	28
MT-[redacted]	311	9	2	-	322
MT-[redacted]	120	2	-	-	122
	578	15	2	1	596

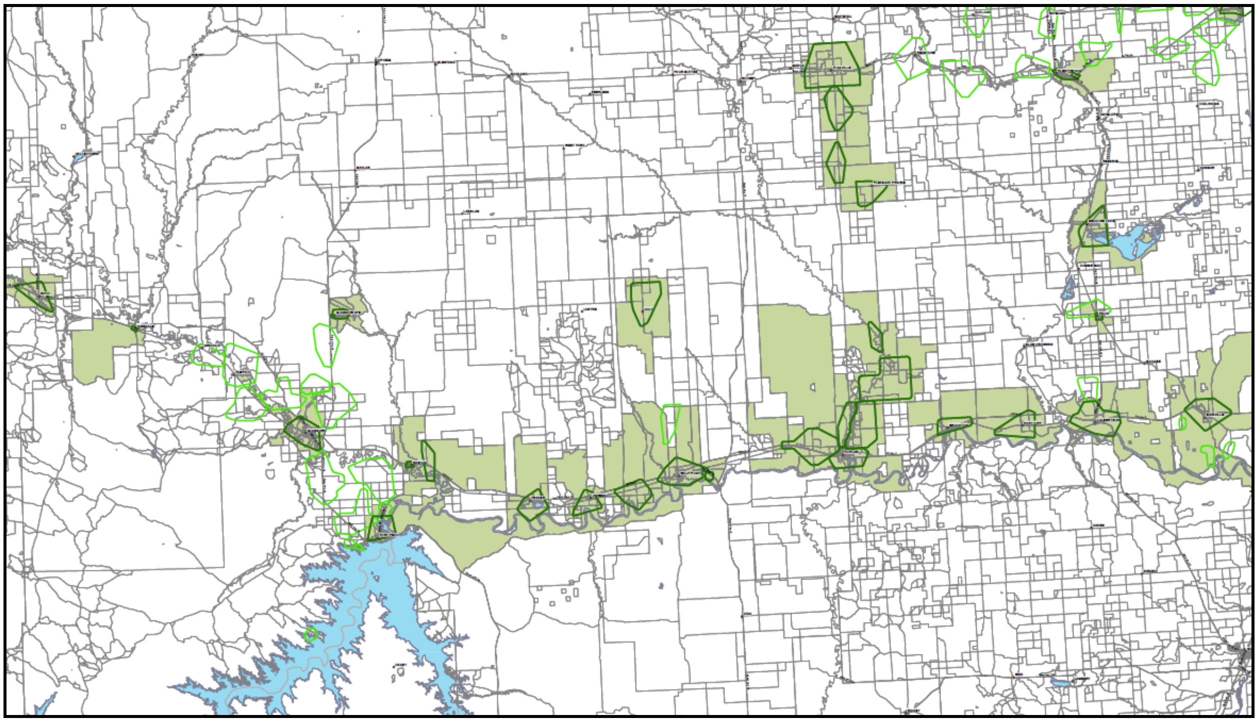
How They Were Handled

FCC Form 477 reports were entered into a standardized format that included the census tract ID code, maximum advertised downstream and upstream speed tier code, and number of subscribers (when available). Since the FCC 477 reports requires providers to submit data for all speed tiers within a census tract, only the highest maximum advertised speed for any given census tract was entered into the standardized spreadsheet in order to be compliant with the definition of broadband service.

The spreadsheets were then joined to a census tract feature class template that included the attribute fields from the NTIA schema. The resulting feature class was a geographical representation of the FCC 477 report including the technology of transmission and speed information. This feature class was used in conjunction with validated infrastructure data (i.e., central offices and/or remote terminals) to run the DSL or Cable geoprocessing models respectively.

The resulting census block selection from the DSL or Cable model was displayed on a standardized review map and returned to the provider for confirmation.

Figure 10 Review Map Example



If additional edits were required the provider "marked-up" the review map(s) to indicate which census blocks should be added and/or removed. The provider submission was handled as a census block update (describe in the section below) from that point forward. In future updates from those providers FCC Form 477 data was not accepted and providers who originally submitted data in this format were asked to make edits to the review maps.

Figure 11 Provider's "Marked-Up" Map Example

Several providers did not respond to the original confirmation maps and their final submission represented the best modeled estimate of their coverage at the census block level for DSL and/or Cable technologies. Providers that submitted FCC 477 data for fiber to the end user or fixed wireless could not be mapped and were not included in the final broadband map unless they provided additional data at the census block level or equivalent coverage at a similar scale.

Providers Submitting Census Block Coverage

Census blocks submitted by providers representing their broadband coverage area come in a wide range of formats including: analog and digital maps, CAD files, GIS shapefiles and geodatabases, tabular lists, and spreadsheets.

Figure 12 Census Block Submission Example (names blacked out)

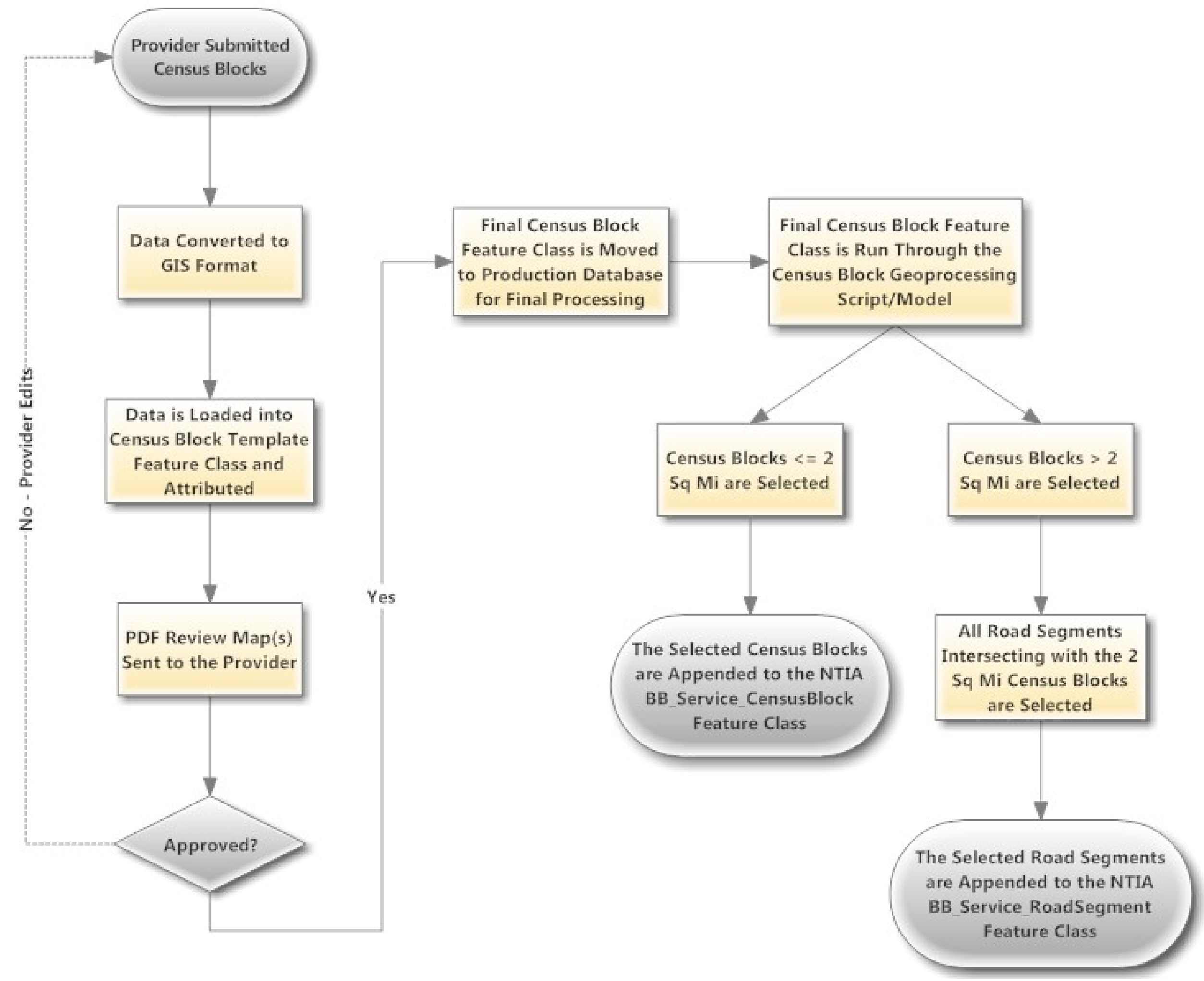
STATE	PROVIDER	DBA_NAME	FRN	CENSUS_BLO	TECHNOLOGY
MT	[redacted]	[redacted]	0018626853	300470002001003	10
MT	[redacted]	[redacted]	0018626853	300470002001008	10
MT	[redacted]	[redacted]	0018626853	300470002001072	10
MT	[redacted]	[redacted]	0018626853	300470002001079	10
MT	[redacted]	[redacted]	0018626853	300470002001083	10
MT	[redacted]	[redacted]	0018626853	300470002001092	10
MT	[redacted]	[redacted]	0018626853	300470002002012	10
MT	[redacted]	[redacted]	0018626853	300470002002021	10
MT	[redacted]	[redacted]	0018626853	300470002002023	10
MT	[redacted]	[redacted]	0018626853	300470002002027	10
MT	[redacted]	[redacted]	0018626853	300470002002029	10
MT	[redacted]	[redacted]	0018626853	300479403011013	10
MT	[redacted]	[redacted]	0018626853	300479403011018	10
MT	[redacted]	[redacted]	0018626853	300479403011022	10
MT	[redacted]	[redacted]	0018626853	300479403011048	10
MT	[redacted]	[redacted]	0018626853	300479403011051	10
MT	[redacted]	[redacted]	0018626853	300479403011055	10
MT	[redacted]	[redacted]	0018626853	300479403011056	10
MT	[redacted]	[redacted]	0018626853	300479403011057	10
MT	[redacted]	[redacted]	0018626853	300479403011058	10
MT	[redacted]	[redacted]	0018626853	300290013011000	10
MT	[redacted]	[redacted]	0018626853	300290013011005	10
MT	[redacted]	[redacted]	0018626853	300290013011010	10
MT	[redacted]	[redacted]	0018626853	300290013011011	10

How They Were Handled

All census block submittals were loaded into a census block feature class template that included all of the attribute fields from the current NTIA schema. Census 2010 geography was used as required by NTIA. Domain codes were entered in the appropriate attribute field for technology of transmission, maximum advertised downstream speed, and maximum advertised upstream speed. If a provider did not identify the technology of transmission for a given census block or blocks, they were contacted by phone or email in order to obtain this information. In instances where speed information was not included in the data submission providers were contacted and asked to supply this data; in cases where the provider refused to supply either the downstream, upstream, or both speeds, and their advertised speeds were not available on their web site, the lowest domain code was entered in the applicable attribute field.

Standardized confirmation maps were created for each provider by type of technology and sent to the provider for review. Once processing was completed for a provider's census block submission, the census block feature class was run through an Esri geoprocessing model that performed several quality control-quality assurance tests and selected census blocks less than or equal to two square miles and road segments that intersected census blocks greater than two square miles and were appended to the appropriate NTIA transfer data model feature classes.

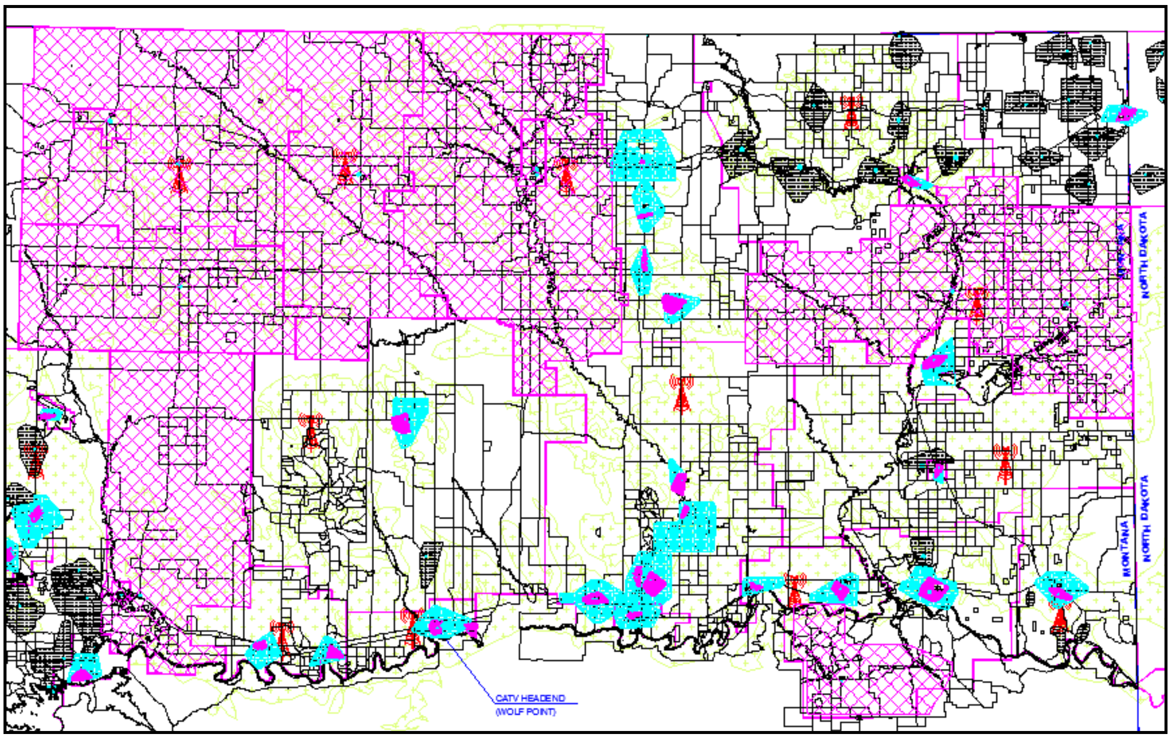
Figure 13 Census Block Geoprocessing Model


Provider Submitted Census Blocks
Data Converted to GIS Format
Data is Loaded into Census Block Template Feature Class and Attributed
PDF Review Map(s) Sent to the Provider
Approved?
No - Provider Edits
Yes
Final Census Block Feature Class is Moved to Production Database for Final Processing
Final Census Block Feature Class is Run Through the Census Block Geoprocessing Script/Model
Census Blocks <= 2 Sq Mi are Selected
Census Blocks > 2 Sq Mi are Selected
The Selected Census Blocks are Appended to the NTIA BB_Service_CensusBlock Feature Class
All Road Segments Intersecting with the 2 Sq Mi Census Blocks are Selected
The Selected Road Segments are Appended to the NTIA BB_Service_RoadSegment Feature Class

Providers Submitting Coverage Data

Provider submitted coverage data were differentiated from the other types of geographic data submissions coarser than a census block since they represented the full and explicit range of broadband coverage. Similar to the other types of data submissions, coverage data was also provided in a wide range for formats including: analog and digital maps, CAD files, GIS shapefiles and geodatabases. Coverage data was submitted by several providers or was available on several providers' websites.

Figure 14 Coverage Data Example



How They Were Handled

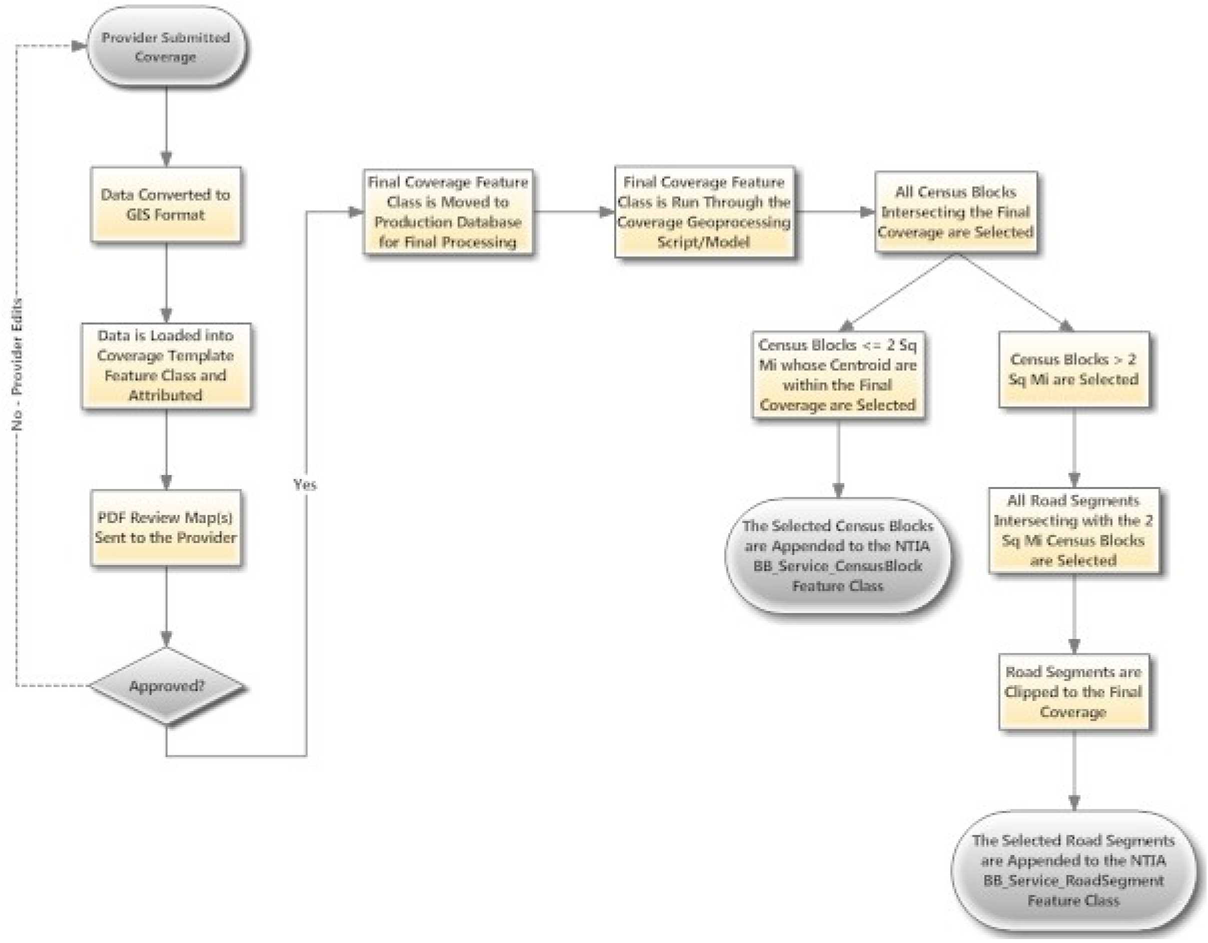
All coverage data was loaded into a coverage template feature class schema that included all of the attribute fields from the NTIA schema. The method of data loading was driven by the format in which it was received. Providers who supplied GIS shapefiles or feature classes could generally be loaded into the coverage template feature class schema using the simple data loader while CAD data had to be exported to GIS format prior to being loaded into the coverage template.

Coverage data supplied as digital or analog maps required georectification and digitizing prior to loading into the coverage template feature class. Domain codes were entered in the appropriate attribute field for technology of transmission, maximum advertised downstream speed, maximum advertised upstream speed, and spectrum. If a provider did not identify the technology of transmission for a given coverage area, they were contacted by phone or email in order to obtain this information.

When speed information was not included in the data submission, providers were contacted and asked to supply this data; in cases where the provider refused to supply either the downstream, upstream, or both speeds, the lowest domain code was entered in the applicable attribute field. If a provider did not specify the type and spectrum used for fixed wireless the default values for unlicensed were used.

Standardized confirmation maps were created for each provider by type of technology and sent to the provider for review. Once processing was completed for a provider's coverage submission, the data was run through an Esri geoprocessing model that performed several quality control-quality assurance tests and selected census blocks less than or equal to two square miles when the centroid of the census block was within the coverage area. Road segments that intersected with census blocks greater than two square miles were selected and then clipped to the coverage area in order to provide the most accurate representation based on the provided coverage. The selected census blocks and road segments were appended to the appropriate feature class in the NTIA data transfer model.

Figure 15 Coverage Geoprocessing Model

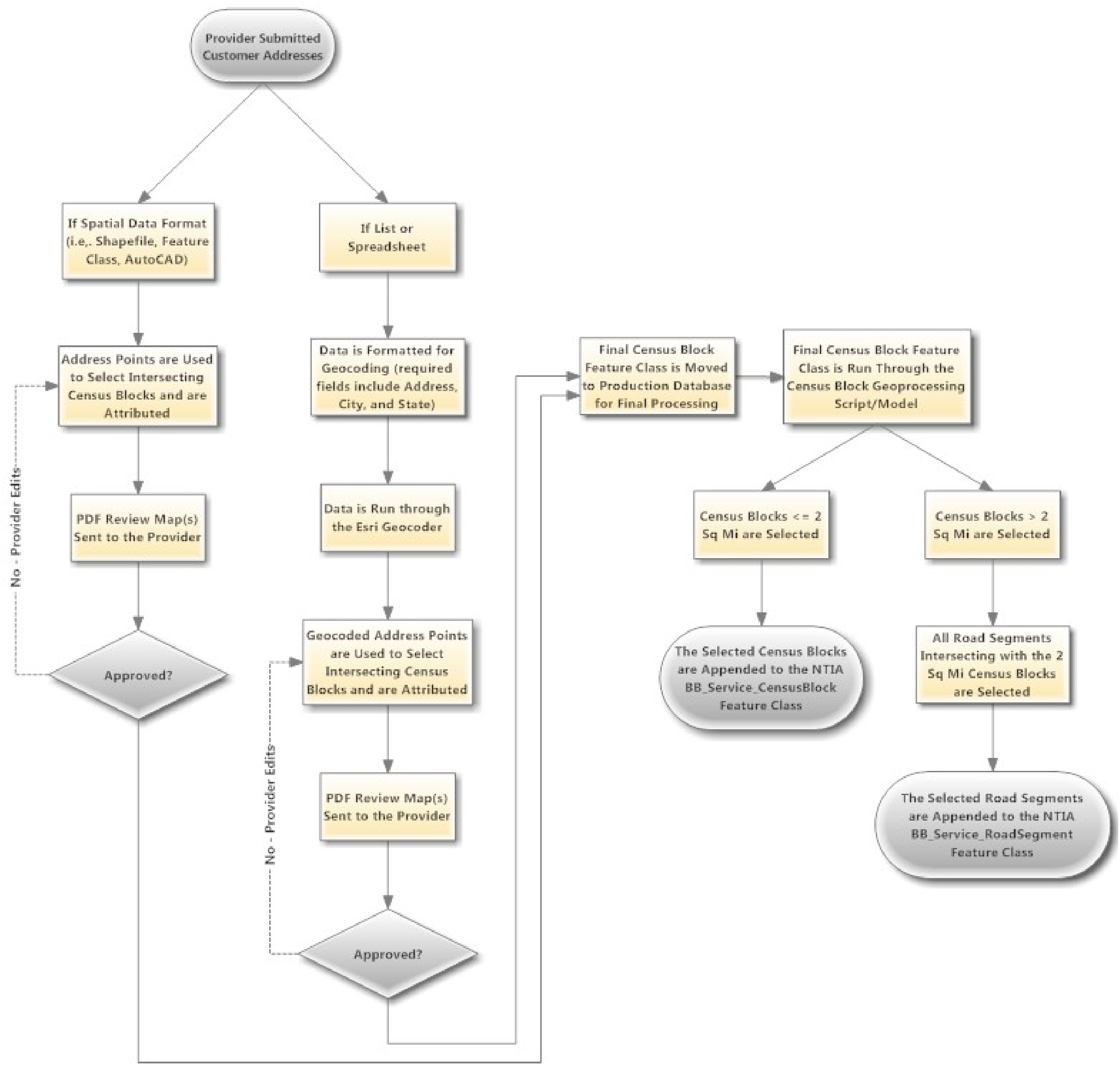


Providers Submitting Customer Locations

Providers that submitted customer locations typically fell into one of four categories. Several providers submitted customer locations in AutoCAD files, the points were exported to a shapefile and used to select all intersecting census blocks. Other providers submitted analog or digital maps that included customer locations, these images were georectified and census blocks were selected by an operator viewing the customer point images underlying the census blocks. Lists of customer addresses were also submitted. The data was loaded into a spreadsheet and geocoded using ESRI Business Analyst USA Geocoding engine. The geocoded points were treated identically to customer locations submitted in GIS or CAD format and used to select intersecting census blocks.

The resulting census blocks were added to confirmation maps and returned to the provider. If edits were necessary the provider indicated on the map which census blocks needed to be added and/or removed. The provider submission was handled as a census block update (described in the section above) moving forward. In subsequent updates subscriber address data was discouraged and providers who originally submitted data in this format were asked to make edits to the review maps.

Figure 16 Customer Addresses Geoprocessing Model



Providers Submitting Other Levels of Course Geographic Submission

This category had a wide range of submissions. The most common were telephone exchange areas or equivalent, wire centers, zip codes, counties or general references to towns or cities. These coarse geographic submissions were problematic because these areas were typically very large and lacked the detail of a defined coverage area resulting in over-exaggerated broadband coverage.

How They Were Handled

Operational rules established early in the project heavily scrutinized provider data that appeared to significantly over-represent broadband coverage and often resulted in a rejection of the submitted data. Providers who submitted coarse geographic levels of coverage data and infrastructure for DSL or cable modem service were initially that also were represented in the last point of aggregation infrastructure point file were sent estimated census block coverage maps and spreadsheets, and provided a second submission with finer level geography.

Providers submitting town locations for DSL or Cable were handled differently, and used as validation for central offices from the last point of aggregation table, and subsequently to run the DSL modeling routine or validate a cable or cable plus areas.

Cable Modem Geoprocessing Model

An ESRI geoprocessing model was created to generate coverage areas for Cable providers who did not submit census block or coverage data (i.e., census tract providers).

The most authoritative GIS layer available from the state with incorporated areas and city boundaries was used as a surrogate to model cable broadband coverage. Some towns that were not incorporated were also added. Municipalities and towns were sporadic in their digital update of these maps, since annexations and other boundary modifications were ongoing and difficult to maintain in real time updates. To compensate, likely areas contiguous to these city boundaries were added, labeled "Cable-Plus" in the operational data model. These additional polygons were determined using operator interpretation, road density, structures points from Info USA in Esri Business Analyst, speed test results, and in some instances NAIP imagery. In general areas were added that were immediately contiguous to existing city or town boundaries that represented likely areas where cable service existed. We were conservative in this approach and did not include populated areas near the cable plus boundaries unless they were directly contiguous to existing boundary areas.

Cable broadband providers primarily work under the structure of franchise agreements with municipalities. In the early rounds of broadband mapping updates, phone calls were made to the largest cities in the state in order to obtain that respective city's cable franchise agreement. They were all either unknown or a text agreement without maps.

The full set of potential cable areas were then passed through validation sources to determine if cable was provided. This included public sources, such as the Warren Communications Cable Fact book (http://www.warren-news.com/factbook.htm).

The second and most authoritative form of validation was data received from cable providers at the census tract, block, or coverage level of geography. A spatial join geoprocessing operation was performed on these datasets with the full set of potential cable coverage areas in order to further validate areas with cable coverage.

The third source of validation came from the public speed test site maintained throughout the project. Whenever user submitted speed tests identified cable modem broadband service near or adjacent to existing estimated cable areas, the cable-plus boundaries were expanded using the same method of digitizing outlined above.

It was not possible to differentiate between technology of transmission codes 40 and 41 using this indirect mapping method. The only authoritative way to determine this information was from data submitted by a provider. In all cases where the provider did not indicate the type of cable modem technology being used, the code for Cable Modem-Other (41) was assumed.

DSL Geoprocessing Model

An ESRI geoprocessing model was created to generate coverage areas for DSL providers who did not submit census block or coverage data (i.e., census tract providers). This model is based on typical DSL technology which can provide service up to 18,000 feet from a central office or remote terminal, unless otherwise specified by a provider.

Since DSL lines are typically buried alongside roadways, underneath roadbeds, or strung on aerial telephone lines which tend to run alongside a road, a GIS dataset of a state's road network were used as a surrogate to model DSL areas. In the initial rounds of broadband maintenance we purchased commercial (GeoTel) and publicly available data sources representing last points of aggregation (LPA) for DSL, including central offices and remote terminals. Each LPA was validated based on publicly available data, provider data, and independent measurements. LPAs were used in a DSL model only if they were supplied directly from a provider or could be verified by two or more sources. The actual geoprocessing model used the validated central office and remote terminal locations to generate a raster cost surface based on all of the available roads radiating out 18,000 feet from each active LPA point. The raster coverage was converted to a polygon feature class and a small back-buffer was applied to achieve the final DSL coverage polygon representing a provider's maximum possible DSL coverage area. The DSL coverage areas were then used to select intersecting census blocks and road segments.

Remote terminals were provided or publicly available for only a small number of providers, therefore this method may tend to underestimate the full DSL coverage for a provider.

It was not possible to differentiate between ADSL or SDSL based on the LPA data; the only authoritative way to determine this was from data submitted by a provider. In all cases where the provider did not indicate which type of DSL service was being provided, the technology code was assigned to 10 "Asymmetric xDSL".

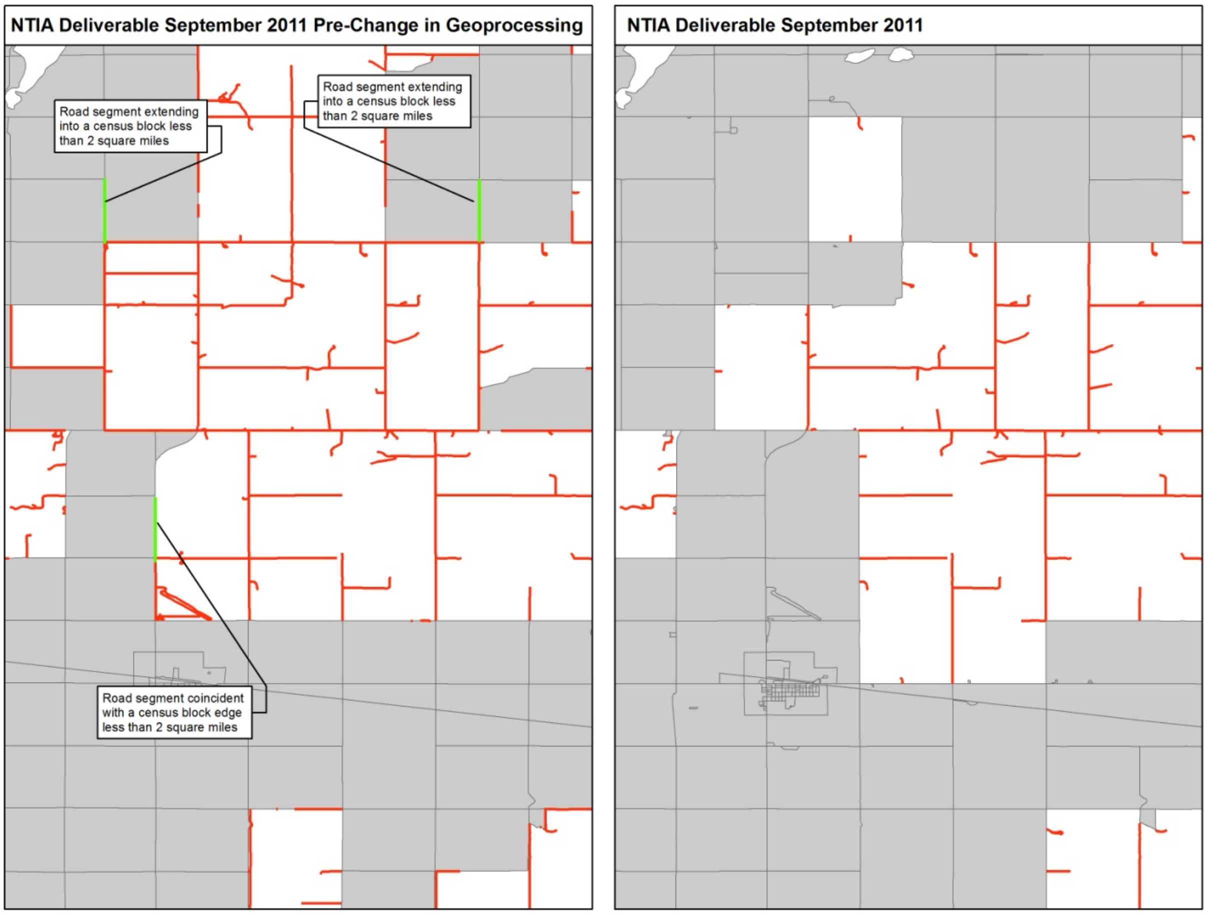
2000 T0 2010 Census Block Conversion

The September 2011 deliverable to NTIA required the transition from 2000 census data to 2010 census data, but the conversion process was dependent upon the type of data submitted by a provider. These providers fell into two categories, block providers or coverage providers. The conversion to 2010 census geography was a straightforward process for the coverage providers; the reference to the census block data in the geoprocessing model used to select census blocks and road segments was simply changed from the 2000 data to the 2010 data and each provider's data was re-run. The conversion from 2000 census to 2010 census data for block providers required several geoprocessing steps due to the inability to simply match census block IDs across vintages. The census blocks for each provider were dissolved by type of technology to form a quasi-coverage area. The dissolved blocks were then used to select any 2010 census block whose centroid fell within the "coverage area."

Road Segment Geoprocessing Change

Prior to the September 2011 NTIA data submission, road segment in census blocks greater than 2 square miles were selected with a straight intersect. This resulted in road segments being selected that were coincident with census block edges in blocks less than or equal to 2 square miles. Using this same geoprocessing methodology combined with the new 2010 census blocks and TIGER roads, road segments were selected that were coincident with census block edges and that extended into census block less than or equal to 2 square mile. We believe this "error" occurred due to the improvements in the spatial accuracy of both the 2010 census blocks and road segments for 2010 where features were now coincident. For the September 2011 submittal a small negative buffer (-0.5 feet) was applied to the intersect to avoid selecting roads that were coincident with census block edges and/or those that extended into census blocks less than 2 square miles. This resulted in a significant decrease in the number of road segments reported but overall we believe this method more accurately portrays each provider's coverage area.

Figure 17 Road Segment Geoprocessing Change Example



Wireless Coverage

Three forms of wireless coverage were provided in this table, fixed point to point wireless, mobile wireless and satellite. No public data was located on fixed wireless infrastructure points, except notification of availability on provider's web pages, and in some instances, specific towns, recreation or commercial locations where wireless service was provided. No modeling was attempted on fixed wireless coverage. All coverage came directly from providers or was mapped from locations provided on a provider web page and was processed using the web-based application. We did not attempt any propagation modeling on fixed wireless, since that can be influenced by local structures and vegetation in the vicinity. A few providers did provide coverage that appeared to be derived from propagation modeling.

Most of the public data research focused on mobile wireless providers using cellular service spectrums. The Federal Communications Commission (FCC) Universal Licensing System (ULS) is the consolidated database and application filing system for most Wireless Radio Services. ULS supports electronic filing and provides public access to licensing information, weekly Public Notices, FCC rulemakings, processing utilities, a telecommunications glossary, and much more." The FCC ULS Advanced Licensing Search was queried for all FCC licenses filed in the state; a relational database was built from the results. Information from the database was extracted in order to perform the cellular tower propagation modeling for wireless broadband.

The FCC ALS and ULS reporting systems were the source for most of the tower locations. Towers were required to be licensed when they meet specific published criteria. These included some variables that could be modeled with GIS statewide, such as varying proximity to airports and heliports, combined with specific local level criteria not easily obtained or modeled statewide such as the grade construction within proximity of these, and any structure over 200 ft in height. A number of cell towers providing broadband were likely not located in the FCC database. None of the mobile wireless providers were willing to provide infrastructure such as tower locations and parameters, and the coverage provided were very generalized.

The mobile wireless coverage in the state is in transition. There were currently no GSM mobile wireless providers meeting the NOFA criteria for being a provider. There is some GSM infrastructure in the state maintained for wholesale arrangements and roaming users with GSM technology.

Any fixed or mobile wireless antenna or tower location submitted by a provider, or obtained from the FCC that was used in the final processing for wireless broadband coverage was maintained in the operational database for last point of aggregation, and subsequently transferred to Table 3 backhaul and middle mile points.

Providers submitted coverage data in a wide variety of formats, levels of completeness, and at varying geographic scales. All types of data was accommodated and processed whenever possible. An open structure process for submittals was allowed, accepting any data, and attempting to work with the provider when questions arose. If data was submitted by a provider in a format that did not allow a direct coverage to be mapped, such as a coarse level of geography such as a census tract, or county, feedback was provided to the providers in the form of standardized spreadsheets in an attempt to standardize the inputs, and increase the geographic granularity of the provider data submission. Although each provider had individual characteristics and nuances in their data submissions, some data patterns can be described generalizing the typical types of submissions. In general, for fixed wireless to be mapped it was necessary to receive data from a provider, since there were no public sources available on point to point wireless tower locations in public form, except as depicted on providers web pages in a few instances.

Providers Submitting FCC Form 477 Report or Similar Format

Geographically, these were lists of census tracts of coverage, accompanied by additional documentation on technology of transmission, speed tiers, and number of customers. Providers submit these twice a year to the FCC and recent submissions have been done using a structured web site maintained by the FCC. A few providers submitted printouts that appeared to be from this web format and were typically complete and standardized. More providers submitted spreadsheets roughly in the F477 format, but with modified and generalized data.

How They Were Processed

If the providers identified specific coverage areas as census blocks, or direct coverage area, or as infrastructure tower locations, they were processed and mapped. Providers identifying census blocks were processed by dissolving the census blocks into single coverage polygons by speed tier. Providers identifying a direct coverage area were converted directly to GIS polygon files and attributed. Providers submitting tower locations were mapped as circular polygons centered on the tower with a radius averaging 10 miles measured as Euclidian (straight line) distance from the tower. Providers that specified variable radius were mapped as circles at the radius they submitted.

Providers Submitting Census Block Coverage

Some providers submitted coverage as census blocks, either through a tabular listing of census blocks or spreadsheet, or in map format. It was common that a provider where public data indicated multiple technologies of transmission only submitted some of the technologies of transmission.

How They Were Processed

These were loaded directly into the master Census 2000 block coverage by provider and attributed with available data submitted by the provider. In instances where some data attributes were missing, such as advertised or typical speed tiers, or subscriber data, the data attributes were left blank or null. Providers identifying census blocks were processed by dissolving the census blocks into single coverage polygons by speed tier. A visual inspection of independent speed test data overlaying the provider submitted block coverage was completed, but no action was taken to override a provider's submittal.

Providers Submitting Actual Coverage Maps

Coverage maps were submitted by several providers, or coverages were derived from public sources or from other indirect indicators of coverage such as customer point maps or tabular lists in text or spreadsheet format. These were differentiated from the other types of geographic submission coarser than a census block since they represented the full and explicit range of coverage.

How They Were Processed

Coverage maps were treated as explicit coverage and all census blocks intersecting any portion of a coverage were selected and attributed with the provider coverage by technology of transmission, and all related attributes were transferred to the census block representation. The method of creating the coverage varied by source. Providers who supplied broadband coverage as a GIS polygon or CAD feature were converted to polygons. Some providers, including non-responsive providers who did not submit anything to the project, had published coverage maps of various forms on their web sites or submitted an image in jpg, tiff, pdf or other graphic format. These were geogeorectified to base map layers, typically roads, but sometimes other features such as state or county boundaries or towns, and subsequently converted to polygon features. Then they were intersected and transferred to census block feature classes like the digital GIS submissions. Providers who submitted customer locations typically fell into four categories. Some were submitted as AutoCAD files where the points could be transferred to the GIS, then spatially joined to the census blocks they were located within. Others submitted maps in image format that were georectified in the same manner as other images, then census blocks were selected by an operator viewing the customer point images underlying the census blocks. When customer lists were submitted, they were loaded in a database and geocoded using ESRI Business Analyst USA Geocoding engine based on TeleAtlas road features. The geocoded points were subsequently treated identically to customer locations submitted in GIS or CAD format, and spatially joined to the census block template file. A visual inspection of independent speed test data overlaying the provider submitted block coverage was completed, but no action was taken to override a provider's submittal.

Providers Submitting Other Levels of Coarse Geographic Submission

This category had a wide range of submissions. The most common was as telephone exchange areas or equivalent, wire centers, zip codes, counties or general references to towns or cities. The problem with these submissions was that often a given polygon overlapped a census block or multiple blocks, and in most cases, they were much larger geographic entities than a census block.

How They Were Processed

Our operating rules established early in the project did not allow final provider coverage to significantly over represent provider coverage. Those providers that submitted coverage area by coarse geographic features and did not specifically identify coverage as a coverage layer or census blocks were not able to be processed. No interpolated data was used to calculate these data, if the data was not provided by a provider in a format capable of processing; the data was not calculated for that provider.

Satellite

The parameters below show the satellite wireless models for MT. A few satellites are use the same azimuth and altitude, so they only need to be run once and subsequently copied and renamed for different providers. There was one coverage for WildBlue and Starband, and four coverage for Hughes/DirectTV. The Anik-F2 satellite appears to be shared by Hughes and WildBlue coverage, and was listed under both.

The process included running a hillshade with the parameters shown below, selecting the "Model shadows" parameter. This was reclassed into 3 classes 0,1,Max value. Then the Majority filter model in Spatial Analyst Generalization was run with a 4x4 neighborhood grid to filter out the smallest isolated shadow pixels. A conditional selection of the class 0 (shadow values) was made for the final grid. This was run through a raster to polygon conversion and added to the master coverage template from geodatabase.

Provider	Satellite	Azimuth	Altitude	Operator
Hughes / DirectTV				
	Anik-E2	141.6	33.7	Telesat Canada Ltd.
	Anik-F2	181.8	36.13	Telesat Canada Ltd.
	Spaceway-1	170.6	35.68	Direct TV, Inc.
	Spaceway-3	160.1	34.17	Hughes Network Systems
WildBlue				
	Anik-F2	181.8	36.13	Telesat Canada Ltd.
	Wildblue 1	181.8	36.1	Wildblue Communications
Starband				
	Echostar 9	195.1	35.03	Echostar Technologies, LLC

Skycasters LLC satellite coverage was added based on instructions from NTIA on September 11, 2012. The coverage modeled for Hughes/Direct TV was used to approximate Skycasters satellite coverage since the satellite coverages are all very similar.

Community Anchor Institutions

Lists were obtained from the state and affiliated processional organizations for anchor institutions to be included in the broadband mapping in each of the community anchor institution community code categories. These were sorted and cross referenced and an initial round of elimination of duplication was accomplished.

All institutions on the initial draft spreadsheets used for the first two submittals were geocoded using ESRI Business Analyst Desktop with the USA Geocoding engine using TeleAtlas premium road features. This was judged to be the best available geocoding source for batch processing of addresses. No commercial source is 100% accurate in a primarily rural state such as this with low population numbers compared to other states and no large cities or metropolitan statistical areas. In subsequent rounds of updates since the first two submittals, we have used the same geocoding engine from esri Business Analyst, but the geocoding locator switched to NavTech geocode locator. In every round of geocoding we used conservative matching criteria, and maintained and stored the type of match (building match, address match, or zip code match), along with a record of those not matching and not able to geocode.

All geocoding is dependent on accurate road locations and complete and accurate street segment attribution. The GIS road layers available from the state were not judged as complete as the premium commercial sources. The Tiger 2009 road files, while spatially comparable to the commercial sources, have a large percentage of null values in the database attribution and street segment address ranges necessary for accurate geocoding. As in most parts of the country, geocoding is more accurate in urban settings than in rural routes. Complicating the process in a rural state for anchor institutions are the situation where some anchor institutions, such as public safety anchors are often staffed by volunteer staff and a post office box is the only valid address, and the physical address is wherever the public safety equipment is parked or stored at any given point in time.

Category codes were assigned based on the original source list and from keywords in the name of the institution and independent research. Technology of transmission and advertised speeds were obtained when possible, which initially was entirely based on the anchor institutions maintained by the state for consortiums providing state service contracts. Two iterations were accomplished with these state maintained lists, and all available attributes were obtained with assistance of the state analysts.

After initial data collection, analysts worked on researching, calling and improving the addresses for those below an 80% match criteria. Many in the 70% matching range were fairly accurately located. The difference between a 70% and 80% match typically occurred when an address lacked a prefix or suffix cardinal direction on a street that had two cardinal directions (example 101 1st Street, on a street segment with 101 N.

1st Street and 101 S. 1st Street). Analysts were also able to obtain physical addresses for some lists supplied by the state with only a P.O. Box.

The lists with updated and corrected addresses were re-geocoded for the final mapping effort, and any anchor with any level of geocoding was included on the final map. The operational database identifies the type of match, so future maintenance cycles can be prioritized and targeted to those matching only zip codes or with address changes.

From the results of the previous step some attribution of database attributes for attributes with null values was accomplished. This step was rule based. The attribute of whether an anchor institution subscribes to broadband service could only authoritatively be answered yes, if the information was provided by the state, or a confirmation from an anchor speed test could be matched. Those anchors that were located within an area covered by a DSL, cable, other copper or fixed wireless were also assumed to have the ability to subscribe to broadband coverage and were also estimated to be subscribers. Assigning the technology of transmission and the advertised speeds (which required identifying a provider for the anchor institution) was only possible on a subset of all coverage in those areas where only one provider/technology of transmission was present. This allowed a few hundred more anchors to be identified, but typically only occurred in rural settings. Most urban settings had multiple providers. In addition many providers submitted multiple technology options, so identifying one provider/technology of transmission combination was not possible even if there was only one provider possible for the anchor institution.

It is likely that in some instances in the rural settings and small towns an anchor institution may rely on mobile wireless broadband. This is common in public safety mobile equipment such as vehicles, but likely less common in anchor facilities. For the purpose of assigning attribution to anchor institutions with remaining null attributes, we took a conservative approach and did not overlay anchor institutions on mobile wireless coverages to assign attributes.

Maximum advertised downstream and upstream speeds were not available or collected for any of the CAIsA new domain value of “U” for Unknown was added to the data model for the current submission, and all values formerly coded as 0, were changed to “U”. A new optional attribute was requested by NTIA for the current submittal requesting knowledge about the presence or absence of WIFI at the CAI locationThis was not researched and attributed by the state in the current submission. All records were set to “Unknown” for the attribute, Public Wi-Fi.

In the first two submission processes for geocoding we used conservative matching criteria, and maintained and stored the type of match (building match, address match, or zip code match), along with a record of those not matching and not able to geocode. The current submission was completed by state analysts, and new additions to the list were not geocoded. The additions of new anchor institutions in this submission were assigned their latitude and longitude geographic location based on their location used in the Montana Structures Framework.

A new optional attribute was requested by NTIA after the initial maintenance updates requesting a CAI unique identification number for K-12 schools, libraries and colleges and universities. The following steps were completed for this request.

1. Added CAIID for the Library category using a combination of the FSCSKEY and FSCS_SEQ number attributes from http://harvester.census.gov/imls/data/pls/index.asp. Added 49 records using the Montana Structures Framework to assign their geographic location.

2. Added CAIID for the University, college, other post-secondary category using the NCES IPEDS ID from http://nces.ed.gov/ipeds/datacenter/. Added 10 records using the Montana Structures Framework to assign their geographic location.

3. Added CAIID for the School – K through 12 category using the NCES ID CCD ID from http://nces.ed.gov/ccd/bat/ . Added 118 schools using information from the OPI Schools http://www.publiclibraries.com/montana.htm list, the NCES Schools List and the Montana Structures Framework. NOTE: NTIA asked that each school be given a unique ID but in the CAI table, many schools at the same address were combined. These were not separated for this round of the NTIA submittal.

A new optional attribute was requested by NTIA for the current submittal requesting a URL for each anchor institution.

Assigned URLS to CAI records: for the University, college, other post-secondary category assigned the actual URL for that institution; for the Library category added a standard URL (http://www.publiclibraries.com/montana.htm); for the School – K through 12 category added the OPI URL (http://opi.mt.gov/Resources/Directo the 2011 update cycry/Index.html); and for other institutions, added an appropriate URL for the type of CAI.

The State of Montana assigned administrative staff to update the anchors during the 2011 update cycles. They eliminated duplicate entries, added additional schools based on Office of Public Instruction data, and updated the NCES codes.

Middle Mile

Middle mile and backhaul points were included for all public data and provider submitted infrastructure judged to be reliable and valid. A systematic reliability (geographic scale and authority of the source) rating and a validity rating (cross referencing between multiple sources) were developed and used throughout the project, both on a scale of 1-

10, along with feature level metadata to maintain the last point of aggregation. A persistent unique identifier was used to track each point and each instance of a point as they moved through the system and improved in quality. Old points were retired but were not deleted from the operational database. Only active records were used in the final processing.

A feature class labeled "Last point of aggregation" (LPA) in the operational database was created to hold point locations of broadband infrastructure (examples include central offices, remote terminals, head ends, etc.). Addresses purchased or obtained at any level of geography were geocoded to a street address (using ESRI Business Analyst and TeleAtlas data) or located more generally to the center of a town (snapped to the USGS Geographic Names Information System location) when no address information was available. and All mobile wireless locations obtained from public sources or commercial sources that were not already validated were confirmed using NAIP aerial imagery and Google Street View (when available). All FCC tower locations included a latitude and longitude, however all towers were validated and moved to the NAIP aerial imagery location.

A reliability code indicating the source and geographic scale represented as an integer from 1 (low) to 10 (high) was assigned. Validity codes were assigned cross-referencing public and provider data submissions; it was also rated on a scale of 1-10. A point with a validity code of 7 that fell within a provider's coverage for DSL, mobile or fixed wireless, or was used in a final modeled coverage was included in this table. In addition, backhaul points identified by the state, by providers and consortiums providing services to the state and anchor institutions, were included in the table. Providers were typically reluctant or unwilling to provide infrastructure data, and often unwilling to confirm data obtained through public sources. The methods used in the state allowed a significant level of identification and mapping of infrastructure locations and feature level metadata on reliability and validity of point locations, but data on owned or leased characteristics, serving facility codes, and for elevation of infrastructure was confirmed by few providers who responded directly in a spreadsheet provided to them to list infrastructure.

Speed Test Data Processing

A public facing website was created in the spring of 2010 asking internet users in the state to complete a brief survey regarding their internet connection and run a speed test on their connection using the Ookla speed test. The speed test site asked that a user enter their location as an address on a Google map interface. If the address did not geocode to their satisfaction, the user could choose to move the place mark to their desired location. Next, users were asked to select their technology of transmission from a list, enter their provider in a free form text field, complete an optional questionnaire, and run a standard speed test on their connection. The date and time, and IP address of the user were captured during the speed test.

All speed tests were geocoded, and the IP address was looked up in batch mode in the WHOIS database returning one or two providers registered with WHOIS. All speed tests were cleaned and analyzed against provider submissions and models. For the first two submissions a final provider assignment was assigned by examining the WHOIS fields, and the provider submitted by users. Consistent rules were not always possible, but generally when two WHOIS records were returned, the second more specific WHOIS provider was selected. In some instances, where the WHOIS providers were backhaul or other and were not providers meeting the NOFA criteria, the user submitted provider designation was cleaned and standardized and assigned as the final provider.

There was considerable variation between the user reported technology of transmission (TOT) and the known technologies for any given provider. Records were divided on unique provider/ TOT combinations for the first and second submissions, which limited the record count in many instances. For the current submission the records were divided only by provider, not taking TOT into consideration.

For the first two submissions, the speed test records were used in two ways for the final processing.

1) As an independent measurement to validate the presence/absence of a provider coverage for DSL and/or Cable technologies.

In the first submission a few providers were identified as DSL broadband providers based primarily on speed tests. In these instances, DSL models were executed for both providers based on verified central office locations. Some speed tests with an identified technology of transmission of Cable Modem were used to expand “likely” cable areas which were typically adjacent to incorporated and urban areas. These “cable-plus” areas were created to supplement submissions from Cable Modem providers who did not provide detailed coverage or census blocks. No new DSL providers or Cable providers were identified using speed tests in the current submission.

2) As an independent measurement for typical upload and download speeds.

Once data were cleaned and final provider and technology of transmission assigned, these fields were concatenated. In the first two submissions, if the remaining records exceeded 10 for the combination of provider and technology, and the speed test was successfully completed (values > 0) the average value and standard deviation of the download speed were calculated. Any values exceeding 1 standard deviation were removed as outliers, and the mean of the remaining records within 1 standard deviation was calculated for the download and upload speed. This value was reported for each provider/technology of transmission record as the typical speeds for that provider. In some instances the typical speed was lower than that required to meet the definition of broadband by NTIA, but that did not preclude the records from being included in the broadband map in the first two submissions as it did in the current submission.

For the current submission, these procedures were modified and all records were re-run. The steps of the current processing are provided below. The primary procedural change was to drop the validation of the presence/absence of provider coverage for DSL and/or Cable technologies, since providers had been validated in the first two submissions and potential new providers identified through additional speed tests were determined to not meet the NOFA criteria for being considered a broadband provider. The use of the speed test data for determining typical speeds was implemented with similar rules as the first two submissions with the exception of the use of the technology of transfer, and raising the minimum number of speed tests to 15, after removing outliers, to be used in typical speed calculations. Procedurally, the process was also automated with a Python script to improve processing performance and minimize quality control/quality assurance testing.

Typical upload and download speeds for all providers with less than 15 processed speed test records were coded as null values. In addition, based on telephone communication with NTIA on March 9, 2011, all typical speeds less than minimum NOFA upload or download speed criteria were also ignored and reported as null. Based on a related request in the same communication, the typical speeds greater than the advertised speeds were ignored and reported as null. Subsequently on March 17, in the NTIA grantee webinar, the NTIA staff indicated that typical speeds would not be compared to advertised speeds. Processing steps for the current submission are provided below:

1. Speed test records were imported into a SQL Server data file, adding fields Final Provider and IPGroup to the initial records.
2. IPGroup attribute was set by extracting the left three nodes of the IP Address of the speed test (e.g. 161.7.1.236 had 161.7.1) moved to the IPGroup attribute.
3. An IPGroup to Final Provider cross reference table was created to determine the final provider from the unique three part IPGroup (e.g. 161.7.1 is known to be the State of Montana).
4. Each IPGroup was reviewed with the data in the WHOIS 1 provider, WHOIS 2 provider and then the user specified provider to determine the most authoritative final provider from the official list of providers. None of the WHOIS or user submitted fields were absolutely authoritative in all instances, so expert opinion by technicians knowledgable of the providers was used in some instances to assign the IPGroups, and subsequently the Final Provider attribute.
5. Run a python script to remove outliers and calculate summary statistics for each Final Provider assignment. The rationale for removing outliers was to mitigate the many variables that effect a typical speeed test, such as the time of day, others on the network, etc. The script implemented the following work flow rules:
    a. Use all records for each unique FinalProv attribute value with D_kbps greater than 0 or U_kbps greater than 0 , then:
    b. Calculate a mean for the unique provider group for each D_kbps and U_kbps.

   c. Calculate a standard deviation for the unique provider group for each D_kbps and U_kbps. Each speed attribute was calculated independently of the other.
   d. Subtract the outliers (if any) higher or lower than one standard deviation from the mean.
   e. Calculate the median value of the remaining non-outliers for each provider D_kbps and U_kbps respectively.
   f. Create a summary table with the final calculated assignment of FinalProv, D_kbps and U_kbps.
6. Post process the summary table in the following sub steps:
   a. Join the summary tables by provider for the upload and download speeds into one summary file including the number of records or frequencies for up and down speeds for each provider after removing the outliers, and the mean up and down speeds in kilobits per second for each provider.
   b. Select "FreqDown" < 15 AND "FreqUp" < 15 then delete the resulting selection set from the joined table. The FreqDown/Up fields counted the number of speed test records for a provider after the outliers more or less than one standard deviation from the mean value were removed from consideration.
   c. Select "D2_kbps" <= 768 kbps AND "U2_kbps" <= 200 kbps. then delete the resulting selection set from the joined table.
7. Import the remaining valid mean values for each provider into the appropriate broadband coverage feature classes.
8. Select any typical speeds greater than advertised speeds either up or down, and make the resulting records null in the final broadband coverage feature classes (as per NTIA request 3/9/2011).

Reliability, Validity and Completeness

Throughout the course of the broadband project the State of Montana has employed several validation and verification techniques to help quantify the accuracy of the broadband map. The techniques used are listed below:

- Reliability Codes Assigned to Infrastructure Points
- State Run Speed Test Portal
- State Wide Broadband Survey

Reliability codes apply to the source data points and polygons and assess the authority of the source we obtained the data from and the level or coarseness of the geography (address or town). Validity codes are determined from cross checks of data sources and the number of independent sources of verification. These are as simple as comparing speed test locations against DSL modeled polygons, or as complex as geospatial analysis operations such as a kernel density function cluster analysis. Completeness is determined by public sources, independent measurements or provider submittals and checks on the domain classes required for the final NTIA deliverables such as Technology of Transmission domains, Speed Test domains and serving facility and wireless spectrum facility types and categories. The categories for these, and the subsequent records in our operational geodatabase tables grow and change as new data is obtained. We are maintaining these as feature level metadata tied to points and polygons maintained by analysts and technicians in a wiki table and coding them to the geodatabase. In this way the unique situations that arise can be cataloged and maintained with some level of flexibility while contributing to the final indices in a controlled fashion.

Reliability Codes

The two factors incorporated in reliability codes include the level of geography that was used as a source or provided as a clarification of location and the authority of the source for the information. We are also considering clusters of point information from independent measurements and sources to be higher in reliability than individual point information.

Generally, the coarser the source geography the lower the resultant score. Everything besides an address or street intersection, latitude/longitude location, or location provided in a georeferenced digital source is assigned a reliability score less than 5. This applies to source data coming (e.g. a central office located in a city instead of an address) and review comments on a previously mapped location (e.g. “That location is wrong, I know it is on the south side of town”).

We have incorporated the reliability code into our last point of aggregation (LPA) and provider coverage geodatabase files, and into some of the publicly available data (PAD) geodatabases. We are also carrying a short text field (50 characters) with a descriptive rationale for the score. This will allow us to focus more on the lower scores that need to be confirmed, and ignore the high confidence data scored as 9 and 10.

Reliability Codes		
Code	**Description**	**Detailed Description**
0	Not assigned	• Not yet assigned
1	Level 1	• Checked but unverified
2	Level 2	• County • Presence by other coarse geography (e.g. administrative region)
3	Level 3	• City • Census tracts • Cable Plus (area likely to have been annexed into an incorporated town or CDP)

<table>
<tr><td>4</td><td>Level 4</td><td>Cable - incorporated
Zipcodes
Census blocks</td></tr>
<tr><td>5</td><td>Level 5</td><td>GeoTel unverified
Confirmed by provider or anchor institution key advisor but to geography coarser than address or intersection</td></tr>
<tr><td>6</td><td>Level 6</td><td>Qwest/Midcontinent or other web site random testing check
Speed test from individual average residential</td></tr>
<tr><td>7</td><td>Level 7</td><td>From anchor institution key advisor Webex
GeoTel verified address only with no 3rd party confirmation from public sources
Building unverified
Speed test from anchor institution</td></tr>
<tr><td>8</td><td>Level 8</td><td>From provider
FCC ULS or ARS
Geotel verified address and possibly verified by 3rd party source (Google Streetview)
Another provider's sign is on building (usually Qwest)
Geotel possibly verified by 3rd party source (NAIP, Google Streetview)
From state authoritative public data source (e.g. DCN or SummitNet)
Address or building unverified
Speed test from cluster of average residential</td></tr>
<tr><td>9</td><td>Level 9</td><td>From provider as coverage with authoritative confirmation
Geotel verified address and verified by 3rd party source (NAIP, Google Streetview)
Provider sign on building
Tower or dish visible
From provider or anchor institution check of our data * Root Wireless</td></tr>
<tr><td>10</td><td>Level 10</td><td>From 2+ authoritative confirmations</td></tr>
</table>

Validity Codes

We included validity codes in the last point of aggregation infrastructure data which drives creation of the DSL models. We also included validity codes in each of the final technology of transmission deliverables for polygons and point feature classes. The scales of validity vary by each major type and function.

Infrastructure Validity Codes

The purpose of this validity code is twofold:
1. To determine which infrastructure points are turned into DSL model coverages
2. To use as a reference in other coverage validity checks

Infrastructure Validity Codes		
Code	**Description**	**Detailed Description**
0	Level 0	• Not yet assigned
1	Level 1	• Not yet assigned
2	Level 2	• Not yet assigned
3	Level 3	• Checked against MT PSC Report or DSLReports at the town level • Checked against SummitNet anchor institution data
4	Level 4	• Checked against two or more independent public sources at the town level • Checked against provider public data (e.g. Qwest ICONN) at the town level
5	Level 5	• Not yet assigned
6	Level 6	• Confirmation of DSL or cable from authoritative public data to broader geography than address not confirmed by provider
7	Level 7	• Authoritative public data at address level (e.g. Geotel) not confirmed by provider
8	Level 8	• Provider submission at the census tract level • Provider website independent address checks (Qwest, Verizon)
9	Level 9	• Provider submission at the census block level or address level
10	Level 10	• Provider submission at the coverage level at census block scale or blocks less than 2 square mile and larger scale then census block for blocks larger than 2 square miles

Final Technology of Transmission Validity Codes

The purpose of this validity code is twofold:
1. To determine which elements are loaded in the spreadsheet provider submission packages in their review
2. To determine which provider coverages are chosen for submittal with one of the NTIA deliverables (April 15, June 24)

Final Technology of Transmission Validity Codes		
Code	**Description**	**Detailed Description**
0	Not assigned	• Not yet assigned
1	Level 1	• Unassigned at this time
2	Level 2	• Unassigned at this time
3	Level 3	• Checked against MT PSC Report or DSL sources at the town level • Checked against SummitNet anchor institution data
4	Level 4	• Checked against two or more independent public sources at the town level • Checked against provider public data (e.g. Centurylink ICONN) at the town level
5	Level 5	• Confirmation of DSL or cable from authoritative public data
6	Level 6	• Provider website independent address checks (Qwest, Verizon) • Provider submission at the census tract level
7	Level 7	• Provider submission at the census block level • Provider submission at the census block level confirmed by Speed test cluster OR other independent measurement
8	Level 8	• Provider submission at the address level
9	Level 9	• Provider submission at the address level confirmed by Speed test cluster OR other independent measurement
10	Level 10	• Provider submission at the address level confirmed by Speed test cluster OR other independent measurement

Quality Assurance Testing

A separate analyst checked each provider submission. Due to the variety of provider submissions, the analyst originally doing the work and the analyst checking discussed the interpretations when the criteria were subject to interpretation.

Coverage, technology of transmission, and speed tier were checked completely for each provider.

Many of the models and block, tract and coverage level processes were completed with ESRI Modelbuilder and Python scripts, and these methods were tested for quality assurance in the preliminary mapping stages and in the initial sample data submissions to NTIA.

All providers who submitted geographic coverage coarser than a census block were provided a data checking package to assess for accuracy and completeness. Any comments received from providers were processed.

1. QA/QC Checks prior to Individual Data Processing (i.e., block or coverage geoprocessing model). [Automated Modelbuilder tools and follow-up by an analyst]
    a. Check for inconsistencies within the Provider Name, DBA Name, FRN
    b. Check for duplicate census blocks or coverage areas
    c. Check the Provider Name, DBA Name, FRN against the “Official Provider Table”

2. For each provider after initial data processing is completed [Review by an analyst that did not process the original data]
    a. Review correspondence log
        i. Review recent correspondence, since previous NTIA submission
        ii. Note changes/additions/comments on coverage area, technologies, speeds, infrastructure, subscriber weighted nominal speeds (SWNS)
    b. Review wiki data processing page (current metadata)
        i. Note changes/additions/comments on coverage area, technologies, speeds, infrastructure, SWNS
    c. Review individual Provider Wiki page (historic metadata)
        i. Note changes/additions/comments on coverage area, technologies, speeds, infrastructure, SWNS
    d. Check Provider Data Folder
        i. Review recent data submissions, since previous NTIA submission
    e. Check Working Data Folder
        i. Review current update feature class geography
        ii. Review coverage with provider’s submissions
        iii. Review technology of transmissions (TOTs) with provider’s submissions
        iv. Review Max Adv Speeds: Down/Up with provider’s submissions

3. For each provider after final data processing is completed [Review by an analyst that did not process the original data]
    a. Check PROVCOV_Master geodatabase:Provider Blocks feature class and/or Provider Coverage feature class
        i. Review geography
        ii. Review TOTS
        iii. Review Max Adv Speeds: Down/Up

4. Check Infrastructure feature class [Review by an analyst that did not process the original data]
    a. Review recent submissions, since previous NTIA submission

5. Check SWNS feature class [Review by an analyst that did not process the original data]
    a. Determine if provider submission is valid

6. For each provider after speed tests are processed [Review by an analyst that did not process the original data]
    a. Check PROVCOV_Master geodatabase for Typical Speeds: Down/Up

7. QA/QC Checks and Reports on the Final NTIA Deliverable [Automated Modelbuilder tools and follow-up by an analyst]
    a. Check the Provider Name, DBA Name, FRN against the “Official Provider Table” for each NTIA feature class (i.e., BB_Service_CensusBlock, BB_Service_RoadSegment, BB_Service_Wireless, etc.). NTIA_Provider_Name_DBA_FRN_Errors_Sample.xls, looks at each NTIA feature class (i.e., census blocks, road segments, wireless, etc…) and checks to see if there is an identical match in the “Official Provider Table.” If an identical match does not exist for that Provider Name, DBA Name, FRN concatenation it is written to a geodatabase table along with the NTIA feature class where the “error” occurred. When an “error” does occur it then has to be checked by an analyst and corrected if necessary.
    b. Change Detection Report – This geoprocessing model compares and reports any changes in the Census Block, Road Segment, and Wireless feature classes for the current and previous versions of the NTIA SBDD Transfer database. The user needs to supply the feature classes for each NTIA version as well as the name of the final change detection table. NTIA_Change_Detection_Example.xls, compares and reports any changes (limited to Provider Name, DBA Name, FRN, TOT combinations) in the Census Block, Road Segment, and Wireless feature classes for the current and previous versions of the NTIA SBDD Transfer database. If the final change detection table has no records, then no changes were detected between the two databases. If a Provider Name, DBA Name, FRN, TOT combination does not have a “pair” in either direction (the current or previous NTIA database) then it is written to a geodatabase table along with the NTIA feature class and version where the “error” occurred. This report does not change any data in either database but rather acts as a flag, requiring an analyst to check if the “error” is valid.
    c. Check for duplicate census blocks or road segments or wireless coverage areas.
    d. Check for duplicate anchor institution points.

8. Review Final NTIA deliverables [Review by an analyst that did not process the original data]
    a. Review BB_ConnectionPoint_MiddleMile
    b. Review BB_Service_CAInstitutions
    c. Review BB_Service_Census Block

d. Review BB_Service_Overview
e. Review BB_Service_RoadSegment
f. Review BB_Service_Wireless

9. Run the NTIA Check submission tool and python tool to confirm that all possible records passed the NTIA data checks. The only items that failed in the checking process were those where inconsistencies in the final NTIA NSGIC data model did not agree with the final documentation and rules established by NTIA and FCC in the final webinar and documentation presented March 17, 2011. These exceptions were documented along with the submission.

Appendix A

Potential providers researched but subsequently identified as not providing broadband service.

Company Name	Filing Company DBA	FRN	URL
5LINX Enterprises Inc. DBA Globalinx	5LINX Enterprises, Inc.	0015304645	www.5linx.com/products
8x8, Inc.	8x8, Inc.	0007099773	www.8x8.com
Access Point Inc.	Access Point Inc.	0004057352	www.accesspointinc.com
Accessline Communications Corporation	Accessline Holdings, Inc.	0015982366	www.accessline.com
ACN Digital Phone Service, LLC	ACN, Inc.	0015312606	www.myacn.com/index.html
All Digital Telecom, Inc.	All Digital Telecom, Inc.		none
Alltel Wireless	Alltel Wireless		www.att.com
Ameripages, Inc.	Ameripages, Inc.		none
AmeriVision Communications, Inc.	AmeriVision Communications, Inc.		http://www.affinity4.com/
Aptela, Inc.	Aptela, Inc.	0015304850	www.aptela.com
AT&T Corp.	AT&T Inc.	0004496774	www.att.com
B2B Advantage, Inc.	B2B Advantage, Inc.		http://www.b2badvantage.net/b2b/index.asp
Bandwidth.com, Inc.	Bandwidth.com, Inc.	0015443773	www.bandwidth.com
Big Sky Wifi, Inc.	Big Sky Wifi, Inc.		www.3rivers.net
BigHoof New Media	BigHoof New Media		none
Birch Telecom	Birch Telecom		www.birch.com
BroadvoxGo!, LLC	BroadvoxGo!, LLC	0017679523	www.broadvox.com

Broadwing Communications, LLC	Level 3 Communications, LLC	0008599706	www.level3.com
Bulldog Cable	Bulldog Cable		www.bulldogcable.com
BullsEye Telecom, Inc.	BullsEye Telecom, Inc.	0004350930	www.bullseyetelecom.com
C-A Information Systems Inc.	C-A Information Systems Inc.		www.consumer.hughesnet.com
Cable & Communications Corporation d/b/a Mid-Rivers Wireless	Mid-Rivers Telephone Cooperative, Inc.	0001634443	www.midrivers.com
Call Catchers Inc.	Call Catchers Inc.	0016109803	none
Cause Based Commerce Incorporated	Cause Based Commerce Inc.	0015173503	www.causebasedcommerce.com
COMCAST CABLE COMMUNICATIONS, INC.	Comcast Corporation	0003768165	www.onlinecomcast.com
CommPartners, LLC	CommPartners Holding Corporation	0011045127	www.commpartnersconnect.com
Contact Communications	Contact Communications		none
CRJ Communications Indications Corp.	CRJ Communications Indications Corp.		none
Dialog Telecommunications	Dialog Telecommunications		none
DSLnet Communications, LLC	Megapath, Inc.	0004324851	www.megapath.com
EarthLink	EarthLink	0015192453	www.earthlink.net
ECR Voice, LLC	ECR Voice, LLC	0015518129	www.ecrvoice.com
Engineered Communication	CommPartners Holding	0019615400	www.commpartnersconnect.com

Systems, Inc	Corporation		
Ernest Communications, Inc.	Ernest Communications, Inc.	0004948642	www.ernestgroup.com
Essen Communications Corporation	Essen Communications Corporation		www.essencommunications.com
Fionda VOIP, LLC	Fionda VOIP, LLC	0015321961	www.fionda.com
First Communications, LLC	First Communications, LLC	0003764487	www.firstcomm.com
Get Mobile	Get Mobile		none
Gilat	Gilat		www.gilat.com
Global Crossing Telecommunications, Inc.	Global Crossing North America, Inc.	0002850519	www.globalcrossing.com
Granite Telecommunications, LLC	Granite Telecommunications, LLC	0008676975	www.granitenet.com/ProductsAndSolutions/Pages/Broadband.html
GreatCall, Inc.	GreatCall, Inc.	0018554386	www.greatcall.com
Greenfly Networks, Inc.	Greenfly Networks, Inc.	0015808736	www.clearfly.net
HughesNet	HughesNet		www.consumer.hughesnet.com
iCore Networks, Inc.	iCore Networks, Inc.	0015340326	www.icore.com
IDirect	IDirect		www.idirect.net
IDT Corporation	IDT Corporation	0003790037	www.idt.net
InPhonex.com, LLC	InPhonex.com, LLC	0010488351	www.inphonex.com
Integra Telecom	Integra Telecom		www.integratelecom.com
Internet Montana	Internet Montana		www.imt.net/services/dsl.html
Ionex Communications North, Inc.	Birch Communications Inc.	0005027305	www.birch.com/about/
IP Networked Services, Inc.	IP Networked Services, Inc.	0016088882	none
iSmart Mobile	iSmart Mobile	001910	www.smartcall.us

LLC	LLC	7051	
Jefferson Broadband	Jefferson Broadband		www.cutthroatcom.com
Kosmaz Technologies LLC	Kosmaz Technologies LLC	0014855084	www.kosmaz.com
LightSquared LP	LightSquared LP	0007705742	www.lightsquared.com
Lightyear Network Solutions, LLC	LY Holdings, LLC	0010045128	www.lightyear.net
LinkStar	LinkStar		www.viasat.com
Matrix Telecom, Inc.	Matrix Telecom, Inc.	0004333068	www.matrixbt.com
Metropolitan Telecommunications Holding Company	Metropolitan Telecommunications Holding Company	0009806019	www.mettel.net
Millicorp	Millicorp	0018930511	www.millicorp.com
Missouri Valley Communications, Inc.	Missouri Valley Communications, Inc.		www.nemont.net
Montana Advanced Information Network, Inc.	Montana Advanced Information Network, Inc.		www.vision.net
Montana Lincnet	Montana Lincnet		www.montanasky.net
Montana Wireless Inc.	Montana Wireless Inc.		none
Mountain West Internet Inc.	Mountain West Internet Inc.		www.mwtn.net
MTPCS, LLC dba Chinook Wireless	MTPCS Holdings, LLC	0013518741	www.cellularone.com
Multiband Communications, Inc.	Multiband Communications, Inc.		www.cutthroatcom.com
Navigator Telecommunications LLC	Navigator Telecommunications LLC	0004349924	www.navtel.com
New Cingular Wireless	AT&T Inc.	0003766532	www.att.com

Services, Inc.			
New Edge Network, Inc.	New Edge Holding Company	0003720471	www.newedgenetworks.com
nexVortex,Inc.	nexVortex,Inc.	0015282155	www.nexvortex.com
NOS Communications, Inc.	NOS Communications, Inc.	0004321006	www.nos.com
Omnicom Paging Plus, LLC	Omnicom Paging Plus, LLC		www.omnicom-paging.com
OnWav, Inc	OnWav, Inc	0018007898	www.onwav.com/home
OPCOM, INC.	OPCOM, INC.		wcstelecom.com
P.W.I. Holdings, Inc.	P.W.I. Holdings, Inc.		none
PAETEC Communications	PAETEC Communications	0003716073	www.paetec.com
Phone.com, LLC	Phone.com, LLC	0016845190	www.phone.com
Proximiti Technologies, Inc.	Proximiti Technologies, Inc.	0016431603	www.proximiti.com/default.aspx
QuantumShift Communications, Inc.	vCom Solutions	0004337523	vcomsolutions.com
Qwest Communications Company, LLC	Qwest Communications International, Inc.	0003605953	centurylink.com
Qwest Corporation	Qwest Corporation		centurylink.com
RNK, Inc.	Wave2Wave Communications, Inc.	0002477743	www.wave2wave.com
Sagebrush Cellular, Inc.	Nemont Telephone Cooperative, Inc.	0001608645	www.nemont.com
Skyland Technologies, Inc.	Skyland Technologies, Inc.		none

SoFast Internet Services, LLC.	SoFast Internet Services, LLC.		none
Sprint Nextel Corporation	Sprint Nextel Corporation	000377 4593	www.sprint.com
Summit Wireless, LLC	Summit Wireless, LLC		none
Telesphere Networks Ltd.	Telesphere Networks Ltd.	001532 8032	www.telesphere.com
Thinking Phone Networks, LLC	Thinking Phone Networks, LLC	001534 3478	thinkingphones.com
Time-Warner	Time-Warner		www.timewarner.com
Trans National Communication s International, Inc.	Trans National Communication s International, Inc.	000433 7846	www.tncii.com
tw telecom holdings inc.	tw telecom inc.	001494 2668	www.twtelecom.com
UC	UC		www.integratelecom.com
Velocity Networks Inc	Velocity Networks Inc	001532 7430	www.vel.net
Verizon Business Global LLC dba Verizon Business	Verizon Communication s Inc.	001085 6284	www.verizon.com
Virgin Mobile USA, LLC	Virgin Mobile USA, LLC		www.virginmobileusa.com/
Vivid Networks, Inc.	Vivid Networks, Inc.		www.lightnex.com/
VoIP360, Inc.	VoIP360, Inc.	001686 8317	none
VoIPStreet, Inc.	VoIPStreet, Inc.	001626 6157	www.voipstreet.com
Vonage Holdings Corp.	Vonage Holdings Corp.	001840 1844	www.vonage.com
Western CLEC Corporation	Western CLEC Corporation		www.cellularone.com
Yellowstone Media Design	Yellowstone Media Design	001605 9842	www.ymdesign.net
YMAX Communication s Corp.	YMAX Communication s Corp.		none

North Carolina Data Submission
Fall 2012

Data Collection Methodology

NC Broadband, a Division of the North Carolina Department of Commerce

10/01/12

Table of Contents

Executive Summary

North Carolina's SBDD Grant

In 2009 the e-NC Authority, the state broadband authority for North Carolina at the time, was designated as the Eligible Entity in North Carolina to receive funding under the State Broadband Data and Development (SBDD) grant program of the National Telecommunications and Information Administration (NTIA) of the U.S. Department of Commerce. In 2009-2010, the e-NC Authority was awarded $6,610,996 in federal funding under Award #37-50-M09002, to implement the following programs for North Carolina: broadband data collection and mapping, technical assistance, state capacity building, computer ownership and address file improvements, with the grant running from October 1, 2009 – October 1, 2014.

During the 2011 legislative session in North Carolina, the sunset date of the e-NC Authority was not extended by the legislature, so North Carolina's state broadband authority ceased to exist after December 31, 2011. The Appropriations Act (Session Law 2011-145) directed the e-NC Authority to work with the NTIA to transfer the federal NTIA grant to the North Carolina Department of Commerce (DOC). The e-NC Authority worked closely with NCDOC and the NTIA on the due diligence process for this grant transfer and in December 2011 the Governor designated the NC Department of Commerce as the new Eligible Entity under this grant. North Carolina's SBDD grant was transferred to the North Carolina Department of Commerce the first quarter of this year, effective January 1, 2012. The remainder of North Carolina's SBDD project is now being implemented by the newly-created Broadband Division (NC Broadband) of the NC Department of Commerce. The overall goals, activities and deliverables for North Carolina's SBDD program are the same, with just this substitution of grant entities.

Under this federal award of $4,045,959 (remaining funding transferred to NCDOC), NC Broadband is responsible for implementation of the following programs:

- State Capacity Building
- Data Collection and Mapping of broadband availability
- Technical Assistance to communities
- Implementation of the LITE-UP Pilot Program
- Update of the NC Master Address File

North Carolina Department of Commerce

NC Broadband, a division of the North Carolina Department of Commerce, was created specifically and primarily to carry out the remaining work of the State Broadband Data and Development Grant awarded to North Carolina by the National Telecommunications and Information Administration (NTIA) of the U.S. Department of Commerce. In this capacity, NC Broadband serves as the State Broadband Initiative for North Carolina. Work under the SBDD grant is being conducted by staff members of NC Broadband as well as the relevant contractors under the grant.

The Department of Commerce is the state's leading economic-development agency, working with local, regional, national and international companies. The Department's mission is to improve the economic well-being and quality of life for all North Carolinians. The mission is carried out by serving existing business and industry, including providing international trade assistance; recruiting new jobs and domestic and foreign investment; encouraging entrepreneurship and innovation; marketing North Carolina and its brand; supporting workforce development; strengthening communities; and promoting tourism, film and sports development. The Department also provides data, statistics, information and reports for state government and agencies, which regulate commerce in the state. As such, the Department of Commerce is a natural fit to house the State Broadband Initiative for North Carolina, with broadband infrastructure being key to reaching North Carolina's business and workforce goals, and with broadband infrastructure being a critical component to allow all NC businesses and communities to participate in the global economy.

Fall 2012 Broadband Data Collection and Mapping Process

Data Collection

The official data request letter from the NC Department of Commerce was sent to all identified providers of broadband service on July 17, via e-mail. Hardcopy mailed letters were not distributed this round. The grant transfer to DOC was explained in the letter. Providers were given a link to the relevant Webpage which housed: Data Instructions, the Excel Data Template, the NC Department of Commerce Designation Letter, the Guidance Letter from NTIA from June 2011, and a file to download the 2010 Census Block GIS layer from NC OneMap. Providers were also reminded that they may choose to submit availability data by census block and street segment, considered public data under the grant program, or address-level data, and were asked to contact DOC with questions about confidentiality of data. Providers were asked to reply to the data request on or before August 10, 2012.

During this data collection, as providers inquired about data confidentiality, they were provided with a letter from the NC Department of Commerce explaining the protections provided under North Carolina's Public Records Act. Working through the NC Telecommunications Industry Association at their request, DOC provided letters to sixteen telco providers explaining these protections. Working through the North Carolina Cable Telecommunications Association at their request, DOC provided three additional letters. Letters were provided directly to four additional providers (three of these being mobile providers). Non-Disclosure Agreements were secured with four of DOC's contractors with potential access to the data. The DOC did not enter into NDAs with any providers. There were no unresolved confidentiality issues brought forward by providers.

As mentioned above, Excel and geodatabase templates were shared with providers, along with PDF format instructions summarizing all NTIA requirements and information relevant to each type of provider (fixed wireless, mobile wireless, and wireline). Technical assistance was provided to any organization who requested it.

A secure server hosted by MCNC is configured with an open source, browser-based direct file upload system called eGroupware. Providers were sent a log-in name and password for this upload system once they contacted either Angie Bailey or Stephanie Jane Edwards to communicate that their data was ready for submission. A confirmation e-mail went to Stephanie Jane once data had been uploaded.

Individual reminder e-mails were sent, or phone calls made, to targeted providers. NC Broadband did use some previously-submitted datasets for providers that were unresponsive, or who asked that previous data be used for this round. NC Broadband plans to make a more concerted effort at full participation in the Spring 2013 data round. The number of known broadband service providers operating in North Carolina is still at 105, with one new addition and one provider removed due to acquisition.

Out of these 105 known providers, 75 now have broadband data in this statewide geodatabase. Several additional providers are in communications with NC Broadband, in an effort to produce usable data for upcoming data collections.

Notable changes in the provider list include the acquisition of Sky Catcher Communications by Skyrunner, and the name change from WildBlue Communications to ViaSat Communications.

Integration of Provider Data into NTIA Statewide Geodatabase

For ease of data integration, a front-end Excel format template was offered to all providers, containing notes defining required fields, explanations of which data is required in which formats by which types of providers, and hyperlinks connecting fields to additional tables listing the corresponding NTIA-specified values and codes (for speed tiers, technology types, connection point facility types and capacities, county codes, end user types). A brief description of how census block FIPS codes work was also taken from an internet source and distributed as needed to providers who had questions about how to report this information.

BB Service by Census Block

As requested by the NTIA mapping and planning team, all census block data is included with 2010 census block geometry. Technical assistance was often needed by providers to correctly report served areas by either the 15-digit FIPS codes or in some way by which NC Broadband staff could derive the appropriate FIPS codes.

BB Service Road Segment

The reporting and mapping of data by street segment presented significant challenges to accurate interpretation of where broadband availability is and is not. This is mainly attributed to the difficulty of standardization among the many data structures by which providers report street segments. Quality of data has improved since some providers have switched to submitting data in shapefile format, and others have been able to start including a Tigerline ID (TLID) field for reference in mapping tabular information. Use of this unique identifier has reduced ambiguity in some tabular datasets and improved data quality upon mapping.

BB Service Address

A few address-level datasets were submitted to NC Broadband with the latitude/longitude coordinates already determined in a spatial format, but most needed to be geocoded. This was done using the NC Master Address file as the primary reference file, significantly increasing the accuracy of matching records. Secondary sources for address records that did not find a match this way included street segment interpolation, ESRI data utilizing the 4-digit ZIP extension, and manual placement/digitizing based on a combination of reference data and online browser maps. Upon completion of geocoding for each provider submitting address data, the address point features were overlain with a 2010 census block layer to add the census block FIPS code attribute, then all address feature points were loaded into the geodatabase feature class. The geocoded shapefiles for each provider are kept with geocode match score and match reference type for every matched address, so the thoroughness of this data type could be tracked and/or improved with more time.

BB Service Wireless

Approximately nine small, fixed wireless providers have been able to share technical information about their transmitting towers, antennae, and frequencies, so that NC Broadband can produce for them a service coverage shapefile using the contracted services of the University of NC at Greensboro Center for Geographical Information Science (http://cgis.uncg.edu) . An Excel template was developed with all the relevant information that can be filled in by providers with technical assistance in some cases, and the propagation model is field-calibrated to reflect actual ground conditions.

BB Service Overview

Records for overview containing subscriber-weighted nominal speeds of a given provider were generally joined to a template layer of county features, using the option to keep matching records only. Then these matching features and their new attributes were exported as a new shapefile before being loaded into the collective overview feature class. For providers with multiple technology types serving a given county in at least one instance, this information was single-field geocoded using the 5-digit county FIPS code, and then geocoded point features were spatially joined to the county polygon using "within" criteria.

Some detail formatting performed as needed:

- Add state FIPS code and any needed leading zeros onto county code for the new State+County FIPS code. Most providers list just the county code because this was the original NOFA request.
- Change state abbreviation values from "37" to "NC".
- Change weighted speeds to appropriate units (kbps) and remove unit text.
- Translate to county from weighted speeds reported by RSA/MSA.

BB Service - Critical Anchor Institutions

Only anchor Institutions that could be geolocated were included. Only 17 CAIs were identified that could not be geocoded to a point feature. CAIs were collected by contacting administrative offices of some CAI category types and receiving databases of information, as well as collecting from individual CAI locations for other types using survey emails and follow up phone calls as necessary. There are 5,857 CAI's identified, located, and included in the geodatabase to date. There were no changes to the CAI feature class since the previous data collection round in fall 2011.

Census Block data (tabular)

- Fields standardized and transferred into Excel template
- Geocoded to centroids of census blocks using 2010 Census Block layer in WGS1984 projection as reference file for "Address Locator".
- Spatial join of geocoded census block data points to polygon features

Street Data

Some datasets were submitted to NC Broadband by providers already in shapefile format, and others were reported in various tabular formats (text, Excel, CSV, etc.). Of the tabular datasets, some included a Tigerline ID ("TLID") field along with some or all other fields such as city, state, zip, and census block FIPS.

- For datasets submitted tabular with TLID:

- Max and Min address ranges were calculated from the FromRight, ToRight, FromLeft, ToLeft format used by most standard street segment reference files and incoming datasets
  - All data formatted into back-end Excel format, including converted speeds if reported at some other granularity.
  - Table geocoded to Tigerline 2010 street segment file using single-field and "TLID" values, with zero offset.
  - Geocoded point features converted to street segment geometry via spatial join using "contains" criteria, keeping matched records only.
- For datasets submitted tabular without TLID:
  - Max and Min address ranges were calculated from the FromRight, ToRight, FromLeft, ToLeft format used by most standard street segment reference files and incoming datasets
  - All data formatted into back-end Excel format, including converted speeds if reported at some other granularity.
  - Table geocoded to Tigerline 2010 street segment file using false midpoint address and either ZIP5 or census block FIPS (whichever available) as address locator zone.
  - Geocoded point features converted to street segment geometry via spatial join using "contains" criteria, keeping matched records only.
- For datasets submitted as shapefiles: VB If/Then statements used to calculate "Max" and "Min" address range attributes required by the NTIA/FCC, converted from the FromRight, ToRight, FromLeft, ToLeft format used by most standard street segment reference files and incoming datasets:
  - **To calculate "Min":**

```
Dim fromRight
Dim toRight
Dim fromLeft
Dim toLeft

fromRight = [FROMRIGHT]
toRight = [TORIGHT]
fromLeft = [FROMLEFT]
toLeft = [TOLEFT]


Dim minright
If fromRight = 0 And toRight = 0 Then
   minright = 0
ElseIf fromRight = 0 Then
  minright = toRight
ElseIf toRight = 0 Then
  minright = fromRight
Else
  If fromRight < toRight Then
    minright = fromRight
```

```
  Else
    minright = toRight
  End If
End If

Dim minleft
If fromLeft = 0 And toLeft = 0 Then
   minleft = 0
ElseIf fromLeft = 0 Then
  minleft = toLeft
ElseIf toLeft = 0 Then
  minleft = fromLeft
Else
  If fromLeft < toLeft Then
    minleft = fromLeft
  Else
    minleft = toLeft
  End If
End If
```

- **To calculate "Max":**

```
Dim fromRight
Dim toRight
Dim fromLeft
Dim toLeft


fromRight = [FROMRIGHT]
toRight = [TORIGHT]
fromLeft = [FROMLEFT]
toLeft = [TOLEFT]


Dim maxright
If fromRight > toRight Then
  maxright = fromRight
Else
  maxright = toRight
End If

Dim maxleft
If fromLeft > toLeft Then
  maxleft = fromLeft
Else
  maxleft = toLeft
End If

Dim max
If maxleft > maxright Then
```

```
  max = CStr(maxleft)
Else
  max = CStr(maxright)
End If
```

Creating last mile and middle mile features

- Formatted numeric fields in Excel as text since the short integer format in the data model for these fields will not accept values from the Excel import's default general format.
- ArcToolbox > Data Management Tools > Layers and Table Views > Create XY Event Layer
- Zoom to Layer, verifying that all points are located inside NC boundaries

Provider-specific notes, functions and corrections performed by NC Broadband as needed

Access/On Multimedia Inc.

- This is a middle mile only provider
- Provider confirmed no changes since last round so fall data was used

Cape Lookout Internet Services F12

- Duplicated Centurylink footprint (CB and street), to represent their reseller status.

AT&T F12

- Converted subscriber weighted nom speed data from CBSA to county
- Calculated conversion of Left and Right To/From addresses for street segment data to NTIA's required Max/Min values (using "min" and "max" formulas in Excel)
- Checked data by CB for duplicates, none found.
- Geocoded street-level data using 2010 TLID field.
- Selected counties from mapped subscriber weighted nominal speed data that actually contain broadband availability data by census block or street segment. Exported selection as Overview file.
- Linked geocoded points representing street segment data to polyline street segments via one-to-many spatial join, using intersect criteria with a 2 foot search radius. Eliminated extraneous joins by selecting out records in the results where target and joined TLID fields did not match.
- Many exact duplicates. After eliminating exact duplicates, many streets were reported with multiple speeds. Consolidated and took the highest speed available.

AT&T Mobility F12

- Merged shapefile features into a single multipart polygon to remove arbitrary grid boundaries.
- Validation: Ran "Eliminate Polygon Part" tool to remove any parts or donut holes less than 0.125 square miles in area.
- Removed extraneous vertices using a max offset of 150 feet.
- Added attributes supplied in Excel spreadsheet.

ATMC F12

- Merged shapefiles of address level data from two counties served, renaming and consolidating attribute fields.

- Added Address field populated with a concatenation formula of component address information.
- Added EndUserCat field and populated with code 5
- Overlay of address points w/CB layer to get FIPS code field
- Created new fields and used Calculate Geometry function in ArcMap to generate Lat and Long attributes

ATMC Wireless F12

- Ran repair geometry to resolve an error due to nonsimple features.
- Clipped shapefile to Tiger 2010 state boundary
- Eliminated polygon parts less than 0.125 square miles
- Ran simplify polygon to remove extraneous points, set to 20 feet max offset.
- Added spectrum attribute

CenturyLink F12

- Reprojected CB and street shapefiles and changed format of some fields for loading (created new fields of compatible type for TransTech, EndUserCat, and Provider_Type fields)
- Used If/Then scripts to calculate min and max address fields from left and right max/min ranges in ArcMap field calculator
- Noted partial CB geometry delineated (ie boundaries indicating where only parts of some CB's are served around the served area perimeter), but with correct 2010 census block FIPS codes, as confirmed by a test geocode.
- Created a template copy of the CB-based polygons and removed duplicates by conducting a one-to-one inner spatial join, using "identical to" criteria, with speed fields set to short integer field type and maximum merge rule.

Charter

- Re-projected and formatted attribute fields. Added EndUserCat field with value 5 for "Other/Unknown"
- Streets submitted and mapped in 2010 Tigerline, with no address range information. No unique identifier in common with reference Tigerline file, so no resulting address range info.
- Checked for duplicates in CB shapefile using Delete Identical, none found.
- exclusion of a small area of street segments and census blocks along the southern border of Cleveland County which was found to be bleedover from availability data in SC. Recalculation of subscriber weighted nominal speeds by county, consolidating two speed tiers calculated separately in previous data collections (values still reflect data as of spring 2011, need update next round).

Comporium F12

- For parent company Springboard: Tidied up text submission of address data and removed duplicates of equal or lesser max speeds. Ran address sorter script, all addresses found a match with previous data and were transferred new GDB (with the newer tech and speed attributes).
- For parent company Citizens Telephone Company: worked with provider to change granularity from census block to street segment level based on a specified radius from DSLAM coordinates sent from their engineering department.

Comcast F12

- Mapped CB's submitted this round
- Calculated min/max address ranges for street segment data in Excel
- Manually cleaned up street data text.
- Geocoded hypothetical midpoint of tabular street segments by address range, using composite street geolocator with zero offset.
- Spatially joined the above geocoding results to TIGER 2010 street segment features (using Intersect criteria with search range of 150 feet). Ran Delete Identical tool on the resulting street segments based on unique shape, TLID, and TransTech.
- Mapped Overview data as submitted in Fall 2010
- Clipped all mapped data to Caswell county, as directed by Comcast point of contact
- Created ArcGIS Explorer map for provider to review and feedback on data quality issues

Cricket S12

- Eliminated polygon parts smaller than 0.125 square mile, and removed extraneous points using a max 20-foot offset.
- Merged and duplicated polygons based on spectrum used
- Formatted attribute fields

Country Cablevision and Carolina Mountain Cablevision F12

- Formatted fields of new address data
- Removed 314 duplicates existing due to exclusion of unit/apt numbers
- Geocoded addresses and designated those in Haywood County as those served by Carolina Mountain Cablevision
- Created overview table based on information sent from provider in a follow up email.

Electronics Service Co of Hamlet

- Customized propagation model for unique antenna setup high up in trees
- Clipped output to state boundary

Frontier F12

- Began new with data submitted in this round, as per the provider this dataset includes/supercedes data previously combined from updates and formerly-Verizon's network.
- Applied speed codes based on email follow-up with provider
- Added fields for EndUserCat and ProviderType, populated all records with 5 and 1, respectively.
- Created XY Event layer for last mile/DSLAM points submitted.
- Applied a 15,000 foot service circle to last mile points for availability (no dissolve).
- Created subset of 2010 road segments that intersect the 15,000 ft radius buffers, via spatial join using intersect criteria.

Greenlight (City of Wilson) F12

- Re-projected shapefiles into WGS84.
- Added FRN2 field with leading zeroes, Lat, Long, EndUserCat (populated with code 5), and Provider type field (populated with code 1) to address attributes, and re-concatenated "Address" field.
- Spatial join of address points to obtain census block FIPS codes

- Removed duplicate addresses using Delete Identical tool in ArcToolbox, checking in Address, TransTech, MaxAdDown and MaxAdUp fields.
- Populated missing Typical speed fields with Maximum Advertised fields.
- Added/populated FRN w/leading zeroes, lat and long fields for middle and last mile
- Attribute join to county template feature class for Overview

Interstar F12

- Mapped subscriber addresses supplied by the provider.
- Saw that previous service area polygons still represent the best approximation of coverage over this new set of addresses plus previously submitted addresses, so transferred previous polygon created in the following way:
  - identified clusters of these address points, then used subsets of the point locations to derive Minimum Bounding Polygons (Convex Hulls) representing available wireless coverage.
- One-to-one spatial join associating provider attributes and speeds with minimum bounding polygons.
- Added spectrum field and populated with code 6.

Inteliport F12

- Provider is working on but has not yet been able to compile equipment specs that would allow us to run a propagation model, so in the meantime, polygons were created from census block locations.
- Follow up from provider in March 2012 clarified the max advertised speed values, based on service tiers and throttling used to keep streaming media from overloading the bandwidth when many users are subscribing to a given microcell. These were reduced from the maximum bandwidth capacity values included previously.
- Census block shapes used in the wireless feature class were merged into a single, multipart polygon based on their identical attributes.

MCNC F12

- Transferred the existing points from spring 2012 data. Corrected provider type value to 3 for "Other". Updated all the EndUserCat codes to 2, since MCNC serves middle mile directly to institutional end users only.
- Confirmed no duplicates between previously reported and new incoming end user address points.
- Geocoded entire set of newly reported/added end user addresses, though some lat/longs were reported (provider staff expressed some doubts about accuracy). Used provided lat/longs for 3 points that did not find a geocode match to the NC Master Address File.
- Mapped new set of the same middle mile information but with some coordinate corrections, per the provider.

Mediacast F12

- Max Advertised speed values duplicated to populate typical speed fields.
- Use of previous wireless propagation data, minimum signal strength threshold of -80 dBm, after confirmation with the provider that 2 towers recently hit by lightning had been restored.

Mediacom F12

Used Spring 2012 data which was processed in the following way:

- Confirmed with provider that address data includes both current and potential customers, and that the list of serviceable addresses had not changed since the fall. Provider did submit new file with typical speeds. These values were the same as populated in fall by duplicating the max advertised speeds.
- Transferred formatted and mapped data from Fall 2011 database. (112,075 points as these do not include duplicates or those we could not geocode).

MI-Connection F12
Used Spring 2012 data, which was processed in this way:

- Deleted 5,989 duplicate records (using address, transtech, and EndUserCat fields)
- Ran script to sort out new address records from previously submitted addresses.
- Populated unmatched/ungeocoded addresses with placeholder values (-9999)
- Concatenated Address field for cleaner, consistent contents

Morris F12

- Use of same address list as Spring 2012, having confirmed that these include both current and potential broadband customer locations. Data contained previous correction for fiber records that had originally been reported by Mbps and converted these to NTIA codes to match other records.
- Spatial join with 2010 census blocks for FIPS field.

NC Wireless F12
Spring 2012 data used, which was processed in the following way:

- Wireless propagation of data, this time using a higher minimum signal strength threshold of -80 dBm.
- Follow up helped correct the max advertised and typical speeds of one tower footprint within more practical values based on channel availability.

North State F12

- Corrections for missing FIPS digit and inserted leading zeros for tracts.
- Speeds were reported as Typical Up/Down only. Substituted these values into Max Ad Up/Down as well.
- Worked with provider to change granularity from census block only to address level across the service area.
- Middle Mile, Last Mile: Added negative sign to longitude values

Pineville Telephone Company F12

- Removed FRN in census block feature class, to prevent conflict with “speed tier” duplicates check in NTIA script. This is a workaround because script is not set up to handle multiple DBA names used by the same parent company with the same FRN.

Randolph TMC and Randolph Telephone Company F12
Used Spring 2012 data, which was processed in this way:

- Formatted text information and consolidated into one Excel file
- Generated hypothetical street addresses based on the min, max, and integer midpoint of each address range provided. Geocoded these addresses to Tigerline 2010 reference file, with zero

offset (3 potential points for every address range record sent by Randolph). Each original record assigned a unique ID which was duplicated with each set. Set field created as well to distinguish.

- Geocoded addresses spatially joined to corresponding street segments
- Merged any duplicates based on TLID, FRN, and temporary ID.

Sprint Nextel F12

- Validation: Ran "Eliminate Polygon Part" tool to remove any parts or donut holes less than 0.125 square miles in area.
- Ran "Simplify Polygon" tool to eliminate unnecessary vertices with a max offset of 20 feet.
- Added Spectrum and new TransTech field with short integer data type.
- Removed hyphens from FRN

Star Telephone Membership Corporation F12

- Identified a formatting issue with zeroes in the tract number section and corrected this. Followed up a second time about
- Identified a remaining 51 census block records that did not find a match, and were found to be vintage 2000 census block FIPS codes. Converted these records to year 2010 geometry, and combined with blocks reported as 2010 geometry, then removed some resulting duplicates.
- Corrected one last mile connection point with a formatting issue on lat/long that was creating an inconsistent extent when mapped.
- Used field calculator to make the contents of Provider Name and DBAName fields consistent and spelled out in every feature class rather than sometimes abbreviating Corporation to Corp.
- Corrected FRN to have sufficient number of digits/leading zeroes.
- Added lat/long coordinates to middle mile point reported, based on communication that Star TMC, Starvision, and Interstar all share this connection point.

Starvision F12

- Parsed street information in address data
- Mapped using lat/longs supplied by provider.
- Corrected latitude coordinates that seem to have been typos in the original file (one degree +/- the location described by the address)

Skybest and Skyline F12

- Created missing .prj file for shapefile exports from provider, based on follow up determining an NAD 83 North Carolina FIPS 3200 ft projection.
- Converted polylines to polygon for each DSL and fiber-to-the-home technology layers.
- Created fields and attributed manually from contents of provider-supplied .mdb files.
- Spatial join with Tigerline 2010 streets WGS84 by location inside newly created polygons (using streets was found to be more accurate, with less overstatement, than an overlay with census blocks).
- Manual touch up, deletion of streets that only touch the boundary of served polygons.
- Used VB script in Field Calculator to derive max/min address range information

Sky Catcher F12

- Using data as previously mapped, this footprint was added to the footprint of Skyrunner following their acquisition of Sky Catcher.

SkyeNet Wireless Communications F12

- Provider does not participate in data collection. Information was gleaned from the provider's website in previous data collections, by selecting and merging the relevant census blocks corresponding to served areas indicated on the provider's online map. This footprint was checked for currency using the company website on 9/26/2012.
- Unlicensed spectrum is assumed and no match could be found on the FCC FRN system.
- Maximum speeds were obtained from the FAQ page of the same website. Typical speeds were inferred by information also on the FAQ page, with speed codes most closely matching the ranges described. Speeds were updated after checking the website again on 9/26/2012.

Skyrunner F12

- Corrected footprint using most current wireless equipement specs and -80 dbm (previous signal threshold change had been done on older data by mistake).
- Added Sky Catcher data to the footprint to reflect the recent acquisition of their network.
- Last Mile: assumed Ownership by Skyrunner in the Ownership field, wireless type for backhaul, and capacity codes equivalent to max advertised speed of the surrounding wireless footprint.

Star TMC F12

- Corrected zero misplacement in tract numbers and 15-digit CB FIPS codes (double zeros should be at the end, rather than beginning of tract numbers)
- 51 CB's found to be reported in year 2000 vintage. Converted those to year 2010 using methods similar to those described in Fall 2011:
    - Select all records in Spring 2011 provider dataset
    - Relate FIPS 2000 field in provider data to FIPS 2000 field in statewide crosswalk table
    - Relate FIPS 2010 field in statewide crosswalk table to GEOID field in 2010 census block layer.
    - Export related/selected 2010 CB records as new layer, and related/selected crosswalk records as a provider-specific dBase table.
    - Join Field on exported Crosswalk subset with Spring 2011 provider data layer based on year 2000 CB number.
    - Join Field on new 2010 CB layer with the joined crosswalk DBF (which should now have the relevant provider data) based on 2010 FIPS field.

Suddenlink F12

- Removed records without speed codes, as per the provider these indicate blocks and street segments without Suddenlink broadband service.
- 553 duplicates removed from address data.
- Mapped new fall data as reported (census blocks and geocoded addresses), despite unexplained reduction in total records (attempting to follow up with provider to find out if they have made corrections, reduced service, or are reporting current subscribers only).
- Changed 45 census blocks and 50 address records from tech code 40 to 41 to reflect lower max advertised speed.

Surry TMC and Piedmont Communications F12

- Added zeroes to FRN for 10-digit format.
- Duplicates removed from streets

- Created hypothetical addresses in increments of 100 from within the address ranges supplied in Excel format: one street number being the integer midpoint, one being the min value plus 50, the next being 100 higher than that, etc. up to the max value minus 50.
- Spatially joined the geocoded points to polyline street segments using intersect criteria and a search radius of 2 feet.
- Used original address ranges for the min and max address ranges in street attribution. Dissolve on resulting street shapefile, to merge Tigerline segments applying to the same address range reported by Surry.
- Removed CBs where streets were given (they were double reported)

TDS Telecom F12

- Data submitted as geodatabase feature classes, availability at address level. Addresses and mid-mile points spatially joined with 2010 census blocks to derive complete/correct FIPS codes.
- Removed 36 addresses that were unmatched by geocode in data received.
- Duplicated max advertised speed codes in typical speed fields

Time Warner Cable F12

- CB and Streets:
  - Reprojected into WGS 1984
  - Added Provider Type field and coded as a “1”
  - Added EndUserCat field and coded as “5”
  - Input Max Advertised speeds as Typical Speeds as well, since they were not included.
- Streets: no min or max address ranges of any kind were included in the data, so this was left null in the transfer geodatabase.
- Mapped middle mile data, which contained nationwide connection facilities TWC chose to include as middle mile, and none of these fall within North Carolina’s boundaries, so none was added to the transfer geodatabase.

T-Mobile F12

- Reprojected shapefiles into WGS 1984.
- Added field to categorize by technology type/T-mobile service tier (3G, 4G).
- Attributed manually from information sent in a text file from T-Mobile.
- Executed Symmetrical Difference on UTMS and HSPA21 layers with layer of next fastest speeds, to extract footprints where only these speeds are available and not the higher speed. Appended both resulting features into shapefile for HSPA42.
- Eliminate Polygon part tool to remove features <0.125 square mile.

Tri-County F12

Spring 2012 data was used, which was processed in the following way:

- Concatenated address information into single Address field in BackEnd template spreadsheet.
- Fall data used for wireless.
- Addresses geocoded for DSL availability, then aggregated to corresponding census blocks and street segments
- For Tech Type 10: Selected and exported resulting aggregated CB data for CB’s <2 mi. These were loaded into the geodatabase with associated broadband data.

Verizon Wireless F12

- Merged “evdo” and “lte” transmission type files into one with field distinguishing the two.
- Simplify wireless polygon to remove extraneous vertices, max offset 150 ft.
- Eliminate polygon parts less than 0.125 square miles
- Applied attributes according to accompanying word document from provider.

Yadtel F12

- Worked with provider staff to improve granularity of data from census block to street (for DSL) and address level (for FTTH). Applied attributes from census block level for each technology type (using within criteria, non-Clementini), as well as EndUserCat codes from a field provided in new address-level data.
- MidMile: changed capacity code from 8 to 3 (most closely matching mid-mile code to what seems to be a value reported in terms of last-mile codes)

Providers for which typical speed information was not supplied to NC Broadband:

- Barnardsville Telephone Company (FRN: 0003766714)
- Clearwire (FRN: 0017775628)
- Comcast
- Frontier Communications of the Carolinas, Inc. (FRN: 0018802660)
- Greenlight/City of Wilson (FRN: 0015950934)
- Lexcom (FRN unknown)
- Saluda Mountain Telephone Company (FRN: 0003767662)
- Service Telephone Company (FRN: 0003767712)
- Time Warner Cable (FRN: 0013430244)
- ViaSat Communications (FRN: 0007843766)
- Windstream Concord Telephone (FRN: 0003762010)
- Winstream North Carolina (FRN: 0004967634)

For these providers listed, the coded values for maximum advertised speeds were duplicated in the typical speed fields, since the placeholder code “ZZ” to indicate missing information is no longer accepted in the data model. When typical speed information is not supplied by the provider, a comprehensive and accurate substitute is not available, particularly since speed test data does not necessarily reflect the throughputs of the highest speed tier available.

Post-processing Functions for Final Integration

Census Block

After Census Block data was loaded into the transfer geodatabase feature class, FIPS code fields were calculated using commands in the Field Calculator and contents of the FullFIPSID field. The following calculation formulas were used:

STATE FIPS = Left ([FULLFIPSID],2)
COUNTYFIPS = Mid([FULLFIPSID],3,3)
TRACT = Mid([FULLFIPSID],6,6)
BLOCKID = Right ([FULLFIPSID],4)

- Duplicate records were identified using the ArcToolbox Frequency tool and various field combinations.
- Format problem with Wilkes Telecom/Wilkes Telecommunications were repaired by reloading their data with an alternate FullFIPS ID field and recalculating individual FIPS components. Records no longer flagged as duplicates due to this correction.
- Duplicate records (with same value for Provider Name, DBA Name, FRN, TransTech, and FullFIPS ID) were removed using a one-to-one spatial join on the original provider dataset for CenturyLink with a template of its own partial-CB geometry (with Delete Identical run on it's FullFIPSID field) and those records were reloaded into the transfer geodatabase. The results of this process were applied to the @ Communications provider footprint, as a licensed reseller of CenturyLink service.
- Warnings on speed values were identified and either edited or explained after follow up with the provider and/or further investigation.
- Ran repair geometry tool 2x and confirmed that no features were deleted.

Road Segment Data

- Warnings on speed values were identified and either edited or explained after follow up with the provider and/or further investigation.
- Ran repair geometry tool and confirmed that no features were deleted.

Address Data

- Populated FIPS code field for 3 address points that did not have a value after their dataset's spatial join (because of location on the state border).
- Verified that all FRN's were either 9999 or 10 digits with leading zeroes.
- 2129 records removed and reloaded after parsing for missing information in building number or street name field, in addition to a join with original data from Suddenlink to populate missing City data. Concatenation of full address field for Suddenlink and North State records.
- Warnings on speed values were identified and either edited or explained after follow up with the provider and/or further investigation.
- Ran Repair Geometry tool and confirmed that no features were deleted.

Wireless

- Duplication of multipart coverage polygons to reflect multiple spectrum ranges used, per NTIA/FCC instruction.
- Separated and performed Erase on provider coverage polygons that overlapped with those of the same provider and spectrum but with higher max speeds available.
- Warnings on speed values were identified and either edited or explained after follow up with the provider and/or further investigation.
- Ran Repair Geometry tool 2x and confirmed that no features were deleted.

Overview

- Field Calculated "Geographic Unit Type" field to CO, and "StateAbbr" field to NC.
- Field Calculated missing Maximum Advertised Up and Down speed fields to "ZZ" "default" values.
- Deleted records of information for wireless technology types.
- Verified that all FRN's were either 9999 or 10 digits with leading zeroes.
- Ran Repair Geometry tool 2x and confirmed that no features were deleted.

Last Mile

- Field Calculated "Ownership" field to -9999 for records null in this field. Calculated "StateAbbr" field to NC.
- Ran Repair Geometry tool and confirmed that no features were deleted.

Middle Mile

- Spatial join with census block layer to derive the 15-digit FIPS code, then reload features into middle mile feature class including the new values for populating the "FullFIPSID" field.
- Replaced Null Elevation values with -9999 "default" value using Field Calculator.
- Populated State Abbreviation column with "NC".

CAI

- Parsed address information for address fields
- Excluded 526 records for which survey respondents report that they do subscribe to broadband but did not give speed information accepted by the NTIA's script.
- Added fire department, health, public health, and police CAI's from recent data gathering efforts.

Verification Implemented Prior to Spring Data Submission

Data verification methods implemented by NC Broadband in time for submission at the federal level followed generally along the lines of quality control. Methods most often used are outlined below. Time constraints on existing staff did not allow for the execution of some more complex verification approaches that are in the planning/setup stages, but more substantial verification involving multiple data sources continue to develop.

Standardizing

The files from datasets received from each provider, except for those few submitted in shapefile format, were manually transferred to a back end Excel-format template with field headers, to create a single-file, standardized field structure for each provider's data that could be used for quick reference and map feature creation. This step also helped staff to ensure that all required components were either present or requested in follow up to the provider, and that the components were reported in the correct format.

Lat/long coordinates

Some information was submitted to NC Broadband with lat/long coordinates included for the location of point features. This location information was checked during the mapping process, and values were corrected if the provider had made mistakes such as reversing the latitude with the longitude, or forgetting to include the negative sign for the longitude value. In addition, NC Broadband followed up with providers on point features that showed up in the map outside the state and/or outside the provider's reasonably expected service area. Point features that mapped outside the state after follow up with providers, including those that mapped to zero degrees latitude and longitude due to an unknown location, were deleted from the geodatabase for submission at the federal level. For fixed wireless data generated by propagation model from antenna specs, the latitude/longitude coordinates of the antenna locations reported by the provider to NC Broadband were verified by NC Broadband's university GIS research contractor using high-resolution orthoimagery.

Multiple FRNs

In several instances, providers reported multiple FRN's that increased in numerical increments of one for each record of data, and this was found to be a simple error when the providers were trying to paste their organization information down the rows applying to a list of broadband data records. This was checked for and corrected after confirming that the lowest/first reported FRN was the correct one.

Correct technology type codes

Knowledge from our technical staff and online research was sometimes used to supplement data that NC Broadband had relevant to a provider that was unresponsive or otherwise did not supply this specific piece of the information. For example, a provider may have gaps in their transmission technology field and these were filled in when technical staff could confirm that the provider operates with only a single technology type. Or the staff may know which technology type is used by a provider who left this field blank on all records.

Subscriber-weighted nominal speeds

Weighted nominal speed values were checked, and staff followed up with the provider if all values were the same for multiple counties, as this could result from either a single speed tier for a given transmission technology across counties, or in some cases providers were not following the formula provided and had manually entered the same value regardless of differences in subscriber numbers. When these cases were discovered, technical assistance was offered and a new subscriber-weighted nominal speed dataset created to reflect variation between counties.

Wireless model fieldwork

For fixed wireless provider data that was generated as coverage area output from models based on technology and environmental factors, the data was verified by "ground-truthing" with measurements of signal strengths at sample locations within a provider's service area, observation of the influential ground conditions in each location, and comparison to the expected signal strengths at the same locations in the model. Some calibration of the model was then performed so that the resulting polygons could more accurately reflect what would be found in real life.

Check Geometry

After compiling all datasets into the geodatabase feature classes, the check geometry process in Arc Toolbox's Data Management section was used on each feature class to identify and repair any geometry errors in the features.

Comparisons with Citizen-Sourced Data

NC Broadband has recently begun mapping layers of input from citizens who report having no access to broadband at their location from any broadband provider (or possibly just mobile or satellite options that don't meet the users needs or budget from their perspective). A compiled layer is collected from local citizen advocates, citizen input on NC Broadband's website feedback form, and locally conducted surveys. Comparison of provider-sourced data with this source of information has allowed for targeted follow up with providers in order to promote access to broadband for these citizens, as well as to begin refinement of our statewide broadband data. FCC deadzone and speed test data has also been retrieved and is being processed for inclusion and comparison. Further data collection from citizen input and comparative analysis approaches will be described in the near future.

North Dakota Broadband Mapping Methodology Report

Submitted To:
Travis Durick
Broadband Technology Manager
Information Technology Department
State of North Dakota

Submitted By:
Fred Gifford
Tetra Tech EC Inc.
and
Ken Wall
Geodata Services Inc.
September 21, 2012

Contents

Executive Summary

The following report describes methods and issues related to the October 1, 2012 deliverables to NTIA for Broadband Mapping in North Dakota. This data submission is compliant with all guidance and specifications provided by NTIA. As per NTIA guidance we are using current versions of the Broadband data model and the validation script.

North Dakota has developed a robust operational data model, components of which are described in this report, to support our broadband mapping efforts. We feel our operational model can support any reasonable modifications to NTIA requirements. Since this deliverable format is derived from our operational data model, we anticipate some modifications will be required. We are able to take best practices recommendations from the NTIA and incorporate those into the final deliverable without major modifications of our work flow and operating rules.

Our mapping process started with infrastructure points (central offices, remote terminals, wireless towers and antenna locations, middle mile and backhaul), cable franchise areas, and anchor institution addresses. Those served an important role, especially with providers who have not actively participated in coverage mapping and those supplying broadband coverage for large generalized areas and larger geographic census units such as census tracts. When providers have not supplied detailed information of their service areas that can be mapped at the census block level, coverage models were derived dynamically from this infrastructure based on geoprocessing techniques specific to each broadband technology. Examples of geoprocessing techniques include using infrastructure points in conjunction with the road network to predict the area served for DSL coverage. For all providers of wired broadband services, those have all been completed and remain static unless a provider chooses to participate with more detailed coverage mapping at a level of geography at or smaller than a census block.

We developed a system to quantify “validated” data for the purpose of determining what was suitable for delivery to NTIA. The operational data model maintained reliability and validity codes. As more data is obtained from providers in maintenance updates, the validity and reliability of infrastructure points has diminished, though they remain the only basis we have for non-participating broadband providers.

Provider Summary

Through extensive research we identified a master list of 173 potential providers in North Dakota with 52 companies identified as actual broadband providers. The North Dakota

Broadband map includes 50 broadband providers. The full list of the potential providers researched but subsequently identified as not providing broadband service is included in Appendix A.

Data Sources

In the first rounds of broadband mapping, provider presence maps were developed for central office locations and incumbent local exchange carrier locations for all assumed providers in the state. These were identified through a commercial spatial database purchased from GeoTel Inc., and supplemented by other public data sources such as the State's Public Service Commission and DSLReports.com. These were intended to be "talking maps" and general intelligence on where providers have infrastructure for subsequent phone and written communications with providers. These maps were compared to counties served by provider in the state's telecommunications association directory.

Web site research, review of materials submitted to the state by providers, and public websites, such as the FCC were researched for each provider.

New providers are contacted to request data when a significant number of speed tests are recorded, or when we learn of their presence through ancillary sources. Providers that contact us directly and submit data are also included.

Broadband Coverage

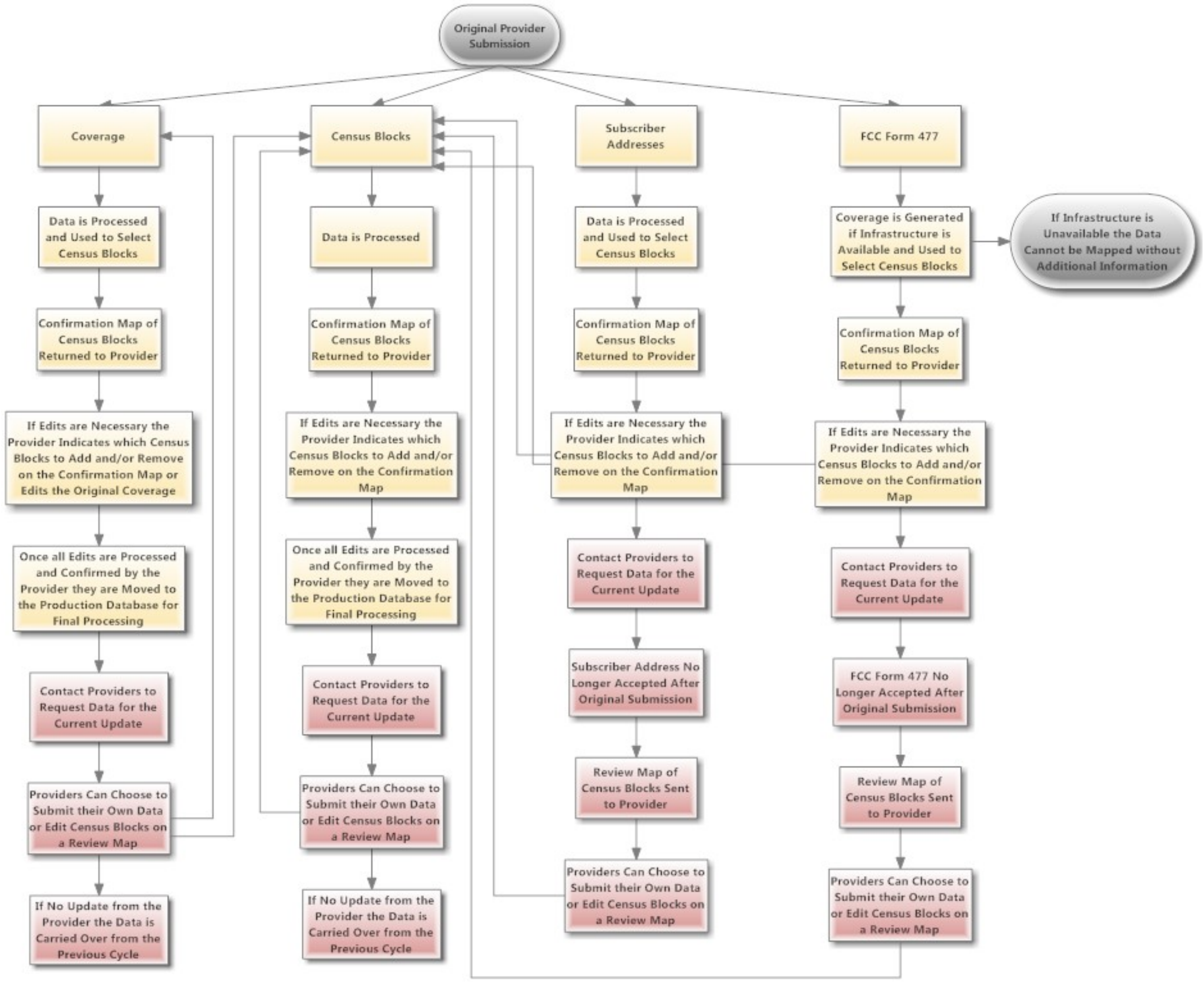
Data submitted by broadband providers was accepted as is and was mapped in complete form when provided as a broadband coverage at the same scale or larger scale than the census block level. Provider coverage submitted at a coarser geographic scale (e.g., census tracts, counties, zipcodes) was supplemented with public data, independent measurements and GIS modeling techniques. When provider submitted data appeared to be exaggerated or providers did not participate in the broadband mapping process, independent measurements and other data sources (e.g., state GIS framework structure locations, speed tests, survey results, website data and infrastructure) were used to override or supplement the provider data.

Broadband providers that chose to submit data did so in a wide variety of formats, levels of completeness, and at varying geographic scales including: narrative descriptions, analog and digital coverage maps, CAD files, GIS shapefiles and geodatabases, KMZ and KML files, FCC 477 reports, and data spreadsheets. All data formats were accommodated and processed whenever possible.

If data was submitted by a provider in a format that did not allow mapping at the census block level of geography, providers were sent standardized maps that included census blocks and a data spreadsheet in an attempt to standardize the inputs and increase the geographic granularity of the provider data submission.

Although each provider had individual characteristics and nuances in their data submissions, several data patterns can be described generalizing the provider submissions.

Figure 1 Provider Submission Types and Workflow



Providers Submitting FCC Form 477 Reports or Similar Format

Broadband providers are required to submit FCC Form 477 reports twice a year to the FCC; recently 477 submissions have been done using a structured web site maintained by the FCC. The 477 reports require broadband providers to submit a list of census tracts with the number of subscribers based on maximum advertised downstream and upstream speed tiers. Several providers submitted their actual FCC 477 report or a modified version in analog or digital format.

Figure 2 FCC Form 477 Example

FCC Form 477 - Local Telephone Competition and Broadband Reporting — Page 1 of 2

FCC Federal Communications Commission — Search | RSS | Updates | E-Filing | Initiatives | Consumers | Find People — REBOOT.FCC.GOV BETA

FCC Form 477 - Local Telephone Competition and Broadband Reporting

Form 477 [redacted] NO: 3060-0816

Form 477 Submission for FRN: 2477693, Company: Northwest Communications Cooperative, Inc., State: ND, Operations: ILEC, Data as of Dec 31, 2009

Census Tract Detail - Technologies except Terrestrial Mobile Wireless

If you reported broadband connections in Part I.A in a technology category other than Terrestrial Mobile Wireless, you must specify the technology category, identify the Census Tracts in this state in which you had connections in service using that technology, and, for each Census Tract, report the number of connections and the percentage residential in each relevant download/upload information transfer rate combination.

You can use the Federal Financial Institutions Examination Council Geocoding System to look up Census Tract numbers for street addresses.

Census Tract / Technology.

Technology of the connections: **Asymmetric xDSL**

Census Tract: State: **ND** County: **Burke** Census Tract: **9532.00**

DOWNLOAD INFORMATION TRANSFER RATE.

UPLOAD INFORMATION TRANSFER RATE:	Greater than 200 kbps and less than 768 kbps	Greater than or equal to 768 kbps and less than 1.5 mbps	Greater than or equal to 1.5 mbps and less than 3 mbps	Greater than or equal to 3 mbps and less than 6 mbps	Greater than or equal to 6 mbps and less than 10 mbps	Greater than or equal to 10 mbps and less than 25 mbps	Greater than or equal to 25 mbps and less than 100 mbps	Greater than or equal to 100 mbps
Less than or equal to 200 kbps Number of Connections:								
Percentage Residential:	%	%	%	%	%	%	%	%
Greater than 200 kbps and less than 768 kbps Number of Connections:		76	214					
Percentage Residential:	%	91 %	86 %	%	%	%	%	%
Greater than or equal to 768 kbps and less than 1.5 mbps Number of Connections:								
Percentage Residential:	%	%	%	%	%	%	%	%
Greater than or equal to 1.5 mbps and less than 3 mbps Number of Connections:								
Percentage Residential:	%	%	%	%	%	%	%	%
Greater than or equal to 3 mbps and less than 6 mbps Number of Connections:								
Percentage	%	%	%	%	%	%	%	%

https://specialreports.fcc.gov/wcb/Form477/Part_6_census.cfm 2/11/2010

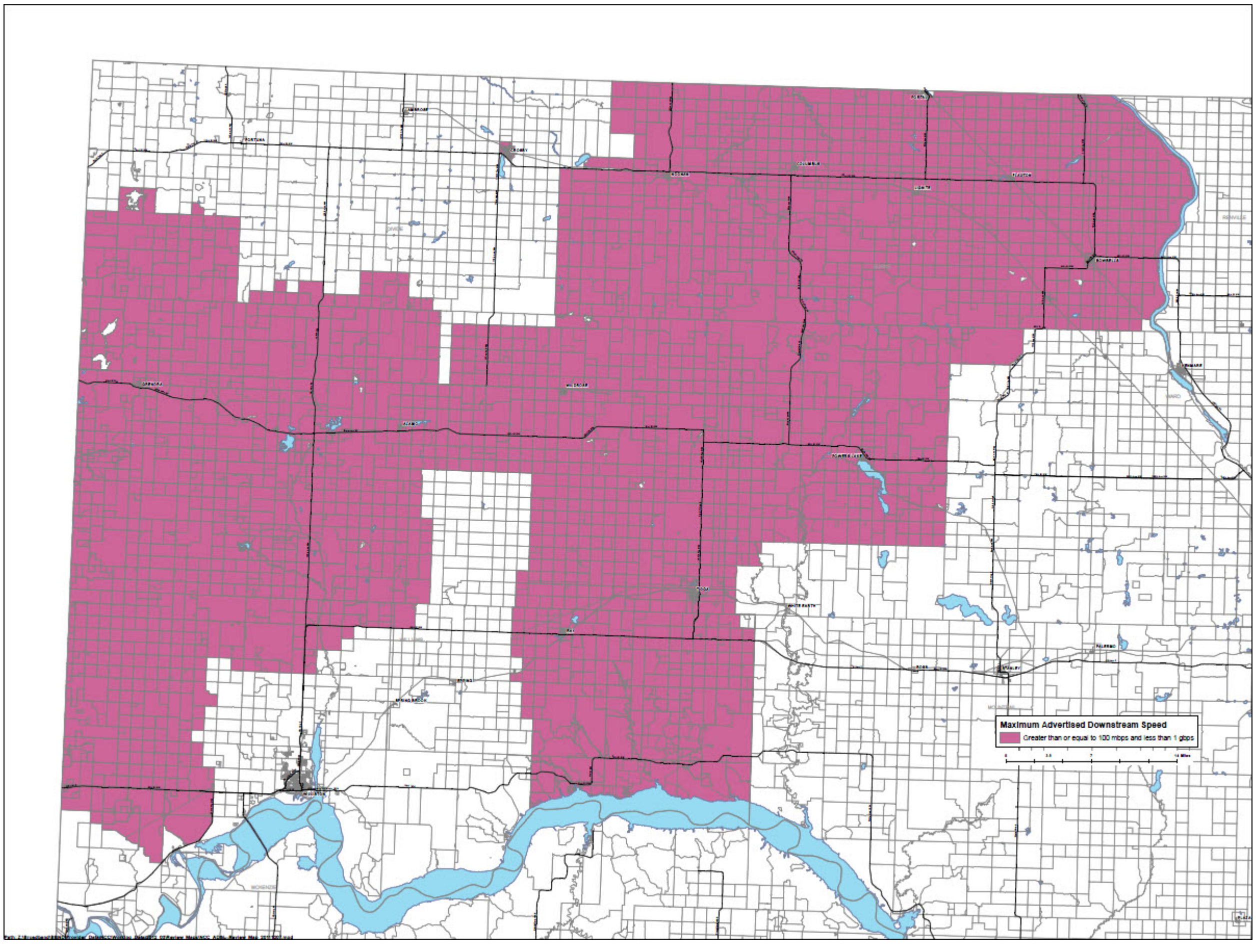
How They Were Handled

FCC Form 477 reports were entered into a standardized format that included the census tract ID code, maximum advertised downstream and upstream speed tier code, and number of subscribers (when available). Since the FCC 477 reports requires providers to submit data for all speed tiers within a census tract, only the highest maximum advertised speed for any given census tract was entered into the standardized spreadsheet in order to be compliant with the definition of broadband service.

The spreadsheets were then joined to a census tract feature class template that included the attribute fields from the NTIA schema. The resulting feature class was a geographical representation of the FCC 477 report including the technology of transmission and speed information. This feature class was used in conjunction with validated infrastructure data (i.e., central offices and/or remote terminals) to run the DSL or Cable geoprocessing models respectively.

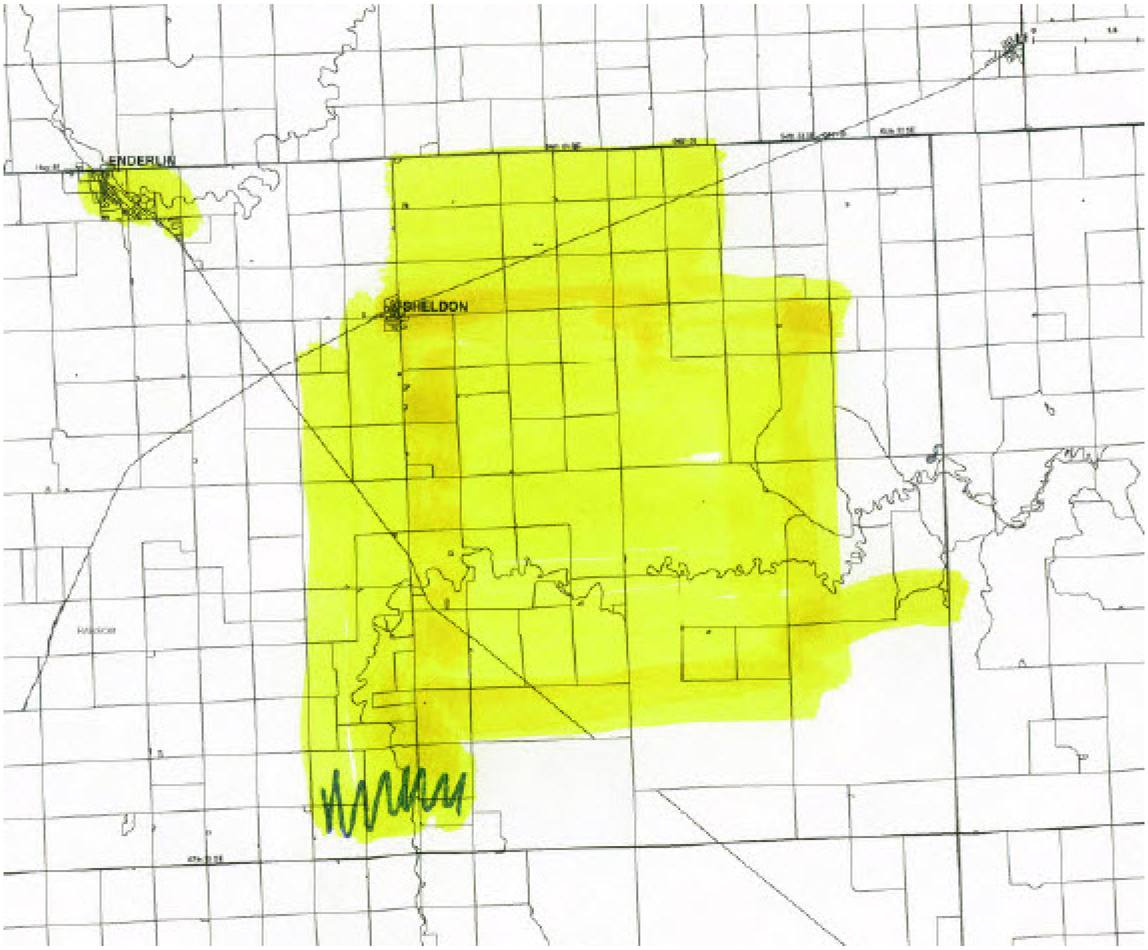
The resulting census block selection from the DSL or Cable model was displayed on a standardized review map and returned to the provider for confirmation.

Figure 3 Review Map Example



If additional edits were required the provider "marked-up" the review map(s) to indicate which census blocks should be added and/or removed. The provider submission was handled as a census block update (describe in the section below) from that point forward. In future updates from those providers FCC Form 477 data was not accepted and providers who originally submitted data in this format were asked to make edits to the review maps.

Figure 4 Provider's "Marked-Up" Map Example

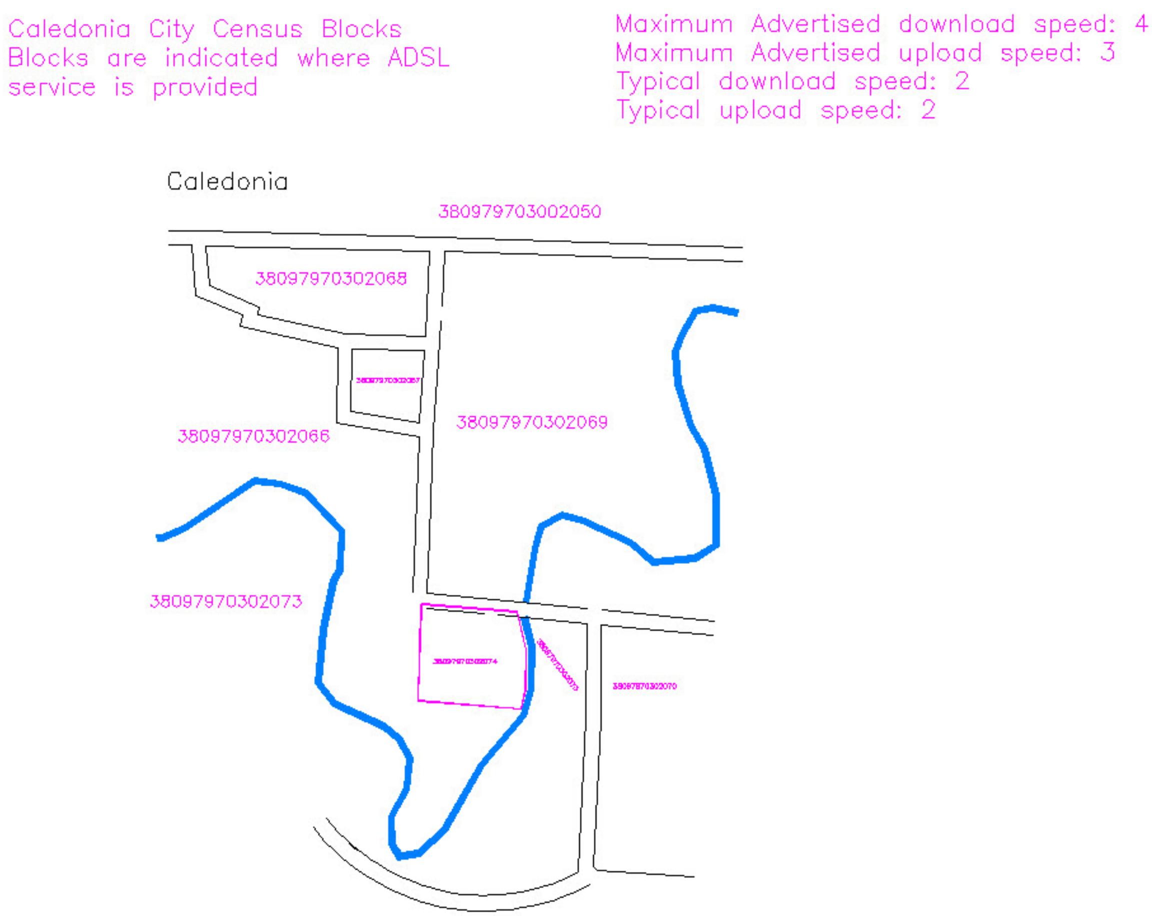


Several providers did not respond to the original confirmation maps and their final submission represented the best modeled estimate of their coverage at the census block level for DSL and/or Cable technologies. Providers that submitted FCC 477 data for fiber to the end user or fixed wireless could not be mapped and were not included in the final broadband map unless they provided additional data at the census block level or equivalent coverage at a similar scale.

Providers Submitting Census Block Coverage

Census blocks submitted by providers representing their broadband coverage area come in a wide range of formats including: analog and digital maps, CAD files, GIS shapefiles and geodatabases, tabular lists, and spreadsheets.

Figure 5 Census Block Submission Example

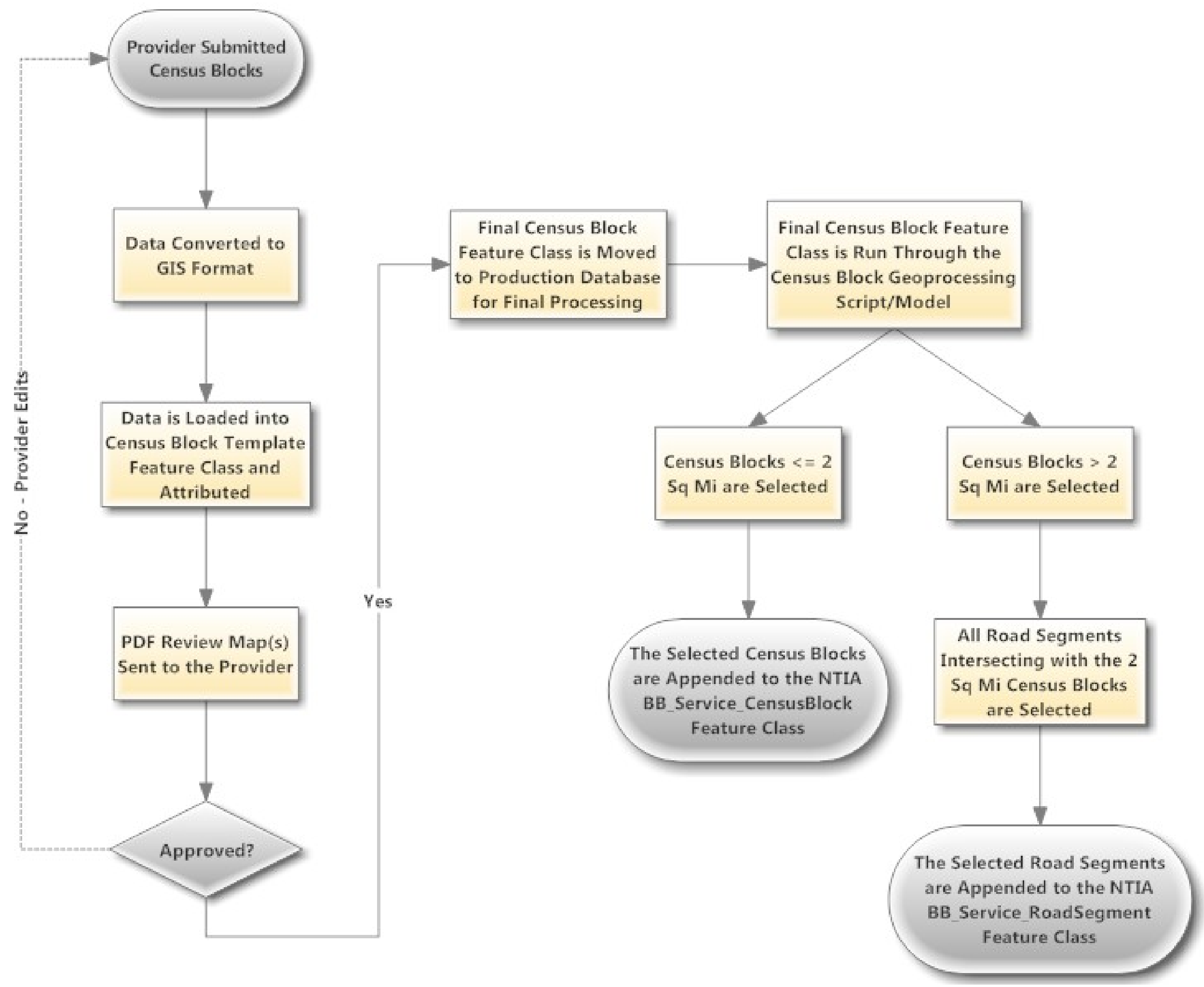


How They Were Handled

All census block submittals were loaded into a census block feature class template that included all of the attribute fields from the current NTIA schema. Census 2010 geography was used as required by NTIA. Domain codes were entered in the appropriate attribute field for technology of transmission, maximum advertised downstream speed, and maximum advertised upstream speed. If a provider did not identify the technology of transmission for a given census block or blocks, they were contacted by phone or email in order to obtain this information. In instances where speed information was not included in the data submission providers were contacted and asked to supply this data; in cases where the provider refused to supply either the downstream, upstream, or both speeds, and their advertised speeds were not available on their web site, the lowest domain code was entered in the applicable attribute field.

Standardized confirmation maps were created for each provider by type of technology and sent to the provider for review. Once processing was completed for a provider's census block submission, the census block feature class was run through an Esri geoprocessing model that performed several quality control-quality assurance tests and selected census blocks less than or equal to two square miles and road segments that intersected census blocks greater than two square miles and were appended to the appropriate NTIA transfer data model feature classes.

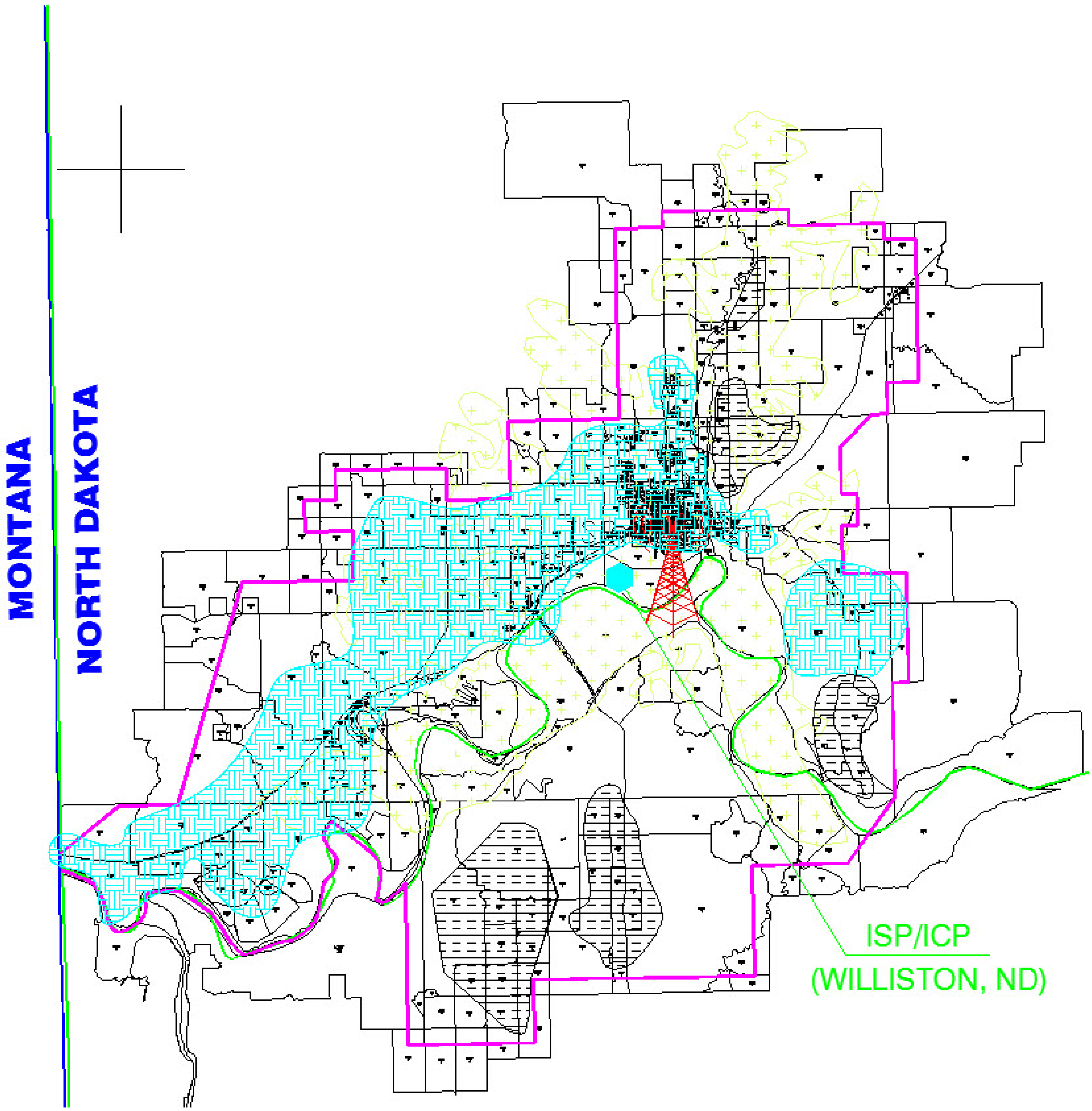
Figure 6 Census Block Geoprocessing Model



Providers Submitting Coverage Data

Provider submitted coverage data were differentiated from the other types of geographic data submissions coarser than a census block since they represented the full and explicit range of broadband coverage. Similar to the other types of data submissions, coverage data was also provided in a wide range for formats including: analog and digital maps, CAD files, GIS shapefiles and geodatabases. Coverage data was submitted by several providers or was available on several providers' websites.

Figure 7 Coverage Data Example



How They Were Handled

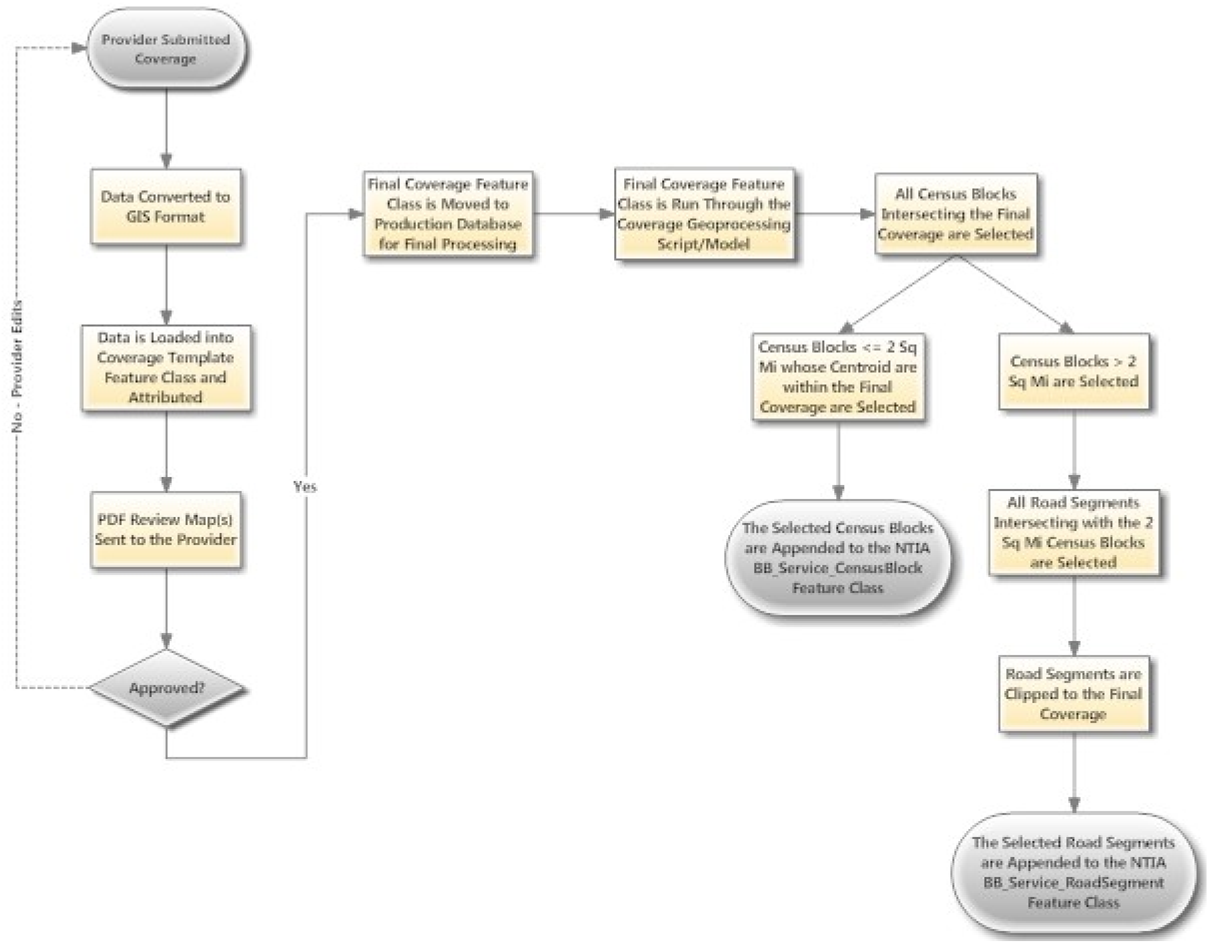
All coverage data was loaded into a coverage template feature class schema that included all of the attribute fields from the NTIA schema. The method of data loading was driven by the format in which it was received. Providers who supplied GIS shapefiles or feature classes could generally be loaded into the coverage template feature class schema using the simple data loader while CAD data had to be exported to GIS format prior to being loaded into the coverage template.

Coverage data supplied as digital or analog maps required georectification and digitizing prior to loading into the coverage template feature class. Domain codes were entered in the appropriate attribute field for technology of transmission, maximum advertised downstream speed, maximum advertised upstream speed, and spectrum. If a provider did not identify the technology of transmission for a given coverage area, they were contacted by phone or email in order to obtain this information.

When speed information was not included in the data submission, providers were contacted and asked to supply this data; in cases where the provider refused to supply either the downstream, upstream, or both speeds, the lowest domain code was entered in the applicable attribute field. If a provider did not specify the type and spectrum used for fixed wireless the default values for unlicensed were used.

Standardized confirmation maps were created for each provider by type of technology and sent to the provider for review. Once processing was completed for a provider’s coverage submission, the data was run through an Esri geoprocessing model that performed several quality control-quality assurance tests and selected census blocks less than or equal to two square miles when the centroid of the census block was within the coverage area. Road segments that intersected with census blocks greater than two square miles were selected and then clipped to the coverage area in order to provide the most accurate representation based on the provided coverage. The selected census blocks and road segments were appended to the appropriate feature class in the NTIA data transfer model.

Figure 8 Coverage Geoprocessing Model

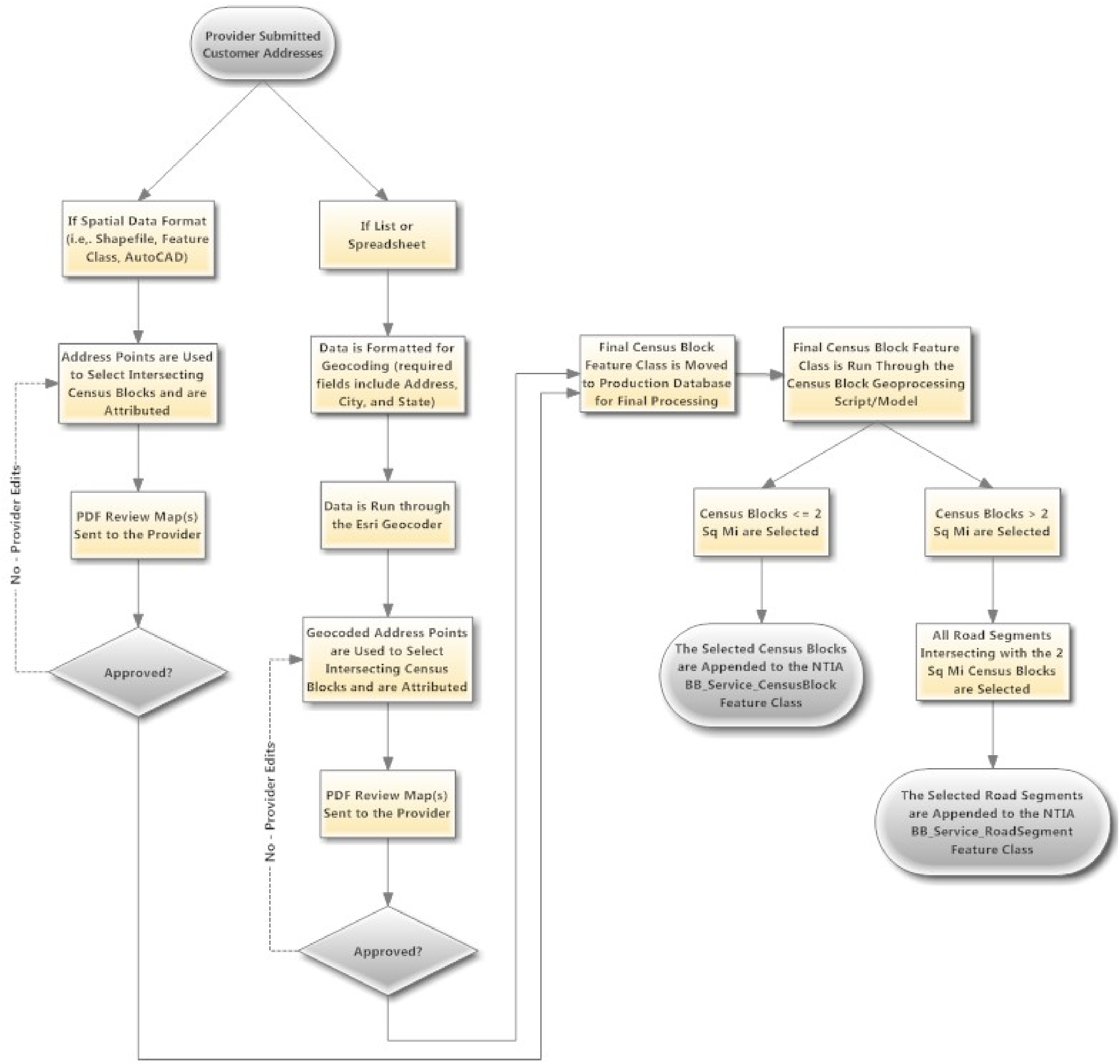


Providers Submitting Customer Locations

Providers that submitted customer locations typically fell into one of four categories. Several providers submitted customer locations in AutoCAD files, the points were exported to a shapefile and used to select all intersecting census blocks. Other providers submitted analog or digital maps that included customer locations, these images were georectified and census blocks were selected by an operator viewing the customer point images underlying the census blocks. Lists of customer addresses were also submitted. The data was loaded into a spreadsheet and geocoded using ESRI Business Analyst USA Geocoding engine. The geocoded points were treated identically to customer locations submitted in GIS or CAD format and used to select intersecting census blocks.

The resulting census blocks were added to confirmation maps and returned to the provider. If edits were necessary the provider indicated on the map which census blocks needed to be added and/or removed. The provider submission was handled as a census block update (described in the section above) moving forward. In subsequent updates subscriber address data was discouraged and providers who originally submitted data in this format were asked to make edits to the review maps.

Figure 9 Customer Addresses Geoprocessing Model



Providers Submitting Other Levels of Coarse Geographic Submission

This category had a wide range of submissions. The most common were telephone exchange areas or equivalent, wire centers, zip codes, counties or general references to towns or cities. These coarse geographic submissions were problematic because these areas were typically very large and lacked the detail of a defined coverage area resulting in over-exaggerated broadband coverage.

How They Were Handled

Operational rules established early in the project heavily scrutinized provider data that appeared to significantly over-represent broadband coverage and often resulted in a rejection of the submitted data. Providers who submitted coarse geographic levels of coverage data and infrastructure for DSL or cable modem service were initially that also were represented in the last point of aggregation infrastructure point file were sent estimated census block coverage maps and spreadsheets, and provided a second submission with finer level geography.

Providers submitting town locations for DSL or Cable were handled differently, and used as validation for central offices from the last point of aggregation table, and subsequently to run the DSL modeling routine or validate a cable or cable plus areas.

Cable Modem Geoprocessing Model

An ESRI geoprocessing model was created to generate coverage areas for Cable providers who did not submit census block or coverage data (i.e., census tract providers).

The most authoritative GIS layer available from the state with incorporated areas and city boundaries was used as a surrogate to model cable broadband coverage. Some towns that were not incorporated were also added. Municipalities and towns were sporadic in their digital update of these maps, since annexations and other boundary modifications were ongoing and difficult to maintain in real time updates. To compensate, likely areas contiguous to these city boundaries were added, labeled "Cable-Plus" in the operational data model. These additional polygons were determined using operator interpretation, road density, structures points from Info USA in Esri Business Analyst, speed test results, and in some instances NAIP imagery. In general areas were added that were immediately contiguous to existing city or town boundaries that represented likely areas where cable service existed. We were conservative in this approach and did not include populated areas near the cable plus boundaries unless they were directly contiguous to existing boundary areas.

Cable broadband providers primarily work under the structure of franchise agreements with municipalities. In the early rounds of broadband mapping updates, phone calls were made to the largest cities in the state in order to obtain that respective city's cable franchise agreement. They were all either unknown or a text agreement without maps.

The full set of potential cable areas were then passed through validation sources to determine if cable was provided. This included public sources, such as the Warren Communications Cable Fact book (http://www.warren-news.com/factbook.htm).

The second and most authoritative form of validation was data received from cable providers at the census tract, block, or coverage level of geography. A spatial join geoprocessing operation was performed on these datasets with the full set of potential cable coverage areas in order to further validate areas with cable coverage.

The third source of validation came from the public speed test site maintained throughout the project. Whenever user submitted speed tests identified cable modem broadband service near or adjacent to existing estimated cable areas, the cable-plus boundaries were expanded using the same method of digitizing outlined above.

It was not possible to differentiate between technology of transmission codes 40 and 41 using this indirect mapping method. The only authoritative way to determine this information was from data submitted by a provider. In all cases where the provider did not indicate the type of cable modem technology being used, the code for Cable Modem-Other (41) was assumed.

DSL Geoprocessing Model

An ESRI geoprocessing model was created to generate coverage areas for DSL providers who did not submit census block or coverage data (i.e., census tract providers). This model is based on typical DSL technology which can provide service up to 18,000 feet from a central office or remote terminal, unless otherwise specified by a provider.

Since DSL lines are typically buried alongside roadways, underneath roadbeds, or strung on aerial telephone lines which tend to run alongside a road, a GIS dataset of a state's road network were used as a surrogate to model DSL areas. In the initial rounds of broadband maintenance we purchased commercial (GeoTel) and publicly available data sources representing last points of aggregation (LPA) for DSL, including central offices and remote terminals. Each LPA was validated based on publicly available data, provider data, and independent measurements. LPAs were used in a DSL model only if they were supplied directly from a provider or could be verified by two or more sources. The actual geoprocessing model used the validated central office and remote terminal locations to generate a raster cost surface based on all of the available roads radiating out 18,000 feet from each active LPA point. The raster coverage was converted to a polygon feature class and a small back-buffer was applied to achieve the final DSL coverage polygon representing a provider's maximum possible DSL coverage area. The DSL coverage areas were then used to select intersecting census blocks and road segments.

Remote terminals were provided or publicly available for only a small number of providers, therefore this method may tend to underestimate the full DSL coverage for a provider.

It was not possible to differentiate between ADSL or SDSL based on the LPA data; the only authoritative way to determine this was from data submitted by a provider. In all cases where the provider did not indicate which type of DSL service was being provided, the technology code was assigned to 10 "Asymmetric xDSL".

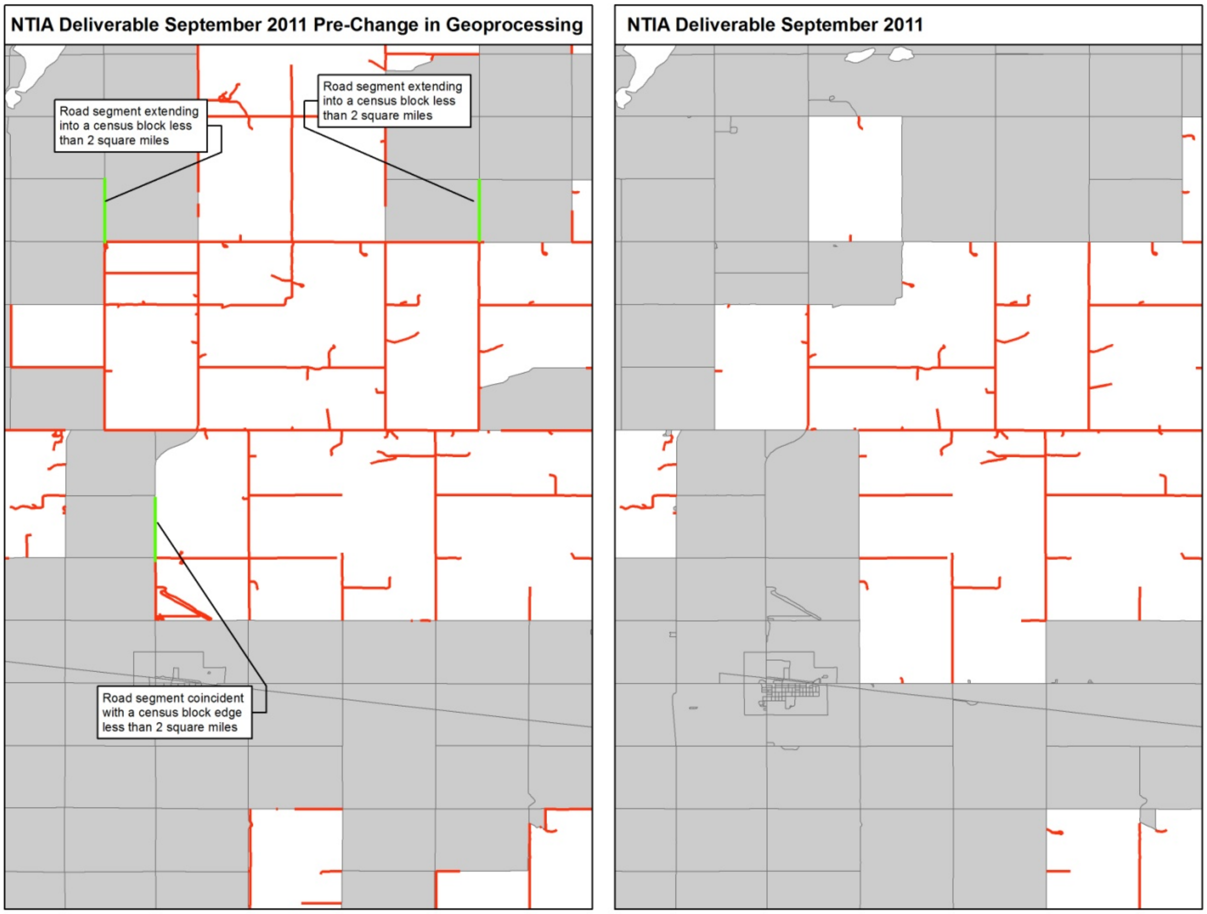
2000 T0 2010 Census Block Conversion

The September 2011 deliverable to NTIA required the transition from 2000 census data to 2010 census data, but the conversion process was dependent upon the type of data submitted by a provider. These providers fell into two categories, block providers or coverage providers. The conversion to 2010 census geography was a straightforward process for the coverage providers; the reference to the census block data in the geoprocessing model used to select census blocks and road segments was simply changed from the 2000 data to the 2010 data and each provider's data was re-run. The conversion from 2000 census to 2010 census data for block providers required several geoprocessing steps due to the inability to simply match census block IDs across vintages. The census blocks for each provider were dissolved by type of technology to form a quasi-coverage area. The dissolved blocks were then used to select any 2010 census block whose centroid fell within the "coverage area."

Road Segment Geoprocessing Change

Prior to the September 2011 NTIA data submission, road segments in census blocks greater than 2 square miles were selected with a straight intersect. This resulted in road segments being selected that were coincident with census block edges in blocks less than or equal to 2 square miles. Using this same geoprocessing methodology combined with the new 2010 census blocks and TIGER roads, road segments were selected that were coincident with census block edges and that extended into census block less than or equal to 2 square miles. We believe this "error" occurred due to the improvements in the spatial accuracy of both the 2010 census blocks and road segments for 2010 where features were now coincident. For the September 2011 submittal a small negative buffer (-0.5 feet) was applied to the intersect to avoid selecting roads that were coincident with census block edges and/or those that extended into census blocks less than 2 square miles. This resulted in a significant decrease in the number of road segments reported but overall we believe this method more accurately portrays each provider's coverage area.

Figure 10 Road Segment Geoprocessing Change Example



Wireless Coverage

Three forms of wireless coverage were provided in this table, fixed point to point wireless, mobile wireless and satellite. No public data was located on fixed wireless infrastructure points, except notification of availability on provider's web pages, and in some instances, specific towns, recreation or commercial locations where wireless service was provided. No modeling was attempted on fixed wireless coverage. All coverage came directly from providers or was mapped from locations provided on a provider web page. We did not attempt any propagation modeling on fixed wireless, since that can be influenced by local structures and vegetation in the vicinity. A few providers did provide coverage that appeared to be derived from propagation modeling.

Most of the public data research focused on mobile wireless providers using cellular service spectrums. The Federal Communications Commission (FCC) Universal Licensing System (ULS) is the consolidated database and application filing system for most Wireless Radio Services. ULS supports electronic filing and provides public access to licensing information, weekly Public Notices, FCC rulemakings, processing utilities, a telecommunications glossary, and much more." The FCC ULS Advanced Licensing Search was queried for all FCC licenses filed in the state; a relational database was built from the results. Information from the database was extracted in order to perform the cellular tower propagation modeling for wireless broadband.

The FCC ALS and ULS reporting systems were the source for most of the tower locations. Towers were required to be licensed when they meet specific published criteria. These included some variables that could be modeled with GIS statewide, such as varying proximity to airports and heliports, combined with specific local level criteria not easily obtained or modeled statewide such as the grade construction within proximity of these, and any structure over 200 ft in height. A number of cell towers providing broadband were likely not located in the FCC database. None of the mobile wireless providers were willing to provide infrastructure such as tower locations and parameters, and the coverage provided were very generalized.

Any fixed or mobile wireless antenna or tower location submitted by a provider, or obtained from the FCC that was used in the final processing for wireless broadband coverage was maintained in the operational database for last point of aggregation, and subsequently transferred to Table 3 backhaul and middle mile points.

Providers submitted coverage data in a wide variety of formats, levels of completeness, and at varying geographic scales. All types of data was accommodated and processed whenever possible. An open structure process for submittals was allowed, accepting any data, and attempting to work with the provider when questions arose. If data was submitted by a provider in a format that did not allow a direct coverage to be mapped, such as a coarse level of geography such as a census tract, or county, feedback was provided to the providers in the form of standardized spreadsheets in an attempt to standardize the inputs, and increase the geographic granularity of the provider data submission. Although each provider had individual characteristics and nuances in their data submissions, some data patterns can be described generalizing the typical types of submissions. In general, for fixed wireless to be mapped it was necessary to receive data from a provider, since there were no public sources available on point to point wireless tower locations in public form, except as depicted on providers web pages in a few instances.

Providers Submitting FCC Form 477 Report or Similar Format

Geographically, these were lists of census tracts of coverage, accompanied by additional documentation on technology of transmission, speed tiers, and number of customers. Providers submit these twice a year to the FCC and recent submissions have been done using a structured web site maintained by the FCC. A few providers submitted printouts that appeared to be from this web format and were typically complete and standardized. More providers submitted spreadsheets roughly in the F477 format, but with modified and generalized data.

How They Were Processed
If the providers identified specific coverage areas as census blocks, or direct coverage area, or as infrastructure tower locations, they were processed and mapped. Providers identifying census blocks were processed by dissolving the census blocks into single coverage polygons by speed tier. Providers identifying a direct coverage area were converted directly to GIS polygon files and attributed. Providers submitting tower locations were mapped as circular polygons centered on the tower with a radius averaging 10 miles measured as Euclidian (straight line) distance from the tower. Providers that specified variable radius were mapped as circles at the radius they submitted.

Providers Submitting Census Block Coverage

A few providers submitted coverage as census blocks, either through a tabular listing of census blocks or spreadsheet, or in map format. It was common that a provider where public data indicated multiple technologies of transmission only submitted some of the technologies of transmission.

How They Were Processed
These were loaded directly into the master Census 2000 block coverage by provider and attributed with available data submitted by the provider. In instances where some data attributes were missing, such as advertised or typical speed tiers, or subscriber data, the data attributes were left blank or null. Providers identifying census blocks were processed by

dissolving the census blocks into single coverage polygons by speed tier. A visual inspection of independent speed test data overlaying the provider submitted block coverage was completed, but no action was taken to override a provider's submittal.

Providers Submitting Actual Coverage Maps

Coverage maps were submitted by several providers, or coverages were derived from public sources or from other indirect indicators of coverage such as customer point maps or tabular lists in text or spreadsheet format. These were differentiated from the other types of geographic submission coarser than a census block since they represented the full and explicit range of coverage.

How They Were Processed
Coverage maps were treated as explicit coverage and all census blocks intersecting any portion of a coverage were selected and attributed with the provider coverage by technology of transmission, and all related attributes were transferred to the census block representation. The method of creating the coverage varied by source. Providers who supplied broadband coverage as a GIS polygon or CAD feature were converted to polygons. Some providers, including non-responsive providers who did not submit anything to the project, had published coverage maps of various forms on their web sites or submitted an image in jpg, tiff, pdf or other graphic format. These were georectified to base map layers, typically roads, but sometimes other features such as state or county boundaries or towns, and subsequently converted to polygon features. Then they were intersected and transferred to census block feature classes like the digital GIS submissions. Providers who submitted customer locations typically fell into four categories. Some were submitted as AutoCAD files where the points could be transferred to the GIS, then spatially joined to the census blocks they were located within. Others submitted maps in image format that were georectified in the same manner as other images, then census blocks were selected by an operator viewing the customer point images underlying the census blocks. When customer lists were submitted, they were loaded in a database and geocoded using ESRI Business Analyst USA Geocoding engine based on TeleAtlas road features. The geocoded points were subsequently treated identically to customer locations submitted in GIS or CAD format, and spatially joined to the census block template file. A visual inspection of independent speed test data overlaying the provider submitted block coverage was completed, but no action was taken to override a provider's submittal.

Providers Submitting Other Levels of Coarse Geographic Submission

This category had a wide range of submissions. The most common was as telephone exchange areas or equivalent, wire centers, zip codes, counties or general references to towns or cities. The problem with these submissions was that often a given polygon overlapped a census block or multiple blocks, and in most cases, they were much larger geographic entities than a census block.

How They Were Processed
Our operating rules established early in the project did not allow final provider coverage to significantly over represent provider coverage. Those providers that submitted coverage area by coarse geographic features and did not specifically identify coverage as a coverage layer or census blocks were not able to be processed. No interpolated data was used to calculate these data, if the data was not provided by a provider in a format capable of processing; the data was not calculated for that provider.

Satellite

Satellite coverage for the entire state was included for the three satellite providers: HNS License Sub, LLC, StarBand Communications Inc., and WildBlue Communications, Inc.

Community Anchor Institutions

Lists were obtained from the state and affiliated processional organizations for anchor institutions to be included in the broadband mapping in each of the community anchor institution community code categories. These were sorted and cross referenced and an initial round of elimination of duplication was accomplished.

All institutions on the initial draft spreadsheets used for the first two submittals were geocoded using ESRI Business Analyst Desktop with the USA Geocoding engine using TeleAtlas premium road features. This was judged to be the best available geocoding source for batch processing of addresses. No commercial source is 100% accurate in a primarily rural state such as this with low population numbers compared to other states and no large cities or metropolitan statistical areas. In subsequent rounds of updates since the first two submittals, we have used the same geocoding engine from Esri Business Analyst, but the geocoding locator switched to NavTech geocode locator. In every round of geocoding we used conservative matching criteria, and maintained and stored the type of match (building match, address match, or zip code match), along with a record of those not matching and not able to geocode.

All geocoding is dependent on accurate road locations and complete and accurate street segment attribution. The GIS road layers available from the state were not judged as complete as the premium commercial sources. The Tiger 2009 road files, while spatially comparable to the commercial sources, have a large percentage of null values in the database attribution and street segment address ranges necessary for accurate geocoding. As in most parts of the country, geocoding is more accurate in urban settings than in rural routes. Complicating the process in a rural state for anchor institutions are the situation where some anchor institutions, such as public safety anchors are often staffed by volunteer staff and a post office box is the only valid address, and the physical address is wherever the public safety equipment is parked or stored at any given point in time.

Category codes were assigned based on the original source list and from keywords in the name of the institution and independent research. Technology of transmission and advertised speeds were obtained when possible, which initially was entirely based on the anchor institutions maintained by the state for consortiums providing state service contracts. Two iterations were accomplished with these state maintained lists, and all available attributes were obtained with assistance of the state analysts.

After initial data collection, analysts worked on researching, calling and improving the addresses for those below an 80% match criteria. Many on the 70 percent matching range were fairly accurately located. The difference between a 70% and 80% match typically occurred when an address lacked a prefix or suffix cardinal direction on a street that had two cardinal directions (example 101 1st Street, on a street segment with 101 N. 1st Street and 101 S. 1st Street). Analysts were also able to obtain physical addresses for some lists supplied by the state with only a P.O. Box.

The lists with updated and corrected addresses were re-geocoded for the final mapping effort, and any anchor with any level of geocoding was included on the final map. The operational database identifies the type of match, so future maintenance cycles can be prioritized and targeted to those matching only zip codes or with address changes.

From the results of the previous step some attribution of database attributes for attributes with null values was accomplished. This step was rule based. The attribute of whether an anchor institution subscribes to broadband service could only authoritatively be answered yes, if the information was provided by the state, or a confirmation from an anchor speed test could be matched. Those anchors that were located within an area covered by a DSL, cable, other copper or fixed wireless were also assumed to have the ability to subscribe to broadband coverage and were also estimated to be subscribers. Assigning the technology of transmission and the advertised speeds (which required identifying a provider for the anchor institution) was only possible on a subset of all coverage in those areas where only one provider/technology of transmission was present. This allowed a few hundred more anchors to be identified, but typically only occurred in rural settings. Most urban settings had multiple providers. In addition many providers submitted multiple technology options, so identifying one provider/technology of transmission combination was not possible even if there was only one provider possible for the anchor institution.

It is likely that in some instances in the rural settings and small towns an anchor institution may rely on mobile wireless broadband. This is common in public safety mobile equipment such as vehicles, but likely less common in anchor facilities. For the purpose of assigning attribution to anchor institutions with remaining null attributes, we took a conservative approach and did not overlay anchor institutions on mobile wireless coverages to assign attributes.

Maximum advertised downstream and upstream speeds were not available or collected for any of the CAIsA new domain value of “U” for Unknown was added to the data model for the current submission, and all values formerly coded as 0, were changed to “U”.

A new optional attribute was requested by NTIA requesting knowledge about the presence or absence of WIFI at the CAI location. This was not researched and attributed by the state in the current submission. All records were set to “Unknown” for the attribute, Public Wi-Fi.

In the first two submission processes for geocoding we used conservative matching criteria, and maintained and stored the type of match (building match, address match, or zip code match), along with a record of those not matching and not able to geocode.

A new optional attribute was requested by NTIA after the initial maintenance updates requesting a CAI unique identification number for K-12 schools, libraries and colleges and universities. The following steps were completed for this request: Added CAIID for the Library category using the NCESID from http://nces.ed.gov/surveys/libraries/librarysearch/ ; Added CAIID for the University, college, other post-secondary category using the IPEDS ID from http://nces.ed.gov/collegenavigator/ ; Added CAIID for the School – K through 12 category for public schools using the NCES ID from http://nces.ed.gov/ccd/schoolsearch/ ; Added CAIID for the School – K through 12 category for private schools using the PSS_SCHOOL_ID from http://nces.ed.gov/surveys/pss/privateschoolsearch/

A new optional attribute for the URL for each anchor institution was requested by NTIA. Assigned URLs to CAI records: for the University, college, other post-secondary category assigned the URL from http://nces.ed.gov/collegenavigator/; for the Library category added the URL from http://nces.ed.gov/surveys/libraries/librarysearch/

Middle Mile

Middle mile and backhaul points were included for all public data and provider submitted infrastructure judged to be reliable and valid. A systematic reliability (geographic scale and authority of the source) rating and a validity rating (cross referencing between multiple sources) were developed and used throughout the project, both on a scale of 1-10, along with feature level metadata to maintain the last point of aggregation. A persistent unique identifier was used to track each point and each instance of a point as they moved through the system and improved in quality. Old points were retired but were not deleted from the operational database. Only active records were used in the final processing.

A feature class labeled "Last point of aggregation" (LPA) in the operational database was created to hold point locations of broadband infrastructure (examples include central offices, remote terminals, head ends, etc.). Addresses purchased or obtained at any level of geography were geocoded to a street address (using ESRI Business Analyst and TeleAtlas data) or located more generally to the center of a town (snapped to the USGS Geographic Names Information System location) when no address information was available. and All mobile wireless locations obtained from public sources or commercial sources that were not already validated were confirmed using NAIP aerial imagery and Google Street View (when available). All FCC tower locations included a latitude and longitude, however all towers were validated and moved to the NAIP aerial imagery location.

A reliability code indicating the source and geographic scale represented as an integer from 1 (low) to 10 (high) was assigned. Validity codes were assigned cross-referencing public and provider data submissions; it was also rated on a scale of 1-10. A point with a validity code of 7 that fell within a provider's coverage for DSL, mobile or fixed wireless, or was used in a final modeled coverage was included in this table. In addition, backhaul points identified by the state, by providers and consortiums providing services to the state and anchor institutions, were included in the table. Providers were typically reluctant or unwilling to provide infrastructure data, and often unwilling to confirm data obtained through public sources. The methods used in the state allowed a significant level of identification and mapping of infrastructure locations and feature level metadata on reliability and validity of point locations, but data on owned or leased characteristics, serving facility codes, and for elevation of infrastructure was confirmed by few providers who responded directly in a spreadsheet provided to them to list infrastructure.

Speed Test Data Processing

A public facing website was created in the spring of 2010 asking internet users in the state to complete a brief survey regarding their internet connection and run a speed test on their connection using the Ookla speed test. The speed test site asked that a user enter their location as an address on a Google map interface. If the address did not geocode to their satisfaction, the user could choose to move the place mark to their desired location. Next, users were asked to select their technology of transmission from a list, enter their provider in a free form text field, complete an optional questionnaire, and run a standard speed test on their connection. The date and time, and IP address of the user were captured during the speed test.

All speed tests were geocoded, and the IP address was looked up in batch mode in the WHOIS database returning one or two providers registered with WHOIS. All speed tests were cleaned and analyzed against provider submissions and models. For the first two submissions a final provider assignment was assigned by examining the WHOIS fields, and the provider submitted by users. Consistent rules were not always possible, but generally when two WHOIS records were returned, the second more specific WHOIS provider was selected. In some instances, where the WHOIS providers were backhaul or other and were not providers meeting the NOFA criteria, the user submitted provider designation was cleaned and standardized and assigned as the final provider

There was considerable variation between the user reported technology of transmission (TOT) and the known technologies for any given provider. Records were divided on unique provider/ TOT combinations for the first and second submissions, which limited the record count in many instances. For the current submission the records were divided only by provider, not taking TOT into consideration.

For the first two submissions, the speed test records were used in two ways for the final processing.

1) As an independent measurement to validate the presence/absence of a provider coverage for DSL and/or Cable technologies.

In the first submission a few providers were identified as DSL broadband providers based primarily on speed tests. In these instances, DSL models were executed for both providers based on verified central office locations. Some speed tests with an identified technology of transmission of Cable Modem were used to expand “likely” cable areas which were typically adjacent to incorporated and urban areas. These “cable-plus” areas were created to supplement submissions from Cable Modem providers who did not provide detailed coverage or census blocks. No new DSL providers or Cable providers were identified using speed tests in the current submission.

2) As an independent measurement for typical upload and download speeds.

Once data were cleaned and final provider and technology of transmission assigned, these fields were concatenated. In the first two submissions, if the remaining records exceeded 10 for the combination of provider and technology, and the speed test was successfully completed (values > 0) the average value and standard deviation of the download speed were calculated. Any values exceeding 1 standard deviation were removed as outliers, and the mean of the remaining records within 1 standard deviation was calculated for the download and upload speed. This value was reported for each provider/technology of transmission record as the typical speeds for that provider. In some instances the typical speed was lower than that required to meet the definition of broadband by NTIA, but that did not preclude the records from being included in the broadband map in the first two submissions as it did in the current submission.

For the current submission, these procedures were modified and all records were re-run. The steps of the current processing are provided below. The primary procedural change was to drop the validation of the presence/absence of provider coverage for DSL and/or Cable technologies, since providers had been validated in the first two submissions and potential new providers identified through additional speed tests were determined to not meet the NOFA criteria for being considered a broadband provider. The use of the speed test data for determining typical speeds was implemented with similar rules as the first two submissions with the exception of the use of the technology of transfer, and raising the minimum number of speed tests to 15, after removing outliers, to be used in typical speed calculations. Procedurally, the process was also automated with a Python script to improve processing performance and minimize quality control/quality assurance testing.

Typical upload and download speeds for all providers with less than 15 processed speed test records were coded as null values. In addition, based on telephone communication with NTIA on March 9, 2011, all typical speeds less than minimum NOFA upload of download speed criteria were also ignored and reported as null. Based on a related request in the same communication, the typical speeds greater than the advertised speeds were ignored and reported as null. Processing steps for the current submission are provided below:

1. Speed test records were imported into a SQL Server data file, adding fields Final Provider and IPGroup to the initial records.

2. IPGroup attribute was set by extracting the left three nodes of the IP Address of the speed test (e.g. 161.7.1.236 had 161.7.1) moved to the IPGroup attribute.

3. An IPGroup to Final Provider cross reference table was created to determine the final provider from the unique three part IPGroup.

4. Each IPGroup was reviewed with the data in the WHOIS 1 provider, WHOIS 2 provider and then the user specified provider to determine the most authoritative final provider from the official list of providers. None of the WHOIS or user submitted fields were absolutely authoritative in all instances, so expert opinion by technicians knowledgable of the providers was used in some instances to assign the IPGroups, and subsequently the Final Provider attribute.

5. Run a python script to remove outliers and calculate summary statistics for each Final Provider assignment. The rationale for removing outliers was to mitigate the many variables that effect a typical speeed test, such as the time of day, others on the network, etc. The script implemented the following work flow rules:

   a. Use all records for each unique FinalProv attribute value with D_kbps greater than 0 or U_kbps greater than 0 , then:

   b. Calculate a mean for the unique provider group for each D_kbps and U_kbps.

   c. Calculate a standard deviation for the unique provider group for each D_kbps and U_kbps. Each speed attribute was calculated independently of the other.

   d. Subtract the outliers (if any) higher or lower than one standard deviation from the mean.

   e. Calculate the median value of the remaining non-outliers for each provider D_kbps and U_kbps respectively.

   f. Create a summary table with the final calculated assignment of FinalProv, D_kbps and U_kbps.

6. Post process the summary table in the following sub steps:

   a. Join the summary tables by provider for the upload and download speeds into one summary file including the number of records or frequencies for up and down speeds for each provider after removing the outliers, and the mean up and down speeds in kilobits per second for each provider.

   b. Select "FreqDown" < 15 AND "FreqUp" < 15 then delete the resulting selection set from the joined table. The FreqDown/Up fields counted the number of speed test records for a provider after the outliers more or less than one standard deviation from the mean value were removed from consideration.

   c. Select "D2_kbps" <= 768 kbps AND "U2_kbps" <= 200 kbps. then delete the resulting selection set from the joined table.

7. Import the remaining valid mean values for each provider into the appropriate broadband coverage feature classes.

8. Select any typical speeds greater than advertised speeds either up or down, and make the resulting records null in the final broadband coverage feature classes (as per NTIA request 3/9/2011).

Reliability, Validity and Completeness

Reliability codes apply to the source data points and polygons and assess the authority of the source we obtained the data from and the level or coarseness of the geography (address or town). Validity codes are determined from cross checks of data sources and the number of independent sources of verification. These are as simple as comparing speed test locations against DSL modeled polygons, or as complex as geospatial analysis operations such as a kernel density function cluster analysis. Completeness is determined by public sources, independent measurements or provider submittals and checks on the domain classes required for the final NTIA deliverables such as Technology of Transmission domains, Speed Test domains and serving facility and wireless spectrum facility types and categories. The categories for these, and the subsequent records in our operational geodatabase tables have the ability to grow and change as new data is obtained. New data for wired We are maintaining these as feature level metadata tied to points and polygons maintained by analysts and technicians in a wiki table and coding them to the geodatabase. In this way the unique situations that arise can be cataloged and maintained with some level of flexibility while contributing to the final indices in a controlled fashion.

Reliability Codes

Throughout the course of the broadband project the State of North Dakota has employed several validation and verification techniques to help quantify the accuracy of the broadband map. The techniques used are listed below:

- Reliability Codes Assigned to Infrastructure Points
- State Run Speed Test Portal
- State Wide Broadband Survey

The two factors incorporated in reliability codes include the level of geography that was used as a source or provided as a clarification of location and the authority of the source for the information. We are also considering clusters of point information from independent measurements and sources to be higher in reliability than individual point information.

Generally, the coarser the source geography the lower the resultant score. Everything besides an address or street intersection, latitude/longitude location, or location provided in a georeferenced digital source is assigned a reliability score less than 5. This applies to source data coming (e.g. a central office located in a city instead of an address) and review comments on a previously mapped location (e.g. “That location is wrong, I know it is on the south side of town”).

We have incorporated the reliability code into our last point of aggregation (LPA) and provider coverage geodatabase files, and into some of the publicly available data (PAD) geodatabases.

We are also carrying a short text field (50 characters) with a descriptive rationale for the score. This will allow us to focus more on the lower scores that need to be confirmed, and ignore the high confidence data scored as 9 and 10.

Reliability Codes		
Code	**Description**	**Detailed Description**
0	Not assigned	• Not yet assigned
1	Level 1	• Checked but unverified
2	Level 2	• County • Presence by other coarse geography (e.g. administrative region)
3	Level 3	• City • Census tracts • Cable Plus (area likely to have been annexed into an incorporated town or CDP)
4	Level 4	• Cable - incorporated • Zipcodes • Census blocks
5	Level 5	• GeoTel unverified • Confirmed by provider or anchor institution key advisor but to geography coarser than address or intersection
6	Level 6	• Qwest/Midcontinent or other web site random testing check • Speed test from individual average residential
7	Level 7	• From anchor institution key advisor Webex • GeoTel verified address only with no 3rd party confirmation from public sources o Building unverified • Speed test from anchor institution
8	Level 8	• From provider • FCC ULS or ARS • Geotel verified address and possibly verified by 3rd party source (Google Streetview) o Another provider's sign is on building (usually Qwest) • Geotel possibly verified by 3rd party source (NAIP, Google Streetview) • From state authoritative public data source (e.g. DCN or SummitNet) o Address or building unverified • Speed test from cluster of average residential
9	Level 9	• From provider as coverage with authoritative confirmation • Geotel verified address and verified by 3rd party source (NAIP, Google Streetview) o Provider sign on building o Tower or dish visible • From provider or anchor institution check of our data * Root Wireless
10	Level 10	• From 2+ authoritative confirmations

Validity Codes

We included validity codes in the last point of aggregation infrastructure data which drives creation of the DSL models. We also included validity codes in each of the final technology of transmission deliverables for polygons and point feature classes. The scales of validity vary by each major type and function.

Infrastructure Validity Codes

The purpose of this validity code is twofold:

1. To determine which infrastructure points are turned into DSL model coverages
2. To use as a reference in other coverage validity checks

Infrastructure Validity Codes		
Code	**Description**	**Detailed Description**
0	Level 0	• Not yet assigned
1	Level 1	• Not yet assigned
2	Level 2	• Not yet assigned
3	Level 3	• Checked against ND PSC Report or DSLReports at the town level • Checked against DCN anchor institution data
4	Level 4	• Checked against two or more independent public sources at the town level • Checked against provider public data (e.g. Qwest ICONN) at the town level
5	Level 5	• Not yet assigned
6	Level 6	• Confirmation of DSL or cable from authoritative public data to broader geography than address not confirmed by provider
7	Level 7	• Authoritative public data at address level (e.g. Geotel) not confirmed by provider
8	Level 8	• Provider submission at the census tract level • Provider website independent address checks (Qwest, Verizon)
9	Level 9	• Provider submission at the census block level or address level
10	Level 10	• Provider submission at the coverage level at census block scale or blocks less than 2 square mile and larger scale then census block for blocks larger than 2 square miles

Final Technology of Transmission Validity Codes

The purpose of this validity code is twofold:

1. To determine which elements are loaded in the spreadsheet provider submission packages in their review

2. To determine which provider coverages are chosen for submittal with one of the NTIA deliverables

Final Technology of Transmission Validity Codes		
Code	**Description**	**Detailed Description**
0	Not assigned	• Not yet assigned
1	Level 1	• Unassigned at this time
2	Level 2	• Unassigned at this time
3	Level 3	• Checked against ND PSC Report or DSLReports at the town level • Checked against DCN anchor institution data
4	Level 4	• Checked against two or more independent public sources at the town level • Checked against provider public data (e.g. Qwest ICONN) at the town level
5	Level 5	• Confirmation of DSL or cable from authoritative public data
6	Level 6	• Provider website independent address checks (Qwest, Verizon) • Provider submission at the census tract level
7	Level 7	• Provider submission at the census block level • Provider submission at the census block level confirmed by Speed test cluster OR other independent measurement
8	Level 8	• Provider submission at the address level
9	Level 9	• Provider submission at the address level confirmed by Speed test cluster OR other independent measurement
10	Level 10	• Provider submission at the address level confirmed by Speed test cluster OR other independent measurement

Quality Assurance Testing

A separate analyst checked each provider submission. Due to the variety of provider submissions, the analyst originally doing the work and the analyst checking discussed the interpretations when the criteria were subject to interpretation.

Coverage, technology of transmission, and speed tier were checked completely for each provider.

Many of the models and block, tract and coverage level processes were completed with ESRI Modelbuilder and Python scripts, and these methods were tested for quality assurance in the preliminary mapping stages and in the initial sample data submissions to NTIA.

All providers who submitted geographic coverage coarser than a census block were provided a data checking package to assess for accuracy and completeness. Any comments received from providers were processed.

1. QA/QC Checks prior to Individual Data Processing (i.e., block or coverage geoprocessing model). [Automated Modelbuilder tools and follow-up by an analyst]
    a. Check for inconsistencies within the Provider Name, DBA Name, FRN
    b. Check for duplicate census blocks or coverage areas
    c. Check the Provider Name, DBA Name, FRN against the "Official Provider Table"

2. For each provider after initial data processing is completed [Review by an analyst that did not process the original data]
    a. Review correspondence log
        i. Review recent correspondence, since previous NTIA submission
        ii. Note changes/additions/comments on coverage area, technologies, speeds, infrastructure, subscriber weighted nominal speeds (SWNS)
    b. Review wiki data processing page (current metadata)
        i. Note changes/additions/comments on coverage area, technologies, speeds, infrastructure, SWNS
    c. Review individual Provider Wiki page (historic metadata)
        i. Note changes/additions/comments on coverage area, technologies, speeds, infrastructure, SWNS
    d. Check Provider Data Folder
        i. Review recent data submissions, since previous NTIA submission
    e. Check Working Data Folder
        i. Review current update feature class geography
        ii. Review coverage with provider's submissions
        iii. Review technology of transmissions (TOTs) with provider's submissions
        iv. Review Max Adv Speeds: Down/Up with provider's submissions

3. For each provider after final data processing is completed [Review by an analyst that did not process the original data]
    a. Check PROVCOV_Master geodatabase:Provider Blocks feature class and/or Provider Coverage feature class
        i. Review geography
        ii. Review TOTS
        iii. Review Max Adv Speeds: Down/Up

4. Check Infrastructure feature class [Review by an analyst that did not process the original data]
    a. Review recent submissions, since previous NTIA submission

5. Check SWNS feature class [Review by an analyst that did not process the original data]

   a. Determine if provider submission is valid

6. For each provider after speed tests are processed [Review by an analyst that did not process the original data]
   a. Check PROVCOV_Master geodatabase for Typical Speeds: Down/Up

7. QA/QC Checks and Reports on the Final NTIA Deliverable [Automated Modelbuilder tools and follow-up by an analyst]
   a. Check the Provider Name, DBA Name, FRN against the "Official Provider Table" for each NTIA feature class (i.e., BB_Service_CensusBlock, BB_Service_RoadSegment, BB_Service_Wireless, etc.). NTIA_Provider_Name_DBA_FRN_Errors_Sample.xls, looks at each NTIA feature class (i.e., census blocks, road segments, wireless, etc…) and checks to see if there is an identical match in the "Official Provider Table." If an identical match does not exist for that Provider Name, DBA Name, FRN concatenation it is written to a geodatabase table along with the NTIA feature class where the "error" occurred. When an "error" does occur it then has to be checked by an analyst and corrected if necessary.
   b. Change Detection Report – This geoprocessing model compares and reports any changes in the Census Block, Road Segment, and Wireless feature classes for the current and previous versions of the NTIA SBDD Transfer database. The user needs to supply the feature classes for each NTIA version as well as the name of the final change detection table. NTIA_Change_Detection_Example.xls, compares and reports any changes (limited to Provider Name, DBA Name, FRN, TOT combinations) in the Census Block, Road Segment, and Wireless feature classes for the current and previous versions of the NTIA SBDD Transfer database. If the final change detection table has no records, then no changes were detected between the two databases. If a Provider Name, DBA Name, FRN, TOT combination does not have a "pair" in either direction (the current or previous NTIA database) then it is written to a geodatabase table along with the NTIA feature class and version where the "error" occurred. This report does not change any data in either database but rather acts as a flag, requiring an analyst to check if the "error" is valid.
   c. Check for duplicate census blocks or road segments or wireless coverage areas.
   d. Check for duplicate anchor institution points.

8. Review Final NTIA deliverables [Review by an analyst that did not process the original data]
   a. Review BB_ConnectionPoint_MiddleMile
   b. Review BB_Service_CAInstitutions
   c. Review BB_Service_Census Block
   d. Review BB_Service_Overview

e. Review BB_Service_RoadSegment
f. Review BB_Service_Wireless

9. Run the NTIA Check submission tool and python tool to confirm that all possible records passed the NTIA data checks. The only items that failed in the checking process were those where inconsistencies in the final NTIA NSGIC data model did not agree with the final documentation and rules established by NTIA and FCC in the final webinar and documentation presented March 17, 2011. These exceptions were documented along with the submission.

Appendix A

Potential providers researched but subsequently identified as not providing broadband service.

Company Name	Filing Company DBA	FRN	URL
5LINX Enterprises Inc. dba Globalinx	5LINX Enterprises, Inc.	0015304645	5linx.com/products
8x8, Inc.	8x8, Inc.	0007099773	www.8x8.com
Ablaze Technologies			none
ACN Communication Services, Inc.	ACN Communication Services, Inc.		www.myacn.com/index.html
Alltel Wireless	Alltel Wireless		na
American Fiber Network, Inc.	MobilePro Corp.	0006801583	none
AT&T Corp.	AT&T Inc.	0004496774	www.att.com
AxisInternet, Inc.	AxisInternet, Inc.	0019609254	www.axint.net
Badlands Cellular of North Dakota Cellular Partnership	Verizon Communications Inc.	0018535716	none
Bandwidth.com, Inc.	Bandwidth.com, Inc.	0015443773	bandwidth.com
BroadvoxGo!, LLC	BroadvoxGo!, LLC	0017679523	www.broadvox.com
Broadwing Communications, LLC	Level 3 Communications, LLC	0008599706	www.level3.com
BullsEye Telecom, Inc.	BullsEye Telecom, Inc.	0004350930	www.bullseyetelecom.com
Call Catchers Inc.	Call Catchers Inc.	0016109803	none
Callsmart	Callsmart		http://www.getcallsmart.com/
Cause Based Commerce Incorporated	Cause Based Commerce Incorporated	0015173503	causebasedcommerce.com
CierraCom Systems	CierraCom Systems		www.cierracom.com
Citizens Communications	Citizens Communications		none
CommPartners, LLC	CommPartners, LLC		www.commpartnersconnect.com
Consolidated Communications Networks, Inc.	Consolidated Telcom	0003740396	www.ctctel.com
Covad Communications Company	Covad Communications Company		www.covad.com/
CrossConnect	CrossConnect		www.crossconnectsolutions.com/
CVC CLEC, LLC	CVC CLEC, LLC		www.cvcclec.com
Cypress Communications, Inc.	Cypress Communications, Inc.	0005038930	cypresscom.net
Daktel Communications, LLC	Dakota Central Telecommunications	0007266703	www.daktel.com

	Cooperative		
DIECA Communications, Inc.	DIECA Communications, Inc.		www.covad.com
Digital Telecommunications, Inc.	Digital Telecommunications, Inc.		digitaltel.com
DSLnet Communications, LLC	DSLnet Communications, LLC		www.megapath.com
Enventis Telecom Inc.	Hickory Tech Corporation	0008394322	www.enventis.com
Ernest Communications, Inc.	Ernest Communications, Inc.	0004948642	www.ernestgroup.com
Ethos Communications Group, Inc.	Ethos Communications Group, Inc.		www.ethoscommunications.net
Exit Mobile	Exit Mobile		www.exitmobile.com
Faith Communications, Inc.	Faith Communications, Inc.		www.faith-inc.com
First Communications, LLC	First Communications, LLC	0003764487	www.firstcommunications.org
France Telecom Corporate Solutions L.L.C.	France Telecom Corporate Solutions L.L.C.		www.francetelecom.com
Frontier Informatics LLC	Frontier Informatics LLC		www.frontiertelco.com
Frontier Telco	Frontier Telco		www.frontiertelco.com
Global Crossing Telecommunications, Inc.	Global Crossing North America, Inc.	0002850519	www.globalcrossing.com
Grand Forks Wireless	Grand Forks Wireless		www.grandforkswireless.com
Granite Telecommunications LLC	Granite Telecommunications LLC	0008676975	www.granitenet.com
Great Western Network	Great Western Network		www.greatwesternnetwork.com
GreatCall, Inc.	GreatCall, Inc.	0018554386	www.greatcall.com
Greenfly Networks, Inc.	Greenfly Networks, Inc.	0015808736	www.clearfly.net
Harris Corporation	Harris Corporation		www.harris.com
Hypercube Telecom, LLC	Hypercube Telecom, LLC		www.h3net.com
iCore Networks, Inc.	iCore Networks, Inc.	0015340326	www.icore.com
InPhonex.com, LLC	InPhonex.com, LLC	0010488351	www.inphonex.com
Integra Telecom of North Dakota, Inc.	Integra Telecom Holdings, Inc.	0005071014	www.integratelecom.com
Ionex Communications North, Inc.	Birch Communications Inc.	0005027305	www.birch.com/about/
IP Networked Services, Inc.	IP Networked Services, Inc.	0016088882	none
KDDI America, Inc.	KDDI America, Inc.		www.kdd.com

Kentucky Data Link, Inc.	Kentucky Data Link, Inc.		www.kdlinc.com
Kotana Communications, Inc.	Kotana Communications, Inc.		kotana.com
Level 3 Communications, LLC	Level 3 Communications, LLC	0003723822	www.Level3.com
LightEdge Solutions, Inc.	LightEdge Solutions, Inc.	0015546443	www.lightedge.com
LightSquared LP	LightSquared LP	0007705742	www.lightsquared.com
Lightyear Network Solutions, LLC	Lightyear Network Solutions, LLC		www.lightyear.net
Loretel Systems, Inc.	Hector Communications Corporation	0002650828	www.loretel.com
Matrix Telecom, Inc.	Matrix Telecom, Inc.	0004333068	www.matrixbt.com
MCImetro Access Transmission Services LLC	MCImetro Access Transmission Services LLC		www.verizon.com
McKenzie Consolidated Telcom, LLC	McKenzie Consolidated Telcom, LLC		none
McLeodUSA Telecommunications Services, Inc.	PaeTec Corporation	0003716073	www.mcleodusa.com
Metropolitan Telecommunications of North Dakota, Inc.	Metropolitan Telecommunications Holding Company	0009806019	www.mettel.net
Millicorp	Millicorp	0018930511	www.millicorp.com
Missouri Valley Communications, Inc.	Nemont Telephone Cooperative, Inc.	0008326787	www.nemont.net
Mix Networks, Inc.	Mix Networks, Inc.	0014166573	www.mixnetworks.com
Mobile ESPN, LLC	Mobile ESPN, LLC		www.espn.com
NB Internet LLC	NB Internet LLC		www.nbinternet.com/
Network Innovations, Inc.	Network Innovations, Inc.		www.nitelecom.com
Neutral Tandem-North Dakota, LLC	Neutral Tandem-North Dakota, LLC		www.neutraltandem.com
New Edge Network, Inc.	New Edge Holding Company	0003720471	www.newedgenetworks.com
nexVortex,Inc.	nexVortex,Inc.	0015282155	www.nexvortex.com
Noonan Farmers Tel Co	Noonan Farmers Tel Co		
Norlight Telecommunications, Inc.	Norlight Telecommunications, Inc.		www.norlight.com
Norlight, Inc.	Norlight, Inc.		www.norlight.com
Northern Red River ITV	Northern Red River ITV		www.nrritv.k12.nd.us
Northstar Telecom, Inc.	Midwest Marketing	0011412905	www.northstartelecom.us

	Group, Inc.		
NOSVA Limited Partnership	NOSVA Limited Partnership		nosva.com
OnWav, Inc	OnWav, Inc	0018007898	www.onwav.com/home
PAETEC Communications	PAETEC Communications		www.paetec.com
Phone.com, LLC	Phone.com, LLC	0016845190	www.phone.com
PNG Telecommunications, Inc.	PNG Telecommunications, Inc.		www.powernetglobal.com
PowerNet Global Communications	PowerNet Global Communications		www.powernetglobal.com
Proximiti Technologies, Inc.	Proximiti Technologies, Inc.	0016431603	www.proximiti.com/default.aspx
Qwest Communications Company, LLC	Qwest Communications International, Inc.	0003605953	centurylink.com
Qwest Corporation	Qwest Corporation		centurylink.com
RNK, Inc.	Wave2Wave Communications, Inc.	0004343737	www.wave2wave.com
Rural Cellular Corp. DBA RCC Network Inc	Rural Cellular Corp. DBA RCC Network Inc		www.unicel.com
Sage Telecom, Inc.	Sage Telecom, Inc.		www.sagetelecom.net
Sagebrush Cellular, Inc.	Nemont Telephone Cooperative, Inc.	0001608645	www.nemont.net
SDN Communications	SDN Communications		www.sdncommunications.com
Skycasters LLC	Skycasters LLC	0018756155	www.skycasters.com
Skyland Technologies, Inc.	Skyland Technologies, Inc.		none
Smartnet, Inc.	Smartnet, Inc.		www.getcallsmart.com
South Dakota Network, LLC	South Dakota Network, LLC		www.sdncommunications.com
TDS Telecommunications Corporation	Telephone and Data Systems, Inc.	0004948105	www.teldta.com
TeleCommunication Systems Corporation of Maryland	TeleCommunication Systems Corporation of Maryland		www.telecomsys.com
Telesphere Networks Ltd.	Telesphere Networks Ltd.	0015328032	www.telesphere.com
The Neighborhood, Built by MCI	The Neighborhood, Built by MCI		www.verizon.com
Time-Warner	Time-Warner		www.timewarner.com
T-Mobile	T-Mobile		www.t-mobile.com
Trans National Communications	Trans National Communications	0004337846	www.tncii.com

International, Inc.	International, Inc.		
Trinsic Communications, Inc.	Trinsic Communications, Inc.		www.matrixbt.com
tw telecom holdings inc.	tw telecom inc.	0014942668	www.twtelecom.com
U.S. Link, Inc.	U.S. Link, Inc.		www.tdstelecom.com
UC	UC		www.integratelecom.com
Venture Communications Cooperative, Inc.	Venture Communications Cooperative, Inc.		www.venturecomm.net
Venture Communications Cooperative, Inc.	Venture Communications Cooperative, Inc./Western T	0003784477	www.venturecomm.net
verizon business global llc dba verizon business	Verizon Communications Inc.	0010856284	www.verizon.com
Vision Systems	Vision Systems		www.vision-systems.com
VoIP360, Inc.	VoIP360, Inc.	0016868317	none
VoIPStreet, Inc.	VoIPStreet, Inc.	0016266157	www.voipstreet.com
Vonage Holdings Corp.	Vonage Holdings Corp.	0018401844	www.vonage.com
WDIG Mobile, LLC	WDIG Mobile, LLC		www.dig.com
Western CLEC Corporation	Western CLEC Corporation		none
Western Wireless Corporation	Western Wireless Corporation		none
Wherify Wireless, Inc.	Wherify Wireless, Inc.		none
Wireless Alliance LLC	Wireless Alliance LLC		none
WWC Holding Co. - Cellular One (Western Wireless)	WWC Holding Co. - Cellular One (Western Wireless)		none
XE Mobile 55, LLC	XE Mobile 55, LLC		www.xemobile.com
YMAX Communications Corp.	YMAX Communications Corp.		www.ymaxcorp.com

Nebraska Broadband Mapping Project: Product Release White Paper

Contact Name Manager:	Mike Hybl
Contact Phone Number:	402-471-0211
Contact E-mail:	**mike.hybl@nebraska.gov**
Submitted By:	Shana Knutson
Contact Phone Number:	402-471-0232
Contact E-mail:	**shana.knutson@nebraska.gov**
Technical Lead:	Don Gray
Contact Phone Number:	402-471-0242
Contact E-mail:	**don.gray@nebraska.gov**

Product Specification:	Fall 2012 NTIA Data Model
Product/Process:	NTIA—October 1, 2012 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's October 1st, 2012 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Provider Participation Statistics Summary

Summary	Count
Total Providers Researched/Contacted	168
Total Participating Broadband Providers	86
Providers in Research Phase	8
Non-Responsive Providers	1
Non-Cooperative Providers	1
Number of Providers - Supplied Updates for this Submission	64
Number of Providers - Confirmed No Updates	6

- New Providers Since Last Data Submission
  - Future Technologies (TT-70)
  - Geneva Broadband, LLC (TT-10)
  - Geneva Broadband, LLC (TT-50)
  - Omni-Tech Inc. (TT-70)
  - Sandhills Wireless (TT-70)
  - Skywave Wireless, Inc. (TT-70)

- Non-Responsive/Non-Cooperative Providers
  - Peetz Communications, Llc
  - Wire Free Nebraska, Inc./Community Internet Systems, Inc.
    - Members of the Commission met with Wire Free Nebraska, Inc. at their offices on August 28, 2012 to discuss their future participation in the SBI Mapping effort.

- Providers that Supplied Coverage Updates

AIS	Glenwood Telephone	Rural Telephone Service Company, Inc.
Allo Communications	Golden West Telecommunications Cooperative, Inc.	Sandhills Wireless
Arapahoe Telephone Company	Great Plains Communications, Inc.	Skycasters
AT&T Corp.	Hamilton Telephone Company/Nedelco	Skywave Wireless, Inc.
Blue Valley Telecommunications, Inc.	Hartelco	Southeast Nebraska Communications
BroadBand Wireless Internet	Hartman Telephone Exchanges, Inc.	Speedconnect/Gryphon Wireless, L.L.C.
BWTelcom	Hershey Cooperative Telephone Company	Sprint Nextel Corporation
C and R Electronics / Action Communications	Huntel, Inc.	Stanton Telecom, Inc.
Century Link	K & M Telephone Company, Inc.	Ste Wireless, Inc.
Charter Communications	Key Art Comm., Inc	Superior Inet
Connecting Point	Mainstay Communications	Telebeep Wireless
Consolidated Telco, Inc.	Mobius Communications Company	Three River Telco
Cox Communications	Nebraska Central Telephone Co. (NCTC)	Time Warner Cable
Cozad Telephone Company	Nebraska Link	Usa Communications, L.L.C.
Cricket Communications, Inc.	Northeast Nebraska Telephone Company	Verizon Wireless
Dalton Telephone Company, Inc.	Omni-Tech	Vistabeam
Diode Communications/Diller	Orbitcom, Inc.	Wauneta Telephone Company
Fibercomm L.C.	PC Telcom	Westel Systems/Hooper
Fort Randall Cable Systems, Inc	Pierce Telephone Co Inc	WildBlue Communications Inc. (ViaStat)
Frontier Communications Of Nebraska	Pinpoint Communications Inc.	Wireless Inter
Future Technologies	Plainview Tel Co.	Zayo Bandwidth Northwest Inc
Geneva Broadband, Llc		

- Existing Providers – No Updates
  - Cable One, Inc.
  - StarBand Communications Inc.
  - Swiftel Communications
  - Unite Private Networks, LLC
  - US Cellular
  - Windstream

- Providers researched and identified as non-broadband providers can be viewed within the table at the end of this document.

COVERAGE AREA CHANGES

- Coverage Footprint Reductions/Map Refinement –
    - CenturyLink (TT-10)
    - Charter Communications (TT-40)
    - Charter Communications (TT-41)
    - Cox Communications (TT-40)
    - Diode Communications (Middle Mile)
    - Fort Randall Cable Systems, Inc (Middle Mile)
    - Frontier Communications Of Nebraska (Middle Mile)
    - Golden West Telecommunications Cooperative, Inc. (TT-10)
    - Golden West Telecommunications Cooperative, Inc. (TT-50)
    - Great Plains Communications, Inc. (TT-50)
    - Hamilton.net, Inc. (Middle Mile)
    - Key Art Comm., Inc (Middle Mile)
    - Mobius Communications Company (Middle Mile)
    - Three River Digital (Middle Mile)

- Coverage Footprint Expansion –
    - Action Communications (TT-70)
    - Allo Communications (TT-50)
    - AT&T Mobility LLC (TT-80 / Added a Spectrum and Speed Change)
    - Atcjet.net LLC (Middle Mile Rename)
    - Citizens Telecommunications Company of Nebraska (Middle Mile)
    - Clarks Telecom (TT-50)
    - Connecting Point (TT-70)
    - Consolidated Companies, Inc. (Middle Mile)
    - Dalton Telecommunications Inc. (Middle Mile)
    - Frontier Communications Of Nebraska (TT-10)
    - Great Plains Broadband, Inc. (TT-41)
    - Great Plains Broadband, Inc. (TT-41)
    - Great Plains Communications, Inc. (TT-10)
    - Great Plains Communications, Inc. (TT-41)
    - Hanson Communications, Inc. (Middle Mile)
    - Hooper Telephone Company (Middle Mile)
    - Huntel Communications (TT-50 / New TT for this round)
    - Mobius Communications Company (TT-50)
    - Nebraska Central Telephone Co. (TT-10)
    - Nebraska Central Telephone Co. (TT-20)
    - Nebraska Central Telephone Co. (TT-50)
    - Nyecom Teleservices (TT-71)
    - Orbitcom, Inc. (TT-10)
    - Pinpoint Communications Inc. (TT-10)
    - ViaSat (TT-60 / Was WildBlue)
    - Zayo Group LLC (TT-50)

- Provider Attribute/Name/TT Changes –
  - New Edge Networks, Inc. (TT-10/TT-20/TT-30/TT-41 Removed / Non-Coop)
  - WildBlue Communications, Inc. (TT-60, Changed Name ViaSat)
  - Northeast Nebraska Telephone Company (TT-71 / Removed the wireless from business)

DATA CORRECTIONS

There were no provider data corrections required for this data submission.

COMMUNITY ANCHOR INSTITUTION (CAI) DETAILS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	CAIID Counts	Broadband Subscriber (Yes)	Trans Tech	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	1497	1192	1119	1119	1120	1117
Category 2 - Library	94	65	93	93	93	93
Category 3 - Medical/Healthcare	162	0	155	155	155	155
Category 4 - Public Safety	129	0	129	129	129	129
Category 5 - Universities/Colleges	162	3	136	131	136	136
Category 6 - Other: Government	349	0	348	348	348	348
Category 7 - Other: Non-Government	134	0	134	134	134	134
Total	**2,527**	**1,260**	**2,114**	**2,109**	**2,115**	**2,112**

CAI CHANGES

- The amount of CAI's and broadband information increased since the last data submission based on information supplied directly from providers stating they specifically supply service to that individual CAI.

- There were 1,260 CAI's within the following categories, that were reviewed against the below-mentioned databases to identify if any CAIID's need to be updated or added.

  - For K-12 institutions (CAI type 1) please add the NCES ID CCD ID value found here: **http://nces.ed.gov/ccd/bat/**

  - For Higher Education (CAI type 5) please add the NCES IPEDS ID value found here: **http://nces.ed.gov/ipeds/datacenter/**

  - For Libraries (CAI type 2) please. Combine (do not add) "FSCSKey" and "FSCs_SEQ" from the "puout08av2000" file and place them here: **http://harvester.census.gov/imls/data/pls/index.asp** (FYI the LIBID is your state's unique ID for libraries)

SUBMISSION RECEIPT

SUBMISSION RECEIPT RESULTS

- Attached are the results from the NTIA data submission receipt quality script.

SD_2012_9_25.txt

- Error Report
  - The main items flagged within the submission receipt were the technology and speed matches, which were validated by the provider and/or are within the ranges communicated in the NTIA data model.

  - All items are included within the accompanying ReadMe file.

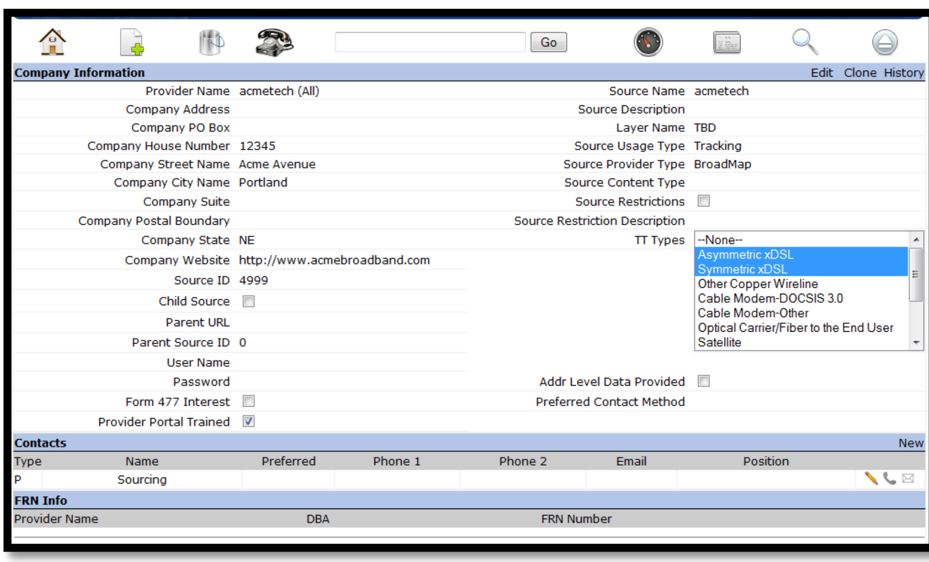
HIGH-LEVEL SUMMARY

DATA GATHERING

BROADBAND SERVICE AREAS, MIDDLE MILE AGGREGATION POINTS AND BROADBAND SERVICE OVERVIEW

The collection of Broadband Service Areas, Middle Mile Aggregation Points and Broadband Service Overview information is handled through the following Provider Outreach Process:

- Build and maintain an inventory of Broadband providers through currently known providers and research.
- The inventory and everyday interaction with providers is tracked using the Provider Catalog (PCat). Below are some examples of the web application, which has a shared access between our team and mapping partner (BroadMap).



Confidence			New
TT Type	Confidence	Last Modified	Comment

Status Tracking

Non Facilities Based Provider	☐		
Business Only Provider	☐		
Reseller	☐	Non Responsive Provider	☐
NDA Review - Internal	☐	Non Cooperative Provider	☐
NDA Review - External	☐	Source Closed	☐

Service Provider Details

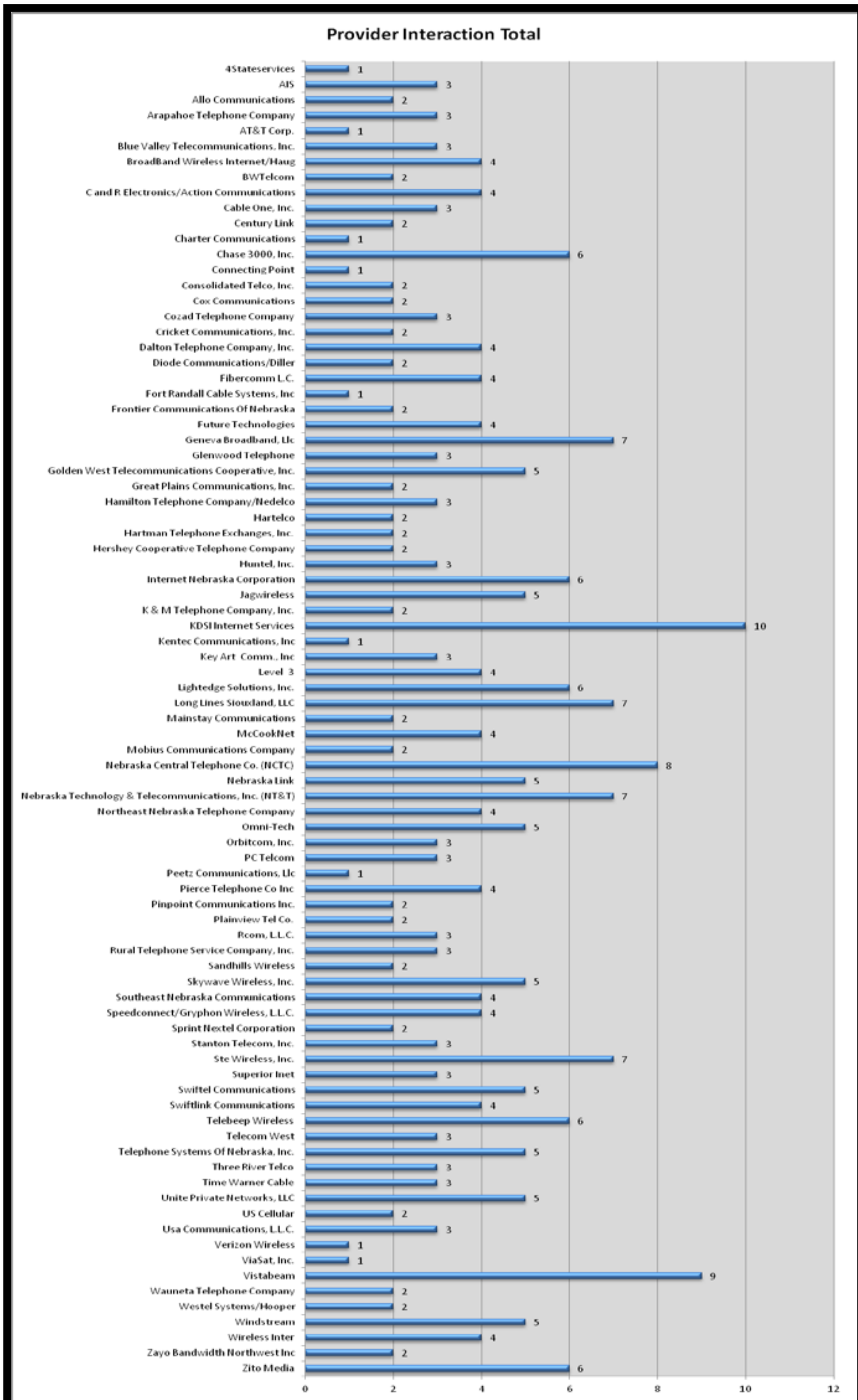
BroadMapper	--None--	BroadMap Status	Unassigned
Initial State Outreach Date		Initial Contact Vehicle	
Provider Origin		Member Association	
		Initial State Outreach	☐
		NDA Status	--None--
		NDA Not Required	☐
Provider Packet Exchanged	☐	NDA Requested	☐
Provider Packet Info Sent		NDA Exchanged	☐
Provider Meeting Status	--None--	NDA Exchange Date	
Technical Meeting Requested	☐	NDA Signed	☐
Technical Meeting Scheduled	☐	NDA Signed Date	
Number of Subscribers			
		Date Loaded	
		Source Closed Date	

BDIA Delivery 0412			Edit
Status	--None--	Provider Data Reviewed	☐
Outreach Date		Provider Data Reviewed Date	
Initial Response		FootPrint	
Meeting Date		MiddleMile	
No Update Date		Subscriber	
Waiting For Data Date		Provider Login	☐
Data Received Date		Provider Login Date	
Data Accepted Date			
Source Ingested		Source Ingested Date	

Additional Data

Notes			
Next Steps			
Inactive	☐	Owner	briordan
Created By	briordan 2011-06-13 12:06:35	Last Modified By	krousseau 2012-03-16 13:41:58

- To encourage participation throughout the life of the program, we feel it's important to foster relationships with providers and encourage a collaborative team effort between all parties for each data submission. The following table represents the number of times each provider was contact via e-mail or phone for this data submission.



- Update provider material that describes the data requirements and logistics for data transfer.
- Update Non-Disclosure Agreement (NDA) for use in the project, where applicable.
- Maintain multiple protocols for the provider to submit data, including Secure File Transfer Protocol (SFTP) technology when desired.
- Conduct one-on-one informational discussions with each provider to communicate the following:
    - Requirements of this project;
    - Broadband data required to support the product data model;
    - Submission protocols available;
    - Capability to validate how the supplied data is aggregated.
- Download/receive provider data.
- Establish a repeatable process with provider. Maintain provider communication, transaction and data handling records throughout the project (dates contacted, data received, etc.).

COMMUNITY ANCHOR INSTITUTION (CAI)

The collection of CAI information is handled through the following CAI Collection Process:

- Collect and maintain inventory of CAIs through currently known CAIs, data mining, and research.
- Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.
- Upload web-based data to Core Database for standardization.
- Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.
- Geocode CAI locations.
- Translate Core Database data to deliverable-ready format.
- Continue engagement with non-responsive institutions.
- In the upcoming months, one of the statewide semi-monthly webinars produced by the Planning team is scheduled and will focus on CAI engagement, education on the program, and use of the CAI Portal. The broadband planning and mapping teams are working together to present material on the overall broadband program, benefits, and importance on CAI involvement.

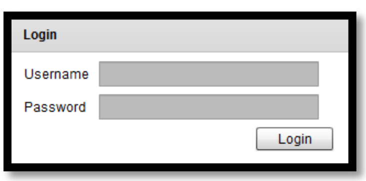
DATA INTEGRATION PROCESS

The data integration and processing mechanisms currently used allows for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

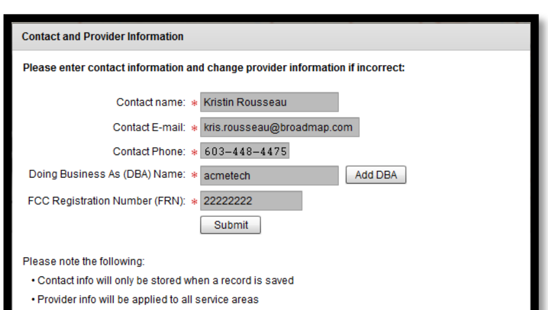
- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type category (addresses, block lists, paper maps, etc.).
- Standardize input based on data type within Staging Database.
- Create Compact Polygons (CP)—(internal methodology for generating area-based feature for coverage in Staging Database).
- Apply broadband attribution to CP; apply metadata to CP.
- Perform quality analysis of the CP against the source supplied to identify any completeness or accuracy issues.
- Request additional information from the provider if elements of coverage are missing or contain discrepancies. This is a second manual quality check to ensure data is complete.
- Process coverage area to build the required NTIA data model layers.

With the deployment of the Provider Portal this round, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it supplies them with more visibility into how their data is being represented and gives them knowledge and ownership of their coverage representation. Below are some bullet points and supporting screen shots on how the portal is used.

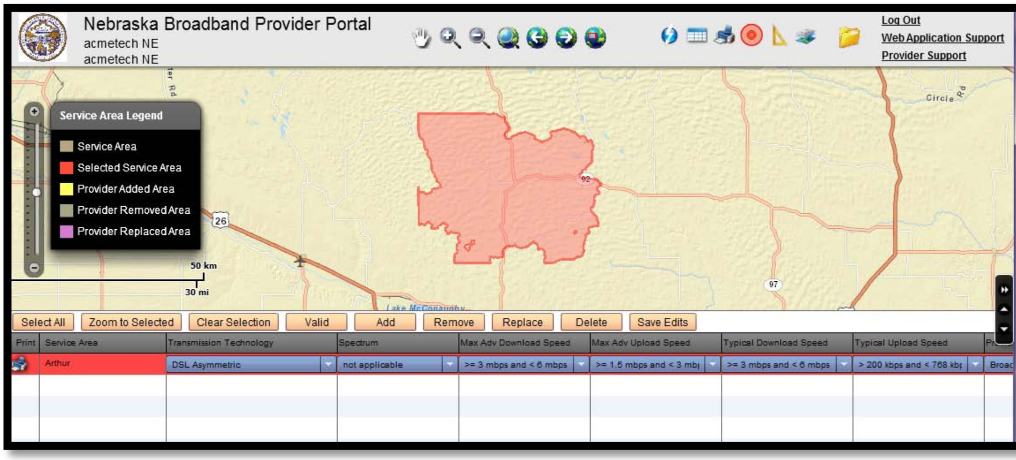
- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration



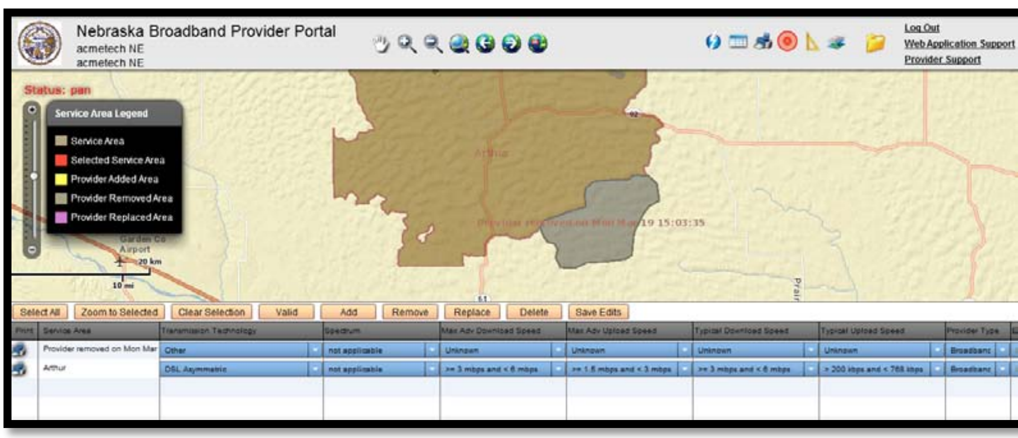
- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy



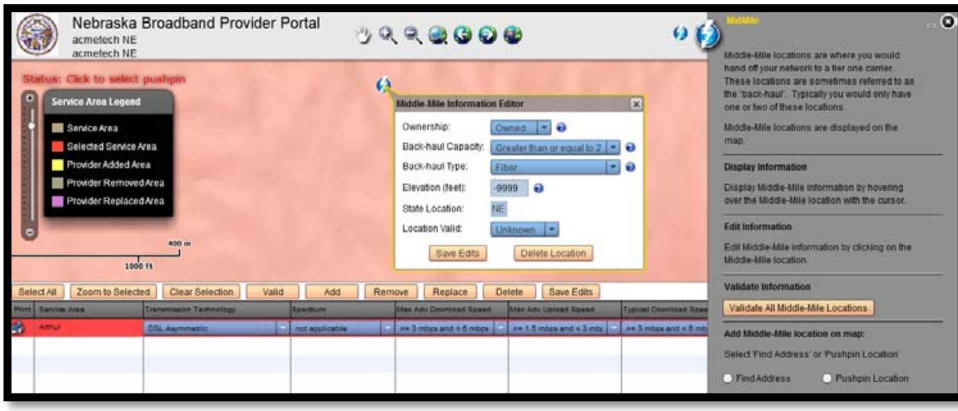
- Capability to review and request changes to the coverage footprint

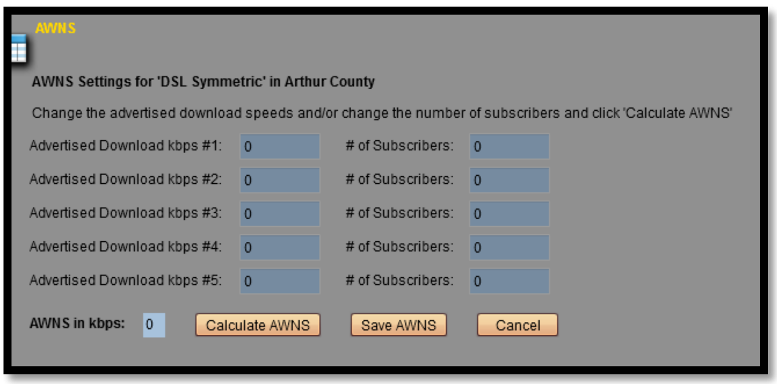


- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

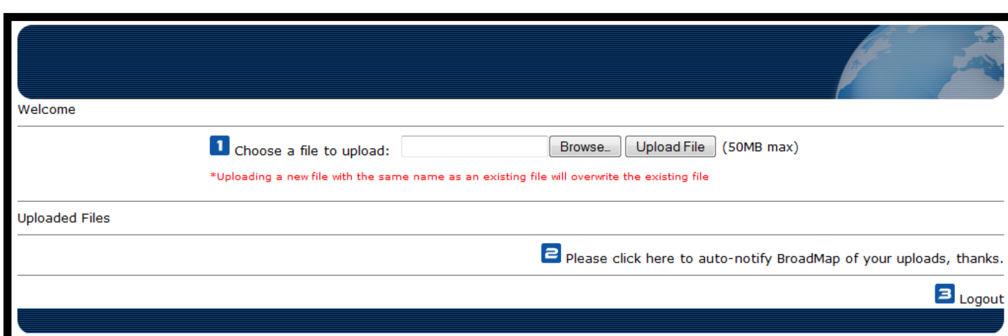


- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





- File upload functionality to support providers that would prefer a shapefile, spreadsheet, PDF, KMZ/KML file be used to reflect changes for the data round



- Once the provider has reviewed the completed changes to their coverage, middle mile and AWNS, they can then validate them all by signing off that everything is accurate.

DATA VALIDATION AND VERIFICATION

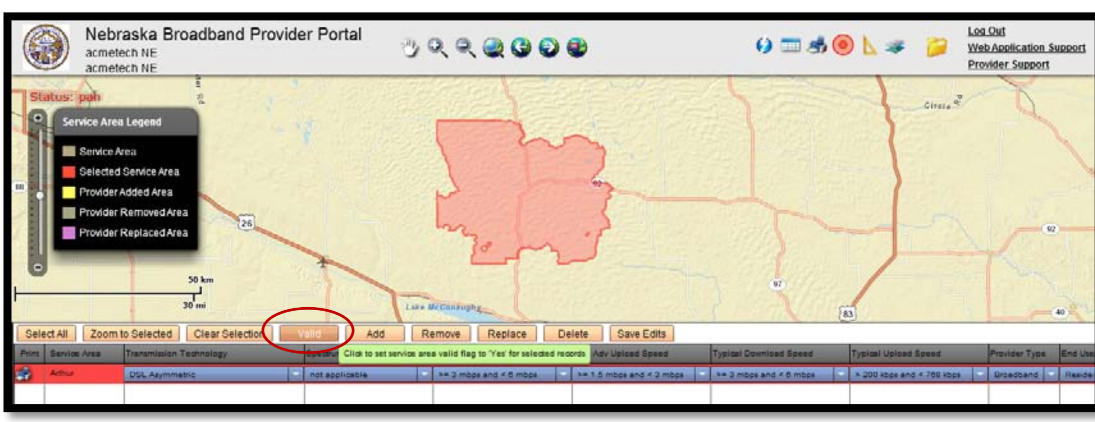
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage areas and serviceability claims, additional reviews are performed using the methods described in the subsections below in order of action (**Broadband Provider Validation**, **Third-Party Data Verification**, **Public Verification, and Confidence Values**).

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

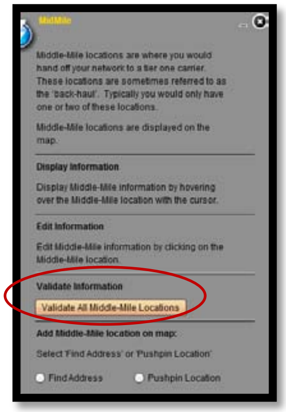
Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the **Data Integration Process** and are reviewed with the provider to complete validation.

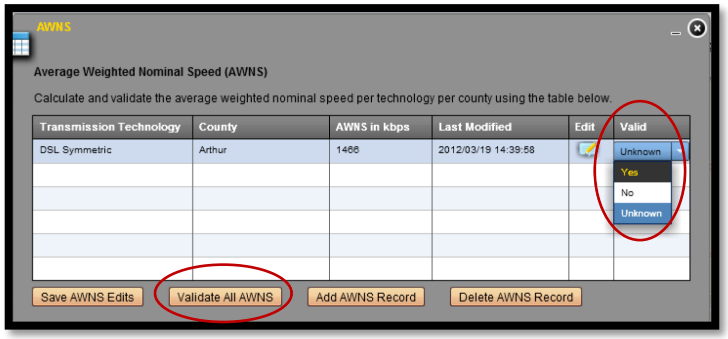
With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

- Coverage validation can be done on one record/footprint at a time or by selecting footprints and selecting the 'Valid' button. The provider could also print off or download their coverage for their own tracking purposes.



- Middle Mile & AWNS Validation





All validation results are tracked internally through our Validation Table, which also improves the overall **Confidence Value** as mentioned below.

SME VERIFICATION – PROVIDER PORTAL ADMIN

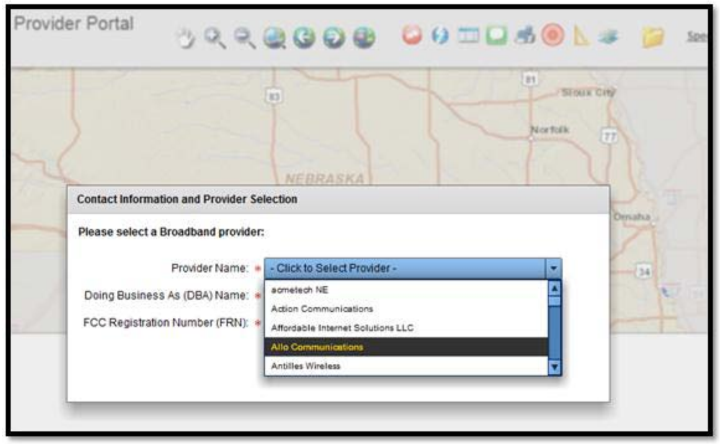
For this dataset submission, Nebraska has introduced new verification enhancements to the Provider Portal that supports administrative functionality for Subject Matter Experts (SMEs) to review the provider coverage areas and supply feedback/commentary on the accuracy and completeness. These enhancements allow them to:

- Review the coverage submitted by the carriers online
- Use subject matter expertise to evaluate the accuracy of the data against local knowledge, online advertising, personal meetings, etc.
- Document a dialogue with its providers for verification purposes. We were able to review many of the provider submissions manually and submit questions to the providers if speeds, coverage areas, technology types, or other items appeared.
- Report verification comments and any responses from the providers to NTIA in the dataset.

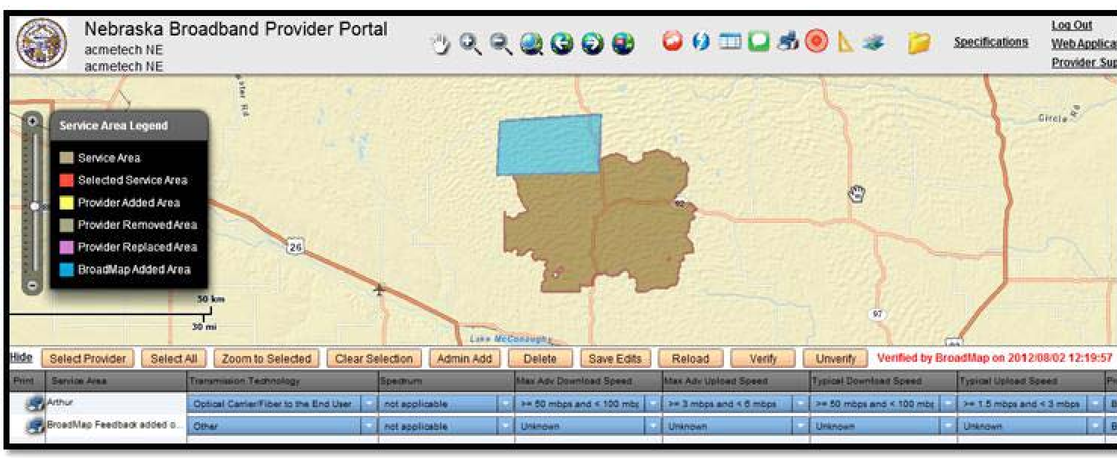
NOTE: This has just recently been released and will be utilized fully for the next data submission

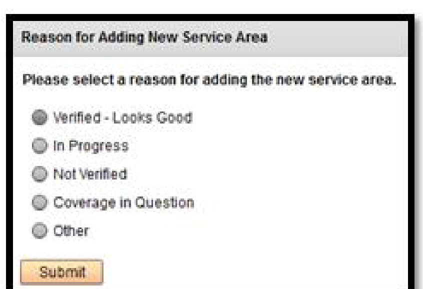
Below are some screen shots illustrating the administrative capability of the Provider Portal.

As shown below, the SME can login through the secure web application and choose the provider to be reviewed.



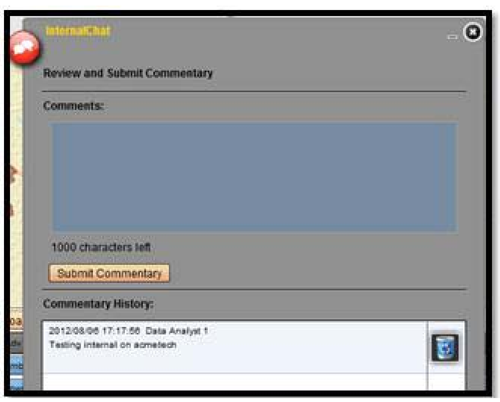
The portal supports two ways of verification at a coverage footprint level. The SME can draw areas of concern or approval on the map and supply a categorized comment that can easily be extracted at anytime.

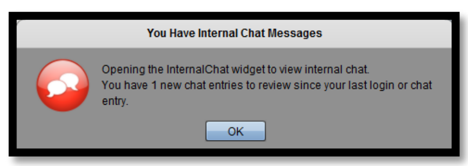




Additionally, the SME can leave commentary that will then be automatically e-mailed to the provider for their review and displayed as a pop-up when the first login to the Provider Portal. This includes historical tracking so you can see all commentary between the SME and provider, as well as the date/time stamp for each comment.

The administrative Provider Portal also allows for commentary between team members, which will only be viewable by the internal admin team members. The team members are notified automatically via e-mail when a comment is submitted, as well as when they login.





Similar to how the providers update and validate their coverage within the Provider Portal, the administrative version walks the SME through the verification assignments to ensure everything is reviewed and documented with a status and date/time stamp. Once everything is signed off on, the SME can select Verify to signify that the provider is signed off for the submission.

Through the testing and initial release of the portal, the providers have been very responsive to the commentary and supplying updates where needed. As we progress with this tool, the commentary and verification status will be included in future submission documentation. Some is already included within this submission's data package.

THIRD-PARTY DATA VERIFICATION

For this submission, the NTIA 3rd Party Data summary was reviewed again to ensure any corrections required were represented in the final product and the supporting documentation. This includes additional feedback received directly from NTIA, prior to this data submission.
We are currently in the process of reviewing 3rd party data to extend our verification efforts.

This submission was also compared to the previous data submission, spring 2012, as a quality check to identify and resolve any potential erroneous discrepancies or data degradation.

PUBLIC VERIFICATION – CROWD SOURCING

The broadband interactive map has been released to the public, which includes functionality to collect feedback on the provider's coverage areas, as well as running a speed test. The feedback and speed results continue to be collected and reviewed with the providers prior to the next data submission to identify if any map refinement is required.

The public website can be viewed at the following hyperlink:

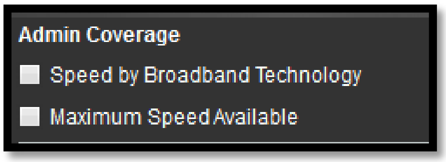
http://broadbandmap.nebraska.gov

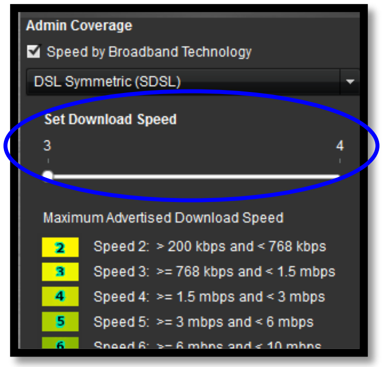
In the past quarter, we've had over 830 visits to the websites, with over 140 speed test and feedback results collected. We will also be promoting this website and the importance of public feedback at the upcoming 2012 Broadband Connecting Nebraska Conference on October 2nd in Lincoln, NE.

During this quarter, we have also updated the public site to have a Planning component, or administrative login capability. This way they can review other layers that may not be appropriate for view to everyone, or review existing layers differently. Some examples are as follows:

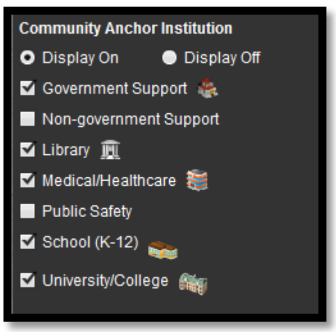
Administrative Login:

Administrative Data Layers and Functionality:
We're still adding more layers to the admin functionality, but below is an example of two that were added. As a layer is selected, additional functionality is provided. In the case below, the speeds can be changed by using the slider.

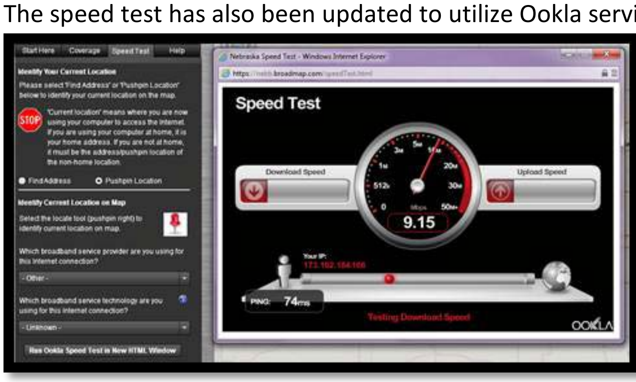




Community Anchor Institutions can also be turned on/off individually to compare against the broadband services available.



The speed test has also been updated to utilize Ookla services.



CONFIDENCE VALUES

All verification, validation and manual quality review results are tracked by provider/technology type and stored and maintained within a **Validation table**. A confidence value is assigned, based on internal assessments of the collected information, to highlight the provider coverage areas and/or attributions that would benefit from further investigation and/or enhancements.

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention.

QUALITY CONTROL

Following collection, processing and analysis of the provider and CAI data, the product is checked manually and algorithmically against the NTIA data model. Some of the items included within these checks are:

- Format correctness;
- Table and field structure;
- Valid values, including default values, where applicable;
- Geographic extent and topology errors.

Prior to data submission, another quality control script supplied by NTIA is run. This script, SBDD_CheckSubmission.py, creates an output in text form that is required to be submitted along with the final deliverable. All errors must come up clean, unless otherwise specified by NTIA.

DETAILED PROCESS REVIEW

To review the detailed process, please review the attached object:

BMap_ProcessDetails_2012_10_01.docx

PROVIDERS RESEARCHED

Below is a list of providers we are still in the process of researching or closing NDA and data collection efforts:

- Chase 3000, Inc.
- KDSI Internet Services
- Kentec Communications, Inc
- Lightedge Solutions, Inc.
- Swiftlink Communications – Recently purchased by 4Stateservices
- Telephone Systems of Nebraska, Inc.
- Zito Media

Below is a list of providers that were researched and contacted, but identified as non-broadband providers and didn't require inclusion within the data submission. Some may be due to different naming conventions or inaccurate FRN/DBA names and were therefore considered a closed source.

ACN Communication Services, Inc.	Mcleodusa Telecommunications Services, Inc.
ACN Digital Phone Service Llc	Mettel

Airnex Communications
Antilles Wireless Llc
Antilles Wireless, LLC
Arlington Telephone Company
Blair Telephone Company
BT Communications Sales, L.L.C.
C & R Electronics
Cable Nebraska Llc
Cable Nebraska, LLC.
Cable USA III Dba RCOM, L.L.C.
Citistream Communications, Inc.
Computer Concepts, Inc.
Connecting Point
Consolidated Telecom Inc
Consolidated Telephone Company
Cricket Communications, Inc.
Dark Fiber Solutions, Inc.
Deltathree, Inc.
Digital Isp Group, Inc.
Dslnet Communications, Llc
Eastern Nebraska Telephone Company
Embarq, Centurylink
Flying J Communications
Future Technologies
Global Connection Inc. Of America
Global Crossing Telecommunications, Inc.
Globalstar Usa, LLC
Granite Telecommunications, L.L.C.
Indigo Wireless
Inventive Wireless of Nebraska, LLC
It Communications, LLC
Kentucky Data Link, Inc.
LH Telecom
Mainstay Communications
Matrix Business Technologies
McLeodUSA Telecommunications Services Inc.

MilliCorp
Mobius Communications Compnay
Nebraska Supercomm, L.L.C.
Network Innovations, Inc.
New Cingular Wireless Services Inc.
New Global Telecom, Inc.
Nextel Boost West, LLc
Nextel Partners
NYECom Teleservices
Rcom, LLC
Rivtel Networks Inc.
Rock County Telephone Company
Sdn Communications
Sioux City Msa Limited Partnership
Skytel
Speakerbus Networks, Inc.
Sprint Communications Company L.P.
Sprint Pcs
Swifttel Communications
TCG Omaha
Three River Communications, LLC
Three River Digital Cable, L.L.C.
Total Call Mobile, Inc.
Tracfone Wireless, Inc.
Tracy Corporation II
Tw Telecom Holdings Inc.
United American Technology, Inc.
V-Global Communications, LLC
Verizon Wireless
Westel Systems
Wholesale Carrier Services, Inc.
Wiltel Communications, LLC.
Windbreak Cable
Wire Free Nebraska, Inc/Community Internet
WWC License LLC
Ztar Mobile, Inc.

New Hampshire Broadband Mapping and Planning Program
University of New Hampshire
October 2012 Data Submission

I. Data Description

In accordance with the effective NTIA guidance for Round 6 data submissions, the New Hampshire Broadband Mapping and Planning Program (NHBMPP) submitted the data set described below and associated documents to NTIA in October of 2012.

NH_SBDD_2012_10_01.gdb – file geodatabase containing feature classes for:

Feature Class	Number of Records
BB_ConnectionPoint_LastMile	0
BB_ConnectionPoint_MiddleMile	117
BB_Service_Address	0
BB_Service_CAInstitutions	3,899
BB_Service_CensusBlock	101,296
BB_Service_Overview	0
BB_Service_RoadSegment	44,005
BB_Service_Wireless	41
State_Boundary	1

In total, over 145,450 individual data records on broadband availability were submitted by New Hampshire. This includes an increase in middle mile records due to the addition of one provider that was previously not included in the NHBMPP. Collectively, these records describe availability as reported by 39 broadband providers in the state. In addition, the NHBMPP submitted data on 3,899 community anchor institutions, a reduction of 15 records from the prior submission due to institution closures.

To achieve this level of reporting, the NHBMPP relied on a number of sources to identify potential providers in the state. The following table details the disposition of the initial set of providers:

Description	Number of Records
Potential providers identified in NH	93
Providers confirmed as delivering service in NH	60
Providers represented in the NHBMPP submission	39

II. Provider Participation

The NHBMPP has identified 60 broadband providers in the state. As noted above, 39 of these providers actively participated in the program for the Fall 2012 cycle. This number represents an increase of two providers from our prior submission – one national satellite provider was just identified and the second new provider was previously non-responsive.

The current participating providers include:

Provider Name	Technology
1. Argent Communications, LLC	Cable, Fixed Wireless
2. AT&T Mobility LLC	Mobile Wireless
3. Charter Communications Inc.	Cable
4. Comcast Cable Communications, LLC.	Cable
5. Covad Communications Company	DSL, Other Copper Wireline, Middle Mile
6. Cyberpine Cooperative, Inc.	Fixed Wireless
7. DSCI Corporation	Middle Mile
8. Dunbarton Telephone Company, Inc.*	DSL
9. FairPoint Communications, Inc.	DSL
10. Freedom Ring Communications, LLC. (dba BayRing Communications)**	Middle Mile
11. G4 Communications**	DSL, Middle Mile
12. Granite State Communications (aka Granite State Telephone)*	DSL, Fiber
13. Great Auk Wireless (dba GAW High-Speed Internet Inc.)	Fixed Wireless
14. GWI (aka Biddeford Internet Corporation)	DSL, Other Copper Wireline
15. HughesNet**	Satellite
16. IAMNOW.net*	Fixed Wireless
17. Lakes Region Wireless**	Fixed Wireless
18. Level 3 Communications**	Fiber, Middle Mile
19. Lightower Fiber Networks*	Middle Mile
20. MetroCast**	Cable
21. OTT Communications	DSL, Middle Mile
22. Oxford Networks*	Middle Mile
23. Sidera Networks, LLC	Middle Mile
24. Skycasters	Satellite
25. Sovernet Communications*	DSL
26. Spectra Access*	Fixed Wireless
27. Sprint	Mobile Wireless
28. StarBand Communications, Inc.**	Satellite
29. Tamworth Wireless Cooperative	Fixed Wireless
30. TDS Telecom	DSL, Fiber, Middle Mile
31. Time Warner Cable	Cable
32. T-Mobile	Mobile Wireless
33. Topsham Communications	Fiber
34. U.S. Cellular*	Mobile Wireless
35. Verizon Wireless	Mobile Wireless
36. Wave Comm, LLC	Fixed Wireless
37. WildBlue Communications, Inc.**	Satellite
38. Wireless LINC of NH and VT (f/k/a NCIC)*	Fixed Wireless
39. WiValley*	Fixed Wireless

* Provider confirmed that coverage has not changed and did not submit revised data for this round. Data reported for the March, 2012 submission was confirmed as still being effective.

** Provider did not confirm or submit revised data for Fall 2012 submission. Data submitted was from previous data submission rounds and is being resubmitted.

The following 21 providers have remained unresponsive to multiple and ongoing requests to participate in the NHBMPP, or have dropped out of the program after initially providing data.

Provider Name	
1. Boston Telephone	2. CityVoice
3. Cogent Communications	4. DESTEK
5. EarthLink Business (aka One Communications)	6. Fibercast Cable Communications
7. The Granite Connection	8. Grolen Communications
9. ITLLC (f/k/a Russet Communications)	10. Met Tel
11. MV Communications	12. NCIA
13. NHvt	14. Qwest Communications
15. RadiusNorth	16. segTel, Inc.
17. SkyWire Wifi (f/k/a Akers Pond)	18. TelJet
19. Turnpike Technologies	20. USAi.net
21. WindStream	

The following 2 providers have been identified as providing internet service, but the maximum download and upload speeds they currently offer do not meet the broadband definition.

Provider Name	
1. Bretton Woods Telephone	2. Dixville Telephone

The 8 providers listed below were identified from analysis of the FCC Form 477 data (filings through February, 2011). The NHBMPP has contacted these providers, but to this date they have either been unresponsive or data has not been received so we cannot confirm their status in NH.

Provider Name	
1. Airespring, Inc.	2. Broadview Networks
3. BurgNet	4. Global Crossing North America, Inc.
5. Hickory Tech	6. NewEdge Network, Inc.
7. NextWave Wireless, Inc.	8. Telovations, Inc.

Finally, the NHBMPP identified a number of providers during previous rounds that we no longer maintain on the active list because they have either ceased providing service, have merged with other providers, or were never an active provider in NH.

Provider Name	
1. Access Communications	2. All Media, Inc.
3. Alterracom Networks	4. BIT-NET

5. CheshireNet	6. Cooperative Resources
7. Equal Access Networks	8. FCG Networks
9. Finowen	10. First Bridge
11. GreenNet	12. Green Wave Wireless
13. JLC	14. Level One Communications
15. Mainstream EIS	16. Mason Coop
17. Megapath	18. RNK Communications
19. TTLC.net	20. Vermont Telephone
21. WaveGuide	22. Wireless Horizon
23. Worldpath	

The initial master list of providers was extracted from the "New Hampshire Broadband Action Plan", 2008, NH Telecommunications Advisory Board (TAB) and NH Department of Resources and Economic Development (DRED). This listing was cross-referenced against a statewide cell tower inventory maintained by the NH Office of Energy and Planning. NHBMPP staff maintains an ongoing effort to identify additional active service providers in the state based on continuing interactions with TAB and DRED, review of speed test results, updated FCC data when published, and other sources as available.

III. Data Collection and Integration

A. Primary Data Collection

Data Acquisition

Primary data was collected directly from the service providers. The NHBMPP first developed a set of guidance documents based on NTIA specifications, and distributed those to the individual providers. Once the guidance was disseminated, NHBMPP staff followed up with providers via phone/email to encourage participation and address questions, as required. Typically, multiple communications were required to ensure a complete data submission was received.

Data Pre-Processing

To support the data mapping and integration efforts, the following base data sets were acquired and/or retrieved from the NH GRANIT state GIS clearinghouse archives:

- State and town boundaries (based on 1:24,000 USGS DLG files);
- 2001 Land Cover data set (derived from Landsat TM imagery);
- 2010 TIGER Census Blocks;
- 2010 Census MAF/TIGER Road Segments; and
- 2009 USGS National Elevation Data set (NED).

All required NTIA fields were added to the census block and road segment data sets. In addition, the road segments were processed against the census blocks to populate two fields used internally – the left block ID and the right block ID associated with each road segment.

Data Processing and Integration

The broadband availability data was processed and integrated using a suite of GIS tools and procedures, depending upon the format and content of the data submitted by the individual providers. Generally, the processing involved executing one or more of the following steps:

- Scanning and georeferencing paper maps and using the results as a visual reference to select out corresponding features from the project base data sets.
- Geocoding addresses using both an internal locator based on the TIGER road segments, and where required, the ESRI TA_BatchAddress_US subscription service; where NDAs were in place, geocoded points were then used to identify the host census block (if <= 2 sq. mi.), or the TIGER road segment in closest proximity but within 500' (if the host census block was > 2 sq. mi.). Related note(s):
    - In some cases, the selection of the TIGER road segment in closest proximity to the geocoded point yielded a pattern of disconnected road segments with broadband service.
- Using ArcGIS Network Analyst to select road segments within a cumulative distance of 3,000 and/or 18,000 lineal feet from central office locations, depending upon data submitted by the provider. The selected segments were subsequently used to identify adjacent census blocks <= 2 sq. mi. or used as features to quantify coverage along census blocks > 2 sq. mi. Note that in previous rounds, adjacent census blocks were flagged based on road segments intersecting those blocks. In this round, we refined our approach to define adjacency as blocks sharing a boundary with the road segment. This more conservative approach resulted in some blocks dropping out of provider coverage footprints.
- Processing KMZ image files, using the bounding rectangle to establish interior georeferencing, and then converting the georeferenced image to polygons.
- Utilizing Cellular Expert ArcGIS extension to generate a signal prediction surface for wireless providers submitting antenna locations (and associated data). Related note(s):
    - The statewide cell tower inventory provided the starting point for the signal propagation modeling efforts.
    - Subsequently, working with UNC-Raleigh and a NH-based fixed-wireless provider, the data processing models were refined to take into consideration visibility parameters (in addition to vegetation and topography).
    - During the current processing round, program staff participated in additional Cellular Expert training sessions to further enhance the signal propagation models. As a result, some provider coverage footprints have been reduced from previous submissions.
    - A -90 DB threshhold was used to define service areas of fixed-wireless providers.
    - In processing the fixed-wireless polygon data, exterior polygons, e.g. those outside of the main coverage footprint, that were < .125 sq. mi. were eliminated. Interior non-coverage polygons were not eliminated.
- Processing satellite coverage footprints to incorporate the Utah shadow analysis (as posted on PBWorks).

The NHBMPP maintains a record of all specific processing steps applied to each provider's data submission in each round. We review that methodology with each provider as part of the verification process to ensure appropriate processing steps are followed.

Data Processing Issues
The NHBMPP encountered a number of issues in processing the broadband data for the state. These include:

- Most providers submitted data only on areas that are currently served, and not on areas that could be served following the NTIA guidance. This contributed to the pattern of occasional disconnected rural road segments with broadband service.
- Reliance on the TIGER road segments likely yielded overstated broadband coverage in rural areas. A single rural customer address, when geocoded, could result in a long street segment being selected as part of a provider's coverage area.
- Most providers did not submit typical speed data. As the volume of our speed test data set grows, we will explore using this information to estimate typical speeds.
- Fixed wireless providers frequently did not deliver the full set of antenna parameters required for the signal propagation software, and required multiple requests for data followed by requests for clarification of those data submitted. While the submissions this round were more complete than in previous rounds, this remains an issue.
- Providers who are knowledgeable and experienced with the original 2009 NTIA NOFA and corresponding clarification documentation provided information appropriate to that data schema / model, and modifications to these in June 2011 resulted in additional follow-up required to achieve a complete data submission.
- As a result of reprocessing data to incorporate enhanced methodologies, there are some instances of reduced provider footprints being reported.
- For providers who submitted address records, the first process was to geocode those addresses to the 2010 TIGER road segments. For any ungeocoded addresses, the program next utilized ESRI's online geocoding services. Any remaining, ungeocoded records were geocoded manually using Bing. In some instances, records continued to remain uncoded after this three-phase approach. We have identified a number of issues with some of the resulting geocoded data:
    - In reviewing addresses geocoded against ESRI services, we discovered a small number of records that did not appear to be correctly positioned. The incorrect positioning was confirmed by viewing the geocoded points relative to both TIGER road data and by referencing Bing. In some instances, the geocoded points were positioned a significant distance away from any mapped road segment. A proximity analysis with a 500' distance constraint was used to identify the closest road in these instances.
    - Finally, some geocoded results were mapped in a town other than the town identified by the provider in their address records. In most instances the geocoded result was to a neighboring town and was within .1 miles of the recorded town. The NHBMPP retained the geocoded locations and notified the provider of these discrepancies.
- For speeds reported by providers in ranges, e.g. 4G LTE, the speed tier reported was selected to include the upper end of the range.

- Some fixed wireless providers continue to report minimum download speeds < 768 kbps, e.g. outside of the NTIA domain, but maximum download speeds within NTIA speed tier domain values. In these instances, the NHBMPP reported the data based on the maximum speed reported.

B. Community Anchor Institutions

Data was submitted for 3,899 Community Anchor Institutions (CAIs) in the state covering the full range of categories established by NTIA, as follows:

Category	Number of CAIs	Percent of Total
1. School – K through 12	762	19.5%
2. Library	766	19.6%
3. Medical/health care	808	20.7%
4. Public safety	564	14.5%
5. University, college, other post-secondary	64	1.6%
6. Other community support – government	736	18.9%
7. Other community support – non governmental	199	5.1%
TOTAL	3,899	100.0%

In this data collection and maintenance round, the collection was largely accomplished by the nine regional planning commissions in New Hampshire, with the Upper Valley Lake Sunapee Regional Planning Commission (UVLSRPC) & NHBMPP staff at the University responsible for developing guidance, for overseeing collection, and for compiling the resulting regional data sets into a standardized statewide layer. The primary steps in the process included:

- Develop a master list of CAIs by category that were not inventoried in previous rounds through review of updated statewide lists (schools, libraries, health care facilities), existing GIS data sets (largely from local hazard mitigation plans), and local knowledge;
- Develop a list of previously identified CAIs with incomplete broadband information;
- Contact those entities to collect their broadband details using an email outreach methodology, as well as phone surveys;
- Map the location of each unmapped CAI, using existing GIS data sets, reference to aerial imagery, property boundaries, web research, and field data collection where necessary;
- Verify data (see verification section below).

IV. Validation

A. Primary Data Collection

The NHBMPP utilized multiple processes to verify the broadband provider data collected during the current round. These processes, each of which is described further below, included:

- Internal verification
- Provider verification
- Ground infrastructure checks
- Use of orthophotography
- Use of parcel data
- Use of FCC filing data
- Crowdsourced data – including speed tests and surveys
- Satellite dish inventory

First, the NHBMPP continued to use local knowledge to conduct an internal analysis of the reasonableness and consistency of our mapping results. Significant overstatements or understatements of service areas resulting from internal processing issues were readily identified and addressed. The NHBMPP also verified the "reasonableness" of data by comparing current coverage footprints to those reported during the prior round. This allowed us to identify areas where service areas changed substantively, and to communicate these findings to the provider for verification.

Secondly, the Fall, 2012 feedback loop with providers was more robust than prior rounds, largely due to increased effort on the part of program staff to solicit comment and the strong relationship now established between the providers and program staff. This round's efforts engaged all providers, including those who did not submit new data but whose prior data was reprocessed according to newer guidelines (described above). The NHBMPP returned maps (.pdf files) to each provider for review and correction. Where providers delivered addresses or road segments, the product returned was a geographically referenced version of the data that was submitted. For wireless providers who delivered antenna locations and specifications, the program provided maps that displayed the modeled coverage area generated from the Cellular Expert signal propagation modeling software. Some providers requested the data verification information be provided in shapefile and/or Google Earth (.kmz) format. The provider verifications yielded a number of requests for modifications, all of which are represented in the data submission.

Orthophotography was utilized to support a number of mapping activities. Among other applications, it assisted in verifying tower locations and mapping results for the wireless signal propagation modeling, was used as an important reference layer in the verification maps delivered to providers, and contributed extensively to the mapping and verification of Community Anchor Institutions.

Community Anchor Institution mapping was supported by two other substantive data sets – parcel data and "community destination" data. The parcel data was used to map and/or verify locations. (Note that it also was used to assist in verifying the positional accuracy of address data submitted by providers.) The statewide community destinations inventory served as a starting point for compiling and mapping municipal facilities.

The NHBMPP utilized FCC Form 477 filings (through February, 2011) to support the verification of provider coverage areas. Analysis of tracts reported as being served by each provider against those developed from the provider's submission allowed for verification and validation of service areas. There were some instances where a provider's FCC report indicated a greater footprint than indicated by their data submission, and this information was relayed back to the provider during the data review period.

Other verification measures included:

- Speed test – The NHBMPP program has posted a customized speed test on the project web site (iwantbroadbandnh.org). To date, over 5,200 have been submitted. We have processed those data to generate speed result summaries and the locations from which the tests were conducted. Through further analysis of the speed tests focusing on reported providers, the program will compare the service identified to the provider's reported coverage area to ensure there are not areas unreported, and/or areas where speed test results represent a significant deviation from the reported speed tier.

- Broadband survey – The NHBMPP website also hosts an online broadband survey, encouraging users to report their broadband access (or lack thereof) at the address level. The address submitted is then geocoded, which delivers a means of verifying provider coverage data at specific locations. (The survey is also linked to the speed test, so that users completing the form are asked to take the speed test as well.) To date, 501 surveys have been completed.

- Satellite dish survey – The NHBMPP has completed a drive-by inventory of satellite dishes in selected rural areas of the state, under the premise that a cluster of buildings with satellite broadband dishes signifies an area with no other broadband options available. This information has been utilized as part of the internal data review cycle.

- Cellular Drive Testing – The NHBMPP has recently completed a mobile wireless drive test to identify the areas of New Hampshire that are lacking mobile wireless data coverage. The 5 mobile wireless providers (AT&T, Sprint, T-Mobile, US Cellular, and Verizon Wireless) have provided the NHBMPP with polygon shapefiles of their coverage in an aggregate for the state. It is recognized through personal experience, community emails, and online surveys that these data overstate the actual service coverage. The drive test results will be used to review, verify and enhance the coverage information submitted by the providers in subsequent data submission rounds.

B. Community Anchor Institutions

The CAI data has been subjected to several rounds of verification during this and previous data submission cycles. An initial round of verification was completed in May, 2010 by re-interviewing a randomly selected subset of CAI contacts (20% of the entities within each of the 7 data categories). Subsequent verification rounds, including one conducted during July/August of 2011, were accomplished by generating a broadband profile sheet for each CAI, emailing that to each CAI contact for review, and modifying the CAI record based on any updates returned.

As of March, 2012, we created an interface for CAI contacts to review and modify their individual records via the NHBMPP website and we continued to leverage the use of these web technologies during the current reporting period. Additionally, the NH Department of Education's Director of Technology and the NH State Librarian were solicited to outreach and engage the schools and libraries in updating their broadband information. We continue to receive contact from these institutions.

Overall, the completeness of the data set improved over the previous submission in two specific areas:

- The percent of libraries with associated CAIIDs increased from 19% to 30%; and
- The data on public WiFi access improved, with the number of complete records increasing from 25% to 34%

New Jersey Broadband Mapping Project:

Methodology Report on Data Integration and Validation Procedures For October 2012 Submission

September 30, 2012

Grantee:
New Jersey Office of Information Technology
200/300 Riverview Plaza
PO Box 212
Trenton, NJ 08625

Contact:
Shelley Bates
shelley.bates@oit.state.nj.us
609-633-9605

Contractor:
Applied Communication Sciences
1 Applied Communication Sciences Drive
Piscataway, NJ 08854

Contact:
Clifford Behrens
cbehrens@appcomsci.com
732-699-2619

Data Processing: Collection, Reception, Loading, Validation

This document describes the process used by the New Jersey Office of Information Technology (OIT) and Applied Communication Sciences to collect, receive, load, validate and verify broadband availability and usage data submitted to us by wireless and wireline service providers, CAIs, and other sources and organizations for the State of New Jersey. Individual provider data reports attached hereto provide details on the processing of each provider's submission and explain how the policies presented in this document were applied to the data. The CAI summary report, also attached, provides details on the CAI data processing. This report also describes some of the complexities and challenges we have encountered to date in this project.

1 Structure of this Report

This methodology report consists of the following

- Section 2 summarizes our outreach efforts to collect data
  - This section also describes some of the challenges in determining what service providers are in and out of scope for this work and our approach to service provider categorization, in addition to summarizing our efforts to engage CAI constituencies
- Section 3 provides an overview of our process for Service Provider Data Reception
- Section 4 provides an overview of our process for Service Provider Data Loading
- Section 5 provides an overview of our process for Data Validation
  - This section includes a table of business rules and how they were implemented.
- Section 6 describes our handling of special cases, including verification procedure, validation warnings and handling of fixed wireless providers
- Appendix A: NJ Provider Data Reports
  - This appendix concatenates 32 files, one file for each provider whose data were included in the submission. Each report provides a narrative describing the steps involved in collecting, verifying, loading, and validating the provider data, including a log of the interactions with the provider.
- Appendix B: CAI Processing Report
  - This is a summary of the details of the CAI processing for this submission.
- Appendix C: Third Party Comparisons
  - This summarizes analysis of feedback received from NTIA/Michael Baker based on their comparison of NJ data submissions with third-party data, and responses from them to questions raised by our analysis.

2 Data Outreach

2.1 Provider Data Outreach

Applied Communication Sciences and OIT have conducted further outreach to identify additional potential providers not previously participating. We re-attempted to contact every company with an FRN active in the state of New Jersey. We conducted Internet searches and used information provided by wireless information service provider associations and neighboring states to try and identify potential new providers. When contacting these providers, we described the potential benefits of participation and included instructions on data requirements, including how to submit via our custom-designed Web site found at http://connectingnj.state.nj.us/.

Most providers who had participated in the past were willing to participate again, although some small providers, e.g., Advanza, expressed concerns about the burdens of the data collection process. Several, listed below, opted not to provide data updates in this round. One provider, New Edge/Earthlink opted out because of data accuracy concerns about their map data. The large national providers clearly have processes in place to collect and submit data, while the small local providers require greater assistance. Applied Communication Sciences offers assistance where possible, allowing providers to submit whatever data they have available in any convenient format. This increases the complexity of the data collection and processing operations, but enables greater coverage of providers. As examples, some smaller wireline providers simply submitted a list of addresses where they offer service and some small cable operators submitted the names of the municipalities they cover.

- In this round, we are submitting data from 34 providers. Of these, two (Tata Communications and Skycasters) are new providers. Also note that AT&T and Cablevision each provided data for two FRN's.
- We contacted more than 70 organizations that were potential service providers, via email, postings to their Web site and/or telephone calls, broken down as follows:
  - 29 facilities based providers who had contributed data previously;
  - 22 other organizations with FRNs associated with the state of New Jersey and hence potential service providers;
  - 6 service providers reported to offer wireless data services in NJ, including one (Jersey Shore Wireless/Duxpond Communications) that submitted data in the last round;
  - 18 additional potential providers we identified through our own market research and Internet searches.
  - Note that Sprint generously provided their data before we sent out requests and information about two other providers, Broadstar and Convergence Technologies, was gleaned from web searches.
- Of the 31 providers who contributed data in the previous round, we are submitting data from 30 of them:
  - We had 20 providers submit revised data for this round.
  - Six providers instructed us to use previously submitted data.
  - Four providers failed to respond to repeated contact attempts via email and phone, but had submitted data during the last round. We elected to submit the spring data for the following providers again:
    - Jersey Shore Wireless/Duxpond Communications
    - Level3
    - Netcarrier Telecommunications
    - Service Electric of Sparta
  - One provider indicated that they no longer wished to submit data:
    - New Edge/OneCommunications/EarthLink sent an email saying they did not believe the data they had was complete or accurate enough for submission;
- We contacted many other organizations who have FRNs associated with New Jersey to try and determine if they are providing service in the state. We contacted these organizations via several emails, telephone and/or through postings on their Web sites. In addition, we reached out through our regional sharing group consisting of local states (PA, VA, MD, WV, DE, etc.) and through PBWORKS to obtain contacts at organizations that other nearby states are using. Of these, we had direct interactions with only four, listed below.
  - Reallinx, Inc.: Provides consulting to potential commercial broadband customers
  - Sidera: Has no broadband customers in New Jersey.
  - World Discount Telecommunications: Uses Megapath or Covad to provision their broadband services in New Jersey.
  - Tata Communications and Skycasters: Provided data for this submission.
  - The following did not reply to any of our requests: Abry Partners, Broadcore, eVolve/Cinncinati Bell, Hickory Tech Corporation/Enventis Telecom, Hotwire Communication, Interglobe, Lightower, SmartChoice, Stage 2 Networks, T2 Technologies, Towerstream, Transbeam, Vocal IP Networks, VoicePulse, Windstream/Cavalier Telephone/Paetec, and Zayo.
  - Email was returned (or not successfully delivered) to the following: Line Systems/Magellen Hill, Reliance Global Communications/YIPES Holdings, and Telefonica Data Corporation.
  - We determined from web searches that Broadstar, a twenty-third organizaiton with an FRN, did not yet offer service in New Jersey.
- We contacted 8 companies identified as wireless information service providers in New Jersey.

    - Hughes Network Systems, ViaSat and Skycasters provided data.
    - StarBand instructed us to resubmit their data from the last round.
    - Jersey Shore Wireless/Duxpond Communications did not respond to our request, so we have resubmitted their data from the last round.
    - We received no response from three other providers: Natural Wireless, Reynwood Communications, and Yellowspeed.
    - In addition to those providers indentified in our last submission as either out of business or no longer in the wireless business we are adding Wave2Wave.
- We attempted to contact 18 additional organizations, not already identified in our April-12 methodology, that we subsequently discovered through our own ongoing market research and in Web searches as **potentially** offering broadband service in New Jersey, e.g., those who provided broadband services in neighboring states:
    - Frontier Communications replied that they do not offer BB services in New Jersey
    - Airespring, Bandwave Systems, BCN Telecom, Cooperative Communications, Copper.net, CTI Networks, Everest Broadband Networks, Link Technologies, Savvis, Tele-Data Solutions, TouchTone Communications, and VoicePulse did not respond to our requests.
    - The following were either unreachable or email was returned from their published addresses: 1800HIGHSPEED.com, Data Network Solutions, EmbraceCORTEL Technologies, and MetroPCS Wireless.
    - We determined from their website that Convergence Technologies does not deliver broadband service in New Jersey.
- We have previously identified the following organizations that do not serve New Jersey:
    - Five companies that are not in business at this time: FARIOUS.NET, Near You Networks, SeaWaves Technology, SuperNet WISP, and WEBNJ.net.
    - Four companies that are not service providers: American Telephone Company (sells equipment), MeTel Metropolitan Telecommunications (reseller), Reallinx (consulting group), and World Discount Telecommunications (reseller).
    - Four companies not providing service in New Jersey: Broadstar, Metrocast/Harron Communications, and Sidera (formerly RCN).
    - Three companies that provide service in New Jersey but cannot meet a 7-10 day service window: Atlantech Online, Azirband Communications Holdings, and Global Crossing North America.

2.2 Service Provider Classification

We have classified Service Providers into the four categories as follows:

Type 1 = Broadband
These are broadband providers that meet the NOFA definition of a facilities-based provider with a 7-10 service provision time frame.

Type 2 = Reseller
These are broadband providers who do not meet the NOFA definition of a facilities-based provider because they resell facilities that belong to another service provider.

Type 3= Other
These are broadband providers who are known not to be of Type 1 or Type 2. Typically this is either because they cannot meet the 7-10 day service provision time frame or because their service architecture is complex and is neither facilities-based nor a reseller.

Type 4 = N/A
We used this classification for providers who did not respond to our requests, because we did not have sufficient information to assign them to another class.

Since it is only Type 1 providers who are squarely in scope for this program, these are the only ones for whom we have ensured that the NDA, provider_ind and submit_ind columns in the service_provider_info spreadsheet are completed. Our rationale for this is the following -- we would not want to categorize a non-Type-1 organization as "will not provide data" or "non-responsive" under provider_ind, as this may appear pejorative.

In our ongoing efforts to reach out to the full set of broadband service providers in New Jersey, we work to identify potential providers and screen them to determine if they are providing or reselling broadband services in the state. We maintain a commented list of those organizations that we have determined not to be New Jersey broadband providers or resellers and of those organizations that remain under investigation. Some of these organizations are no longer active business concerns; some are no longer independent organizations, but have been acquired by other entities; some offer or resell broadband service in other locations but not in New Jersey; some are companies that provide engineering or consulting support around broadband, but do not provide or resell service; and some are firms for which further interaction is needed to definitely determine their situation. Service Providers

2.3 CAI Data Outreach

Applied Communication Sciences and OIT used a variety of means to collect Community Anchor institution data. We collected reference data with lists of CAIs of various types in the state and we collected broadband data from individual institutions via our website and from aggregated sources. For healthcare institutions we used as the reference list an enhanced list of hospitals, pharmacies and clinical laboratories that the NJ OIT obtained. For public K-12 schools, we obtained the results of the survey conducted by the New Jersey Department of Education to collect Internet access information from public K-12 schools. This survey had a high degree of participation from the schools and has resulted in significantly higher records in the category of public schools.

CAI Category	Reference Records	Broadband Records	Total Records Identified	Complete Records Created
School K-12 (Public) School K-12 (Private)	2686 (DOE) 1156 (NCES)	2428 (DOE) 796 (Web)	3762	2465
Libraries	461 (IMLS)	89	460	43
Medical/Healthcare	9265	5	8604	5
Public Safety	343 (NJ 911 Comm.)	120	337	76
University	160 (NCES IPEDS)	39 (NJEdge)	159	34
Other – State and Local Government		2007	1694	1694
Other – Non Government		8	8	8

For each CAI category, the following table provides the number of records we obtained from the reference source, the number of broadband access records we obtained, the total number of records we submitted to the NTIA and the number of complete records, with verified address information and broadband access information.

Abbreviations and Acronyms

911 Comm	New Jersey 9-1-1 Commission
IMLS	Institute of Museum and Library Services
IPEDS	Integrated Postsecondary Education Data System
NCES	National Center for Education Statistics
NJHA	New Jersey Hospital Association
NJ-DHHS	New Jersey Department of Health and Human Services

New Jersey has a strong tradition of home rule and, like many eastern states, a plethora of small governance entities – towns, townships, boroughs, cities, and other local municipalities. Among the major challenges we face in collecting broadband CAI data in the state are the dearth of strong, state-level organizations that might compel members to provide data (as opposed to comparatively weaker coordinating bodies) and the lack of existing broadband data sources. NJEdge's data on the higher education institutions to which they provide service is one of the very few such resources in the state.

NJ OIT executives worked through state-level contacts in public safety, education and libraries, etc., to encourage their constituencies to participate and submit data through the website. While some groups were more responsive than others, many have expressed concerns about placing additional burdens in a time of shrinking budgets and cutbacks. We did not receive any additional data from the website in this round.

We encountered a few issues with collection, interpretation and processing of CAI data:

- Some institutions provide information on multiple connections to the internet, each with its own technology of transmission and maximum speeds. These may represent separate redundant connections for a large institution that provides critical services or separate facilities for different classes of users (e.g., staff and clients). Our policy thus far has been to submit a single entry for each institution, but this policy may be a candidate for refinement.
- Satellite institutions such as branch libraries or campus outreach centers can complicate the CAI picture. Our policy is to attempt to collect data for each separate geographic location as a separate CAI.
- Sometimes multiple government offices are co-located in one geographic location; e.g., a large building or complex that may include county government offices, court, jail, and/or other government offices. Here the challenge is avoid incorrectly overstating broadband capability or understating the need for broadband services.
- It remains challenging to convince busy employees at CAIs to take the time to provide this data.
- The CAI transfer model requires a street number and for some CAIs this is not readily available as institutions may use a cross street for directions, a PO box for paper mail, etc.

3 Service Provider Data Reception

Applied Communication Sciences defined a process for handling provider data upon receipt. The following steps describe that process:

These steps must be performed upon receipt of provider data. These steps set up the file system and database for later processing, including both the initial assessment and load, and protect the confidentiality of the information.

1. Update the provider interaction log spreadsheet with the date of receipt and other metadata.

2. Copy the email or decrypt the uploaded files to individual directory on dedicated and secure server.
3. Test that the files can be opened, read, etc. This may require using ESRI ArcCatalog to check a shapefile or file geodatabase.
4. Send an acknowledgement to the provider of receipt of readable submission, or request re-send as needed.
5. Create empty provider data report into the new folder, using the appropriate wireless or wireline template**.**
6. Connect to the PostgreSQL database and instantiate a schema for the provider
7. Perform an evaluation on the submitted data, evaluating the completeness of the submission and the validity and reasonableness of the included values. In addition, run the NTIA validations against the submitted data to determine if there are any errors or warnings. Interact with provider to address any questions or issues.

4 Service Provider Data Loading

The provider data submissions vary in form, format and content and in the ease versus complexity of the processing and loading tasks.

In general, the most straightforward data to process are shape files submitted by wireless providers. Wireline providers who submit census block data are a step up in terms of complexity. Some cable providers simply list the municipalities which they serve. A number of smaller providers submit a list of addresses corresponding to locations where they provide service. These are much more challenging to process as we must first manipulate the address information and then geo-code the locations; these operations can be time consuming and subject to inaccuracies.

The service provider reports attached in Appendix A give the full details per provider on all steps taken to extract, transform, and load the contents of the provider tables into the NTIA tables. Note that every NTIA table has a "shape" column where a geographic feature such as a point, line (e.g., road segment) or area (e.g., census block) must be submitted.

Here is a summary of some of our key policies and challenges:

- All non-disclosure agreements executed with providers prohibit us from disclosing customer addresses. Although some providers have not executed NDAs, we have chosen to treat all providers similarly. We have chosen to obfuscate the address data by transforming it to census blocks or street segments. This carries a slight risk of overstating coverage, but that seems more appropriate than simply dropping the data because it is sensitive. In addition we had one provider who sent us proprietary subscriber-weighted nominal speed data. Given the proprietary restrictions associated with these data, we did not include them in the submission.
- Speeds associated with address data from some providers represent the price plan chosen by the customer; they are definitely neither the max advertised speed nor the typical speed. Our decision was to keep the maximum speeds encountered in the census block and report them in the maximum advertised fields and to report typical as null.
- Maximum advertised speed, combined with the 7-10 day availability requirement, results in vagaries in interpretation. In particular, the concept of advertised speed is well suited for providers who offer services to extended areas, such as large telephone and cable television companies. Its application is less clear for providers who offer service to defined set of specific addresses. They deliver services to those specific addresses, and could offer the same service to a new tenant within the time limit. In some cases, they could increase the speed within that time period as well. They could not easily deliver service to any neighboring location with a two-week period. We have operationalized the notion of maximum advertised speed by determining the maximum speed a provider could offer on the facilities they have in place at customer locations, then reporting that speed for census blocks or street segments.
- After initial poor results in geo-coding the customer address lists provided by some cable providers who had no geo-spatial capabilities, we identified an alternate approach that leveraged the franchise-nature of

cable television service in the state. We asked those cable TV providers to send us the list of municipalities that they are licensed to serve. We build the submission by locating the municipality shapes and using those shapes to find all census blocks contained within them. For large census blocks, we report all the TigerLine street segments that are contained within those blocks.

- For middle mile data, the exact definition of a connection point remains open to interpretation and requires further development. We are not completely sure that all providers interpret middle mile in the same fashion and do not have a clear enough picture ourselves to provide appropriate guidance or validation. Despite this, we have submitted the middle mile information that we received.
- All but one provider submitted 2010 Census Blocks (CBs). On satellite provider submitted data using 2000 CBs. Given that we had to convert this to a single shape, rather than map to Y2010 census blocks, this was not an issue.

5 Validation and Verification Operations

5.1 Custom Data Verification and Validation

Incoming data was subjected to a number of validation checks. When incoming data failed a validation check, we first investigated our process to ensure that we were not inadvertently creating an issue. If the problem was determined to be with the submitted data, we notified the provider concerned and recorded the interaction in the provider data report as provided in Appendix A.

We have observed a few issues that arose when processing the current submission:

- New Jersey placenames can be difficult. We validate against data from the following sources: State of New Jersey geographic information (https://njgin.state.nj.us/NJ_NJGINExplorer/DataDownloads.jsp), the Federal Government placename information (http://geonames.usgs.gov/domestic/download_data.htm), and the US Postal Service data (available for a fee).
- A survey of 3100 New Jersey households was conducted in November and December by Rutgers University as Applied Communication Sciences's subcontractor under this program. Householders who responded that they were broadband users were asked who their service provider was and this was compared against service provider serving areas. 95% of the responses aligned with service provider information. In the remaining 63 cases, the survey respondents reported being served by a provider whose coverage area did not appear to cover that location. Through these cases we have identified an area for additional investigation which may lead to improvements in service provider coverage. The technique, based on geo-spatial analysis of neighboring CBs is briefly described in Section 6.2.
- T-Mobile submitted wireless coverage data that provided one of the more interesting validation issues. T-Mobile provided separate information about three different varieties of 3GPP-based wireless technology, each of which supports broadband data services through mobile terrestrial wireless service capability; namely: UMTS, HSPA21 (i.e., HSPA) and HSPA42 (i.e., HSPA+)[1]. In order to avoid duplicates – that is, rows of T-Mobile data with identical shapes and the same technology and spectrum codes, differing only in maximum speed, we performed spatial joins separately for each of UMTS, HSPA21 and HSPA42. We then submitted one shape for each technology.
- The End_User_Category for Census Blocks or Road Segments is an optional field for designating the geography as being primarily Residential, Non-Residential, or Other (primarily neither Residential nor Non-Residential). We have elected not to complete this field as we do not have a trusted data source for this information.

---

[1] Here are a few more technical details. UMTS is based upon 3GPP release 99 and is the oldest and slowest of the three varieties. HSPA (HSPA21) is 3GPP R6 which supports HSDPA and HSDPU for downlink and uplink high-speed packet access and offers intermediate speeds. HSPA+ (HSPA42) is 3GPP R7. It is the most advanced of the three and supports high-speed packet access evolution with peak data rate increases from MIMO and higher-order modulation, among other technical advances.

We applied the business rules in the script supplied by the NTIA and other data-specific validations after the data were loaded into the tables. These were applied as a check on both the data supplied by the providers and on the process we used for data collections, reception and loading. Moreover, other business rules were applied above and beyond those in the NTIA script, as described below.

We checked uniqueness of the entries in each table, using the following definitions of uniqueness:

Layer	Unique key	Notes
Middle Mile	frn, latitude, longitude	
CAI	anchorname, address	
Census Block	frn, fullfipsid, transtech	
Street Segment	frn, tlid, transtech	Tlid is an internal column.
Wireless	frn,transtech, spectrum, maxadup, maxaddown	

We also performed the following additional validations:

Layer	Validation Rules
Middle Mile	• Check (dbaname, provname, frn) against our FRN reference table • Valid census block id within the state of New Jersey • Check latitude not between 38.7 and 41.4 • Check longitude not between -75.6 and -73.8 • Shape should not be empty • All check_submission rules
CAI	• Valid zip code • Check latitude not between 38.7 and 41.4 • Check longitude not between -75.6 and -73.8 • SubScrbDown is less than SubSrbUP • CAIID is null for schools and libraries • Mismatch of transtech with SubScrbDown and SubSrbUP • Shape should not be empty • All check_submission rules
Census Block	• Check (dbaname, provname, frn) against our FRN reference table • Valid census block id within the state of New Jersey • The area of a census block should be less than < 2 square Mile • Shape should not be empty • All check_submission rule
Street Segment	• Check (dbaname, provname, frn) against our FRN reference table • Street segment is present in a census block >= 2 square miles • Shape should not be empty • All check_submission rule

Wireless	• Check (dbaname, provname, frn) against our FRN reference table • Shape should not be empty • All check_submission_rule

5.2 Verification through Gap Analysis of Neighboring Census Blocks

We have continued to assess coverages in the latest data using gap analysis, as first described in our last submission. The analysis of the survey data identified some instances where a survey respondent identified their service provider and then the service provider's data did not show coverage in that respondent's Census Block. Further analysis indicated that a number of these instances occurred in 'gaps' or 'holes' in submitted provider coverage data. One way to define a simple hole is that it is a single CB that is not in the stated provider coverage area when all neighboring CBs are in the stated coverage area. Our investigations of these simple holes showed that some are associated with zero-population CBs – e.g., a CB that comprises a strip of land neighboring a major roadway. Other simple holes, however, appear to be anomalies in service provider data as we find examples of a residential CB, surrounded by other residential CBs, and no clear rationale to explain why the initial (middle) CB would not have coverage when all neighboring CBs do have coverage.

The next figure shows a few simple holes in Comcast data from Cranbury Township at a fine resolution.

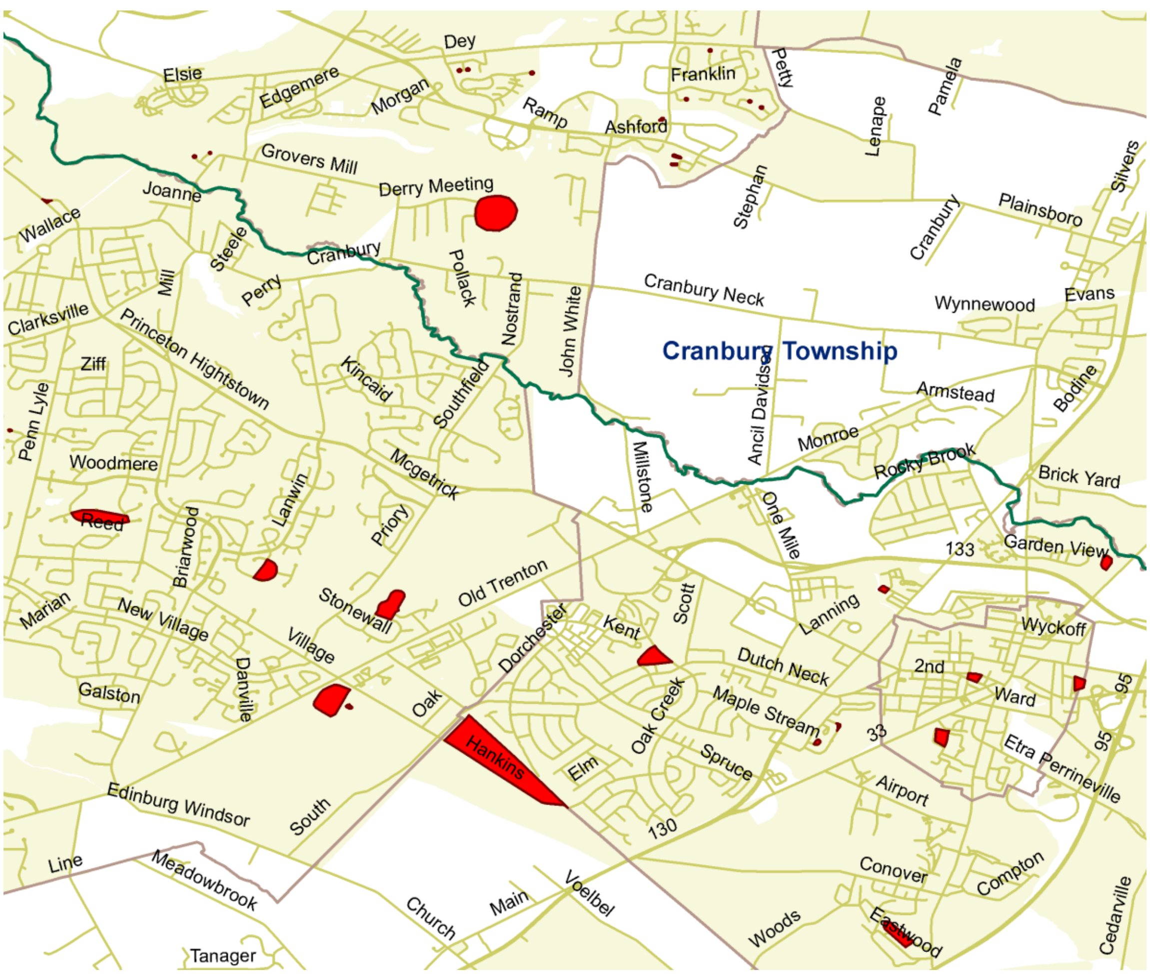


Figure 1: Detailed view of "Doughnut Holes" in coverage

Our analysis of the simple holes shows that some are anomalies that may provide a way to improve the accuracy of provider data. To pursue such possible improvements, we developed software that automates the identification of simple holes. Somewhat to our surprise, when we ran this software on the data for this submission, we found rather sizeable numbers of holes for some of the providers. For example, we identified almost 250 simple holes for Cablevision (including Lightpath) and over 1400 for Comcast. The following graphic illustrates the simple holes for Comcast.

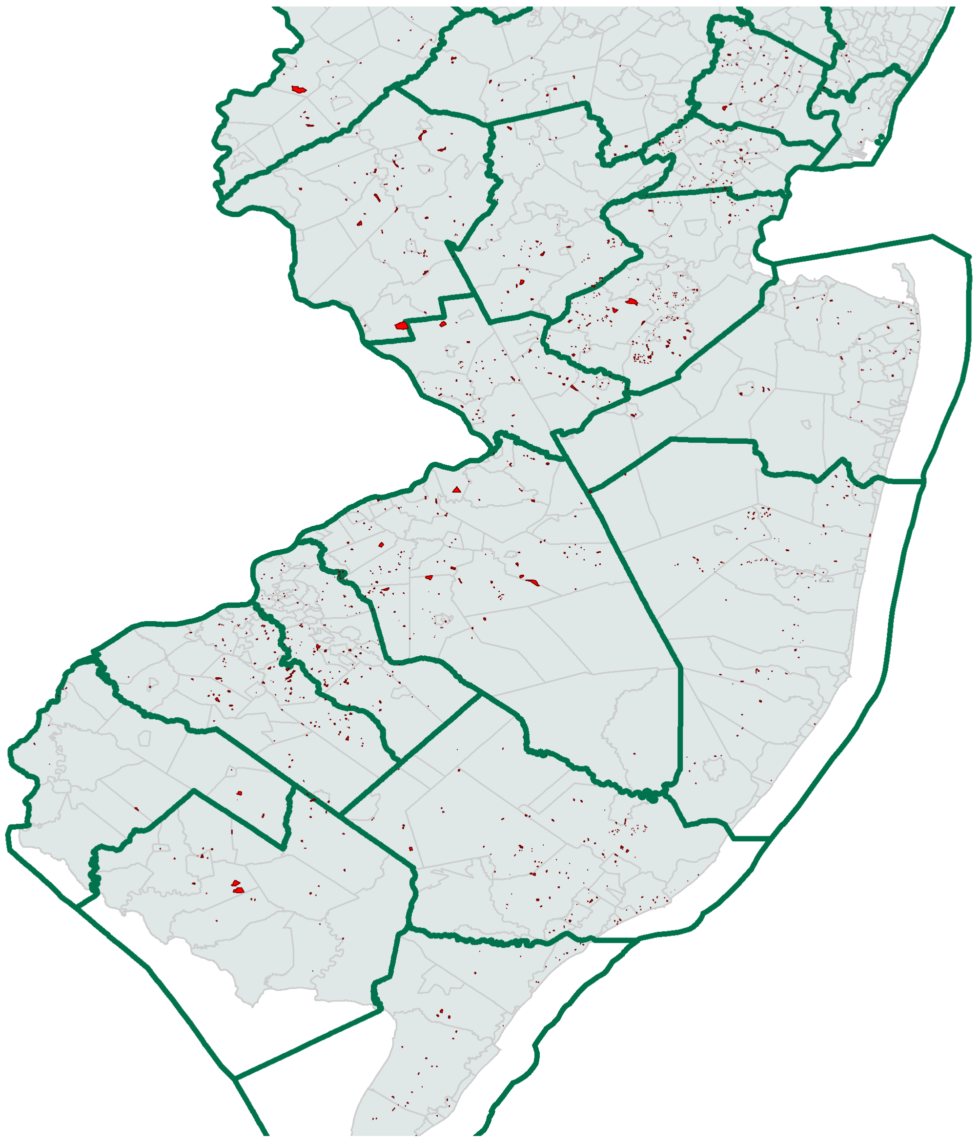


Figure 2: Graphic of Holes in Comcast Data:

For the providers where we identified such holes in the data they submitted for the Fall 2011 round, we generated a complete listing of the holes and a document containing a description of the process of identifying the holes and a detailed analysis of a few sample holes that appear in the provider's coverage. This information was sent to the providers along with the request for revised data for this round.

In the course developing the tools for this analysis, we noticed that Verizon has made changes in their process for generating submitted data, because while such holes had been present in the data they submitted previously, their current data has no such holes.

5.3 Fixed Wireless Processing

NTIA had questioned us about the coverage areas associated with two providers who offer fixed-wireless service in New Jersey. In one case, the provider, Global Online Electronic Services, uses fixed wireless links as a substitute for wireline connections and serves a single location with each link. We therefore generated a "coverage area" by using the census block that contains the address. This is clearly not the result of propagation model analysis, but due to the nature of the service they provide accurately reflects their capabilities.

We also receive information from a new fixed wireless provider, Jersey Shore Wireless. They provided us with image files (e.g., jpegs) with coverage maps that had been hand-drawn based on a drive-test they had conducted in 2008. Given the source of the information, the shapes tend to align with major roadways. Jersey Shore Wireless did not have the resources available for propagation modeling and we did not have sufficient time to assist them in performing this task. For this round, we manually converted their images into shape files. It was clear that these shapes would understate, rather than overstate coverage, and thus it seemed reasonable to include them.

5.4 Process Verification

We instituted a thorough review of our process steps. The review involved investigation of each process step by an individual other than the person who had created the process or executed it in the past. As a result of this process, we were able to implement several process improvements. The corrections and improvements include:

- For CenturyLink, altered Census Block process to allow provider's speed values, with validation-related adjustments, rather than setting all values the same.
- For Hometown Online, adjusted Census Block process to account for the fact that provider reported different transtech and speed values in one census tract.
- For Service Electric – Sparta, set middle mile capacity and type values, which had inadvertently been left null in the previous submission. Adjusted technology and speed values to reflect DOCSIS 3.0.
- For ViaSat, corrected spectrum value to reflect that they offer satellite service.
- For Verizon, corrected the ownership value of the middle mile locations, which had been inadvertently left as null in previous rounds.
- For Xchange Telecom, set provider type to "reseller", based on interaction with provider that indicated that they lease facilities from Verizon.
- Revised CAI processing rules to insert "NA" for building number when no value was available.
- Made multiple improvements to CAI address processing to enhance the automated address extraction and mapping to reference data.

5.5 Validation Warnings

We received warning messages from the NTIA data validation tool when processing submission data from several providers. The details of these warnings and our reaction to them are included in the individual provider reports later in this document. Here we provide a convenient summary of those warnings that are still present in the submitted data.

5.5.1 Provider Warnings

The following table describes the warnings we received from the validation script and provides our explanations for submitting these values.

Provider	Warning
AT&T	We received a warning on the wireless shape record for the combination of downstream speed code of 7 (10-25 Mbps) with a transtech code of 80 (Mobile Wireless) for the LTE service. The maximum advertised speed tier provided in the cover letter that came with the provider's submission is 7. Provider confirmed that the value is correct.
Century Link	We received warnings on 7083 census blocks and 1690 street segments for the combination of a downstream speed code of 7 (10-25 Mbps) with a transtech code of 10 (ADSL). The provider had originally reported speeds exceeding 25 Mbps, or a speed code of 8. When we questioned these, the provider could not confirm those values, but asserted that all areas were covered with speeds exceeding 10 Mbps.
Covad	We received warnings on 9681 census blocks for the combination of a downstream speed code of 7 (10-25 Mbps) with a transtech code of 10 (ADSL). Note that the provider confirmed that they support 15 Mbps with their ADSL2+ service in limited regions in the state.
Global Online	We received warnings on the wireless shape record for the combination of upstream and downstream speed codes of 7 (10-25 Mbps) with a transtech code of 70 (Fixed Wireless - Unlicensed). The provider has only a single fixed wireless site, and it is used for point-to-point links, rather than to provide a coverage area. The provider confirmed that the speed is 10 Mbps.
Service Electric Broadband Cable	We received warnings on 5265 census blocks and 985 street segments for the combination of a downstream speed code of 8 (25-50 Mbps) with a transtech code of 40 (DOCSIS 3.1). The provider was not willing to commit that they offered anything faster. A search of their Web site confirmed that the fastest speed they advertise is 35 Mbps down and 3 Mbps up.
Skycasters	We received a warning on the wireless shape record for the combination of downstream speed code of 6 (6-10 Mbps) with a transtech code of 60 (Satellite). A search of their Web site confirmed that the fastest speed they advertise is 6.09 Mbps down and 1.5 Mbps up.
T-Mobile	We received a warning on the wireless shape record for the combination of downstream speed code of 7 (10-25 Mbps) with a transtech code of 80 (Mobile Wireless). Investigation of the T-Mobile Web site showed that they are advertising average speeds "approaching 10 Mbps" and peak speeds of 27 Mbps. Sent a note to the provider to verify the value. Provider confirmed that those values are correct.
Verizon Wireless	We received a warning on the wireless shape record for the combination of downstream speed code of 7 (10-25 Mbps) with a transtech code of 80 (Mobile Wireless). The maximum advertised speeds provided in the cover letter that came with the provider's submission are 600 - 9.99 mbps down and 3.00 - 5.99 mbps up. The typical speeds are provided as ranges: 5 - 12 Mbps down and 2 - 5 Mbps up. For max adv speeds we had originally encoded the submitted down speed as value 6 (range 6-10Mbps) and encoded the submitted up speed as value 5 (range 3-6mbps). Based on the email from Anne Neville data 2/21/2012, we modified the down speed to code 7.
ViaSat	We received a warning on the wireless shape record for the combination of downstream and

	upstream speed code of 7 (10-25 Mbps) with a transtech code of 60 (Satellite). Provider said that in most locations, speeds are significantly in excess of the speeds set forth in the NTIA Tiers for "Satellite Technology" so they are reporting the actual maximum advertised upload and download speeds. Provider confirmed that they launched two new services named Exede 5 and Exede 12 and Exede 12 has a maximum advertised upload speed of 3 Mbps and a maximum advertised download speed of 12 Mbps.
Warwick Online	We received warnings on 404 census blocks for the combination of a downstream speed code of 7 (10-25 Mbps) with a transtech code of 10 (ADSL). We searched the provider's Web site for speed information. We only found one reference to speed packages, and these values and the Web page seemed out of date. We sent a request for clarification to the provider. The provider acknowledged the validation requirements, indicated that the Web page found by our search was in error and confirmed the submitted speed values. The president of the company also indicated that they would be launching a new Web site with corrected speed information in the near future.
Xchange Telecom	We received warnings on 1012 census blocks for the combination of a downstream speed code of 7 (10-25 Mbps) with a transtech code of 10 (ADSL). Note that the provider confirmed, and we validated via their Web site that they advertise, 10 Mbps, which is just at the bottom of the range for code 7.

5.5.2 CAI Warnings

The validation script produced 10718 warnings on our CAI data for 10695 null values of transtech and 23 zero values of transtech. This is a result of our decision to include all the CAIs that we could reliably identify and geo-locate, even if we have not been able to ascertain the broadband usage at the site as yet. The 23 records with zero for transtech are a result of two forms of data submission. 16 of these records were a result of submissions to our website where the CAIs selected it to signify a technology other than the NTIA defined ones. These are accompanied by valid speed tiers. The remaining 7 were from records where the technology, downstream speed and upstream speed were all zero. We are in the process of ascertaining if this indicates that there is no broadband connection or if it is unknown.

This full list provides us with a target for our outreach efforts to these institutions. The set of "complete records", which include full broadband access information, is a key metric we are using to track progress in obtaining information about the broadband access. The counts of these records by category are included in the table above and in the CAI data processing section in Appendix B.

5.6 Analysis of FCC Third Party Data Comparisons

For this submission the NJ BB Mapping Team benefited from having received feedback from NTIA/Michael Baker with results of comparisons they made between the data we had submitted in June-11 and Dec-11 and their third-party data. After a careful analysis of these results (provided in Appendix C) we determined that most of the discrepancies reported back to us could be attributed to data submitted by the following six providers: Comcast, DIECA/COVAD/Megapath, Sprint, T-Mobile, Verizon Online, and Verizon Wireless/Cellco. It is important to note that the NJ BB Mapping Team was not given copies of the third-party data, so the reasons for mismatches between the data we submitted and these third-party data were not clear. Our intent was two-fold: (1) to try and understand the scope of possible reasons underlying the discrepancies and (2) share with providers problematic fields, such as provider name or speed tier, which seemed to generate a lot of mismatches, and do some further inquiry to better validate the provider's data. Obviously, by working more closely with providers in this way, we hope to continue to improve data quality in future submissions. The table below summarizes the apparent source of discrepancies and the provider's explanation, for those who responded.

Provider	Probable Source of Discrepancy	Provider Explanation
Comcast	• Most mismatches on max advertised downstream speed (principally tier 10) and maximum advertised upstream speed (principally tier 7) for Cable Modem DOCSIS 3.0.	I believe this issue is one that we have encountered in other states, and results from the method by which we submit data. We provide maximum advertised speed data by MSA, but not all Census blocks within an MSA may offer D3 service--in which case, a D2 Census block may reflect a maximum advertised speed coded as "10." Similarly, but less frequently, Comcast may be in the process of upgrading service to D3 but has not yet initiated advertising for D3 speeds in that area--in which case, a D3 Census block may reflect a maximum advertised speed coded as "7." Accordingly, if a D2 Census block is in a MSA in which the overwhelming majority of Census blocks are coded as a "10," those D2 blocks should be coded as a "7." If a D3 Census block is in an MSA coded as a "7," that is likely due to the fact that Comcast has not begun advertising the D3 speeds in that MSA. I believe in our last submission, Comcast showed 100% D3 blocks throughout the state of New Jersey and a maximum advertised download speed of "10." I am waiting for this cycle's data to confirm that this remains the case. Comcast provides D3 throughout New Jersey, so there should be no disconnect between the Census block data and maximum advertised speeds.
DIECA/COVAD/Megapath	• Many provider name mismatches. Might this be attributed to recent M&A activities? • On records where provider name matches third-party data, large number of transfer technology mismatches, primarily involving transtech code 20 (SDSL) and code 30 (Other Copper Wireline). • Most mismatches on max advertised downstream speed involve tiers 5 & 7. • Most mismatches on max advertised upstream speed involve tiers 3, 5 & 7.	More than half of our lines in each state are supplied via ISP resellers, where we provide the underlying internet connectivity in a wholesale capacity for service that is otherwise branded, billed and supported as the ISP's own service. For over 90 of our resellers, we perform a layer 2 network handoff, such that the reseller's IP address space is what would be visible via the internet as well. This makes it impossible for a third party data collector to know these are being served by our last mile infrastructure without detailed cooperation from each ISP. Of course, if supplied a few example instances of these purported mismatches, we could readily provide an exact analysis. Our branding does not necessarily make it clear what underlying technologies are being used to provide service, so it is likely that a third party data collector has made incorrect assumptions in some situations. For example, we offer "TeleSpeed" and "Ethernet" branded services that may be utilizing symmetric DSL or other copper wireline technology. In a few cases, we also have legacy residential "TeleSurfer" services

		that may be utilizing symmetric or asymmetric DSL technology. Again, if we could be supplied a few examples, we could readily provide a exact analysis. In the case where a third party data provider may have found faster than reported speed, this may be due to the filing requirement that we report only services that can be installed within a typical service interval. From time to time, we also change our network deployment which could result in an increase or decrease in maximum available speed. Also, in our own direct business, we did not always sell our maximum provisionable speed, even though we made these offerings available to our resellers. We will be happy to provide more precise explanation if given actual examples.
Sprint	• Most mismatches on max advertised downstream speed tier 3. Possibility that tier 3 understates downstream speed? • Most mismatches on max advertised upstream speed for tier 2. Possibly understating upstream speed?	No explanation offered
T-Mobile	• Most mismatches on max advertised downstream speed tiers 4 & 6. Possibly understated downstream speed in lowest tiers? • Most mismatches in max advertised upstream speed for tier 2. Possibly understating your upstream speed?	No explanation offered
Verizon Online	• Most mismatches on max advertised downstream speed involve tiers 4, 5 & 6 for ADSL. • Most mismatches on max advertised upstream speed involve tiers 2 (ADSL) & 7 (Optical Fiber). • Mismatches have to do with the way provider identifies ADSL speed tiers?	No explanation offered
Verizon Wireless/Cellco	• Most mismatches on max advertised downstream speed tiers 3 & 7. Possibility 3 understates downstream speed and 7 overstates it? • - Most mismatches in max advertised upstream speed is for tier 2. Possibly understating upstream speed?	No explanation offered

The complete set of email exchanges with these providers regarding these analyses is included in their respective data reports (see Appendix A). A set of six questions related to this analysis of discrepancies between NJ and third-party data was also transmitted to the NTIA/Michael Baker team and discussed in a teleconference call involving members of this team and the NJ Broadband Mapping Team. These questions, along with answers provided by the NTIA/Michael Baker participants, are provided in Appendix C.

6 Appendix A: Individual Provider Process Descriptions

6.1 Advanza

Connecting New Jersey - Broadband Provider Data Report

Provider: Advanza
Received: August 2011
Submission date: October 2012

This report presents details on processing of broadband data for delivery to the National Telecommunications and Information Administration.

For October 2012:

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Section 1: NDA Status

Advanza states that NONE is required.

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA – RECEIVED AUGUST, 2010</th></tr>
<tr><td rowspan="5">ID</td><td>Provider name</td><td>Advanza Telecom Inc</td></tr>
<tr><td>“Doing business as” name</td><td>Advanza</td></tr>
<tr><td>FRN</td><td>0017029141</td></tr>
<tr><td>Holding Company Name</td><td>Advanza Telecom, Inc.</td></tr>
<tr><td>Holding Company Number</td><td>180002</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">1 xlsx spreadsheet</td></tr>
<tr><td>File size</td><td colspan="2">NJBB_0017029141_AddressLevelAvailability-20110630.xls file has 47 records</td></tr>
<tr><td>Speeds</td><td><table><tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr><tr><td>Typical-upstream</td><td>X</td><td>address</td></tr></table></td><td>All provided speeds have code 4 (1.5 mbps ≤ BW < 3.0 mbps) for all records, which would make sense if all service is T1</td></tr>
</table>

	Typical-downstream	X	address	
	Advertised-upstream	X	address	
	Advertised-downstream	X	address	
	Subscriber-weighted-up	☐	Not provided	
	Subscriber-weighted-down	☐	Not provided	
Technology Type	Code 30 (= Other Copper Wireline) given for all records			
End-user specification	Values 2, 3 or 4 (Government, Small Business or Enterprises).			
Comments: Data was submitted for Fall 2011 submission. Provider did not respond to requests for revised data. Confirmed via Web site that they offer these services (T1 and NxT1). Web site lists possibility of higher speeds as well. Based on this information, it was determined that the data is likely still accurate and decision was made to re-use prior data.				

INTERCONNECTION DATA – NO DATA PROVIDED	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments:	

Section 3: Submission File Details

Received one file by secure upload to the connectingnj web site.

Size **Name**

71,168 NJBB_0017029141_AddressLevelAvailability-20110630.xls

The addresses in this file appear to be for individual customers (as opposed to addresses of multi-tenant buildings in a central business district).

Section 4: Data Validation,Transformation and Loading

The standard NDA prohibits us from submitting address-level data to the NTIA. Instead, we discover the census block for each customer address, and then report the census block shape drawn from Census Bureau TigerLine reference data.

NTIA Table BB_Service_CensusBlock

Loaded from the file mentioned above. The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	Set to " Advanza Telecom Inc" (no trailing period)
DBANAME	Not supplied; set same as PROVNAME
PROVIDER_TYPE	Set to 1
FRN	Set to "0017029141"
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	As supplied in column Tehcnology of Transmission (sic)
MAXADDOWN	As supplied in column Maximum Advertised Downstream Speed
MAXADUP	As supplied in column Maximum Advertised Upstream Speed
TYPICDOWN	Set to null (see below)
TYPICUP	Set to null (see below)
ENDUSERCAT	Set to null (see below)
SHAPE	Copied from Census Bureau TigerLine 2010, as matched by spatial join on geocoded address

Internal processing notes.

1. Following steps were performed for Fall 2011 submission
    a. Geocoded the addresses using an Arroyo flow and the Yahoo geocoder, leaving the result with address and lat, long data in an Excel spreadsheet. All addresses were successfully geo-coded.
    b. Imported the spreadsheet to a simple ESRI geodatabase table
    c. Added point shapes corresponding to each Latitude,Longitude pair by creating a feature

class from the table using ArcCatalog's "Create Feature Class from XY Table" option

d. Added a column containing the ID of the containing year 2010 census block using ArcCatalog's spatial join feature. The newly created point shapes are joined against census block shapes from reference data. All records successfully spatially joined on 2010 NJ Census Block shapes.
e. Discarded typical speeds since they were in all cases identical to maximum advertised speeds, not measured values.
f. The end user category value as originally supplied applied to an address, but we must anonymize the addresses and report census blocks. The NTIA directs us to report the "predominant" end-user category, which is not supplied here.
g. Copied contents to the target data model table with the transformations specified above. Discarded 15 rows with duplicate census blocks.

2. Copied prior data into new BB_Service_CensusBlock table.
3. All data passed NTIA validations.

Section 5: Clarification Questions and Responses

Subject: URGENT: Response Requested: Get your Broadband Services on the National Broadband Map
Date: Fri, 17 Aug 2012 14:34:18 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: TomG@advanza.net

Tom,

Will Advanza Telecom be submitting map data updates in this round? Time is running out. If you require assistance, please contact us so we can include your service area in the latest National Broadband Map: connectingNJ@groups.appcomsci.com or 732-699-2380.

Regards,

Cliff Behrens

Subject: Re: URGENT: Response Requested: Get your Broadband Services on the National Broadband Map
Date: Fri, 17 Aug 2012 14:40:38 -0400
From: Tom Garrison <tomg@advanzasystems.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>, TomG@advanza.net

Hi,

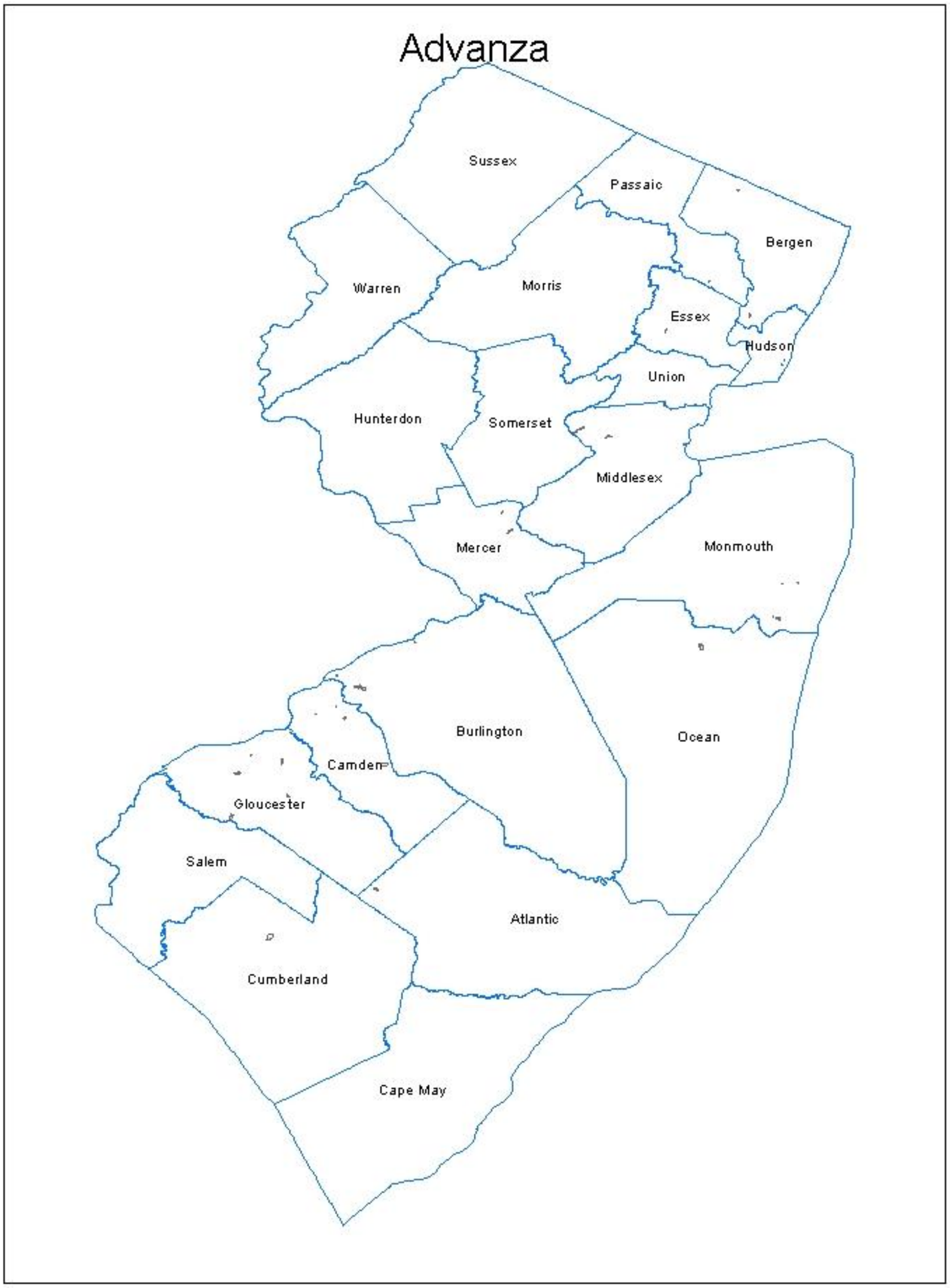
If it's not absolutely required I would prefer not to. We're a small company with less than 100 circuits in service and I really don't have time to gather the data.

Thank You.

Tom

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.2 AT&T Mobility

Connecting New Jersey - Broadband Provider Data Report

Provider: AT&T Mobility LLC
Received: August 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NDA was executed with NJ OIT.

Section 2: Submission Overview

AVAILABILITY DATA		
ID	Provider name	AT&T Mobility LLC
	"Doing business as" name	AT&T Mobility LLC
	FRN	0004979233 for mobility NB: "AT&T Corporation, Inc." with FRN 0004979244 for middle mile
FOR WIRELESS		
Filetypes	shapefile collection: shp/dbf/prj/shx, mdb, gdb, imagefile etc.	Spreadsheet (XLSX) and shapefile that uses projection GCS_WGS_1984
Speeds	Type	Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)
	Upstream max adv	State
	Downstream max adv	State
	Upstream typical	Not provided
	Downstream typical	Not provided
	Subscriber-weighted	Not provided
Technology	Spectrum (Mhz, FCC code)	Cellular (code 1) and PCS (code 3)

Type		
Comments:		

INTERCONNECTION DATA	
ID	
File size	Single row
Ownership	Code 0
Transport Type	Code 1
Data Rates/Capacity	Code 6
Location	Newark, NJ
Comments: Single location provided	

Data overview:

Figure 1. Quick load of data into ArcMap

Section 3: Submission File Details

Received files by SECURE UPLOAD:

Name	Size
ATT Router Locations NJ June 2012.xlsx	8 KB
ATT_LTE_July2012_NJ.DBF	12 KB
ATT_LTE_July2012_NJ.PRJ	1 KB
ATT_LTE_July2012_NJ.shp	175 KB
ATT_LTE_July2012_NJ.SHX	1 KB
Mobility Response Template June 2012 Ne...	9 KB
NJ_ATT_3G_July2012.DBF	1 KB
NJ_ATT_3G_July2012.PRJ	1 KB
NJ_ATT_3G_July2012.shp	161 KB
NJ_ATT_3G_July2012.SHX	1 KB
NJ_ATT_4G_July2012.DBF	1 KB
NJ_ATT_4G_July2012.PRJ	1 KB
NJ_ATT_4G_July2012.shp	112 KB
NJ_ATT_4G_July2012.SHX	1 KB

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

Loaded from supplied Excel Spreadsheet "ATT Router Locations NJ June 2012.xlsx" (1 row). Since data is identical to that included in previous submission, we copied the previous data.

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	As supplied
DBANAME	As supplied
FRN	Added leading zeroes to read 0004496774 (see below)
OWNERSHIP	As provided in column "Ownership"
BHCAPACITY	As provided in column "Serving Facility Capacity"
BHTYPE	As provided in column "Serving Facility Type"
LATITUDE	As provided in column "Latitude_geo"
LONGITUDE	As provided in column "Longitude_geo"

ELEVFEET	Set to "0" (zero)
STATEABBR	Set to "NJ"
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Created using ESRI ArcDesktop

Internal notes on processing:

1. Used the provider name, DBA name, and FRN as supplied, after adding back leading zeros to the FRN. Note that the middle-mile entity is different than the mobility entity and per clarification from AT&T during the October 2010 submission round, should indeed be reported differently.
2. Imported the excel sheet to a geo-database table.
3. Added point for the Latitude, Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
4. Mapped to separate shape file to correct tolerance.
5. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data.

NTIA Table BB_Service_Wireless

Different from the last submission where only one shape file, UMTS, is submitted, there are 3 shape files submitted this time: ATT_LTE_July2012_NJ with 47 records, NJ_ATT_3G_July2012 with 25 records, and NJ_ATT_4G_July2012 with 9 records.

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "AT&T Mobility LLC"
DBANAME	As supplied in file Mobility Response NJ June 2011.xlsx
FRN	Set to 0004979233
TRANSTECH	As supplied in file Mobility Response NJ June 2010.xlsx
SPECTRUM	Set to "3" per translation shown below
MAXADDOWN	Set to "4", see below.
MAXADUP	Set to "3", see below.
TYPICDOWN	Not provided, set to null
TYPICUP	Not provided, set to null

STATEABBR	Set to “NJ”
SHAPE	As supplied.

Internal notes on processing:

1. File “Mobility Response Template June 2012 New Jersey.xlsx” (different than the one in the previous submission) contains three rows with provider name, DBA name, FRN, technology of transmission, a specification of the spectrum bands used, and the maximum advertised up/down speeds. The FRN is missing the leading zeros. The TechTrans code is valid. The max speed values are plausible.
2. The shape files have no text attributes associated with the row. The coverage area is most of the State of New Jersey, broken into separate shapes by various horizontal and vertical lines. The map strongly resembles the map shown at www.wireless.att.com.
3. The supplied shapes use geographic coordinate system name GCS_WGS_1984. The NTIA data model requires the same coordinate system. No geographic transformation was required, but the XY Tolerance value differs from the required value. Imported shape then mapped to separate shape with proper tolerance which resulted in a new feature class with the suffix “_tol”.
4. NTIA requires shapes to be contained in the NJ state boundary. Although we visually verified that it is the case, we clipped the shape using ESRI: Analysis Tools-> Extract -> Clip with, select feature class refdata_2010.tl_2010_34_state10_wgs. The feature classes have the suffix "_clip"
5. Coalesced the single-part polygons into one multi-part polygon using the ArcGIS “Dissolve” tool, which resulted in a new feature class with the suffix “_Dissolve”.
6. Spectrum: AT&T Mobility provided multiple columns of data about their spectrum use. Searching on the web suggests that AT&T 3G uses frequencies 850MHz and 1900Mhz. The NTIA data model has a single column for spectrum. No mapping is provided for frequency 850MHz. Frequency 1900MHz corresponds to NTIA “SPECTRUM USED” code value 3 – this was used for the 3G and 4G services.
7. Speeds were given as index values conforming to the NTIA model.
8. The only data imputed was the state abbreviation.
9. Validation rules produced a warning on the wireless shape record for the combination of downstream speed code of 7 (10-25 Mbps) with a transtech code of 80 (Mobile Wireless) for the LTE service. The maximum advertised speed tier provided in the cover letter that came with the provider’s submission is 7. Provider confirmed that the value is correct.

Section 5: Clarification Questions and Responses

From: Connecting NJ [mailto:ConnectingNJ@appcomsci.com]
Sent: Friday, August 31, 2012 3:17 PM
To: WAGNER, GREGORY G
Subject: Re: NJ Broadband Data Collection - Fall 2012

Greg,

Before we submit provider data to the NTIA it must be validated by an NTIA script.
When we processed your submission with this script, it generated a warning and

recommended that for transtech=80 the maxaddown speed should be changed from "7" to "6." In other words, the NTIA believes that the maximum advertised downstream Service Speed for Terrestrial Mobil Wireless cannot equal 10 mbps or greater (hence the recommended value "6", see table below). I just need to confirm from you that you think "7" is the value you intended to submit and the speed you support.

Best regards,

Cliff

Subject: RE: NJ Broadband Data Collection - Fall 2012
Date: Tue, 4 Sep 2012 13:15:02 +0000
From: WAGNER, GREGORY G <gw5604@att.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>

Cliff,

We have determined that speed tier 7 is the appropriate designation for our LTE product.

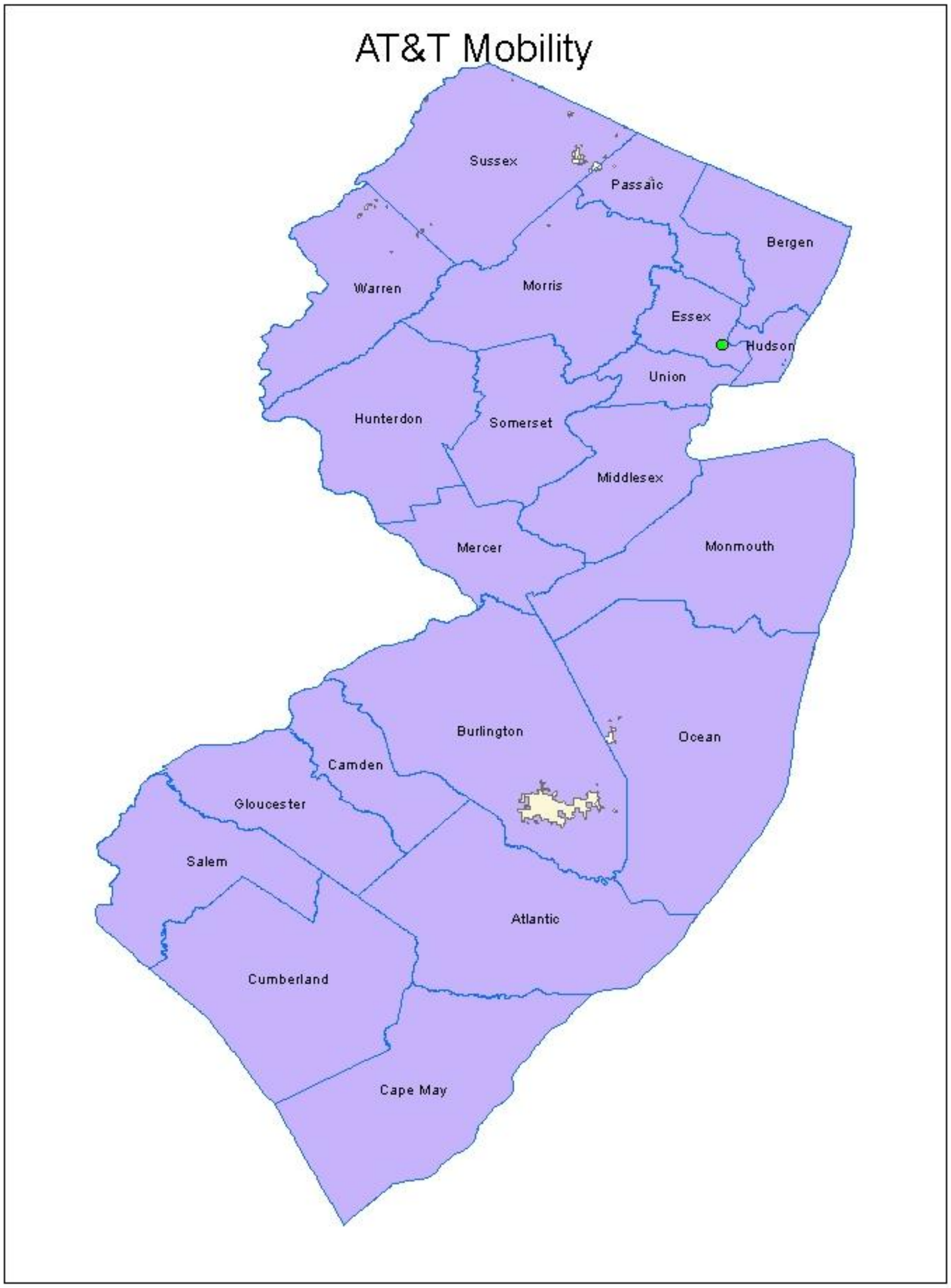
Greg

Gregory G. Wagner
(210)246-8157

Note: This e-mail message is confidential and intended only for the named recipient(s) above. It contains information that may be privileged, attorney work product, or exempt from disclosure under applicable law. If you have received this message in error, or are not the named recipient(s), please immediately notify me at (210)246-8157 and delete this e-mail message from your computer. Thank you.

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.3 CableVision

Connecting New Jersey - Broadband Provider Data Report

Provider: Cablevision
Received: August 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Sections:
1. NDA Status
2. Submission Overview
3. Submission File Details
4. Data Validations and Results
5. Data Transformation and Loading
6. Clarification Questions and Provider Responses
7. Notes and Open Issues

Section 1: NDA Status

Executed with NJ OIT.

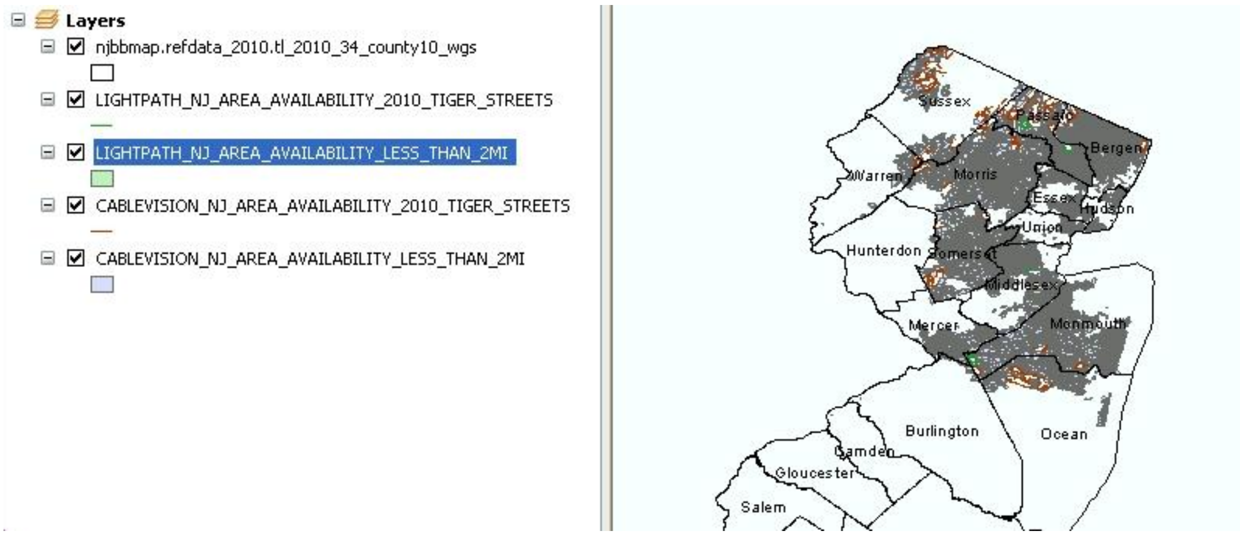
Section 2: Submission Overview

AVAILABILITY DATA				
ID	Provider name "Doing business as" name FRN Holding company name Holding company number		CSC HOLDINGS INC CABLEVISION / LIGHTPATH 0003735909, 0003510195 CSC Holdings, Inc. 130370	
FOR WIRELINE				
Filetypes	Shapefile with Census Block Year 2010 data			
File size	Multiple tables and shapes, for cable modem and optical (Lightpath) technologies.			
Speeds	Type		Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)	

	Typical-upstream		Not provided		
	Typical-downstream		Not provided		
	Advertised-upstream		Census block and street segment		
	Advertised-downstream		Census block and street segment		
	Subscriber-weighted-up		Not provided		
	Subscriber-weighted-down		Not provided		
Technology Type	40 (Cable Modem DOCSIS3.0), 41 (Cable Modem - Other), 50 (Optical carrier)				
End-user specification	Yes. Address data provided in 2 shape files (for both cable and optical) with street segment ID. (a field is called TLID, which is assumed means Tiger Line ID).				
Comments: Street data is comprised solely of polylines in the shapefile while the other files are polygons representing coverage. No subscriber weighted data found.					

INTERCONNECTION DATA: PROVIDED AFTER REQUEST	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: None.	

Figure 1. submitted data (quick preview)



Section 3: Submission File Details

Received one (1) file by SECURE UPLOAD. The zip archive contains six shapefiles: large census blocks (Cablevision and Lightpath), small census blocks (Cablevision and Lightpath), and one with roadsegments (Cablevision and Lightpath). The data and shapes appear to use Year 2010 Census Bureau geometry. The shapefiles use the XY Coordinate System GCS_North_American_1983.

Name	Size
CABLEVISION_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.dbf	1,147 KB
CABLEVISION_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.prj	1 KB
CABLEVISION_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.shp	457 KB
CABLEVISION_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.shx	11 KB
CABLEVISION_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.dbf	16,126 KB
CABLEVISION_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.prj	1 KB
CABLEVISION_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.shp	32,489 KB
CABLEVISION_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.shx	475 KB
CABLEVISION_NJ_LESS_THAN_2_BLOCKS_07_2012.zip	20,272 KB
CABLEVISION_NJ_STREETS_07_2012.zip	301 KB
CABLEVISION_NJ_STREETS_07_2012_bad.zip	20,272 KB
LIGHTPATH_NJ_07_2012.zip	755 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.dbf	100 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.prj	1 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.shp	31 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.shp.xml	1 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_2010_TIGER_STREETS.shx	1 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.dbf	317 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.prj	1 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.shp	1,142 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.shx	10 KB
LIGHTPATH_NJ_AREA_AVAILABILITY_LESS_THAN_2MI.shp.NJBBMAP-PC.259...	0 KB

Section 4: Data Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

Since data was not provided for the October 2012 submission, the April 2012 data was copied.

The following describes how the data was loaded in previous submission.

Loaded from data supplied in the XLS sheet. Only one row describes a connection point in New Jersey. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to “CSC HOLDINGS INC”
DBANAME	Set to “CABLEVISION”
FRN	As supplied in column frn_name
OWNERSHIP	Set to code 1, leased
BHCAPACITY	Set to code 4; 1gbps falls in range 600mbps – 2.4gbps

BHTYPE	Set to code 1, fiber
LATITUDE	Obtained by geocoding the address
LONGITUDE	Obtained by geocoding the address
ELEVFEET	Set to “0” (zero)
STATEABBR	Set to “NJ”
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Point shape created using ESRI ArcDesktop

Internal notes on processing:

6. Reused the table created for the October 2010 submission, but mapped Lat/Long to 2010 census block.
7. Since the data was not provided for the April 2012, the October 2010 data was reused.

NTIA Table BB_Service_CensusBlock

Loaded from the two supplied feature classes (shapefiles) with census blocks, one for Cablevision and one for LightPath. The following table explains the transformations that were applied to load the target table. The Cablevision has 60,706 records and LightPath has 1,242 records.

Table Column	**Data Source / Transformation**
PROVNAME	As supplied in column proname
DBANAME	As supplied in column dbaname
PROVIDER_TYPE	Set to 1
FRN	As supplied in column frn
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from cenblock (digits 3-5)
TRACT	Populated from cenblock (digits 6-11)
BLOCKID	Populated from cenblock (digits 12-15)
FULLFIPSID	As supplied in column cenblock
TRANSTECH	As supplied - For Cablevision: column trechtrans2 - For Lightpath: column techtrans
MAXADDOWN	As supplied in column maxaddnsp
MAXADUP	As supplied in column maxadupsp

TYPICDOWN	Set to null, not supplied
TYPICUP	Set to null, not supplied
ENDUSERCAT	Set to null, not supplied
SHAPE	As supplied in column shape

Internal processing notes:

1. Import the features with XY Coordinate System " GCS_North_American_1983" via the following three-step process. (A simple Import using ArcCatalog yields an incompatible tolerance value.)
    a. First, copy the data from the shapefiles to the geodatabase using a geographic transformation “NAD_1983_to_WGS_1984_5”. This yields feature classes with the required coordinate system but an incorrect tolerance value. Names are "cv_nj_ar_av_cb_lt_2mi_wgs" and "lp_nj_ar_av_cb_lt_2mi_wgs".
    b. Second, create new feature classes with the same schema as the provided shapefile feature classes and the required coordinate reference system (GCS_WGS_1984) and tolerance (0.000000002 degrees). Names are " cv_nj_ar_av_cb_lt_2mi _wgs_tol" and "lp_nj_ar_av_cb_lt_2mi _wgs_tol".
    c. Third, load the data into the newly created feature classes to ensure perfect compatibility with the required coordinate reference system and tolerance.
2. Ignored the column "techtrans1" in the Cablevision feature class. The presence of two transport technologies indicates that they can support both DOCSIS 3.0 and Other on the all lines.
3. All of the cenblock values correspond to valid Year 2010 Census Block IDs.
4. All census blocks were confirmed to be less than 2 square miles.
5. There were no duplicates in terms of census block and transtech.

NTIA Table BB_Service_RoadSegment

Loaded from the two supplied features with line segments. The following table explains the transformations that were applied to load the target table. The Cablevision has 1,276 records and Lightpath has 111 records.

Table Column	**Data Source / Transformation**
PROVNAME	As supplied in column prvd_name
DBANAME	As supplied in column dba_name
PROVIDER_TYPE	Set to 1
FRN	As supplied in column frn_name
ADDMIN	Set to the least of the non-empty address numbers
ADDMAX	Set to the greatest of the non-empty address numbers

PREDIR	Set to null (no value supplied)
STREETNAME	As supplied (has all street components, not just name)
STREETTYPE	Set to null (no value supplied)
SUFFDIR	Set to null (no value supplied)
CITY	Set to null (no value supplied)
STATECODE	Set to "NJ"
ZIP5	Set to null (no value supplied)
ZIP4	Set to null (no value supplied)
TRANSTECH	As supplied in column tech_trans
MAXADDOWN	As supplied in column max_ad_dwn
MAXADUP	As supplied in column max_ad_up
TYPICDOWN	Set to null (no value supplied)
TYPICUP	Set to null (no value supplied)
SHAPE	As supplied

Internal processing notes:

1. Feature classes were imported exactly as discussed above for table BB_Service_CensusBlock.
2. Ignored the column "techtrans1" in the Cablevision feature class. The presence of two transport technologies indicates that they can support both DOCSIS 3.0 and Other on the all lines.
3. Three records in the Cablevision set were determined to be duplicates, in terms of county and Tiger Line ID. One record in the Lightpath set was found to be duplicate. These records were discarded.

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Tuesday, February 21, 2012 10:14 PM
To: 'tbaecher@cablevision.com'
Cc: 'NJ Broadband Data Collection'
Subject: NJ Broadband Clarification

Ted,

We have performed our initial review of the data you submitted and we have a clarification question. Your recent submission did not include any middle mile information. The last middle-mile data you submitted is from a year ago. Is that data still valid? If not, could you please supply us with revised information?

Thanks for your cooperation.

John Wullert

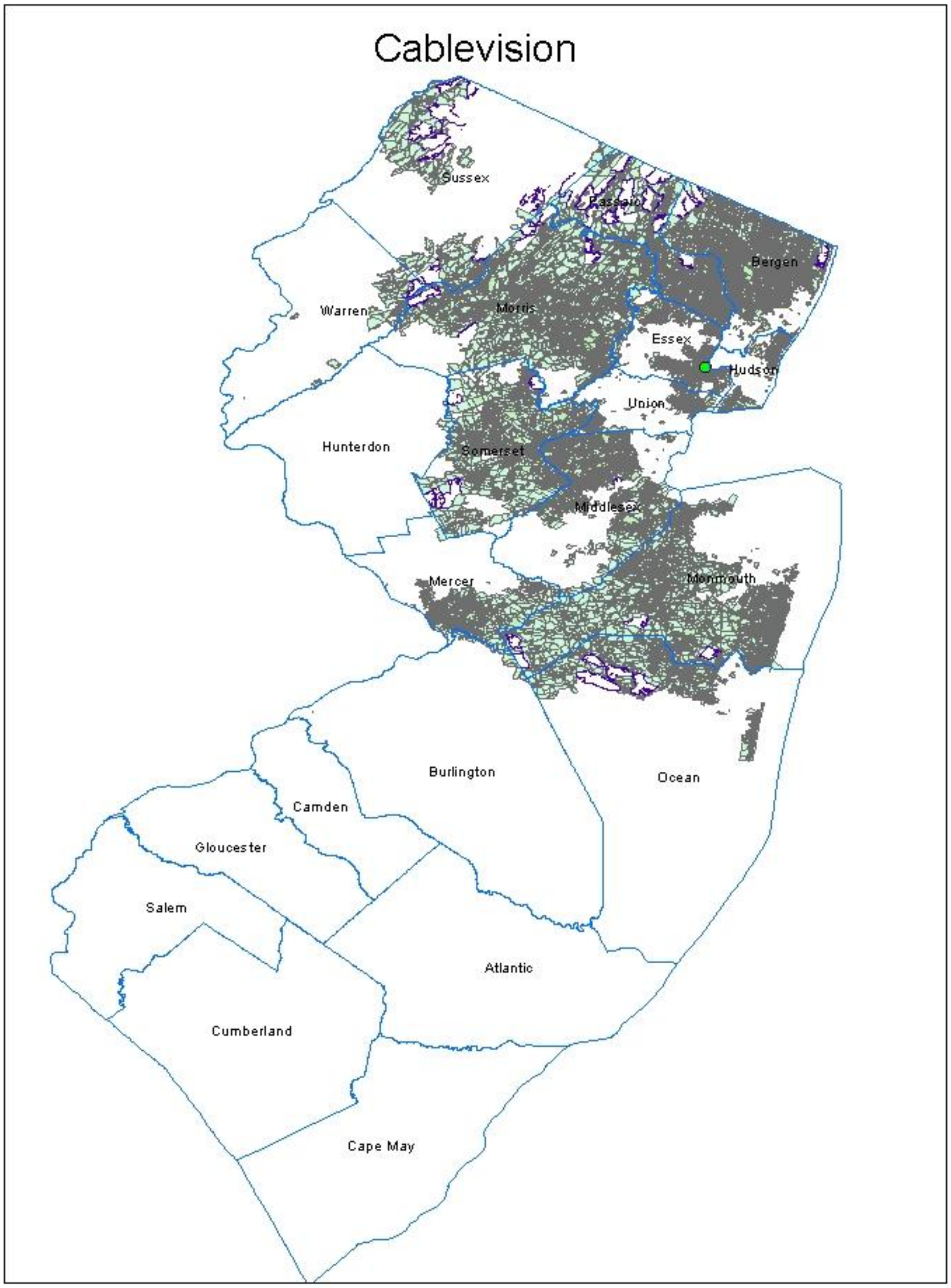
Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.4 Century Link

Connecting New Jersey - Broadband Provider Data Report

Provider: CenturyTel DBA Century Link
Received: August 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Sections:

8. NDA Status
9. Submission Overview
10. Submission File Details
11. Data Validations and Results
12. Data Transformation and Loading
13. Clarification Questions and Provider Responses
14. Notes and Open Issues
15. Overview Map of Submitted Data

Section 1: NDA Status

Century Link executed an NDA with NJ OIT; the data files refer to the NDA.

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN</td><td>CenturyLink, Inc. (per email)
Century Link
0018626853</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">Shapefiles “CTL_NJ_2012_06_polyline” and “CTL_NJ_2012_06_region”</td></tr>
<tr><td>File size</td><td colspan="2"></td></tr>
<tr><td>Speeds</td><td colspan="2"><table>
<tr><th>Type</th><th></th><th>Spatial Resolution: county</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Census block and street segment</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Census block and</td></tr>
</table></td></tr>
</table>

			street segment	
	Advertised-upstream		Census block	
	Advertised-downstream		Census block	
	Subscriber-weighted-up		Not provided	
	Subscriber-weighted-down			
Technology Type	10 (ADSL)			
End-user specification	Not provided			
Comments:				

INTERCONNECTION DATA	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: Middle-mile data was not provided this submission.	

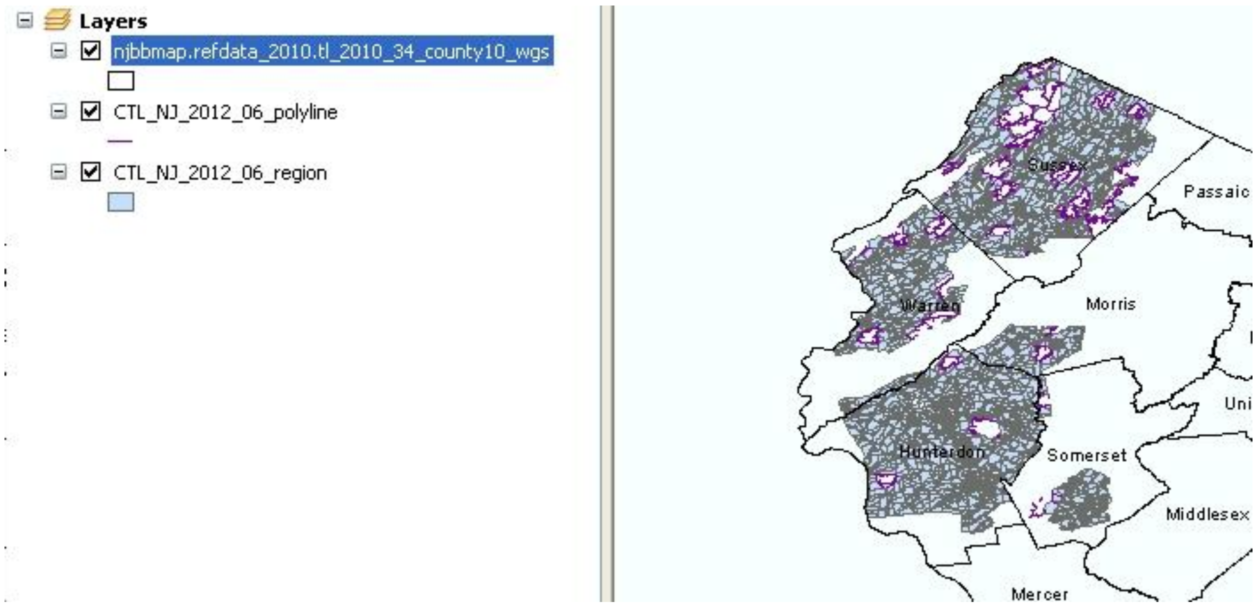


Figure1. Quick load test results

Section 3: Submission File Details

Name	**Size**
CTL_NJ_2012_06_polyline.dbf	1,036 KB
CTL_NJ_2012_06_polyline.prj	1 KB
CTL_NJ_2012_06_polyline.shp	619 KB
CTL_NJ_2012_06_polyline.shx	25 KB
CTL_NJ_2012_06_region.dbf	2,462 KB
CTL_NJ_2012_06_region.prj	1 KB
CTL_NJ_2012_06_region.shp	11,388 KB
CTL_NJ_2012_06_region.shx	58 KB
CTL_NJ_080812.zip	8,828 KB

Section 4: Data Validation,Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

According to the email below, there is no change in middle mile data in the 2012 April. Since the middle mile data is not submitted, we assume that there is no change in this submission.

The following table explains the transformations that were applied in earlier submission.

Table Column	Data Source / Transformation
PROVNAME	Set to “CenturyLink, Inc.” per email
DBANAME	As supplied in DbaName
FRN	As supplied in FRN
OWNERSHIP	As supplied in Own
BHCAPACITY	As supplied in BHCap
BHTYPE	As supplied in BHType
LATITUDE	As supplied in Lat
LONGITUDE	As supplied in Long
ELEVFEET	Set to “0” (zero)
STATEABBR	Set to “NJ”
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Point shape created using ESRI ArcDesktop

Internal notes on processing:

8. Loaded 1 row of data from Excel Spreadsheet “middlemile_NJ.txt” (1 row) that was supplied for the April 2011 submission. Data in that table had previously been spatially joined to find containing census block.

NTIA Table BB_Service_CensusBlock

Loaded from supplied shapefile feature “CTL_NJ_2011_12_region”. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to “CenturyLink, Inc.” per email
DBANAME	As supplied in column “dba_name”
PROVIDER_TYPE	Set to 1
FRN	Set to "0018626853"
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from census_blo (digits 3-5)
TRACT	Populated from census_blo (digits 6-11)
BLOCKID	Populated from census_blo (digits 12-15)

BLOCKSUBGROUP	Set to null
FULLFIPSID	As supplied in column census_blo
TRANSTECH	As supplied in column technology
MAXADDOWN	Set to 7 for all records
MAXADUP	Set to 4 for all records
TYPICDOWN	Set to null
TYPICUP	Set to null
SHAPE	As supplied

Internal notes on processing

10. Differently from the 2012 April submission, the supplied shapes use geographic coordinate system GCS_North_American_1983. The NTIA data model requires coordinate system GCS_WGS_1984. To change the projection we applied the ESRI geographic transformation NAD_1983_To_WGS_1984_5 (per ESRI KB article 24159). The resulting table is named with suffix "_wgs".
11. We had to create a new feature class and reload the data so that the tolerance value matches the NTIA transfer model's tolerance value exactly, resulting in a feature class with a suffix of "_tol".
12. Shapefile (feature class) CTL_NJ_2012_06 _region provides coverage data for census blocks with an area less than or equal to 2 square miles. It contains 7,369 records. All of the IDs shown in the shapefile correspond to valid Year 2010 Census Block IDs and all are smaller than 2 square miles.
13. The feature class "region" has 286 rows with duplicate census block IDs and identical technology codes (confusingly the speeds are different for the some of these duplicates). We discarded these to avoid creating duplicate shapes in the table.
14. The feature class has 11 rows with technology 10 and downstream speed code 8. This combination produced a validation warning. The provider could not confirm that these values were correct, but asserted that all areas were covered with speed tiers 7 down and 4 up. We changed the speed tiers on these values to 7/4.
15. We loaded 7083 records into the bb table.

NTIA Table BB_Service_RoadSegment

Loaded from supplied shapefile feature "CTL_NJ_2012_06_polyline". The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	Set to "CenturyLink, Inc." per email
DBANAME	As supplied in column "dba_name"
PROVIDER_TYPE	Set to 1

FRN	Set to "0018626853"
ADDMIN	Set to the least of the non-empty address numbers
ADDMAX	Set to the greatest of the non-empty address numbers
PREDIR	Set to null (no value supplied)
STREETNAME	As supplied
STREETTYPE	Set to null (no value supplied)
SUFFDIR	Set to null (no value supplied)
CITY	Set to null (no value supplied)
STATECODE	Set to “NJ”
ZIP5	Set to null (no value supplied)
ZIP4	Set to null (no value supplied)
TRANSTECH	As supplied
MAXADDOWN	Set to 7
MAXADUP	Set to 4
TYPICDOWN	Set to null
TYPICUP	Set to null
TLID	Set to Null – not supplied
SHAPE	As supplied

Internal notes on processing:

1. Shapefile (feature class) CTL_NJ_2012_06 _polyline shows street segments for census blocks larger than 2 square miles. In contained 3098 records.
2. Differently from the 2012 April submission, the supplied shapes use geographic coordinate system GCS_North_American_1983. The NTIA data model requires coordinate system GCS_WGS_1984. To change the projection we applied the ESRI geographic transformation NAD_1983_To_WGS_1984_5 (per ESRI KB article 24159). The resulting table is named with suffix “_wgs”.
3. We had to create a new feature class and reload the data so that the tolerance value matches the NTIA transfer model’s tolerance value exactly, resulting in a feature class with a suffix of “_tol”.
4. We discarded 734 records with no street name (field empty), leaving 2364 full records. These entries typically had no min/max address information as well.
5. We checked for uniqueness using the county number, street name, min and max address and the string portion of the shape object. Including the string description of the shape object had the effect of including the number of points in the shape as part of the uniqueness test. We discarded 674 records as duplicates using this method. There is a chance that this discarded some non-duplicates, but our manual inspection of the data made it appear valid.
6. Based on provider instructions that they have 10 Mbps coverage in all their NJ exchanges, we set all down/up advertised speeds to 7/4.

7. We loaded 1690 rows.

Validation rules produced a warning on 7084 census blocks and 1690 street segments for the combination of a downstream speed code of 7 (10-25 Mbps) with a transtech code of 10 (ADSL). The provider had originally reported speeds exceeding 25 Mbps, or a speed code of 8. When we questioned these, the provider could not confirm those values, but asserted that all areas were covered with speeds exceeding 10 Mbps.

Section 5: Questions

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Friday, March 09, 2012 6:42 AM
To: Flurer, Gerry F
Cc: NJ Broadband Data Collection
Subject: NJBB Data Clarification - CenturyLink

Gerry,

We have reviewed the data you submitted and have a few questions:

1. The NTIA wants us to verify cases where speeds over 10 Mbps are reported for DSL. You reported instances of download speeds in the 10-25 Mbps and 25-50 Mbps for your DSL service. Are these correct values?
2. In previous rounds, you had submitted a single middle mile point. Do you have updated information, or should we use that same data for this round?
3. In prior submissions, your street-segment data included the TigerLine ID of each segment. Is it possible for you to include that information this round?

We appreciate your participation in the program.

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Flurer, Gerry F [mailto:Gerald.F.Flurer@CenturyLink.com]
Sent: Friday, March 09, 2012 10:59 AM
To: NJ Broadband Data Collection

Cc: Bonsick, David
Subject: RE: NJBB Data Clarification - CenturyLink

John: See response inserted, below.

Gerry Flurer

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Friday, March 09, 2012 6:42 AM
To: Flurer, Gerry F
Cc: NJ Broadband Data Collection
Subject: NJBB Data Clarification - CenturyLink

Gerry,

We have reviewed the data you submitted and have a few questions:

1. The NTIA wants us to verify cases where speeds over 10 Mbps are reported for DSL. You reported instances of download speeds in the 10-25 Mbps and 25-50 Mbps for your DSL service. Are these correct values?

[G. Flurer] Yes. CTL uses ADSL2 and VDSL2 in certain areas to achieve those speeds.

2. In previous rounds, you had submitted a single middle mile point. Do you have updated information, or should we use that same data for this round?

[G. Flurer] No updates for that data.

3. In prior submissions, your street-segment data included the TigerLine ID of each segment. Is it possible for you to include that information this round?

[G. Flurer] In several other states we found Tiger ID data from Pitney Bowes to be invalid. For this round we adopted the use of the TIGER street data. I'm looking at possibly including the TIGER ID in future submissions.

We appreciate your participation in the program.

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Friday, March 09, 2012 10:08 AM
To: Flurer, Gerry F
Cc: NJ Broadband Data Collection
Subject: RE: NJBB Data Clarification - CenturyLink

Gerry,

Thanks for the quick response. Can you give us any sense of where you have the ADSL2/VDSL2 operational? The NTIA would prefer not to overstate capabilities.

Thanks,

John

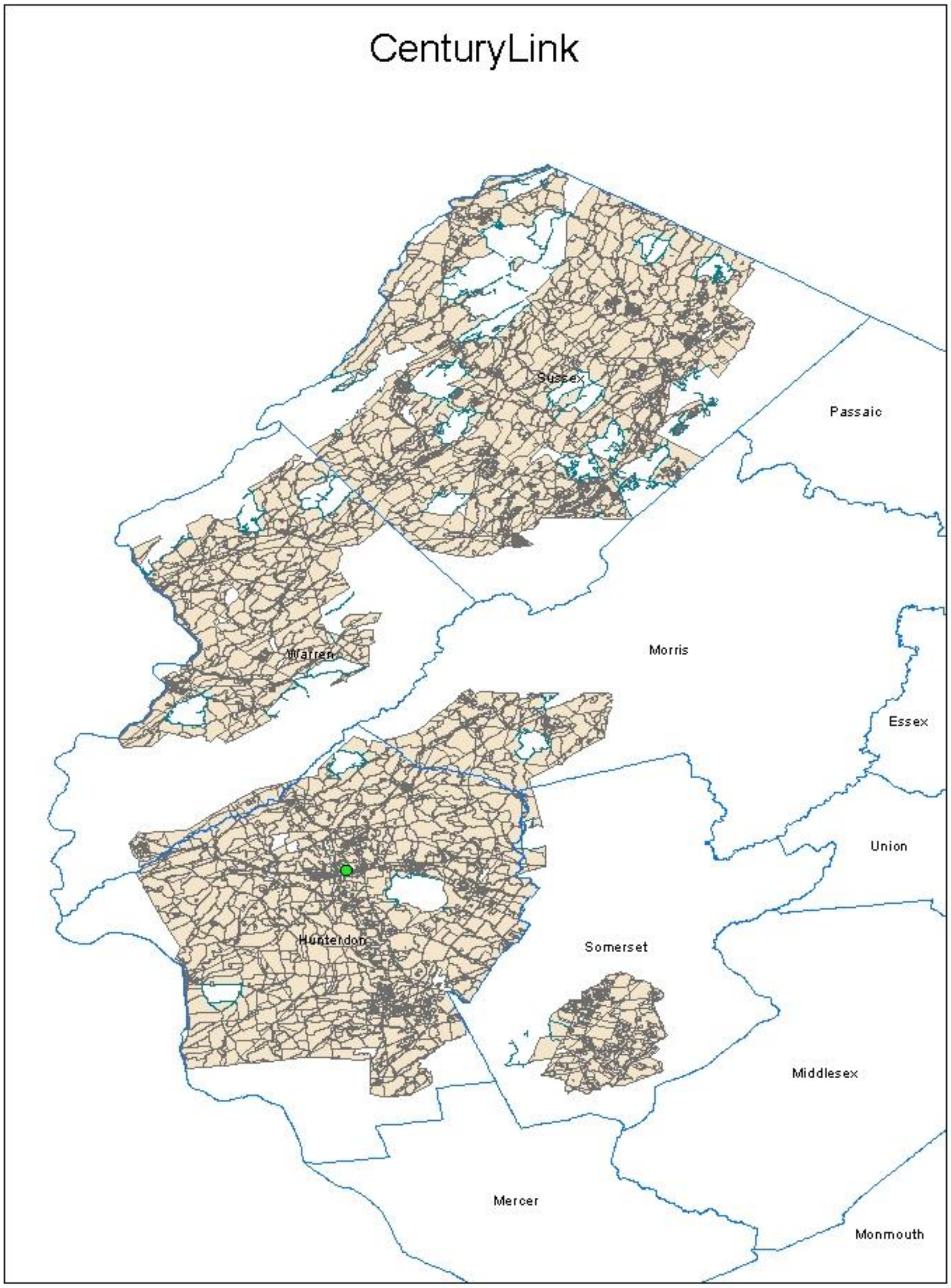
From: Flurer, Gerry F [mailto:Gerald.F.Flurer@CenturyLink.com]
Sent: Friday, March 09, 2012 11:58 AM
To: NJ Broadband Data Collection
Subject: RE: NJBB Data Clarification - CenturyLink

John: We have 10 mbps service available in all our NJ exchanges. The few spots we have listed as Speed Tier 8 look pretty remote to me. I'll have to check into them more specifically. For now, though, can we consider them as a lower speed tier for this round? Let's make them tier 7 and I'll look into them for the next round.

Gerry Flurer

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.5 Clearwire

Connecting New Jersey - Broadband Provider Data Report

Provider: Clearwire
Received: July 2012
Submission date: October 2012

This report presents details on processing of broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Unknown

Section 2: Submission Overview

AVAILABILITY DATA		
ID	PROVIDER NAME DBA NAME FRN Holding company name: Holding company number:	Clearwire Corporation Clearwire Corporation 0017775628
FOR WIRELESS		
Filetypes	shapefile collection: shp/dbf/prj/shx, mdb, gdb, imagefile etc.	The shape file contains 521 polygon shapes, as well as an attribute, ID_UNIQUE (6 digit number)

Speeds

Type	Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)	
Upstream max adv	no.	**This data was not included with submitted shape file, but advertised speed, technology and spectrum data from prior rounds was verified with provider.**
Downstream max adv	no.	
Upstream typical	no.	
Downstream typical	no.	
Subscriber-weighted	no.	

Technology Type	Spectrum : no	
Comments:		
INTERCONNECTION DATA		
ID		
File size		
Ownership		
Transport Type		
Data Rates/Capacity		
Location		
Comments: no IC data provided.		

Section 3: Submission File Details

Received the zip file by email

Size	**Name**
3739KB	NJ_WiMAX_063012_region.zip

The1 zip file containing 6 files:

Size	**Name**
14KB	NJ_WiMAX_063012_region.dbf
1KB	NJ_WiMAX_063012_region.prj
6KB	NJ_WiMAX_063012_region.sbn
1KB	NJ_WiMAX_063012_region.sbx
5918KB	NJ_WiMAX_063012_region.shp
5KB	NJ_WiMAX_063012_region.shx

Section 4: Data Validation,Transformation and Loading

NTIA Table BB_Service_Wireless

Loaded from the supplied shapefiles as augmented by email and phone conversations. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to “Clearwire Corporation” per email
DBANAME	Set to “Clearwire Corporation” per email
FRN	Set to “0017775628”
TRANSTECH	Set to “80” (terrestrial mobile wireless) based on statement of WiMAX
SPECTRUM	Set to “5” per email
MAXADDOWN	Set to “5” (code for range of 3-6Mbps) per email
MAXADUP	Set to “3” (code for range that includes 1Mbps) per email
TYPICDOWN	Set to null
TYPICUP	Set to null
STATEABBR	Set to “NJ”
SHAPE	As supplied.

Internal notes on processing:

16. The shape file contains 520 polygon shapes, as well as an attribute, ID_UNIQUE (a 6 digit number).
17. The supplied shape file uses geographic coordinate system name GCS_WGS_1984. The NTIA data model requires the same coordinate system. No geographic transformation was required. Loaded into our geo-database to feature class name NJ_WiMAX_063012_region.
18. The XY Tolerance value differs on the supplied data from the required NTIA model. Imported the table schema and the table data in two separate operations, thereby ensuring perfect compatibility with the NTIA data model. The table has the suffix “_tol”.
19. The shape extends beyond the NJ State boundary. Clipped the shape using ESRI: Analysis Tools-> Extract -> Clip with, select feature class ntia_oct2012.State_Boundary. The feature class has the suffix "_clip". 269 rows are left after clip operation.
20. Coalesced the single-part polygons into one multi-part polygon using the ArcGIS ESRI: Data Management Tools->Generalization->Dissolve (without choosing anything in the Dissolve_Field(s) option), which resulted in a new feature class with the suffix “_dissolved” with a single row.

Section 5: Clarification Questions and Responses

The email has no info about advertized and typical speed. (7/12/2012)

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Wednesday, February 15, 2012 5:23 PM
To: Tajit Mehta
Cc: ConnectingNJ@groups.appcomsci.com
Subject: RE: NJ Broadband Data Collection - Spring 2012

Taj,

A few additional questions regarding the service you deliver over the covered area. From your previous submissions, we have the following information:

Provider Name = Clearwire Corporation

FRN = "0017775628"

Transmission technology = 80 (wireless)

spectrum = 5 (Broadband Radio Service/Educational Broadband Service spectrum (2496-2690 MHz))

Maximum Advertised Download Speed = "5" (Greater than or equal to 3 mbps and less than 6 mbps)

Maximum Advertised Upload Speed = "3" (Greater than or equal to 768 kbps and less than 1.5 mbps)

Are these values still accurate?

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Tajit Mehta [mailto:tajit.mehta@clearwire.com]
Sent: Wednesday, February 15, 2012 5:24 PM
To: NJ Broadband Data Collection
Subject: RE: NJ Broadband Data Collection - Spring 2012

Hi John,

Yes the date stays the same.

Regards,

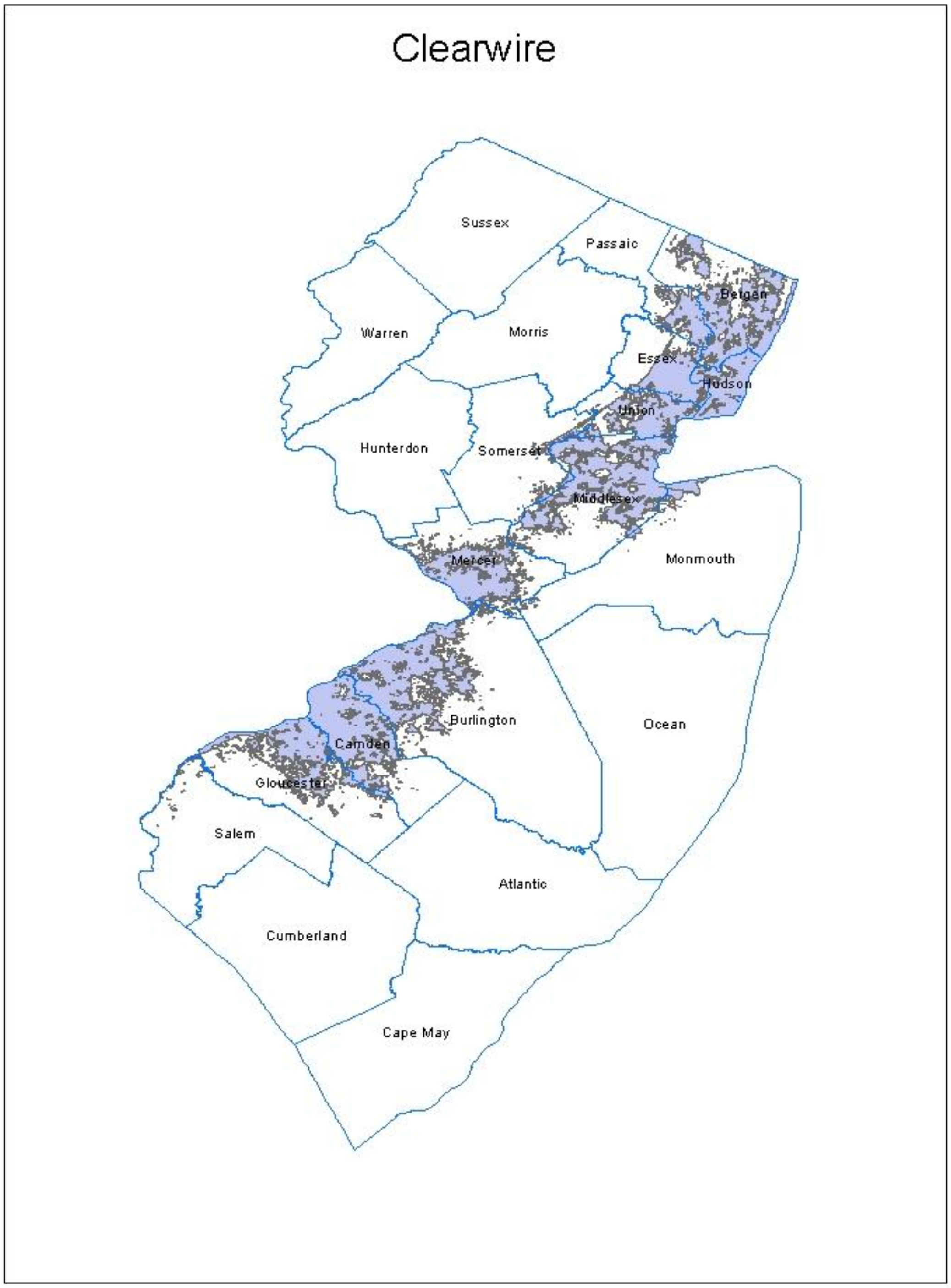
Taj

Taj Mehta – clearwire - Spectrum Development

593 Herndon Parkway, Herndon, VA 20170 - Office 571-490-8577 - Mobile 571-220-4657 – Fax 571-490-8491

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.6 Cogent Communications

Broadband Provider Data Report

Provider: Cogent Communications
Received: August 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Sections:

16. NDA Status
17. Submission Overview
18. Submission File Details
19. Data Validations and Results
20. Data Transformation and Loading
21. Clarification Questions and Provider Responses
22. Notes and Open Issues

Section 1: NDA Status

No NDA was executed. All data were taken from the provider's public web site, FCC filings and/or information supplied by the provider via email

Section 2: Submission Overview

<table>
<tr><th colspan="4">MAPPING DATA</th></tr>
<tr><td rowspan="3">ID</td><td colspan="2">Provider name</td><td>Cogent Communications, Inc.</td></tr>
<tr><td colspan="2">“Doing business as” name</td><td>Not provided</td></tr>
<tr><td colspan="2">FRN</td><td>0019898303</td></tr>
<tr><th colspan="4">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">Txt, xls, pdf, etc.</td><td>Email and pointers to Web site and SEC filings</td></tr>
<tr><td>File size</td><td colspan="2">Number of records, data elements</td><td>List of 21 addresses where they offer service</td></tr>
<tr><td rowspan="2">Speeds</td><td>Type</td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</td><td rowspan="2">Provided building addresses. Adver down and up are 10/11, very fast.</td></tr>
<tr><td>Adver down</td><td>Address</td></tr>
</table>

	Adver up	Address	
	Typical down	Not provided	
	Typica up	Not provided	
	Subscriber-weighted	Not provided	
Technology Type	DOCSIS, xDSL, fiber, etc.		Fiber
End-user specification	Business, consumer, gov't etc		
Comments: They offer service directly to businesses at the addresses they provided. They are a reseller of broadband access to businesses at other locations. They had previously refused to provide data on Typical and Subscriber Weighted speeds.			

INTERCONNECTION DATA		
ID	Provider name "Doing business as" name FRN	
File size	Number of records, data elements	
Ownership	Leased/owned	
Transport Type	Fiber, wireless, copper	
Data Rates/Capacity		
Location	Street address, lat/lon, elevation	
Comments: We had previously extracted data for Middle Mile sites, based on the assumption that Cogent's Data Centers were interconnection points. We were instructed by the provider that these sites did not meet the definition of Middle Mile sites and thus should be removed.		
DATA COMPLETENESS		
Data Validation/ Verification		

Section 3: Submission File Details

Data received and processed in previous submissions was updated (address information) via a query of "Service Locations" from provider's Web site (http://www.cogentco.com/?lang=en&option=com_content&view=article&id=40&action=search).

There were two new records in the data from the Web site – one was an update of a previously present record, another was a truly new record (for 3003 Woodbridge Ave.). The CDNC field together with information obtained in previous rounds were used to determine the advertised speeds for that record.

Section 4: Validations and Results

During previous rounds provider reported data rates were confirmed with their published information and SEC filings.

The only other validation to be done is whether each address can be successfully geocoded. See next section. One address is not

Section 5: Data Transformation and Loading

The standard NDA prohibits us from submitting address-level data to the NTIA. Instead, we discover the census block for each customer address, then report the census block shape drawn from Census Bureau TigerLine reference data.

NTIA Table BB_Service_CensusBlock

We copied the information to a spreadsheet. The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	Set to “Cogent Communications, Inc.”
DBANAME	Same as PROVNAME
PROVIDER_TYPE	Set to 1
FRN	Set to “0019898303”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	Set to “50”
MAXADDOWN	Populated from column “Maximum Advertised Speed Down”
MAXADUP	Populated from column “Maximum Advertised Speed Up
TYPICDOWN	Set to null

TYPICUP	Set to null
SHAPE	Copied from Census Bureau TigerLine 2010, as matched by spatial join on geocoded address

Internal processing notes:

9. Geocoded the addresses using the Google geocoder to obtain a Latitude, Longitude pair for each..
10. Created an excel sheet and imported it to a geodatabase table.
11. Added point shapes corresponding to each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
12. Added a column containing the ID of the containing year 2010 census block via a spatial join of the point shapes and the census block shapes from reference data.
13. Discarded 6 rows with duplicate census blocks.

Section 6: Clarification Questions and Responses

From: Zulager, Ried [mailto:RZulager@Cogentco.com]
Sent: Thursday, July 07, 2011 11:11 AM
To: Wullert, John R II
Subject: For your information: NJ Broadband Data Collection

Fine. The website may have changed slightly, but you can still get a list of address locations fairly easily from Cogent's public facing data. Just limit your searches to NJ as the jurisdiction of interest.

http://www.cogentco.com/en/network/service-locations

Ried Zulager

Corporate Secretary

Cogent Communications Group, Inc.

1015 31st St. NW

Washington, DC 20007

tel: +1-202-295-4274

rzulager@cogentco.com

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Tuesday, March 01, 2011 4:45 PM
To: 'Zulager, Ried'
Cc: ConnectingNJ@research.telcordia.com

Subject: RE: NJ BB Data Collection - Spring 2011
Sensitivity: Private

Ried,

The attached spreadsheet integrates the data you submitted to us last year with and the data we could obtain from your Web site and SEC filings. We will use this data as the basis for the submission to the NTIA. If you have any comments or corrections on the data, please let me know.

We did notice that the "Service Location" form on your Web site did not return a valid zip code for the 5851 Westside Ave in North Bergen. We assigned an zip code of 07047 based on a Google search.

Of the data requested by NTIA, we were not able to obtain data on Typical speeds and the Subscriber Weighted Nominal Speed. You indicated last time that you were not prepared to offer this information. If your position on this matter has changed, we would be happy to receive the data.

Thanks for your cooperation

John Wullert

Manager – NJ BB Data Collection

Telcordia Technologies

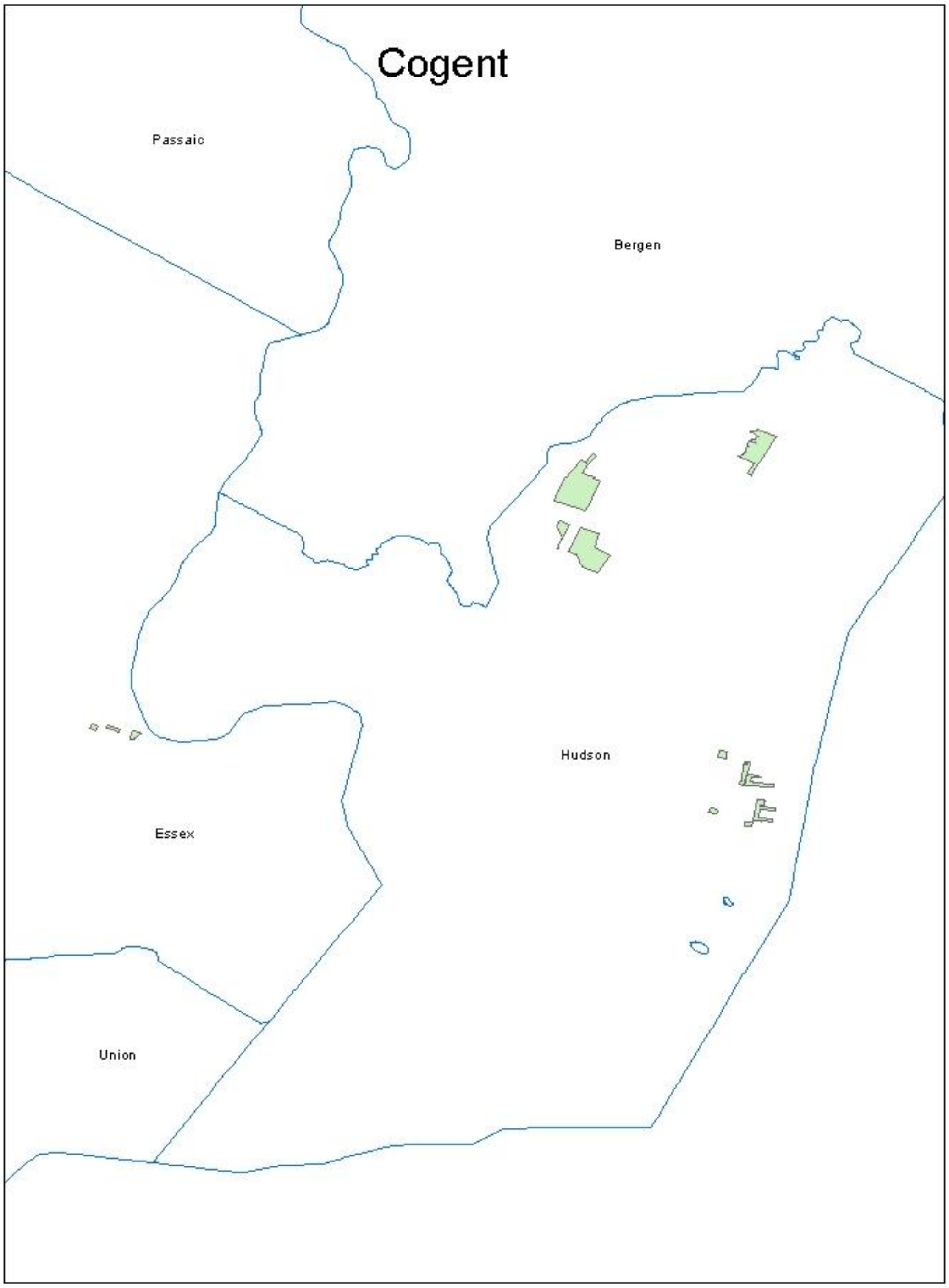
732-699-2687

From: Zulager, Ried [mailto:RZulager@Cogentco.com]
Sent: Tuesday, March 01, 2011 6:03 PM
To: ConnectingNJ@research.telcordia.com
Subject: RE: NJ BB Data Collection - Spring 2011
Sensitivity: Private

"We did notice that the "Service Location" form on your Web site did not return a valid zip code for the 5851 Westside Ave in North Bergen. We assigned an zip code of 07047 based on a Google search." Seems reasonable; since zip codes are fairly irrelevant to Cogent's business the zip code is not something that hits out A list of priorities in any database – nor is geocode.

Section 7: Notes and Open Issues

Section 8: Overview Map of Submitted Data



6.7 Comcast

Connecting New Jersey - Broadband Provider Data Report

Provider: Comcast
Received: August 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Section 2: Submission Overview

AVAILABILITY DATA		
ID	Provider name “Doing business as” name FRN	COMCAST CABLE COMMUNICATIONS LLC COMCAST 0004-4416-63
FOR WIRELINE		
Filetypes	Excel files w. Census Block Year 2010 data. Street segment level and CB level availability tables for CB’s less than and greater than 2 sq. mi.	
File size	see files	
Technology	40 (Cable Modem DOCSIS3.0), 41	

Speeds

Type		Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)
Typical-upstream		Not provided
Typical-downstream		Not provided
Advertised-upstream		yes (CBSA/RSA level)
Advertised-downstream		yes (CBSA/RSA level)
Subscriber-weighted-up		no
Subscriber-weighted-down		no.

Type	
End-user specification	Comcast provides availability at the Census Block and Street Segment level.
INTERCONNECTION DATA: PROVIDED AFTER REQUEST	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments:	

Section 3: Submission File Details

Received three (3) files by SECURE UPLOAD.

Size	**Name**
72KB	34-streets-NJ.xlsx
3374KB	34-blocks-NJ.xlsx
9KB	New Jersey Maximum Advertised Speeds June 30 2012.xlsx

Section 4: Validation, Data Transformation and Loading

NTIA Table BB_Service_CensusBlock

The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column “Provider_Name” but without trailing period
DBANAME	As supplied in column “DBA_NAme”
PROVIDER_TYPE	Set to 1

FRN	As supplied in column “FRN”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census_Block_FIPS_Code (first 3 digits)
TRACT	Populated from Census_Block_FIPS_Code (next 6 digits)
BLOCKID	Populated from Census_Block_FIPS_Code (last 4 digits)
FULLFIPSID	As supplied in column Census_Block_FIPS_Code
TRANSTECH	As supplied in column Technology_of_Transmission
MAXADDOWN	Set to “8”, “9” or “10” (see below)
MAXADUP	Set to “7” (see below)
TYPICDOWN	Set to null, not supplied
TYPICUP	Set to null, not supplied
SHAPE	Copied from Census Bureau TigerLine 2010, As matched by Census block 2010 ID

Processing notes:

4. File 34-blocks-NJ.xlsx contains 70,672 records. No shape was provided, but a Census Block ID is provided. Every ID is 15 digits long.
5. Census Blocks: Comcast supplied Census 2010 block IDs. We referenced the Census Bureau reference database for Year 2010 to extract and submit geographic features (i.e., shapes) for each census block based on the supplied Census_Block_FIPS_Code.
6. Speeds: Data for maximum advertised down and up speeds were taken from file “New Jersey Maximum Advertised Speeds June 30 2012.xlsx”. Comcast listed the same upload speed (7) and download speed (10) for all seven MSAs they serve. However, for records with a technology of transmission code 41, we reported a download speed to code 8.

NTIA Table BB_Service_RoadSegment

Loaded as discussed below. The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	Set to “Comcast Cable Communications, LLC”
DBANAME	Set to “Comcast”
PROVIDER_TYPE	Set to 1
FRN	Set to “0004441663”
ADDMIN	Set to the least of the non-empty address numbers for the line segment

ADDMAX	Set to the greatest of the non-empty address numbers for the line segment
PREDIR	Set to null (no value supplied)
STREETNAME	As obtained with the procedure outlined bellow (has all street components, not just name)
STREETTYPE	Set to null (no value supplied)
SUFFDIR	Set to null (no value supplied)
CITY	Set to null (no value supplied)
STATECODE	Set to “NJ”
ZIP5	Set to value of zipl column for the line segment
ZIP4	(no value supplied)
TRANSTECH	As supplied (40)
MAXADDOWN	See below
MAXADUP	Set to 7
TYPICDOWN	Set to null
TYPICUP	Set to null
SHAPE	Copied from Census Bureau TigerLine 2010, As matched by County + Tiger Line ID

File 34-streets-NJ.xlsx contains 656 records. No shape is provided, and no reference ID such as Tiger Line ID is provided either. We cannot validate these segments against reference data, nor can we accurately generate shapes for these segments. Instead we gathered a list of segments in large census blocks based on the municipalities served by Comcast. We processed 3142 street segments.

For municipalities served in their entirety by Comcast, the following approach was used. (Note: steps 1-4 were performed previously and not repeated for this round.)

1. Adjusted the Municipality names provided by Comcast with the following rules to enable matching with official New Jersey Municipality reference data
    a. Changed to upper case
    b. Performed the following string replacements on the Municipality field
        i. TOWNSHIP -> TWP
        ii. BOROUGH -> BORO (only when preceded by a space)
        iii. MT. -> MOUNT
        iv. PT. -> POINT
        v. ORANGE CITY -> CITY OF ORANGE TWP (ORANGE at start of line)
    c. Removed any additional information in parentheses (I.e., appended county name)
2. Performed join between two data sources, using Municipality and County as keys
3. Dropped four military bases that did not match any municipality

4. Generated a file with Municipality, Type, County and Municipal Code
5. Joined this information with the large census blocks for each municipality, and then joined that result with the street segments for each large census block.
6. Loaded the resulting set of street segments and shapes after removing duplicates.

Download Speed

1. Speeds: Data for maximum advertised down and up speeds were taken from file "New Jersey Maximum Advertised Speeds June 30 2012.xlsx". Comcast listed the same upload speed (7) and download speed (10) for all seven MSAs they serve so these values were used. (Note: all the streets included in the street-segment data submitted by Comcast had technology code of 40, so there was no need to insert a lower speed for code 41, as was done for census block data.)

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Wednesday, February 22, 2012 6:51 AM
To: 'Ruger, Michael'
Subject: NJBB Clarification

Michael,

We wanted to verify that our processing strategy is still appropriate. During the previous rounds, we had difficulties in mapping the street-level data you provided for the large census blocks. The data is generally the same, so we anticipate similar issues. The approach we have taken was to assume Comcast offered full coverage for a set of municipalities (the list you provided is attached.) You also named three municipalities where that approach would not be advisable (Mount Olive Twp, Toms River, Berkeley Twp.). Can we use that same approach during this submission? Can you provide an updated list of municipalities or confirm that the attached list still applies?

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Ruger, Michael [mailto:Michael_Ruger@comcast.com]
Sent: Wednesday, February 22, 2012 6:53 AM
To: 'connectingnj@groups.appcomsci.com'
Subject: Re: NJBB Clarification

John--
We have not changed our communities served so the same list and logic apply. Would it help if we provided address data?
Thanks--
Michael

From: Wullert, John R II
Sent: Wednesday, February 22, 2012 6:58 AM
To: 'Ruger, Michael'; 'connectingnj@groups.appcomsci.com'
Subject: RE: NJBB Clarification

Michael,

The process we defined works well for the communities you serve completely. However, if it is still the case that you do not cover Mount Olive Twp, Toms River, Berkeley Twp completely, then address level data might be helpful there.

John

From: Ruger, Michael [mailto:Michael_Ruger@comcast.com]
Sent: Wednesday, February 22, 2012 9:15 AM
To: Wullert, John R II
Subject: RE: NJBB Clarification

John—

Let me know if this helps.

Thanks--

Michael

Michael Ruger

Senior Director, Government Affairs

Comcast Cable Communications, LLC

One Comcast Center

Philadelphia, Pennsylvania 19103

(215) 286-7586

Note: attachment was a list of 5284 addresses, all in large census blocks, including Technology of Transmission.

From: Ruger, Michael [mailto:Michael_Ruger@comcast.com]
Sent: Wednesday, February 22, 2012 1:25 PM
To: NJ Broadband Data Collection
Subject: RE: NJBB Clarification

John—

I took another look at what I sent…it's not sufficiently comprehensive to help you.

Thanks--

Michael

Michael Ruger

Senior Director, Government Affairs

Comcast Cable Communications, LLC

One Comcast Center

Philadelphia, Pennsylvania 19103

(215) 286-7586

Subject: Questions about previous data submissions
Date: Fri, 27 Jul 2012 11:39:08 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: Michael_Ruger@comcast.com

Mr. Ruger,

The NJ Broadband Mapping team has received feedback from the NTIA regarding our 4/11 and 10/11 data submissions. The NTIA contracted the Michael Baker firm who, using third-party data, evaluated the quality of data submissions it received from its grantees. Since the feedback we have received for the last two submissions is consistent, we would like to share it with you. Please note that we were not given copies of the third-party data, so the reasons for mismatches between the data we submitted and these third-party data are not always clear. Our intent is merely to share with you problematic fields, such as provider name or speed tier, that have a lot of mismatches, and do some further inquiry to better validate the provider's data. Obviously, by working more closely with you, we hope to reduce data mismatches in future submissions. Here are some of the questions we have about your data.

Comcast
- Most of your mismatches are on max advertised downstream speed (principally tier 10) and maximum advertised upstream speed (principally tier 7) for Cable Modem DOCSIS 3.0. (Please refer to speed tier tables below.)

Can you please explain how you are determining these speeds?

Thank you for your interest and continued support in our NJ BB Mapping program.

Best regards,

Cliff Behrens
Manager - NJ BB Data Collection
Applied Communication Sciences
ConnectingNJ@groups.appcomsci.com
732.699.2380

Subject: RE: Questions about previous data submissions
Date: Fri, 27 Jul 2012 15:52:01 +0000
From: Ruger, Michael <Michael_Ruger@comcast.com>
To: Connecting NJ <connectingnj@appcomsci.com>

Mr. Behrens--

I believe this issue is one that we have encountered in other states, and results from the method by which we submit data. We provide maximum advertised speed data by MSA, but not all Census blocks within an MSA may offer D3 service--in which case, a D2 Census block may reflect a maximum advertised speed coded as "10." Similarly, but less frequently, Comcast may be in the process of upgrading service to D3 but has not yet initiated advertising for D3 speeds in that area--in which case, a D3 Census block may reflect a maximum advertised speed coded as "7."

Accordingly, if a D2 Census block is in a MSA in which the overwhelming majority of Census blocks are coded as a "10," those D2 blocks should be coded as a "7." If a D3 Census block is in an MSA coded as a "7," that is likely due to the fact that Comcast has not begun advertising the D3 speeds in that MSA.

I believe in our last submission, Comcast showed 100% D3 blocks throughout the state of New Jersey and a maximum advertised download speed of "10." I am waiting for this cycle's data to confirm that this remains the case.

Please let me know if this helps, or if you would like to discuss.

Thanks--
Michael

Michael Ruger
Senior Director, Government Affairs
Comcast Cable Communications, LLC
One Comcast Center
Philadelphia, Pennsylvania 19103
(215) 286-7586

Subject: Re: Questions about previous data submissions
Date: Tue, 31 Jul 2012 13:30:07 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: Ruger, Michael <Michael_Ruger@comcast.com>

Mr. Ruger,

After reviewing your response below, our data collection team was wondering whether you can provide us with a means of distinguishing D2 and D3 census blocks within an MSA?

Cliff Behrens

Subject: RE: Questions about previous data submissions
Date: Tue, 31 Jul 2012 23:21:44 +0000
From: Ruger, Michael <Michael_Ruger@comcast.com>
To: Connecting NJ <connectingnj@appcomsci.com>

Cliff--

Let me take a look at the data that is being finalized to determine the extent of this issue in New Jersey based on the June 30 data. That will direct the easiest way to solve the issue.

Thanks--

Michael

Subject: RE: NJ Broadband Data Collection - Fall 2012
Date: Thu, 9 Aug 2012 14:01:29 +0000
From: Ruger, Michael <Michael_Ruger@comcast.com>
To: Connecting NJ <connectingnj@appcomsci.com>

Good morning--

I have Comcast's broadband data update ready to file. In the past I have sent the data directly to Shelly Bates; may I do so again this time?

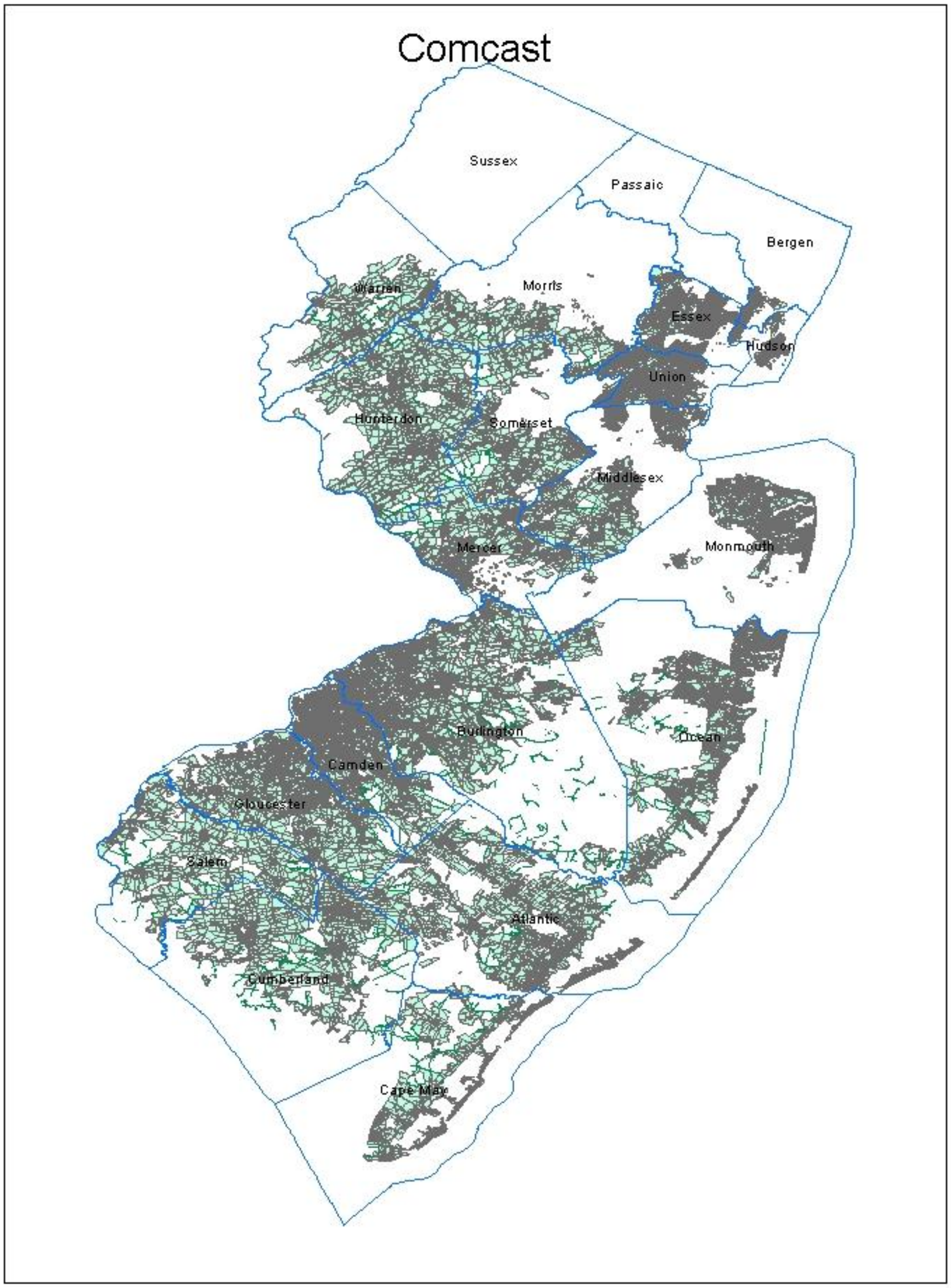
Also, I note that Comcast provides D3 throughout New Jersey, so there should be no disconnect between the Census block data and maximum advertised speeds.

Thanks--

Michael

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.8 Dieca/Covad

Connecting New Jersey - Broadband Provider Data Report

Provider: Dieca DBA Covad
Received: July 2012
Submission date: October 2012

This report presents details on processing broadband data for delivery to the National Telecommunications and Information Administration.

Sections:

23. NDA Status
24. Submission Overview
25. Submission File Details
26. Data Validations and Results
27. Data Transformation and Loading
28. Clarification Questions and Provider Responses
29. Notes and Open Issues
30. Overview Map of Submitted Data

Section 1: NDA Status

NDA was executed with NJ OIT.

Section 2: Submission Overview

AVAILABILITY DATA				
ID	Provider name		DIECA Communications, Inc.	
	"Doing business as" name		Covad Communications Company	
	FRN		0003753753	
FOR WIRELINE				
Filetypes				
File size				
Speeds	Type		Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)	Speeds are provided at address (line segment) and census block granularity.
	Typical-upstream		Address & block	
	Typical-downstream		Address & block	

	Advertised-upstream		Address & block
	Advertised-downstream		Address & block
	Subscriber-weighted-up		county level
	Subscriber-weighted-down		county level
Technology Type	10 (ADS), 20 (SDSL), 30 (other copper)		
End-user specification	Not provided		
Comments:			

INTERCONNECTION DATA	
ID	File **MiddleMileConnection*.txt
File size	1kb
Ownership	1
Transport Type	
Data Rates/Capacity	4, 5
Location	5 locations
Comments: Five (5) data rows provided	

Section 3: Submission File Details

Received a zip file by SECURE UPLOAD in July 2012:

Size	**Name**
700790	DIECACommunicationsInc._NJ_CONFIDENTIAL.zip

The original archive contains the following five (5) files:

Size	**Name**
82717	NJBB_0003753753_AddressSegmentAvailability_DIECACommunicationsInc._CONFIDENTIAL.txt
20361729	NJBB_0003753753_CensusBlockAvailability_DIECACommunicationsInc._CONFIDENTIAL.txt
2509	NJBB_0003753753_CMAAdvertisedAvailability_DIECACommunicationsInc._CONFIDENTIAL.txt

630	NJBB_0003753753_MiddleMileConnection_DIECACommunicationsInc._CONFIDENTIAL.txt
2240	NJBB_0003753753_SubscriberWeightedNominalSpeed_DIECACommunicationsInc._CONFIDENTIAL.txt

Section 4: Data Validation and Results

Section 5: Data Transformation and Loading

The following describes the validations and transformations that were applied to the submitted data.

NTIA Table BB_ConnectionPoint_MiddleMile

Since the data is exactly the same as the last submission with one less record and there is no change in NTIA data model, the table is copied from the 2012 April table, using an ESRI tool, "ArcToolBox->Data Management Tools->General->Append" with NO_TEST in the Schema Type option and one record is removed.

Below is description for the April 2012 model as a reference.

Loaded from supplied file "..MiddleMileConnection..". The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column Provider Name
DBANAME	As supplied in column DBA Name
FRN	As supplied in column FRN
OWNERSHIP	As supplied in column Ownership
BHCAPACITY	As supplied in column Serving Facility Capacity
BHTYPE	As supplied in column Service Facility Type
LATITUDE	As supplied in column Latitude
LONGITUDE	As supplied in column Longitude
ELEVFEET	As supplied in column Elevation
STATEABBR	Set to "NJ"
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau reference data
SHAPE	Point shape created using ESRI

Internal notes on processing:

14. The data included the following fields:
    a. Provider Name
    b. DBA Name
    c. FRN
    d. Ownership
    e. Serving Facility Capacity
    f. Service Facility Type
    g. Latitude
    h. Longitude
    i. Street Address (blank)
    j. Elevation
15. There are 6 rows, different from the last submission. Viewing the data in ArcMap indicates that all points are in New Jersey.
16. Created an Excel sheet and imported to a geodatabase table.

    (The column data format of the FRN should be Text, not General. Save the excel in the 97-2003 format)
17. Added a point shape to each row corresponding to the Latitude, Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option. Specify WGS84 for the coordinate system of the points. Result is feature class middlemile_point_tol.
18. Added a column "geoid10" with the ID of the containing year 2010 census block via a spatial join of the points. Result is feature class middlemile_point_tol_cb.
19. Populated stateabbr and FRN column during data transformation and loaded table.

NTIA Table BB_Service_CensusBlock

Loaded from supplied file "..CensusBlockAvailability..". The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	As supplied in column Provider_Name
DBANAME	As supplied in column DBA_Name
PROVIDER_TYPE	Set to 1
FRN	As supplied in column FRN
STATEFIPS	Set to "34" (NJ)
COUNTYFIPS	Populated from Census_Block_ID (digits 3 to 5)
TRACT	Populated from Census_Block_ID (next 6 digits)
BLOCKID	Populated from Census_Block_ID (remaining 4 digits)
FULLFIPSID	As supplied in column Census_Block_ID
TRANSTECH	As supplied in column Technology_of_Transmission

MAXADDOWN	As supplied in column Maximum_Advertised_Downstream_Speed
MAXADUP	As supplied in column Maximum_Advertised_Upstream_Speed
TYPICDOWN	As supplied in column Typical Downstream Speed
TYPICUP	As supplied in column Typical Upstream Speed
ENDUSERCAT	Set to null because not supplied
SHAPE	As found in Census Bureau year 2010 reference data

Internal processing notes:

6. Following data fields were supplied:
    a. Provider Name
    b. DBA Name
    c. FRN
    d. Census Block ID
    e. Street NameStreet Segment ID (TLID)
    f. Technology of Transmission
    g. Maximum Advertised Downstream Speed
    h. Maximum Advertised Upstream Speed
    i. Typical Downstream Speed
    j. Typical Upstream Speed
7. The supplied text file has 214,332 rows which exceeds number of census blocks in New Jersey because multiple technologies were submitted.
8. Typical speeds were used as provided.
9. We used Census Bureau reference data for Year 2010 to locate and submit geographic features (i.e., shapes) for each census block.
10. Total rows (shapes) loaded is 214,331.
11. Validation rules produced a warning on 9,681 census blocks that had a transtech of 10 (ADSL) and a download speed code of 7 (10-25 Mbps). We reported this to the provider, who confirmed the submitted data. The provider offers ADSL2+, with a download speed of 15 Mbps, in select areas in New Jersey.

NTIA Table BB_Service_RoadSegment

Loaded from supplied File "..AddressSegmentAvailability..". The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column Provider_Name
DBANAME	As supplied in column DBA_Name
PROVIDER_TYPE	Set to 1
FRN	As supplied in column FRN

ADDMIN	Set to the least of the non-empty address numbers from TigerLine
ADDMAX	Set to the greatest of the non-empty address numbers from TigerLine
PREDIR	Set to null (no value supplied)
STREETNAME	As supplied (has all street components, not just name)
STREETTYPE	Set to null (no value supplied)
SUFFDIR	Set to null (no value supplied)
CITY	Set to null (no value supplied)
STATECODE	Set to “NJ”
ZIP5	Set to zipl from TigerLine
ZIP4	Set to null (no value available in reference data)
TRANSTECH	As supplied in column Technology_of_Transmission
MAXADDOWN	As supplied in column Maximum_Advertised_Downstream_Speed
MAXADUP	As supplied in column Maximum_Advertised_Upstream_Speed
TYPICDOWN	As supplied in column Typical Downstream Speed
TYPICUP	As supplied in column Typical Upstream Speed
SHAPE	Road segment shape from Year 2010 TigerLine reference data, as matched by TLID

Internal processing notes:

1. The following data fields were submitted
    a. Provider Name
    b. DBA Name
    c. FRN
    d. Census Block ID
    e. Technology of Transmission
    f. Maximum Advertised Downstream Speed
    g. Maximum Advertised Upstream Speed
    h. Typical Downstream Speed
    i. Typical Upstream Speed
2. There were 704 input rows. One was row was removed as a duplicate, in terms of county and Tiger Line ID. After a join against Census Bureau 2010 reference data, no rows were discarded based on compound key of county, TLID, and tech_transmission fields. Total rows (shapes) loaded is 703.

Section 6: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Thursday, February 23, 2012 9:00 PM

To: 'Stefanie Santa-Esparza'
Cc: NJ Broadband Data Collection
Subject: NJ Broadband Clarification

Stefanie,

The NTIA has provided additional validation rules for us to apply to the data during this round. One of these rules raises and warning, and requires additional clarification, in cases where ADSL is reported with a speed code of 7 (10-25 Mbps). In the data you supplied, there are about 15,000 census blocks that meet this condition. Can you please confirm that these values are correct? A few of the census blocks with this combination are listed below.

Thanks for your help,

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

340030010005000

340030010005001

340030010005002

340030010005003

340030010005004

340030010005005

340030010005006

340030010005008

340030010005010

From: Stefanie Santa-Esparza [mailto:Stefanie.Santa-Esparza@megapath.com]
Sent: Friday, February 24, 2012 12:21 PM
To: 'NJ Broadband Data Collection'
Subject: RE: NJ Broadband Clarification

John,

Our highest bandwidth asymmetric DSL is ADSL2+ for which we have a 15.0Mbps/1.0Mbps offering, in limited parts of the state. Actually, at the beginning of this month, we reduced our ADSL2+ deployment in NJ from 54 central offices down to 35 central offices, but the blocks specified in our Round 5 submission indeed represent our 2011 Year End coverage.

Thanks,

Stefanie

Subject: Questions about previous data submissions
Date: Fri, 27 Jul 2012 11:26:52 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: SSanta@covad.com

Stefanie,

The NJ Broadband Mapping team has received feedback from the NTIA regarding our 4/11 and 10/11 data submissions. The NTIA contracted the Michael Baker firm who, using third-party data, evaluated the quality of data submissions it received from its grantees. Since the feedback we have received for the last two submissions is consistent, we would like to share it with you. Please note that we were not given copies of the third-party data, so the reasons for mismatches between the data we submitted and these third-party data are not always clear. Our intent is merely to share with you problematic fields, such as provider name or speed tier, that have a lot of mismatches, and do some further inquiry to better validate the provider's data. Obviously, by working more closely with you, we hope to reduce data mismatches in future submissions. Here are some of the questions we have about your data.

Provider Name: DIECA Communications, Inc.; DBA Name: Covad Communications Co.
- Your data seem to have many provider name mismatches. Might this be attributed to recent M&A activities?
- On those records where the provider name matches the third-party data, there seem to be a large number of transfer technology mismatches, and these primarily involve transtech code 20 (SDSL) and code 30 (Other Copper Wireline).
- Most mismatches on max advertised downstream speed involve tiers 5 & 7. (Please refer to downstream speed tier table below.)
- Most mismatches on max advertised upstream speed involve tiers 3, 5 & 7. (Please refer to upstream speed tier table below.)

We are wondering whether you can help us better understand these discrepancies?

Thank you for your interest and continued support in our NJ BB Mapping program.

Best regards,

Cliff Behrens

Subject: RE: Questions about previous data submissions
Date: Thu, 2 Aug 2012 15:48:59 -0700
From: Katherine Mudge <Katherine.Mudge@megapath.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>
CC: Stefanie Santa-Esparza <Stefanie.Santa-Esparza@megapath.com>

Cliff:

Sorry for the delay in responding - I ended up on some unexpected business travel.

Here are our observations and responses to your questions. Once you've had a chance to review, please let us know if you have any other questions.

NJ: Your data seem to have many provider name mismatches. Might this be attributed to recent M&A activities?

Response: More than half of our lines in each state are supplied via ISP resellers, where we provide the underlying internet connectivity in a wholesale capacity for service that is otherwise branded, billed and supported as the ISP's own service. For over 90 of our resellers, we perform a layer 2 network handoff, such that the reseller's IP address space is what would be visible via the internet as well. This makes it impossible for a third party data collector to know these are being served by our last mile infrastructure without detailed cooperation from each ISP. Of course, if supplied a few example instances of these purported mismatches, we could readily provide an exact analysis.

NJ: On those records where the provider name matches the third-party data, there seem to be a large number of transfer technology mismatches, and these primarily involve transtech code 20 (SDSL) and code 30 (Other Copper Wireline).

Response: Our branding does not necessarily make it clear what underlying technologies are being used to provide service, so it is likely that a third party data collector has made incorrect assumptions in some situations. For example, we offer "TeleSpeed" and "Ethernet" branded services that may be utilizing symmetric DSL or other copper wireline technology. In a few cases, we also have legacy residential "TeleSurfer" services that may be utilizing symmetric or asymmetric DSL technology. Again, if we could be supplied a few examples, we could readily provide a exact analysis.

NJ: Most mismatches on max advertised downstream speed involve tiers 5 & 7. (Please refer to downstream speed tier table below.) AND Most mismatches on max advertised upstream speed involve tiers 3, 5 & 7. (Please refer to upstream speed tier table below.)

Response: In the case where a third party data provider may have found faster than reported speed, this may be due to the filing requirement that we report only services that can be installed within a typical service interval. From time to time, we also change our network deployment which could result in an increase or decrease in maximum available speed. Also, in our own direct business, we did not always sell our maximum provisionable speed, even though we made these offerings available to our resellers. We will be happy to provide more precise explanation if given actual examples.

Again, I trust that our additional information responds to your questions. Please let us know if you need anything else.

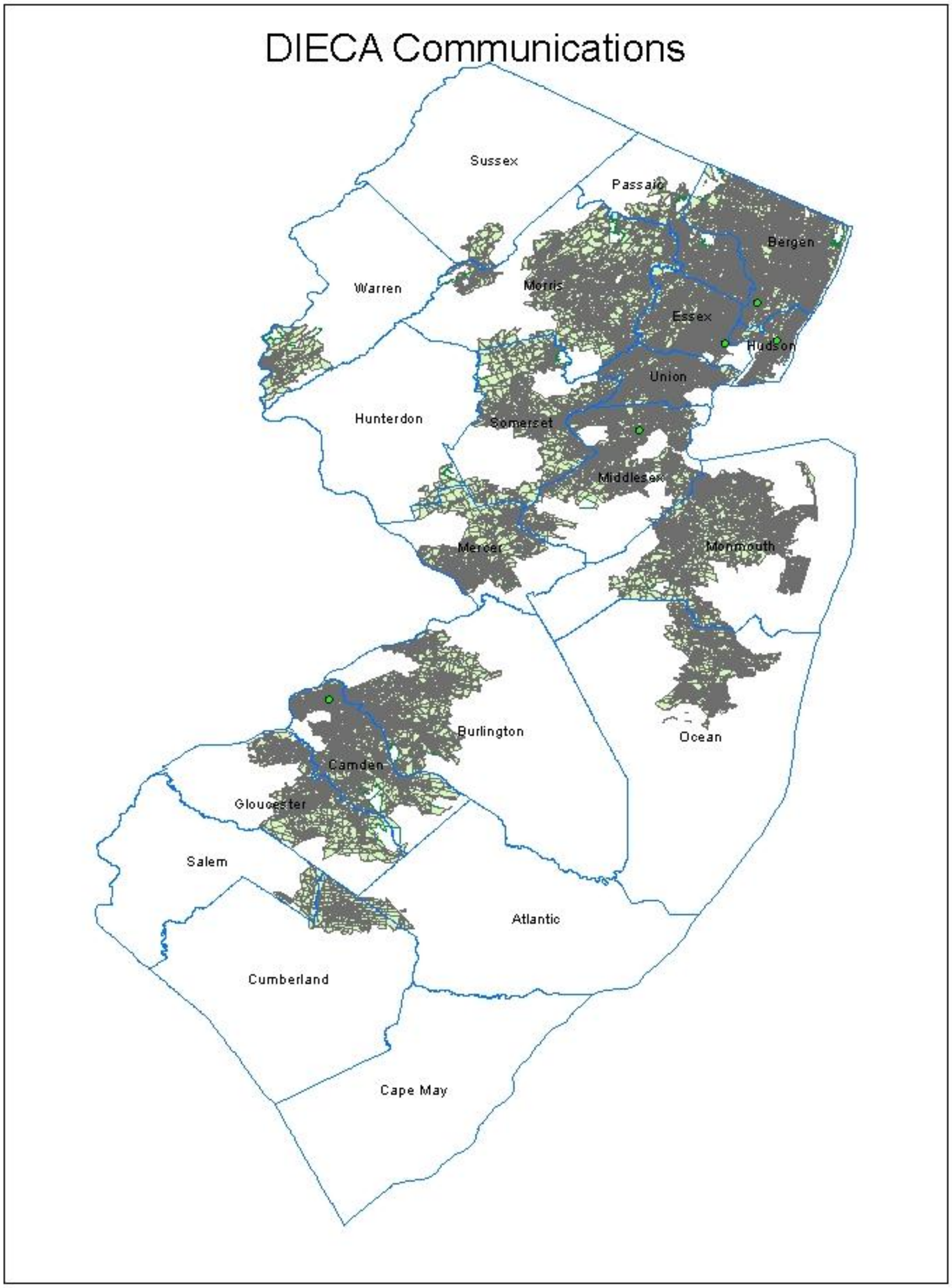
Katherine K. Mudge
Director, State Affairs & Litigation

1835-B Kramer Ln., Ste. 100
Austin, Texas 78758
(512) 794-6197 (T)
(512) 794-6006 (F)

Section 7: Notes and Open Issues

The provider submitted the file "..CMAAdvertisedAvailability..", which provides three technology codes (10, 20, 30), MSA codes, and max advertised up and down speed codes. The max speed for a given technology is different for different MSAs. We did not use this data since max speed codes were provided on a row-by-row basis.

Section 8: Overview Map of Submitted Data



6.9 GOES Telecom

Broadband Provider Data Report

Provider: GOES Telecom
Received: August 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

None

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN
Holding company name
Holding company number</td><td>GOES Telecom
Not provided
0011437746
GOES
130548</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">1 Excel</td></tr>
<tr><td>File size</td><td colspan="2">worksheet 20 bytes, 23 data rows</td></tr>
<tr><td>Speeds</td><td><table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
</table></td><td>Submitted 24 addresses with upload and download speeds (generally in kbps) for each address. These are delivered speeds to customers. We located advertised speeds on their Web site, and provider confirmed that those speeds were available at each location they served. We will use the data from Web site as advertised speeds.

Note that for two addresses, submitted speeds “10mpbh”. They confirmed this should be</td></tr>
</table>

	Subscriber-weighted-down	Not provided	10Mbps. Note also that some speeds are listed as having faster upload speeds than download speeds. All of these values are less than broadband speeds, so are not relevant. No typical or subscriber weighted speeds were provided.
Technology Type	10 (ADSL) and 70 (Terrestrial fixed wireless)		
End-user specification	None		
Comments: Provided a list of 24 customers and the speeds they are subscribed to. Most are 128K up, 512K down.			
INTERCONNECTION DATA			
ID	None provided		
File size			
Ownership			
Transport Type			
Data Rates/Capacity			
Location			
Comments:			

Section 3: Submission File Details

Received 1 file by email:

Size **Name**

20,000 20120228 Telcordia.xls

The file contains a list of addresses and max speeds; e.g., the “up-to” limit of their rate plan. The addresses in this file appear to be for individual customers (as opposed to addresses of multi-tenant buildings in a central business district).

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_CensusBlock

Loaded from supplied file "20120228 Telcordia_update.xls" (24 data rows). The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to "Global Online Electronic Services, Inc."
DBANAME	Not supplied; set same as PROVNAME
PROVIDER_TYPE	Set to 1
FRN	Set to "0011437746"
STATEFIPS	Set to "34" (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (digits 2-5)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	As supplied in column Technology Code
MAXADDOWN	Set to code 4 per March 2011 email response to questions
MAXADUP	Set to code 3 per March 2011 email response to questions
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Copied from Census Bureau 2010, as matched by spatial join on geocoded address point

Internal processing notes:

7. Geocoded the addresses using the Google geocoder to obtain latitude, longitude value pairs. Of 24 original records, all were successfully geocoded.
8. Created point shapes using ESRI from lat, long value pairs.
9. Spatially joined the points with Census Bureau Year 2010 reference data to find the containing census block. This yielded census-block attributes including the block ID ("geoid10").
10. Verified that all 24 records joined successfully with NJ census blocks
11. Dropped 16 records that did not have broadband speeds
12. Dropped 2 records because of duplicate census blocks (caused by multiple customer addresses in the same census block).

13. All remaining records were verified to be in small (< 2 square miles) census blocks.
14. Loaded the resulting data into an SDE feature class.

NTIA Table BB_Service_Wireless

Loaded using shapes from reference data for the records that indicates wireless technology. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to “Global Online Electronic Services, Inc.”
DBANAME	Not supplied; set same as PROVNAME
FRN	Set to "0011437746"
TRANSTECH	Set to 70 as supplied in XLS sheet
SPECTRUM	Set to 6
MAXADDOWN	Set to 7
MAXADUP	Set to 7
TYPICDOWN	Set to null
TYPICUP	Set to null
STATEABBR	Set to “NJ”
SHAPE	Year 2010 Census Block shape obtained from reference data.

Internal processing notes:

21. Processed, as described above (points 1 – 7).
22. Spectrum: Set to 6, Unlicensed
23. Speeds: The fixed-wireless link is reported with 10Mbph, which we confirmed with provider is actually 10Mbps in each direction (symmetric). That corresponds to NOFA speed code 7. Provider also noted that they only have one fixed-wireless site.

Validation rules produced a warning on the wireless shape record for the combination of upstream and downstream speed codes of 7 (10-25 Mbps) with a transtech code of 70 (Fixed Wireless - Unlicensed). The provider has only a single fixed wireless site, and it is used for point-to-point links, rather than to provide a coverage area. The provider confirmed that the speed is 10 Mbps.

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Friday, March 02, 2012 7:15 AM

To: 'georgeb@tricaps.com'
Subject: RE: Goes Telecom Telicordia data

George,

I wanted to confirm the speed values you included in the data you submitted. I have three questions:

1. In the past, we had used the data from your Web site to determine your maximum advertised upload and download speeds. I still see 1536K Downstream/768K Upstream as the fastest DSL speed you deliver. Is that correct?
2. You report two fixed wireless sites as “10mpbh”. Is that really mega-bits-per-hour? That comes to about 2.8 Mbps. Is that correct?
3. When we have spoken in the past, you reported that you use fixed wireless for point-to-point links, rather than to cover a wider area. Is that still correct?

Thanks for your participation,

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

From: georgeb@tricaps.com [mailto:georgeb@tricaps.com]
Sent: Monday, March 05, 2012 11:08 AM
To: NJ Broadband Data Collection
Subject: Re: Goes Telecom Telicordia data

Hi John,

I got the answers. See blow.

Thanks,

George

George,

I wanted to confirm the speed values you included in the data you submitted. I have three questions:

1. In the past, we had used the data from your Web site to determine your maximum advertised upload and download speeds. I still see 1536K Downstream/768K Upstream as the fastest DSL speed you deliver. Is that correct?

   Yes

2. You report two fixed wireless sites as “10mpbh”. Is that really mega-bits-per-hour? That comes to about 2.8 Mbps. Is that correct?

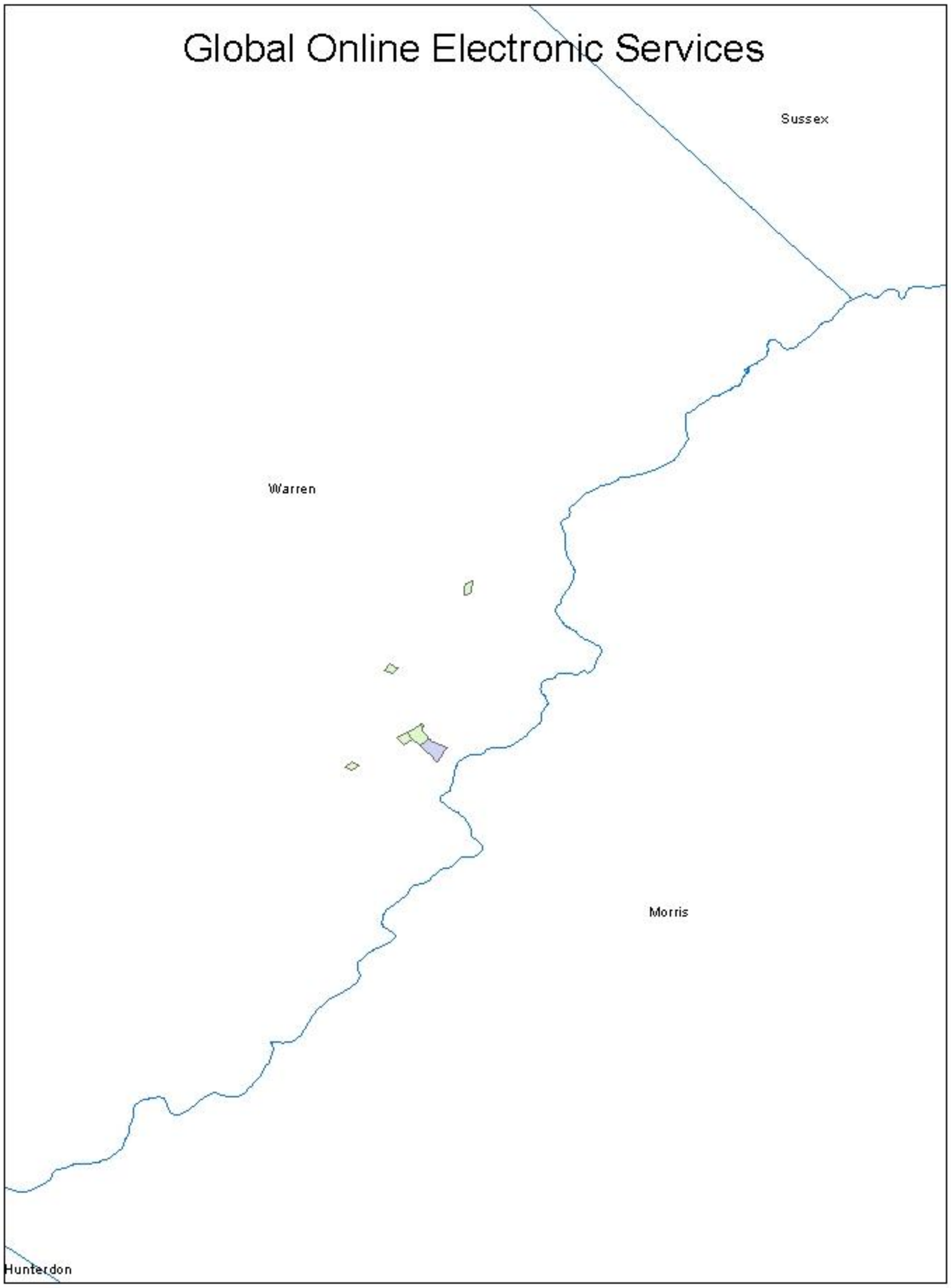
   No, the correct speeds are 10mbps and we now only have a single fixed wireless link instead of two.

3. When we have spoken in the past, your reported that you use fixed wireless for point-to-point links, rather than to cover a wider area. Is that still correct?

   Yes

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.10 Hometown Online

Connecting New Jersey - Broadband Provider Data Report

Provider: Hometown Online
Received: August 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

No NDA in place.

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN</td><td>Hometown Online Inc.
Warwick Online
0006-6512-44</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">Text</td></tr>
<tr><td>File size</td><td colspan="2">1,764,352 bytes; 6,778 rows</td></tr>
<tr><td>Speeds</td><td><table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>Not provided</td></tr>
</table></td><td>Provided list of customer locations with column “DSL speed avail”. This is probably downstream speed, but need to verify with provider.

Communications with provider and validation via their Web site resulted in clarification: Max advertised ADSL speeds are:
Downstream: 15 Mbps
Upstream: 800 Mbps.</td></tr>
<tr><td>Technology Type</td><td colspan="2">DSL – Previous interactions with provider revealed that Census tract 3714 has SDSL, all others are ADSL</td></tr>
</table>

End-user specification	Not provided
Comments: Address data with some indications of qualification for different data services.	
INTERCONNECTION DATA	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: No connection-point data provided	

Section 3: Submission File Details

Received one (1) file by EMAIL:

Size	**Name**
1,061,712	NJ Final 8-14-12.xlsx

The file contains 7054 rows of data. Each row has a street address. All rows have an indication of maximum possible DSL speed. Some indicate 5Mbps, some 15Mpbs and some 30Mbps. Also has information about TV qualification, which we will ignore.

Section 4: Data Validation, Transformation and Loading

This section details the validations and transformations we applied to the provider submitted data.

NTIA Table BB_Service_CensusBlock

Loaded from the supplied file after geocoding. The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	Set to “Hometown Online Inc.”

DBANAME	Set to “Warwick Online”
PROVIDER_TYPE	Set to 1
FRN	Set to “0006651244”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block 2010 (digits 2-5)
TRACT	Populated from Census Block 2010 (next 6 digits)
BLOCKID	Populated from Census Block 2010 Code
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block 2010 Code
TRANSTECH	Census blocks in census tracts starting with 3714 were set to code “20” (SDSL) All others set to code “10” (ADSL), (per provider email)
MAXADDOWN	Set to code “7” (range includes 15Mbps, per email)
MAXADUP	For ADSL: Set to code “3” (range includes 1Mbps, per email) For SDSL: Set to code “7” (range includes 15Mbps, per email)
TYPICDOWN	Set to null, not supplied
TYPICUP	Set to null, not supplied
SHAPE	Copied from Census Bureau TigerLine 2000, as matched by spatial join on geocoded address point

Internal processing notes:

15. The following steps were performed when the data was submitted and the results were re-used for this round
    a. All addresses were successfully geocoded using Arroyo with the Yahoo geocoder. Four records failed to spatially join on 2010 NJ Census Block shapes.
    b. Created an excel sheet and imported to a geodatabase table.
    c. Added point shapes corresponding to each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
    d. Added a column containing the ID of the containing year 2010 census block via a spatial join of the point shapes and the census block shapes from reference data.
16. Discarded 6579 rows with duplicate census blocks, leaving 465 unique census blocks.
17. Discarded 3 census blocks larger than 2 square miles.
18. Loaded 462 blocks.
19. Validation rules produced a warning on 404 census blocks that had a transtech of 10 (ADSL) and a download speed code of 7 (10-25 Mbps). We searched the provider’s Web site for speed information. We only found one reference to speed packages, and these values and the Web page seemed out of date. We sent a request for clarification to the provider. The provider

acknowledged the validation requirements, indicated that the Web page found by our search was in error and confirmed the submitted speed values. The president of the company also indicated that they would be launching a new Web site with corrected speed information in the near future.

Section 5: Clarification Questions and Responses

From: Scott Sommerer [mailto:s.sommerer@wvtcg.com]
Sent: Wednesday, February 22, 2012 7:21 PM
To: NJ Broadband Data Collection
Cc: shelley.bates@oit.state.nj.us
Subject: RE: Reminder - NJ Broadband Data Collection

Dear Sir or Madam:

I have investigated with technicians and engineers. Our data is totally unchanged from last year's submission

Have A GREAT DAY

J. Scott Sommerer

845 986 2250

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Thursday, February 23, 2012 8:11 PM
To: 'Scott Sommerer'
Cc: NJ Broadband Data Collection
Subject: RE: Reminder - NJ Broadband Data Collection

Scott,

As I mentioned, we have additional validations to perform. NTIA is questioning reported DSL speeds over 10 Mbps. In our previous interactions, you had given us the following speeds:

ADSL: 15 Mbps and uploads of 800 kbps.

SDSL: 15 Mbps up and down (available in Census tract 3714)

I see on your Web site now the packages you offer are at 512, 1 Mbps and 2 Mbps. Should we be using 2 Mbps as the download speed? Does this apply for both ADSL and SDSL?

Thanks in advance for the clarification.

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Scott Sommerer [mailto:s.sommerer@wvtcg.com]
Sent: Tuesday, February 28, 2012 10:35 AM
To: NJ Broadband Data Collection
Cc: Ginny Quackenbush
Subject: RE: Reminder - NJ Broadband Data Collection

John

I appreciate your validation requirements.

No, do not use 2 Mbps. Our website is inaccurate. Please use the submission from last year. With the higher speeds.

J. Scott Sommerer

From: Ginny Quackenbush [mailto:g.quackenbush@wvtc.com]
Sent: Tuesday, February 28, 2012 11:51 AM
To: Scott Sommerer; NJ Broadband Data Collection
Cc: Jean Beattie
Subject: RE: Reminder - NJ Broadband Data Collection

Good Afternoon,

FYI, we will be launching a new website by or before the end of March.

Our new website will have the correct information.

Thank you very much.

Virginia Quackenbush
President, Warwick Valley Telephone Company
47 Main Street - PO Box 592
Warwick, NY 10990

Section 6: Notes and Open Issues

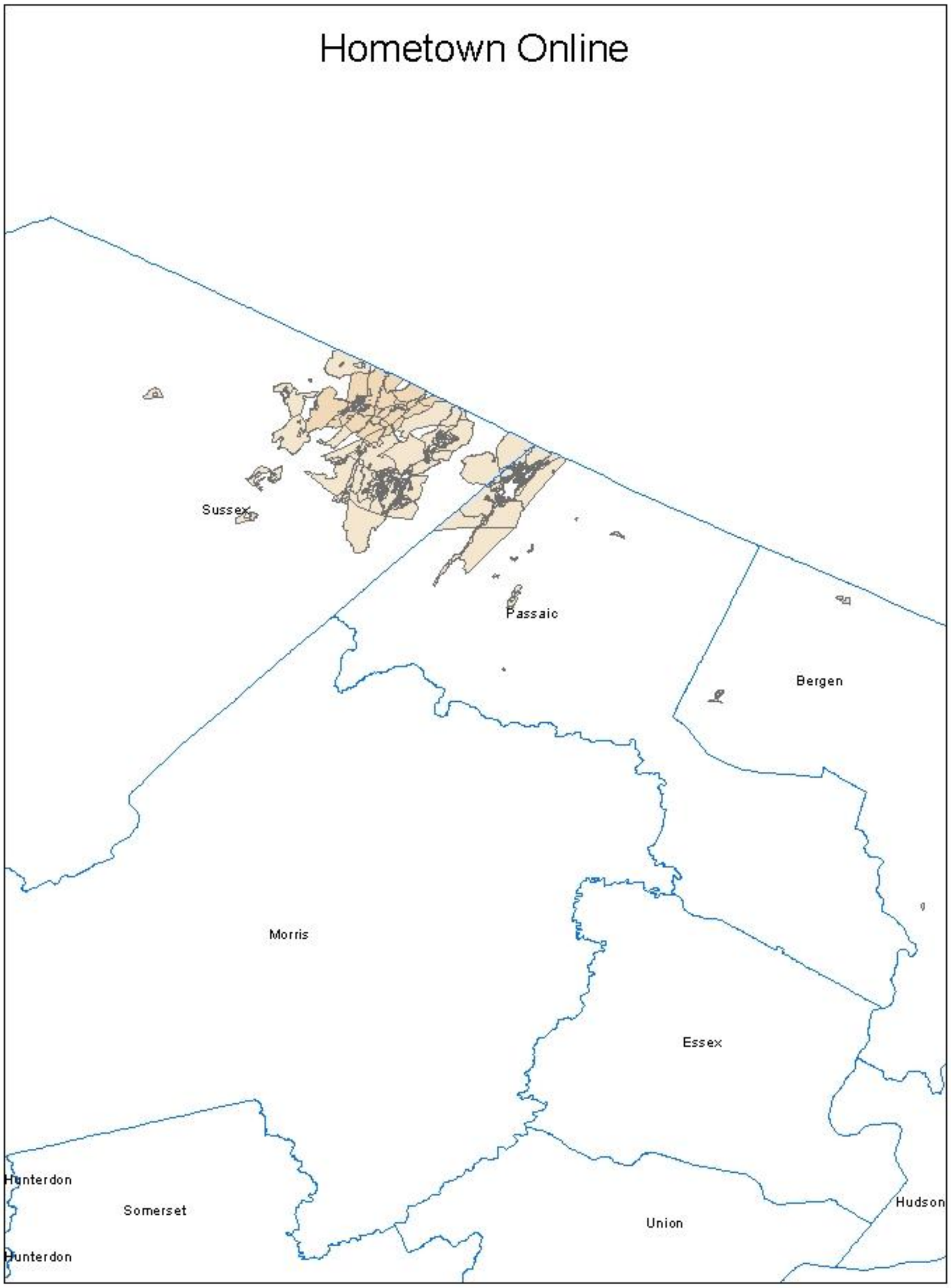
Provider had provided the following information via email in prior rounds and confirmed again this round:

Maximum advertised download speed is 15 Mbps for both ADSL and SDSL

Maximum upload speed for ADSL is 800 Kbps

SDSL is available in census tract 3714xx, all other locations are ADSL

Section 7: Overview Map of Submitted Data



6.11 HughesNet Communications

Connecting New Jersey - Broadband Provider Data Report

Provider: HughesNet Communications Inc.
Received: August 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NONE

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td rowspan="3">ID</td><td>Provider name</td><td>Hughes Network Systems, LLC</td></tr>
<tr><td>“Doing business as” name</td><td>HughesNet</td></tr>
<tr><td>FRN</td><td>0017434911</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">CSV file with list of Year 2000 census blocks, plus email information on speed</td></tr>
<tr><td>File size</td><td colspan="2"></td></tr>
<tr><td>Speeds</td><td>
<table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Provided</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Provided</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>Not provided</td></tr>
</table>
</td><td>Submitted CSV file with list of 141,363 records of Y2000 census blocks, specified by fips code, census tract and block. Note that this exceeds number of Y2000 census blocks in NJ.

Email message contained an description of speeds: 2Mbps down, 300Kbps up. The corresponding speed range codes are 4 down, 2 up.

Spectrum is 9, satellite.</td></tr>
<tr><td>Technology</td><td colspan="2">Code 60 (Satellite)</td></tr>
</table>

Type	
End-user specification	
Comments:	
INTERCONNECTION DATA: NONE	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: Not provided	

Section 3: Submission File Details

Received an email containing a link to the submission data (census blocks) together with the necessary credentials. All other information reused from the previous rounds.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_Wireless

The following table explains the transformations that were applied.

Table Column	**Data Source / Transformation**
PROVNAME	Set to "Hughes Network Systems, LLC"
DBANAME	Set to "HughesNet"
FRN	Set to 0017434911
TRANSTECH	Set to 60
SPECTRUM	Set to 9 per translation shown below
MAXADDOWN	Set to 4, see below.

MAXADUP	Set to 2", see below.
TYPICDOWN	Not provided, set to null
TYPICUP	Not provided, set to null
STATEABBR	Set to "NJ"
SHAPE	Single shape created from CBs (See below).

Internal notes on processing:

24. Spectrum: No statement was provided. The NTIA data model has a single column for spectrum. As per the latest clarifications, satellite corresponds to NTIA "SPECTRUM USED" code value 9.
25. We concatenated the fips code, census tract and block values into a census block ID. In some cases the census tract values had less than six digits. In some cases the block id had less than four digits. In these cases, leading zeros were added to the values to pad the values to the correct length.
26. In 21 cases, the values for block ID and census tract were filled in with spaces. We attempted to pad these out with zeros, but the resulting census block IDs did not match any NJ census block. These 21 records represent the amount by which the submission exceeded the count of Y2000 NJ census blocks. These were dropped.
27. We verified that all of the resulting census block IDs were unique.
28. We compared the census block IDs generated from the submission with the set of 141,342 Y2000 census blocks for New Jersey. All NJ census blocks (large and small) were matched. .
29. Speeds: For maximum advertised speeds we encoded the down speed as value 4 (range 1.5-3 Mbps) and encoded the up speed as value 2 (range 200 Kbps -- 768 Kbps).
30. We merged the census blocks into a single shape with the suffix "_dissol" using the ArcGIS "Dissolve" tool.
31. The resulting shape passed all NTIA validations

Section 5: Clarification Questions and Responses

From: Alok Mathur [mailto:Alok.Mathur@hughes.com]
Sent: Monday, March 12, 2012 1:17 PM
To: Wullert, John R II
Cc: Mark Wymer
Subject: RE: NJ Broadband Data Collection

John

You may download listing of each of the FIPS Code, Census Tract and Block where Hughes Network coverage is available at download speeds of up to 2 mbps and upload speeds of up to 300 kbps.

https://REDACTED

username: REDACTED

password: REDACTED

For the most recent data, please use the following folder;

/ Home/ ex_hns_pickup/ 201201 - Census 2000/

Thanks

Alok

Alok Mathur

PMP, CISA, CIPP, CRISC

Senior Director – Revenue Management

Hughes Network Systems, LLC., Germantown, MD 20876, USA.

Subject: Re: URGENT: Response Requested: Get your Broadband Services on the National Broadband Map
Date: Fri, 07 Sep 2012 17:59:31 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: Alok Mathur <Alok.Mathur@hughes.com>

Alok,

Sorry for another note but the word I am getting back from the person who is loading all of the data we receive is that the attached CSV file is effectively identical to the zipped file (and to the file from your previous submission). Moreover, after downloading the files once again (from the exact location you indicated) and comparing the data with the previous submission, there are no differences. After unzipping, the date on the file is 1/27/2012 even though the zip file itself has the date 8/14/2012.

Please understand that, if necessary, we are willing to resubmit your data without updates; I just was operating on the impression that you wished to submit data more recent than the last April submission. Please let me know what you want to do.

Regards,

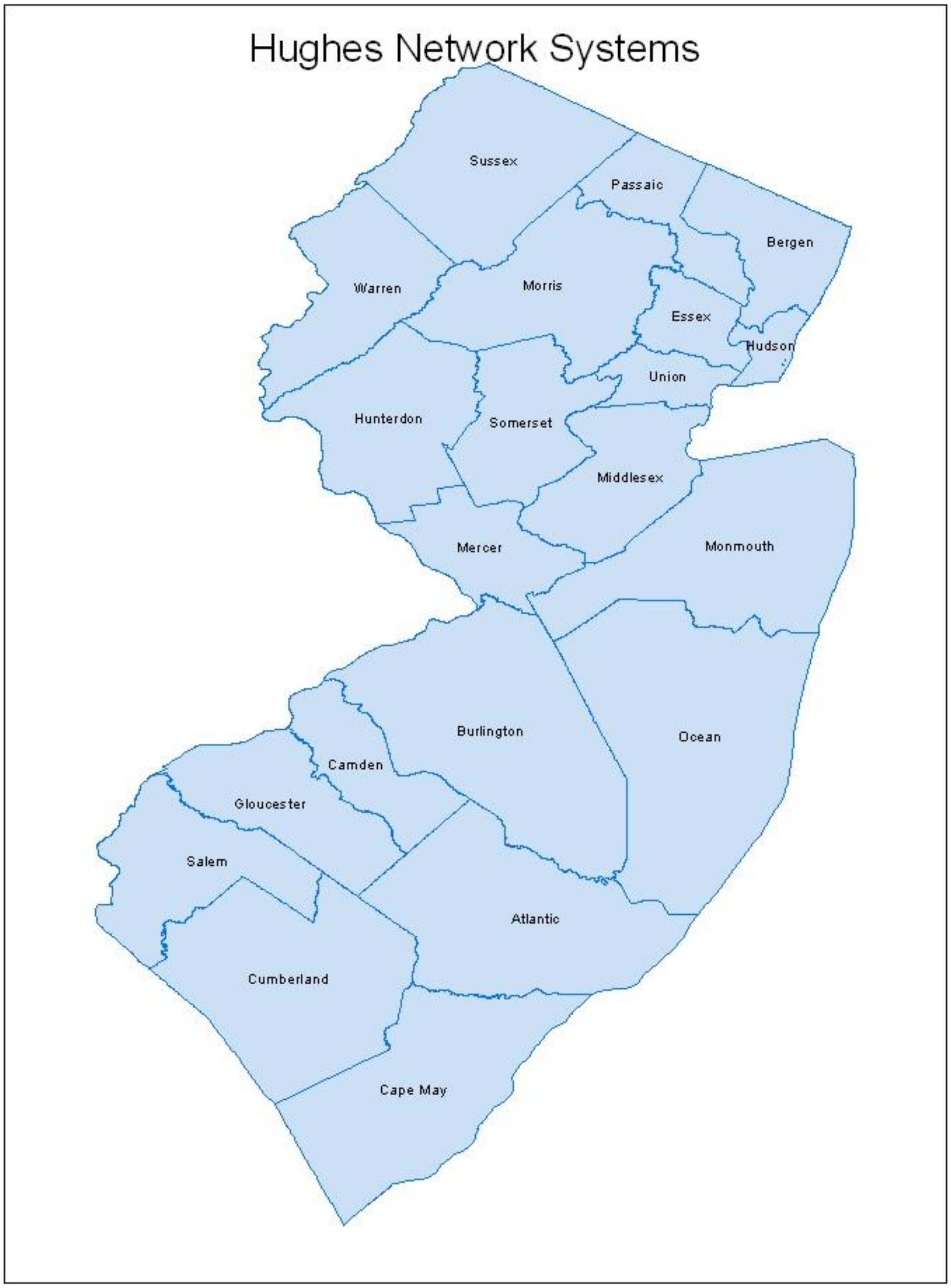
Cliff

Subject: RE: URGENT: Response Requested: Get your Broadband Services on the National Broadband Map
Date: Mon, 10 Sep 2012 08:39:08 -0400
From: Alok Mathur <Alok.Mathur@hughes.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>

Cliff
Your observation is correct. There is no change in the HughesNet coverage since last submission. HughesNet is available in the entire state of New Jersey. Files were updated on 8/14 to ensure that we have the most recent data.
Thanks
Alok

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.12 Jersey Shore Wireless

Broadband Provider Data Report

Provider: Jersey Shore Wireless
Received: March 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

For October 2012:

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Section 1: NDA Status

None

Section 2: Submission Overview

AVAILABILITY DATA		
ID	Provider name	Jersey Shore Wireless
	"Doing business as" name	Duxpond Communications
	FRN	0011543782
FOR WIRELESS		
Filetypes	shapefile collection: shp/dbf/prj/shx, mdb, gdb, imagefile etc.	Images files (jpegs) depicting coverage maps in various regions in New Jersey
Speeds	Type	Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)
	Upstream max adv	10 Mbps listed on Web site
	Downstream max adv	Not specifically advertised. Listed as 800 kbps
	Upstream typical	N/A

	Downstream typical	N/A	
	Subscriber-weighted	N/A	
Technology Type	Spectrum (Mhz, FCC code)		Unlicensed
Comments:			
INTERCONNECTION DATA			
ID	NONE		
File size			
Ownership			
Transport Type			
Data Rates/Capacity			
Location			
Comments:			

Section 3: Submission File Details

Provider pointed us to information on their Web site, including coverage maps and speed offerings.

Section 4: Data Validation, Transformation and Loading

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "Jersey Shore Wireless"
DBANAME	Set to "Duxpond Communications"
FRN	Set to 0011543782
TRANSTECH	Set to 70, for fixed wireless
SPECTRUM	Set to "6" for unlicensed
MAXADDOWN	Set to "6", see below.
MAXADUP	Set to "3", see below.

TYPICDOWN	Not provided, set to null
TYPICUP	Not provided, set to null
STATEABBR	Set to “NJ”
SHAPE	Generated, see below

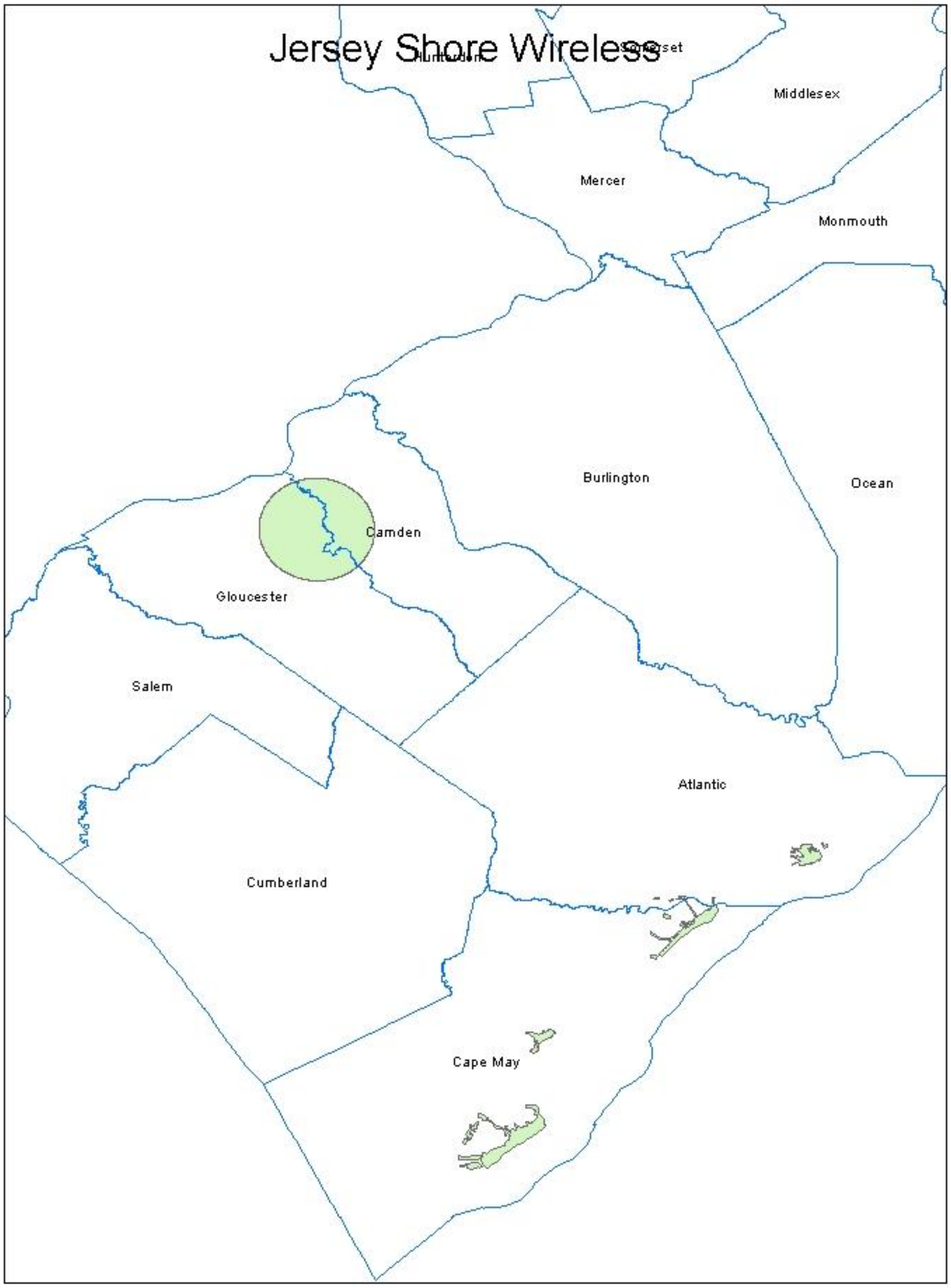
Internal notes on processing:

1. Provider directed us to their Web site, which included image files (jpeg) depicting coverage maps, along with listings of the speed plans they offer.
2. We manually created shape files that replicated the coverage in their image files to produce the SHAPE
3. Their Web site had two different listings for download speeds, one showing speeds of 1, 2 and 5 Mbps and the other showing speeds of 1, 2, 3 and 10 Mbps. Given the discrepancy between the two lists, and without any confirmation from the provider, we elected to map this to speed tier 6, ranging from 6 to 10 Mbps.
4. The Web site did not include advertised upload speeds. There was an indication of typical upload speeds of 800 Kbps. We mapped that value to a speed tier of 3.

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.13 Leap/Cricket

Broadband Provider Data Report

Provider: Leap Cricket
Received: August 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NDA with NJ OIT in place

Section 2: Submission Overview

AVAILABILITY DATA		
ID	PROVIDER NAME	Leap Wireless International, Inc.
	DBA NAME	Cricket Communications, Inc.
	FRN	0002963528
	Holding company name:	Leap Wireless International, Inc."
	Holding company number:	130730
FOR WIRELESS		
Filetypes	shapefile corresponding to NJ terrestrial mobile wireless coverage (type 80)	
Speeds	Type	Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)
	Upstream max adv	yes (for entire shapefile) given in tier
	Downstream max adv	yes (for entire shape) given in tier
	Upstream typical	no.
	Downstream typical	no.
	Subscriber-weighted	no.

Technology Type	Spectrum : yes	3 (PCS) and 4(AWS)
Comments:		
INTERCONNECTION DATA		
ID		
File size		
Ownership		
Transport Type		
Data Rates/Capacity		
Location		
Comments: no IC data provided.		

Quick loading results:

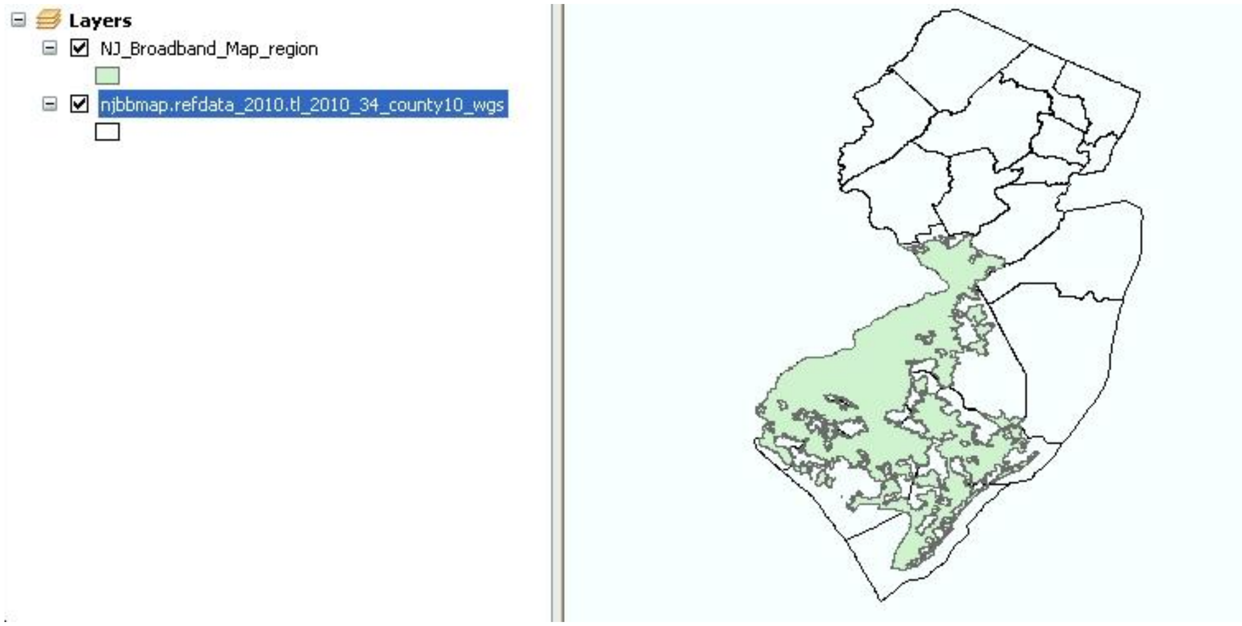


Figure 1. Loading results

Section 3: Submission File Details

1 zip file containing 6 files by (EMAIL, SECURE UPLOAD):

Name	**Size**
NJ_Broadband_Map.zip	1,287 KB
Cricket Communications - Wireless Record Format.xlsx	12 KB
NJ_Broadband_Map_region.dbf	1 KB
NJ_Broadband_Map_region.prj	1 KB
NJ_Broadband_Map_region.shp	2,008 KB
NJ_Broadband_Map_region.shx	1 KB
NJ_Broadband_Map_region.TAB	2 KB

Section 4: Data Validation, Transformation and Loading

Loaded from the supplied file, with transformations as:

Table Column	Data Source / Transformation
PROVNAME	As supplied in column prov_name
DBANAME	As supplied in column dba_name

FRN	Set to " 0002963528"
TRANSTECH	As supplied in column tech_trans
SPECTRUM	Set to “4” per translation shown below
MAXADDOWN	As supplied in column down_speed.
MAXADUP	As supplied in column up_speed..
TYPICDOWN	Not supplied, set to null
TYPICUP	Not supplied, set to null.
STATEABBR	Set to “NJ”
SHAPE	As supplied.

Internal notes on processing:

5. The shape file contains a single row with a multipolygon shape (see above for preview picture). The columns identify that the technology of transmission is wireless and that two different spectrum ranges are in use.
6. The supplied shape uses geographic coordinate system GCS_WGS_1984, same as that required by the NTIA data model. No geographic transformation was required, but the XY Tolerance values differ if the shape file is imported trivially into the geo-database. Imported shape then mapped to separate shape with proper tolerance which resulted in a new feature class with the suffix “_tol”.
7. NTIA requires shapes to be contained in the NJ state boundary. Although we visually verified that it is the case, we clipped the shape using ESRI: Analysis Tools-> Extract -> Clip with, select feature class refdata_2010.tl_2010_34_state10_wgs. The feature class has the suffix "_clip"
8. Spectrum: Leap provided “Y” value in the columns spectrum_pcs and spectrum_aws. In response to previous queries on this, the provider had indicated that they covered separate areas, with PCS coverage limited to a few counties, but did not provide separate shapes. We sent a request again. Therefore, we uniformly use value 4 (AWS) for the entire coverage, at this time.

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Thursday, February 23, 2012 8:42 PM
To: 'Douglas White'
Cc: 'ConnectingNJ@research.telcordia.com'
Subject: RE: State broadband mapping, 5th round submission for Cricket

Doug,

We had asked previously, but wanted to see if there was any change. Are you able to generate separate shape files for the AWS and PCS coverage areas?

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Tuesday, February 28, 2012 10:05 AM
To: Douglas White
Cc: ConnectingNJ@research.telcordia.com
Subject: NJ Broadband Clarification

Doug,

We have reviewed the data you submitted and have discovered two anomalies:

1. The FRN included in your shape file is 5927056. We have your FRN number as 0002963528. Is this latter number still correct?
2. The transtech number in your shape file is 160. This is an invalid value. We have your transtech as 80 (Terrestrial Mobile Wireless). Is this still correct?

Thanks for your help.

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Douglas White [mailto:dougwhite@cricketcommunications.com]
Sent: Friday, March 02, 2012 7:18 PM
To: NJ Broadband Data Collection
Cc: ConnectingNJ@research.telcordia.com
Subject: RE: NJ Broadband Clarification

John –

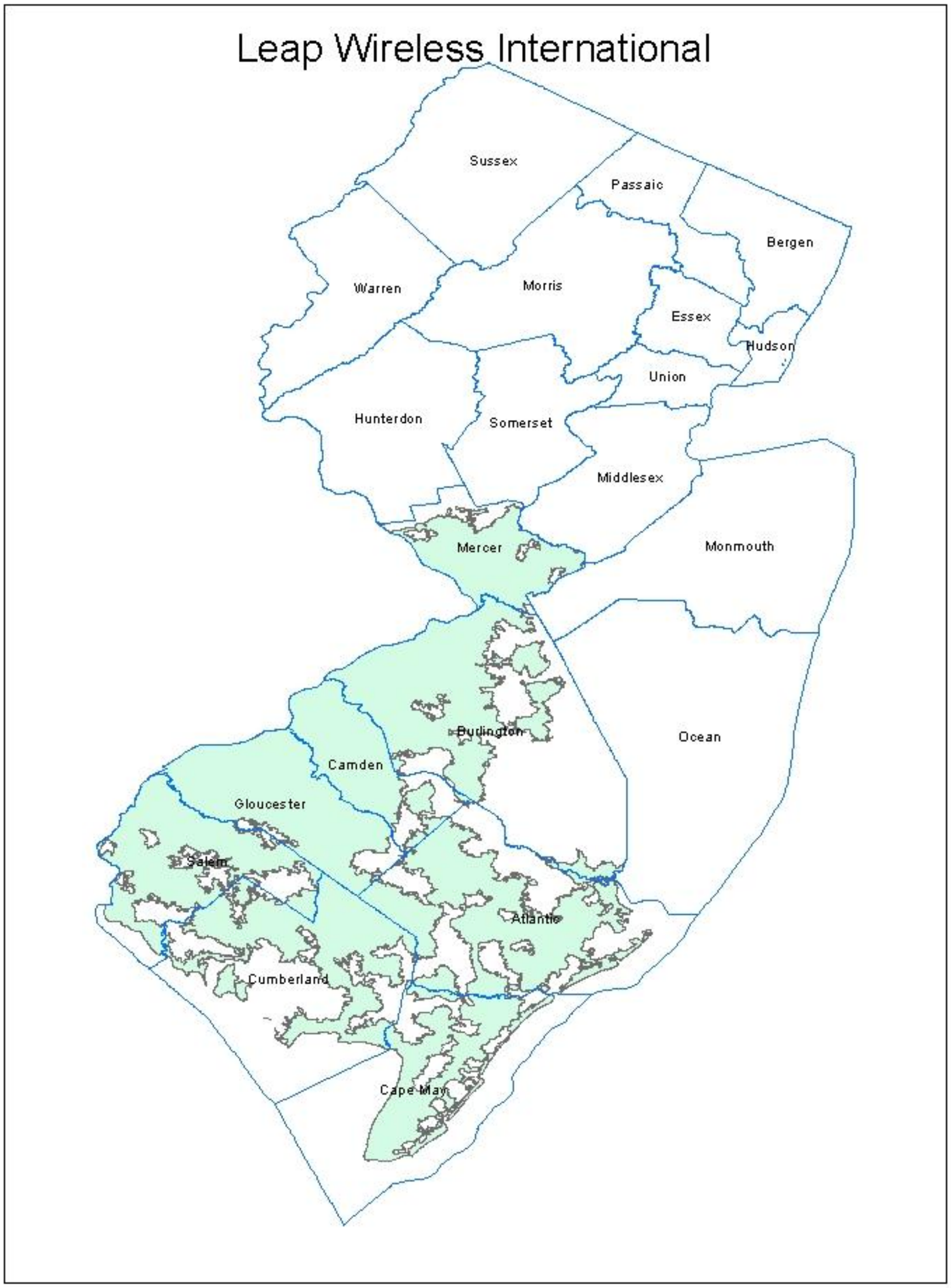
I’m told that the NJ data we previously sent was incorrect. Please find attached the tables with the correction. The FRN is 2963528 and the technology is 80, are correct though.

Please contact me with any questions. Thanks,

-Doug

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.14 Level3 Networks

Connecting New Jersey - Broadband Provider Data Report

Provider: Level3 Networks, Inc.
Received: August 2011
Submission date: October 2012

This report presents details on processing of broadband data for delivery to the National Telecommunications and Information Administration.

For October 2012:

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

For April 2012:

The Service provider stated there is no change in data for the April 2012 Submission.

We copied the Oct 2011.

Sections:

31. NDA Status
32. Submission Overview
33. Submission File Details
34. Data Validations and Results
35. Data Transformation and Loading
36. Clarification Questions and Provider Responses
37. Notes and Open Issues

Section 1: NDA Status

No NDA executed.

Section 2: Submission Overview

AVAILABILITY DATA		
ID	Provider name	Level 3 Communications, LLC
	"Doing business as" name	Level 3
	FRN	0003723822

<table>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">Text file spreadsheets</td></tr>
<tr><td>File size</td><td colspan="2">350 data rows</td></tr>
<tr><td>Speeds</td><td>
<table>
<tr><th>Type</th><th></th><th>Address level data</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Yes</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Yes</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Yes</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Yes</td></tr>
<tr><td>Subscriber-weighted-nominal speed</td><td></td><td>Not provided</td></tr>
</table>
</td><td>All set to same value: 11 (>= 1gpbs)</td></tr>
<tr><td>Technology Type</td><td colspan="2">50 (optical carrier/fibre)</td></tr>
<tr><td>End-user specification</td><td colspan="2">Yes (addresses)</td></tr>
<tr><td colspan="3">Comments: typical and Advertised UP and DOWN are ALL THE SAME VALUE: 11 (>= 1gpbs)</td></tr>
</table>

INTERCONNECTION DATA	
ID	
File size	text spreadsheet with 338 rows. (See comment)
Ownership	Not provided
Transport Type	provided
Data Rates/Capacity	provided
Location	Address provided as well as lat/long
Comments: A large number of duplicate rows were confusing. This is worth asking the provider. Provider indicates that they are separate instances and should NOT be removed as duplicates.	

Section 3: Submission File Details

Received 2 files by secure upload:

Size kb	**Name**
45	AddressAvailability_NewJersey_8-18-2011.txt
41	MiddleMile_New Jersey_8-18-2011.txt

Section 4: Validations and Results

The "address" file has 350 rows. All speed codes set the same, code 11 (1+ Gbps), suggesting these are all commercial customers.

The "middlemile" file has 338 rows, including many rows that are exact duplicates which we will have to discard despite the provider's assurances that they are "different".

Section 5: Data Transformation and Loading

The standard NDA prohibits us from submitting address-level data to the NTIA. Instead, we discover the census block for each customer address, and then report the census block shape drawn from Census Bureau TigerLine reference data.

NTIA Table BB_ConnectionPoint_MiddleMile

Loaded from the supplied tab-separated file. The following table explains the transformations that were applied.

Table Column	**Data Source / Transformation**
PROVNAME	As supplied in column "DBA" (no provider name supplied separately)
DBANAME	As supplied in column "DBA"
FRN	As supplied in column "FRN" after removing dashes
OWNERSHIP	Set to null (not supplied)
BHCAPACITY	As provided in column "Serving Facility Capacity"
BHTYPE	As provided in column "Serving Facility Type"
LATITUDE	As supplied
LONGITUDE	As supplied
ELEVFEET	As supplied (all zero values)
STATEABBR	Set to "NJ"
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Point shape created using ESRI ArcDesktop

Internal notes on processing:

20. Imported the data to a geodatabase table
21. Added a point for each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
22. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data. All records successfully spatially joined on 2010 NJ Census Block shapes.
23. Discarded 149 records with identical lat, long values and addresses.
24. Loaded 188 records.

NTIA Table BB_Service_CensusBlock

Loaded from the supplied tab-separated file. The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	As supplied in column "DBA" (no provider name supplied separately)
DBANAME	As supplied in column "DBA"
PROVIDER_TYPE	Set to "1"
FRN	As supplied in column "FRN"
STATEFIPS	Set to "34" (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	As supplied in column "Technology of Transmission"
MAXADDOWN	As supplied in column "Maximum Advertised Download Speed"
MAXADUP	As supplied in column "Maximum Advertised Upload Speed"
TYPICDOWN	Set to null (see below)
TYPICUP	Set to null (see below)
ENDUSERCAT	Set to null (see below)
SHAPE	Copied from Census Bureau TigerLine 2010, as matched by spatial join on the geocoded address

Internal processing notes:

20. Geocoded the addresses using an Arroyo flow and the Yahoo geocoder, leaving the result with address and lat, long data in an Excel spreadsheet. All addresses were successfully geocoded,

although 1 was not placed in New Jersey.

21. Imported the spreadsheet to an ESRI geodatabase table
22. Added point shapes corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option
23. Added a column containing the ID of the containing year 2010 census block using ArcCatalog's spatial join feature. The newly created point shapes are joined against census block shapes from reference data. All but three records successfully spatially joined on 2010 NJ Census Block shapes.
24. Discarded typical speeds since they were in all cases identical to maximum advertised speeds, not measured values.
25. The end user category value as originally supplied applied to an address, but we must anonymize the addresses and report census blocks. The NTIA directs us to report the "predominant" end-user category, which is not supplied here.
26. Discarded 79 duplicate census block records, which result from multiple addresses in the same census block.
27. Loaded 270 records.

Section 6: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Wednesday, August 24, 2011 9:14 AM
To: Diamond, Greg
Cc: ConnectingNJ@research.telcordia.com
Subject: NJBB Data Clarification

Greg,

We have reviewed the data you submitted to the New Jersey Broadband Mapping program. We have one question. The middle-mile data you submitted in MiddleMile_New Jersey_8-18-2011.txt includes many rows that are duplicates. Can we safely discard these duplicate entries?

Thanks for you participation,

John Wullert

Manager – NJ BB Data Collection

Telcordia Technologies

732-699-2687

From: Diamond, Greg [mailto:Greg.Diamond@Level3.com]
Sent: Wednesday, August 24, 2011 1:17 PM
To: ConnectingNJ@research.telcordia.com
Subject: RE: NJBB Data Clarification

John, this issue came up with our CA submission as well. We investigated and determined that there were in fact some differences, albeit small, with some of the sites such that each site is in fact unique. Give that, I would not treat them as duplicates.

Greg

PLEASE NOTE MY NEW ADDRESS AND TELEPHONE NUMBER

Gregory T. Diamond

Regulatory Counsel

Level 3 Communications

1505 5th Avenue

Suite 501

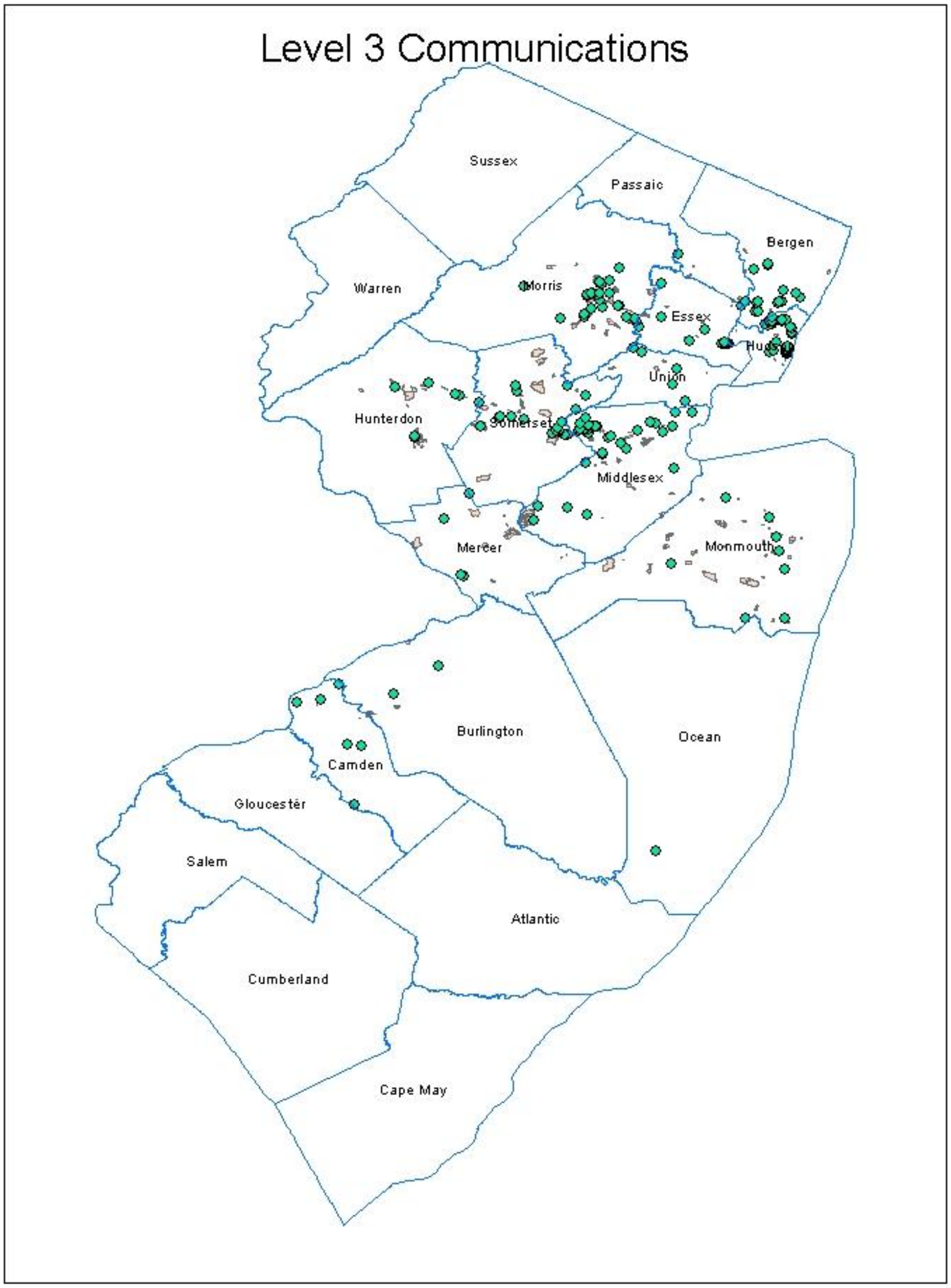
Seattle, WA 98110

Desk: 206-652-5608

Mobile: 303-562-7378

Section 7: Notes and Open Issues

Section 8: Overview Map of Submitted Data



6.15 Monmouth Telephone and Telegraph

Connecting New Jersey - Broadband Provider Data Report

Provider: Monmouth Telephone and Telegraph
Received: August 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Signed NDA is in place with NJ OIT.

Section 2: Submission Overview

AVAILABILITY DATA		
ID	Provider name "Doing business as" name FRN	Monmouth Telephone & Telegraph same 0004325205
FOR WIRELINE		
Filetypes	Csv (NJBB_0004325205_AddressLevelAvailability june 30 2012.csv)	
File size	94 Kbytes, 946 records	
Speeds	Type	Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)
	Typical-upstream	Address
	Typical-downstream	Address
	Advertised-upstream	Address
	Advertised-downstream	Address
	Subscriber-weighted-up	None provided
	Subscriber-weighted-down	Not provided
Technology	Code 30 – other copper line	

Type	Code 50 - Optical Carrier/Fiber to the End User
End-user specification	Code 4 – Medium or Large Enterprise
Comments:	
INTERCONNECTION DATA	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: No middle mile was provided at this time. Monmouth gave the following explanation: Please note that Table 8, "Middle-mile and Backbone Interconnection Points Data", is not included per instructions on page 11 of the Data Submission Specifications" "Middle-mile and Backbone Interconnection Point information should focus on the connectivity at a point. That is, if a point at which network elements or segments are joined would not reasonably offer the possibility of technical connectivity with the network[s], it should not be reported".	

Section 3: Submission File Details

The data are very similar to the last submission.

Received 1 zip file:

Size	**Name**
20Kb	Broadband Mapping.zip

The zip archive contains the following files:

Size	**Name**
94Kb	NJBB_0004325205_AddressLevelAvailability june 30 2012.csv
1Kb	NJBB_0004325205_CMAAdvertisedAvailability June 30 2012.csv

1Kb	NJBB_0004325205_SubscriberWeightedNominalSpeed June 30 2012.csv
22Kb	Read Me.doc

File details:

NJBB_0004325205_AddressLevelAvailability june 30 2012.csv:

The file contains 946 records. Note that data file does not have a header row, but follows (largely) the ADDRESS DATA table from the NTIA "State Broadband Data and Development Grant Program" document. The columns and the corresponding headers are:

A	- Provider Name
C	- FRN
D-L	- Address
M	- EndUserCat
N	- TransTech
O	- MaxAdvDown
P	- MaxAdvUp
Q	- TypicDown
R	- TypicUp

The FRN is missing leading zeros. Most of the zip codes do not have the required leading zeros. It was established (prior interactions) that the DBA is Monmouth Telephone & Telegraph. Certain addresses will need to be fixed for geocoding (also per prior interactions).
Some records have speed tiers of 2 or less.

NJBB_0004325205_CMAAdvertisedAvailability June 30 2012.csv

The file contains 16 records. Note that data file does not have a header row, but follows the CMA data submission template that we posted on the connectingnj web site. The columns and the corresponding headers are:

A	- Provider Name
C	- FRN
D	- CMA
E	- TransTech
F	- MaxAdvDown

G - MaxAdvUp

NJBB_0004325205_SubscriberWeightedNominalSpeed June 30 2012.csv

The file contains 16 records. Note that data file does not have a header row, but follows the Subscriber-Weighted Nominal Speed data submission template that we posted on the connectingnj web site. The columns and the corresponding headers are:

A - Provider Name

C - FRN

D - CMA

E - TransTech

F - SubsWeightedSpeed

Read Me.doc

The file contains explanations of the submission.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_CensusBlock

We loaded from supplied Excel spreadsheet after suitable geo-spatial operations that obtained latitude/longitude pairs for each address. The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	Set to “Monmouth Telephone & Telegraph”
DBANAME	Set same as PROVNAME
PROVIDER_TYPE	Set to 1
FRN	Set to “0004325205”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)

BLOCKID	Populated from Census Block FIPS Code
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	As supplied in column TransTech
MAXADDOWN	As supplied in column MaxAdvDown
MAXADUP	As supplied in column MaxAdvUp
TYPICDOWN	Set to null
TYPICUP	Set to null
SHAPE	Copied from Census Bureau TigerLine 2000, as matched by spatial join on geocoded address

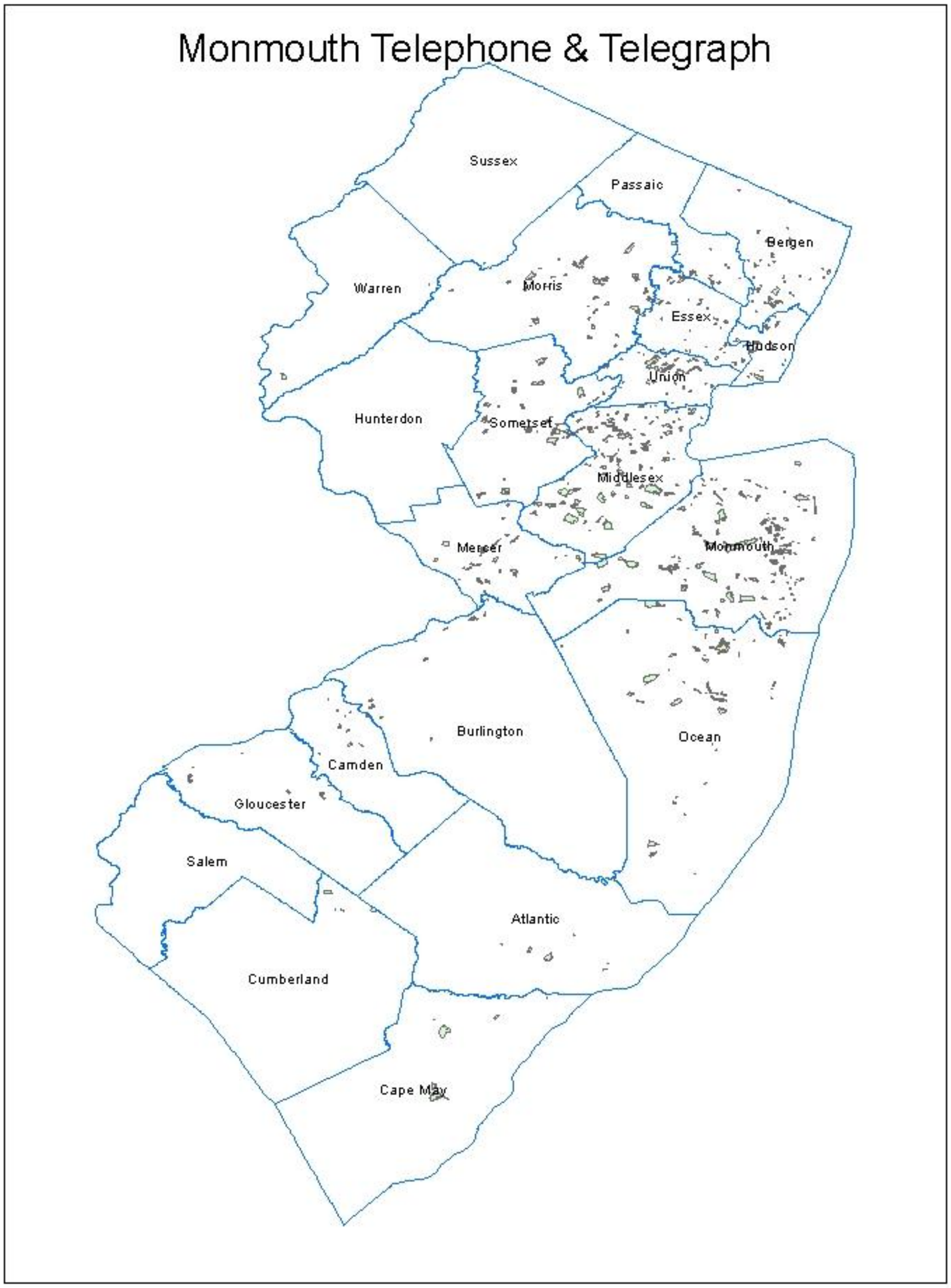
Internal processing notes:

28. All NJBB_0004325205_AddressLevelAvailability.csv records were successfully geo-coded using the Google and Yahoo geocoders to obtain a Latitude, Longitude pair for each.. Addresses that yielded results with accuracy of 6 or below were excluded; only intersection (7) or rooftop (8) accuracy is acceptable.
    Created an Excel sheet and imported it to a geodatabase table.
29. Added point shapes corresponding to each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
30. Added a column containing the ID of the containing year 2010 census block via a spatial join of the point shapes and the census block shapes from reference data.
31. Discarded one record that failed to spatially join on the 2010 NJ Census Block shapes.
32. Discarded 72 rows because the max adv down speed code was 1 or 2, which is not broadband according to the requirements of the NOFA
33. Discarded 163 rows with duplicate census blocks while preserving the greatest speed. These result from multiple customers in the same census block.
34. Discarded 4 large census blocks (greater than 2 square miles).
35. Final record count loaded is 703.

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.16 Network Billing Systems

Connecting New Jersey - Broadband Provider Data Report

Provider: Network Billing Systems
Received: February 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

For October 2012:

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Section 1: NDA Status

None

Section 2: Submission Overview

AVAILABILITY DATA		
ID	Provider name	Network Billing Systems LLC
	"Doing business as" name	
	FRN	0004965141
FOR WIRELINE		
Filetypes		
File size		
Speeds		

Type		Spatial Resolution: **address**
Typical-upstream		
Typical-downstream		
Advertised-upstream		
Advertised-downstream		
Subscriber-weighted-		

	up			
	Subscriber-weighted-down			
Technology Type	Types:			
End-user specification				
Comments:				
INTERCONNECTION DATA				
ID				
File size				
Ownership	Confirmed via email - Leased			
Transport Type	Fiber			
Data Rates/Capacity	T1 to OC 48 (2.488 Gbps)			
Location	Provided by street address			
One email with three addresses of their fiber ring interconnections, two in New Jersey.				

Section 3: Submission File Details

Received information via email:

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to “Network Billing Systems LLC”
DBANAME	Set to “Network Billing Systems LLC”
FRN	Set to “0004965141”
OWNERSHIP	Set to null, not provided
BHCAPACITY	Set to 5, OC-48 is 2.5Gbps

BHTYPE	Set to 1, transport facility is fiber
LATITUDE	As computed from address
LONGITUDE	As computed from address
ELEVFEET	Set to "0" (zero)
STATEABBR	Set to "NJ"
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Created using ESRI ArcDesktop

Internal notes on processing:

25. Used the provider name, DBA name, and FRN from FCC Form 477 reference data.
26. The following steps were performed for the October 2011 submission and the results re-used here:
    a. Geocoded the address to obtain a Latitude, Longitude value pair. All middle-point addresses were successfully geocoded using Arroyo with Yahoo geocoder.
    b. Imported the resulting data to a geodatabase table.
    c. Added a point for the Latitude, Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
    d. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data. All records successfully spatially joined on 2010 NJ Census Block shapes.
27. Based on provider email response, set ownership value to leased.
28. Loaded 2 records.

Section 5: Clarification Questions and Responses

From: Ray Wood [mailto:RayW@nbsvoice.com]
Sent: Wednesday, February 22, 2012 4:07 PM
To: NJ Broadband Data Collection
Cc: shelley.bates@oit.state.nj.us
Subject: FW: Reminder - NJ Broadband Data Collection

John/Shelley,

Nothing has changed on our end – sorry this is late, in this chain you will see my other responses.

If this does not suffice, please let me know.

Ray Wood

NBS

973-638-2155

From: Ray Wood
Sent: Tuesday, August 16, 2011 3:11 PM
To: 'ConnectingNJ@research.telcordia.com'
Cc: shelley.bates@oit.state.nj.us
Subject: RE: Reminder - NJ Broadband Data Collection

This is what I submitted – I think last summer.

Does this suffice?

To: Telcordia (NJ BB Data Collection)

From: Ray Wood (NBS, Product Manager).

Re: NJ BB Data Collection

I believe that we qualify for the BB Data Collection. However, what we do have that qualifies is only a portion of our business.

I don't believe we qualify as a fixed broadband or mobile broadband service provider.

However, we probably do qualify as a middle mile infrastructure provider.

We have a fiber ring that runs through the addresses listed below:

60 Hudson Street

NY, NY

(Carrier Hotel)

155 Halsey Street

Newark, NJ 07102

(Carrier Hotel)

282 Main Street

Little Ferry NJ

(Verizon Central Office)

We can offer bandwidth increments from T1 to OC-48.

Please let me know if you require further detail on this.

Thank you,

Ray Wood

Product Manager

NBS

973-638-2155

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Wednesday, February 22, 2012 5:57 PM
To: 'Ray Wood'; 'NJ Broadband Data Collection'
Cc: 'shelley.bates@oit.state.nj.us'
Subject: RE: Reminder - NJ Broadband Data Collection

Ray,

This is great. The NTIA is collecting data every six months, and wants us to get revised data or verify previous data.

A couple of clarifications:

1. I am assuming you lease space at these facilities, rather than own them. Is that true in all three cases?
2. When you say you can offer T1 to OC-48, how is that configured? Do you resell facilities from other providers to connect to your locations?

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Ray Wood [mailto:RayW@nbsvoice.com]
Sent: Wednesday, February 22, 2012 6:00 PM
To: NJ Broadband Data Collection
Cc: shelley.bates@oit.state.nj.us
Subject: RE: Reminder - NJ Broadband Data Collection

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Wednesday, February 22, 2012 5:57 PM
To: Ray Wood; 'NJ Broadband Data Collection'
Cc: shelley.bates@oit.state.nj.us
Subject: RE: Reminder - NJ Broadband Data Collection

Ray,

This is great. The NTIA is collecting data every six months, and wants us to get revised data or verify previous data.

A couple of clarifications:

1. I am assuming you lease space at these facilities, rather than own them. Is that true in all three cases?

Yes.

2. When you say you can offer T1 to OC-48, how is that configured?

I don't understand.

Do you resell facilities from other providers to connect to your locations?

Yes.

Subject: RE: URGENT: Response Requested: Get your Broadband Services on the National Broadband Map
Date: Mon, 30 Jul 2012 12:35:27 -0400
From: Ray Wood <RayW@nbsvoice.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>

```
Mr. Behrens,

Is NBS required to actually participate in this?  By law, I mean?

I have provided info by email to John Wullert / Shelley Bates in the
past.  I took at quick look at the guidelines now - it seems very
onerous.

Ray Wood
973-638-2155
```

Subject: Re: URGENT: Response Requested: Get your Broadband Services on the National Broadband Map
Date: Mon, 30 Jul 2012 13:04:16 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: Ray Wood <RayW@nbsvoice.com>

Ray,

No...your are not required by law to participate in this mapping activity. You are strongly encouraged to do so, but the decision is yours. The map is used primarily for national and state-level planning and informational purposes. Having said all of this, the reason I contacted you is because you are on my list of those who made previous data submissions. I looked at the report for NBS Voice, and found the following:
:
:
:
If there haven't been any changes in the services you offer since last December, then we can resubmit the same data that we used last April.

Regards,

Cliff Behrens

Subject: RE: URGENT: Response Requested: Get your Broadband Services on the National Broadband Map
Date: Mon, 30 Jul 2012 13:54:35 -0400
From: Ray Wood <RayW@nbsvoice.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>

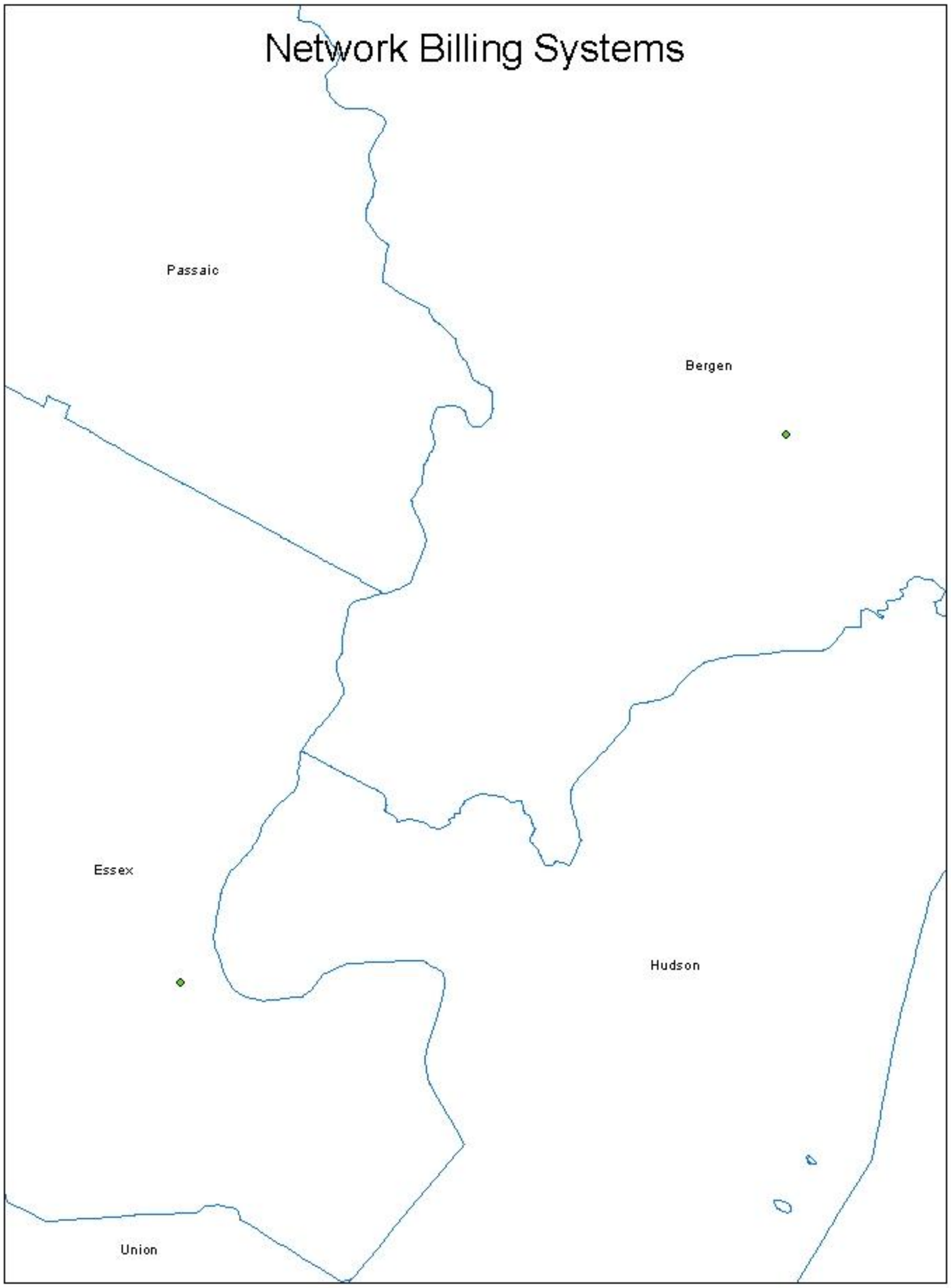
If there haven't been any changes in the services you offer since last December, then we can resubmit the same data that we used last April.

There have been no changes. I would have resubmitted the email I have sent, but it appeared that your org was looking for more and different types of info.

Ray

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.17 Netcarrier

Connecting New Jersey - Broadband Provider Data Report

Provider: Netcarrier
Received: June 2011
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

For October 2012:

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Section 1: NDA Status

Section 2: Submission Overview

AVAILABILITY DATA				
ID	Provider name		Netcarrier	
	"Doing business as" name		Netcarrier Telecom, Inc.	
	FRN		0005043195	
FOR WIRELINE				
Filetypes	Excel			
File size	119 KB (595 rows)			
Speeds	Type		Spatial Resolution: **address**	Provides a .xls file with 895 rows of information (end user addresses).
	Typical-upstream		Address-level	
	Typical-downstream		Address-level	
	Advertised-upstream		Address-level	
	Advertised-downstream		Address-level	
	Subscriber-weighted-up		Not provided	

	Subscriber-weighted-down		Not provided	
Technology Type	Types: 10, 30, 50			
End-user specification	Address level.			
Comments: Provider did not respond to requests for revised information for Spring 2012 submission. Their Web site indicates that they offer T1/T3 and fiber-based services. They do not specifically list ADSL. They do offer fractional T1 services, indicating that they could potentially support new customers at existing locations. Based on this information, it was decided to reuse their prior data for this round.				
INTERCONNECTION DATA				
ID	NJ_Broadband_Mapping-Backbone-090711			
File size	12 kb			
Ownership	Not provided			
Transport Type	Facility type provided (code 1 and 2 used)			
Data Rates/Capacity	Not provided			
Location	Provided by street address (elevation provided as well)			
Comments: 2 other fields called V-COORD and H-COORD (5 digit #'s) are provided.				

Section 3: Submission File Details

Received 1 file by secure upload:

Size	**Name**
74 kb	NJ477_Workbook-090411-NJ-BroadbandMapping-A.xls
12	NJ_Broadband_Mapping-Backbone-090711.xls

Section 4: Data Transformation and Loading

The following describes the processing applied to load the tables

NTIA Table BB_ConnectionPoint_MiddleMile

Loaded from the supplied Excel Spreadsheet. The following table explains the transformations that were applied.

Table Column	**Data Source / Transformation**
PROVNAME	As supplied in column “Provider Name” but changed “c” to “C”
DBANAME	As supplied in column “DBA” but changed “c” to “C”
FRN	As supplied in column “FRN”
OWNERSHIP	As provided in column “Ownership”
BHCAPACITY	As provided in column “Serving Facility Capacity”
BHTYPE	As provided in column “Serving Facility Type”
LATITUDE	As computed from address
LONGITUDE	As computed from address
ELEVFEET	Set to “0” (zero); values such as “Fl 1” were not parsed
STATEABBR	Set to “NJ”
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Created using ESRI ArcDesktop

Internal notes on processing:

29. Used the provider name, DBA name, and FRN as supplied.
30. Following steps were performed for Fall 2011 submission and the results reused:
    a. Geocoded the address to obtain a Latitude, Longitude value pair. All middle-point addresses were successfully geocoded using Arroyo with Yahoo geocoder.
    b. Imported the resulting data to a geodatabase table.
    c. Added a point for the Latitude, Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
    d. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data. All records successfully spatially joined on 2010 NJ Census Block shapes.
    e. Loaded 11 records.
31. These records were copied over into a new BB_ConnectionPoint_MiddleMile table
32. Results passed all NTIA validations.

NTIA Table BB_Service_CensusBlock

The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	As supplied in column “Provider Name” but changed “c” to “C”

DBANAME	As supplied in column “DBA” but changed “c” to “C”
PROVIDER_TYPE	Set to “1”
FRN	As supplied in column “FRN”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	As supplied in column “Technology Code”
MAXADDOWN	As supplied in column “Max Ad Download Speed”
MAXADUP	As supplied in column “Max Ad Upload Speed”
TYPICDOWN	Set to null (see below)
TYPICUP	Set to null (see below)
ENDUSERCAT	Set to null (see below)
SHAPE	Copied from Census Bureau TigerLine 2010, as matched by spatial join on geocoded address

Internal processing notes:

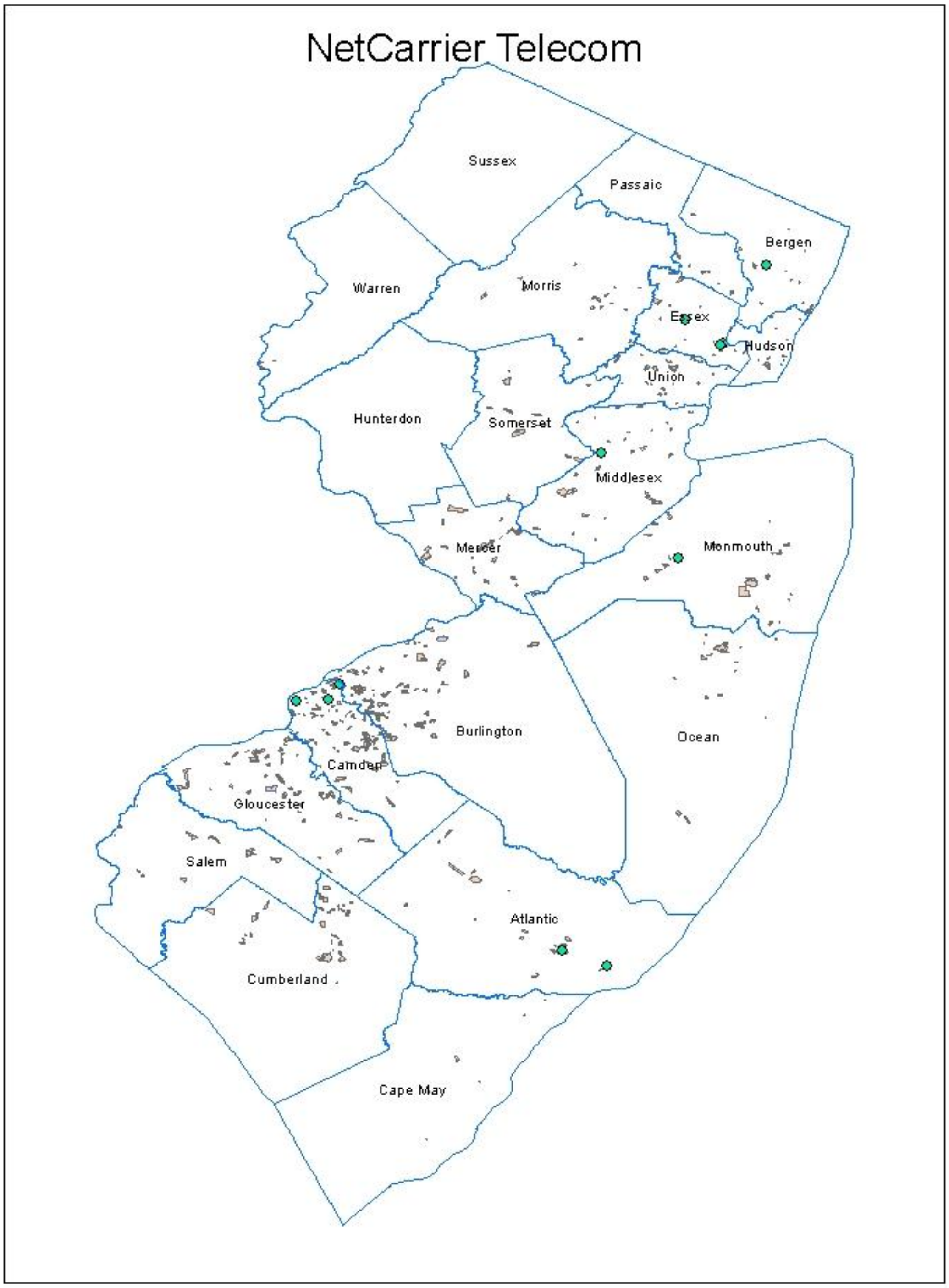
36. Following steps were performed for the Fall 2011 submission:
    a. Geocoded the addresses using an Arroyo flow and the Yahoo geocoder, leaving the result with address and lat, long data in an Excel spreadsheet. All addresses were successfully geocoded (note: Excel file has an empty record at the end).
    b. Imported the spreadsheet to a simple ESRI geodatabase table
    c. Added point shapes corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option
    d. Added a column containing the ID of the containing year 2010 census block using ArcCatalog's spatial join feature. The newly created point shapes are joined against census block shapes from reference data. All but three records successfully spatially joined on 2010 NJ Census Block shapes.
    e. Discarded typical speeds since they were in all cases identical to maximum advertised speeds, not measured values.
    f. The end user category value as originally supplied applied to an address, but we must anonymize the addresses and report census blocks. The NTIA directs us to report the “predominant” end-user category, which is not supplied here.
    g. Discarded 324 duplicate census block records, which result from multiple addresses in the same census block.
    h. Discarded 1 large census block record (340297351041013).
    i. Loaded 567 records.

37. Copied result into new BB_Service_CensusBlock

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.18 Service Electric Cable TV of Hunterdon

Connecting New Jersey - Broadband Provider Data Report

Provider: Service Electric Cable TV of Hunterdon
Received: August 2010/April 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

For October 2012:

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Section 1: NDA Status

None.

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN</td><td>Service Electric Cable TV of Hunterdon, Inc.
DBA not provided
0003760014</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">Text (a letter, not structured data)</td></tr>
<tr><td>File size</td><td colspan="2"></td></tr>
<tr><td>Speeds</td><td><table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
</table></td><td>In telephone conversation, provider indicated that their footprint has not changed from previous submissions, that speeds were 15 Mbps down and 1 Mbps up. While they are testing DOCSIS 3.0, it is not yet available commercially for residential customers.</td></tr>
</table>

	Advertised-upstream	Municipality	In previous submissions, provider had given a list of municipalities that they covered completely.
	Advertised-downstream	Municipality	
	Subscriber-weighted-up	Not provided	
	Subscriber-weighted-down	Not provided	
Technology Type	Docsis 2.0 (use code 41)		
End-user specification	Not provided		
Comments: Provider also indicated they deliver fiber service to business customers, but were not in a position to deliver location data for this round. We will pursue this further for the next round.			
INTERCONNECTION DATA			
ID			
File size			
Ownership	Leased		
Transport Type	Fiber		
Data Rates/Capacity	1 Gbps		
Location	List of addresses		
Comments: In telephone conversation, Provider described locations of interconnection huts and provided information on technology and speeds.			

Section 3: Submission File Details

Received email for October submission with information on the municipalities served in entirety, the technology of transmission, and the speed tiers offered to customers. Confirmed that information via phone on March 4, 2011

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation

PROVNAME	Set to “Service Electric Cable TV of Hunterdon, Inc.”
DBANAME	Not supplied; set same as PROVNAME
PROVNAME	As supplied
DBANAME	As supplied
FRN	Set to “0003760014”
OWNERSHIP	Set to 1 for leased
BHCAPACITY	Set to 4 for 1 Gbps
BHTYPE	Set to 1 for fiber
LATITUDE	Obtained by geo-coding addresses
LONGITUDE	Obtained by geo-coding addresses
ELEVFEET	Set to “0” (zero)
STATEABBR	Set to “NJ”
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Created using ESRI ArcDesktop

Internal notes on processing:

1. Provider gave a set of addresses. These addresses were geo-coded using Google geo-coder into an Excel spreadsheet.
2. Imported the Excel sheet to a geo-database table.
3. Added point for the Latitude, Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
4. Mapped to separate shape file to correct tolerance.
5. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data.

NTIA Table BB_Service_CensusBlock

Loaded based on email received on August 23, 2010. We submitted all census blocks in the named municipalities. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to “Service Electric Cable TV of Hunterdon, Inc.”
DBANAME	Not supplied; set same as PROVNAME
RESELLER	Set to “N”

FRN	Set to “0003760014”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	Set to 41 (Cable Modem – Other) per email Docsis-2.0
MAXADDOWN	Set to 7 (15 Mbps) per email
MAXADUP	Set to 3 (1 Mbps) per email
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Copied from Census Bureau TigerLine 2000, as matched by spatial join on geocoded address

Internal processing notes:

38. Following steps were performed for October 2011 submission
    a. Created a file with municipality names that match exactly names in the “name” column in the Year 2000 Census Bureau TigerLine database. Primarily this meant changing “Boro” to “Borough”.

Municipality	**County**
Alexandria Township	Hunterdon
Alpha Borough	Warren
Bloomsbury Borough	Hunterdon
Frenchtown Borough	Hunterdon
Greenwich Township	Warren
Harmony Township	Warren
Holland Township	Hunterdon
Kingwood Township	Hunterdon
Lopatcong Township	Warren
Milford Borough	Hunterdon
Phillipsburg	Warren

Pohatcong Township Warren

b. Joined against municipalities against reference data to identify corresponding list of census blocks.

39. Ran all NTIA validations.

NTIA Table BB_Service_RoadSegment

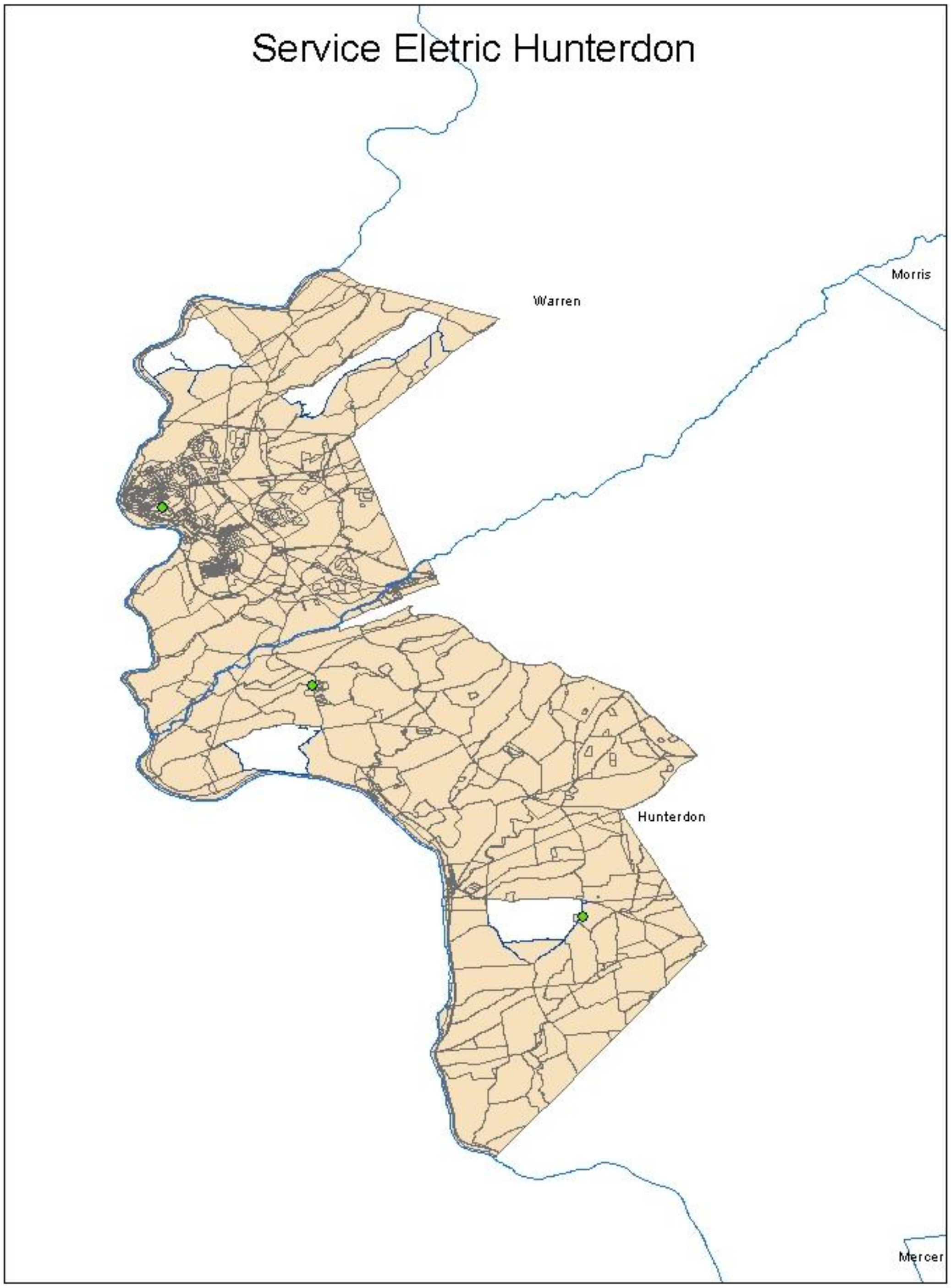
Loaded with street segments in census blocks larger than 2 square miles as listed in Census Bureau TigerLine reference data. The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	Set to "Service Electric Cable TV of Hunterdon, Inc."
DBANAME	Not supplied; set same as PROVNAME
RESELLER	Set to "N"
FRN	Set to "0003760014"
ADDMIN	From reference data
ADDMAX	From reference data
PREDIR	From reference data
STREETNAME	From reference data
STREETTYPE	From reference data
SUFFDIR	From reference data
CITY	From reference data
STATECODE	From reference data
ZIP5	From reference data
ZIP4	From reference data
TRANSTECH	Set to 41 (Cable Modem – Other) per email Docsis-2.0
MAXADDOWN	Set to 7 (10Mbps) per email
MAXADUP	Set to 3 (800Kbps) per email
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	From reference data

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.19 Service Electric Cable TV of Sparta

Connecting New Jersey - Broadband Provider Data Report

Provider: Service Electric Cable TV of Sparta
Received: March 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

For October 2012:

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Section 1: NDA Status

No NDA executed.

Section 2: Submission Overview

<table>
<tr><th colspan="5">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td colspan="3">Provider name
“Doing business as” name
FRN</td><td>Service Electric Cable TV of NJ Inc.
Service Electric Broadband Cable
0005007125</td></tr>
<tr><th colspan="5">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="4">Text</td></tr>
<tr><td>File size</td><td colspan="4">9728 bytes</td></tr>
<tr><td rowspan="5">Speeds</td><td>Type</td><td></td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</td><td rowspan="5">Provided list of municipalities they serve. Provider indicated that they do not cover all streets in the rural area they serve. Rather than overstate coverage, we elected to omit streets in large census blocks that are more likely to represent rural areas.

Provider indicated in email</td></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Municipality</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Municipality</td></tr>
</table>

	Subscriber-weighted-up		Not provided	exchange that they offer DOCSIS 3.1 over their entire footprint. He provided list of speeds, which we confirmed with him.
	Subscriber-weighted-down		Not provided	
Technology Type	Docsis 3.1 (will use code 40)			
End-user specification	Not provided			
Comments:				

INTERCONNECTION DATA	
ID	
File size	Several addresses provided
Ownership	Owned
Transport Type	Fiber
Data Rates/Capacity	One says “Fiber 10 gbps”; others have no statement - Clarified this via email. See answers below.
Location	Address
Comments:	

Section 3: Submission File Details

Received one (1) file by EMAIL:

Size	**Name**
9728	Broadband data Information.xls

Received a spreadsheet with information on the municipalities served in entirety, the technology of transmission, the modem speeds offered to customers, and some connection points.

We will gather all the census blocks in the municipality based on the TigerLine reference data and report those shapes in the BB_service_censusblock table.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

Loaded from 8 rows in the supplied Excel spreadsheet. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "Service Electric Cable TV of NJ Inc." per email response
DBANAME	Set to "Service Electric Broadband Cable" per email response
FRN	Set to "0005007125" per email response
OWNERSHIP	Set to 0 to indicate owned
BHCAPACITY	Set to 6 or 4, see below
BHTYPE	Set to 1, provider indicated fiber.
LATITUDE	Created by geocoding the supplied address
LONGITUDE	Created by geocoding the supplied address
ELEVFEET	Set to "0" (zero)
STATEABBR	Set to "NJ"
FULLFIPSID	ID of containing census block from Year 2000 Census Bureau TigerLine reference data
SHAPE	Created using ESRI ArcDesktop

Internal notes on processing:

6. Following steps were performed during prior submission
   a. Created an excel sheet and imported to a geodatabase table.
   b. Added points corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
   c. Added a column containing the ID of the containing year 2000 census block via a spatial join of the points and the census block shapes from reference data.
7. Provider indicated that two sites are served by dual 10 Gbps links (code 6) and the rest are served by dual 2 Gbps links (code 4).

NTIA Table BB_Service_CensusBlock

Loaded based on the supplied file "Broadband data Information.xls". We submitted all census blocks less than 2 square miles in the named municipalities. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to “Service Electric Cable TV of NJ Inc.” per email response
DBANAME	Set to “Service Electric Broadband Cable” per email response
PROVIDER_TYPE	Set to 1
FRN	Set to “0005007125” per email response
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (digits 3-5)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code (next 5 digits)
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	Set to 40 per file (DOCSIS 3.0)
MAXADDOWN	Set to code 8 as reported by provider
MAXADUP	Set to code 5 as reported by provider
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Copied from Census Bureau TigerLine 2010, as matched by spatial join on geocoded address

Internal processing notes:

40. Created a file with municipality names supplied by provider in a form that match exactly names the “name” column in the Year 2010 Census Bureau TigerLine database. Primarily this meant changing “Boro” to “Borough”.
41. Joined against reference data to discover census blocks, for a total of 4,135 blocks.

NTIA Table BB_Service_RoadSegment

Loaded with street segments in census blocks larger than 2 square miles as gathered from Census Bureau TigerLine reference data. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to “Service Electric Cable TV of NJ Inc.” per email response
DBANAME	Set to “Service Electric Broadband Cable” per email response
PROVIDER_TYPE	Set to 1

FRN	Set to “0005007125” per email response
ADDMIN	From reference data
ADDMAX	From reference data
PREDIR	Set to null, not available in reference data
STREETNAME	From reference data
STREETTYPE	Set to null, not available in reference data
SUFFDIR	Set to null, not available in reference data
CITY	From reference data
STATECODE	Set to "NJ"
ZIP5	From reference data
ZIP4	Set to null, not available in reference data
TRANSTECH	Set to 40 (DOCSIS 3.0)
MAXADDOWN	Set to code 8 as reported by provider
MAXADUP	Set to code 5 as reported by provider
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	From reference data

Internal processing notes:

1. Discovered all street segments that touch census blocks larger than 2 square miles in the municipalities served by the provider as discussed for table BB_Service_Censusblock.
2. Joined against reference data to discover street segment, for a total of 2,223 entries.

Validation rules produced a warning on 5265 census blocks and 985 street segments for the combination of a downstream speed code of 8 (25-50 Mbps) with a transtech code of 40 (DOCSIS 3.1). Provider was not willing to commit that they offered anything faster. Internet search confirms that the fastest speed they advertise is 35 Mbps down and 3 Mbps up.

Section 5: Clarification Questions and Responses

From: James Galliford [mailto:jamesg@secable.com]
Sent: Monday, March 05, 2012 4:04 PM
To: Fiuk, Marek J
Cc: Wullert, John R II
Subject: Re: Tiger lines

Marek,

Thank you for your understanding.

These are the changes in speeds:

- 1.5/256 -> 2.0/256
- 7/1 -> 8/1
- 12/2 - 15/2
- 35/3 - No Change

We are going to work on compiling the detailed information using information that apparently has become available from our billing system recently. As soon as we get this information, we'll pass it on to you.

Thanks again.

-James

On 3/12/12 12:30 PM, Fiuk, Marek J wrote:

James,

Thank you for your cooperation in providing us with data needed for the forthcoming New Jersey Broadband submission.

While processing your data we have encountered some issues that we would like to clarify with you, in order to assure the best possible quality of the information we are going to submit.

You have provided us with a list of speed tiers that you support. Are all these speeds (in particular, the highest one) advertised in ALL municipalities from the list you supplied to us ?

If this is not the case, would you be able to provide the speed list on the per-municipality basis?

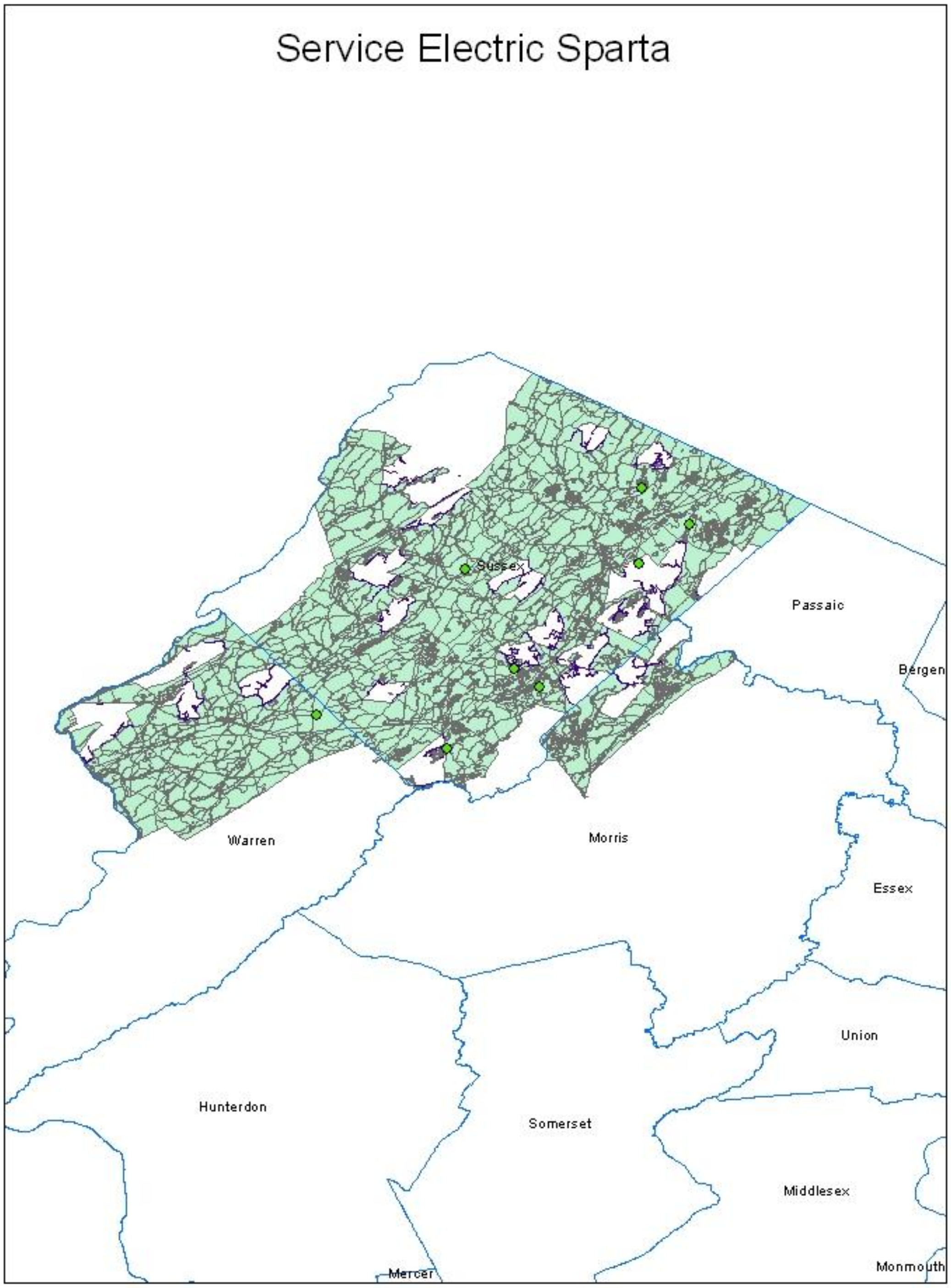
We also have a similar question regarding the cable technology - DOCSIS 3.0 and DOCSIS 1.1. Our current understanding is that you provide both of these in all covered municipalities. Is that correct ? If not, would you be able to provide us with the per-municipality list?

Regards,

Marek Fiuk

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.20 Skycasters

Connecting New Jersey - Broadband Provider Data Report

Provider: Skycasters, LLC
Received: September 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NONE

Section 2: Submission Overview

<table>
<tr><td colspan="3">AVAILABILITY DATA</td></tr>
<tr><td rowspan="3">ID</td><td>Provider name</td><td>Skycasters, LLC</td></tr>
<tr><td>“Doing business as” name</td><td>Skycasters, LLC</td></tr>
<tr><td>FRN</td><td>0018756155</td></tr>
<tr><td colspan="3">FOR WIRELESS</td></tr>
<tr><td>Filetypes</td><td>Excel file with data gleaned from the Skycasters WEB site</td><td></td></tr>
<tr><td>Speeds</td><td><table>
<tr><td>Type</td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</td></tr>
<tr><td>Upstream max adv</td><td>1.5M</td></tr>
<tr><td>Downstream max adv</td><td>6.09M</td></tr>
<tr><td>Upstream typical</td><td></td></tr>
<tr><td>Downstream typical</td><td></td></tr>
<tr><td>Subscriber-weighted</td><td></td></tr>
</table></td><td>Skycasters WEB site lists multiple speed plans, the highest speed combination offered is 6.09M / 1.5M</td></tr>
<tr><td>Technology Type</td><td>Code 60 (Satellite)</td><td></td></tr>
<tr><td colspan="3">Comments: Skycasters WEB site indicates that Ku-Band (12-18 GHz) satellites are being used. None of the spectrum ranges available in the NTIA document covers Ku-Band.</td></tr>
<tr><td colspan="3">INTERCONNECTION DATA</td></tr>
</table>

ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments:	

Section 3: Submission File Details

The Excel file was created from data gleaned from the Skycasters WEB site:
http://www.skycasters.com/satellite-internet-coverage/skycasters-coverage-NewJersey.html

There are 729 records. The file has latitude and longitude for county, city, zip code, and area code. It looks like the latitude and longitude is a centroid of area codes. Since we do not have shape files for area codes, we will use the latitude and longitude as a centroid of zip codes.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_Wireless

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "Skycasters, LLC"
DBANAME	Set to "Skycasters, LLC"
FRN	Set to 0018756155
TRANSTECH	Set to 60
SPECTRUM	Set to 9 per translation shown below
MAXADDOWN	Set to 6.
MAXADUP	Set to 4.
TYPICDOWN	Not provided, set to null

TYPICUP	Not provided, set to null
STATEABBR	Set to “NJ”
SHAPE	Single shape created from Municipalities (see below).

Internal notes on processing:

9. The excel sheet is imported to a geodatabase table.
10. Added point shapes corresponding to each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option. The name is skycasters_cov.
11. Refdata.nj_zip_poly_wgs is our reference data that contains shapes for zip codes in NJ. Spatial join nj_zip_poly_wgs with skycasters_cov, using the “contains match” option and unselecting “keep all target features”. The output is skycasters_cov_zip_poly. This is a subset of the nj_zip_poly_wgs table that contains the points in the skycasters_cov table.
12. Coalesced the single-part polygons into one multi-part polygon using the ArcGIS “Dissolve” tool, which resulted in a new feature class with the suffix “_dissol”.
13. Spectrum: Skycasters uses Ku-Band spectrum (12-18 GHz band). While this is not specifically included in the list of satellite frequencies associated with Code 9, we used code 9 anyway. This is consistent with the approach taken for WildBlue.

Validation rules produced a warning on the wireless shape record for the combination of downstream speed code of 6 (6-10 Mbps) with a transtech code of 60 (Satellite). A search of their Web site, http://www.skycasters.com/broadband-satellite-compare/compare.html, confirmed that the fastest speed they advertise is 6.09 Mbps down and 1.5 Mbps up.

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data

6.21 Sprint

Broadband Provider Data Report

Provider: Sprint
Received: July 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Sections:

38. NDA Status
39. Submission Overview
40. Submission File Details
41. Data Validations and Results
42. Data Transformation and Loading
43. Clarification Questions and Provider Responses
44. Notes and Open Issues

Section 1: NDA Status

NDA was executed.

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA - RECEIVED JULY 11, 2012</th></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN</td><td>Sprint Nextel Communications
Sprint
0003-77-45-93</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td>Txt, xls, pdf, etc.</td><td></td></tr>
<tr><td>File size</td><td>Number of records, data elements</td><td></td></tr>
<tr><td>Speeds</td><td><table><tr><th>Type</th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)</th></tr><tr><td>Upstream</td><td></td></tr></table></td><td></td></tr>
</table>

	Downstream Typical Advertised Subscriber-weighted	
Technology Type	DOCSIS, xDSL, fiber, etc.	
End-user specification	Business, consumer, gov't etc	
Comments:		
FOR WIRELESS		
Filetypes	shapefile collection: shp/dbf/prj/shx, mdb, gdb, imagefile etc.	**Supplied a shapefile (zip archive) with a two rows that uses projection GCS_WGS_1984. The actual shape in the archive is a multi-polygon. The 2 rows correspond to spectrums 3 and 5.**
Speeds	Type: Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode) Upstream max adv: Single shape, single speed Downstream max adv: Single shape, single speed Upstream typical: Single shape, single speed Downstream typical: Single shape, single speed Subscriber-weighted: County; but all values are identical	Max advertised up 3, down 2; typical upstream 3, down 2.
Technology Type	Spectrum (Mhz, FCC code)	**3 and 5 (PCS 1850-1915 MHz, 1930-1995)**
Comments:		
INTERCONNECTION DATA		
ID	Provider name	Sprint Nextel Corporation

	"Doing business as" name FRN	Sprint 0003-77-45-93
File size	Number of records, data elements	4
Ownership	Leased/owned	Leased = 1, owned = 0
Transport Type	Fiber, wireless, copper	Fiber
Data Rates/Capacity		2.4 GBPS < < 10GBPS
Location	Street address, lat/lon, elevation	Lat/Long
Comments:		
DATA COMPLETENESS		
Data Validation/ Verification	- Sprint provided a map showing coverage areas covering the majority of the state of New Jersey - Sprint provided a single set of attribute data, to be applied to the entire coverage area on 2 polygons o They included typical and maximum advertised upload and download speeds - Sprint provided spectrum data	

Section 3: Submission File Details

Received these files by upload to the secure web site:

Size	**Name**
1KB	Confidential_Middlemile_NJ.zip
3413KB	Sprint_AreaAvailability_NJ.zip

The zip archives contained these files:

Size	**Name**
1KB	Confidential_Middlemile_NJ.txt
2KB	Sprint_AreaAvailability_NJ_region.dbf
1KB	Sprint_AreaAvailability_NJ_region.prj
5647KB	Sprint_AreaAvailability_NJ_region.shp

1KB Sprint_AreaAvailability_NJ_region.shx

Section 4: Validations and Results

Section 5: Data Transformation and Loading

Loaded 4 rows from the text file "Confidential_Middlemile_NJ.txt" supplied. The following table explains the transformations that were applied.

Table Column	**Data Source / Transformation**
PROVNAME	As supplied in column "provider_name"
DBANAME	As supplied
FRN	As supplied in column "frn", after removing hyphens
OWNERSHIP	As supplied
BHCAPACITY	As supplied in column "servingfacilitycapacity"
BHTYPE	As supplied in column "servicefacilitytype"
LATITUDE	As supplied
LONGITUDE	As supplied
ELEVFEET	As supplied in column "elevation" (all zero)
STATEABBR	Set to "NJ"
FULLFIPSID	Year 2010 Census Bureau TigerLine reference data
SHAPE	Created via ArcMap "Add XY Data" feature for lat/long value pairs

Internal notes on processing:

8. Removed a space in the longitude of the last line of the input file: `"-74.1610 "`
9. Created an excel sheet with the data and export to dBase from the excel 97-2003 format. Make sure the types of latitude and longitude are double.
10. Created a feature class from the table by creating a Point shape using ArcMap's "Add XY Data" feature corresponding to each Latitude, Longitude pair, using the wgs 1984 coordinate. The name of the feature class is sprint_middlemile_shape_wgs_tol.
11. Added a column containing the census block id of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data. The name of the feature class is sprint_middlemile_shape_wgs_tol_cb.
12. The only data imputed was the state abbreviation.

NTIA Table BB_Service_Wireless

Loaded two rows from from the supplied shapefile "Sprint_AreaAvailability_NJ_region. The following table explains the transformations that were applied.

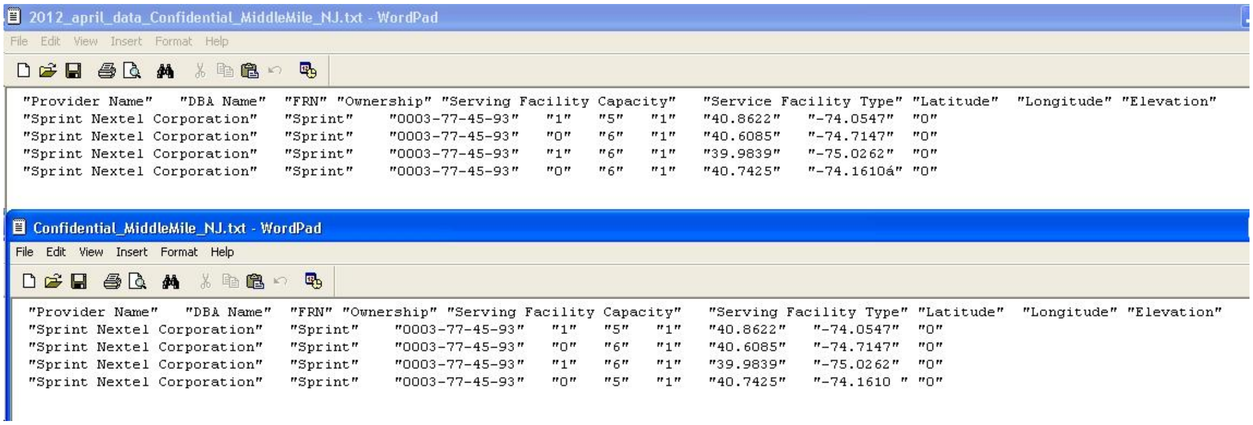
Table Column	Data Source / Transformation
PROVNAME	As supplied in column "provider_name"
DBANAME	As supplied in column "dbaname"
FRN	As supplied in column "frn" after removing hyphens
TRANSTECH	As supplied in column "techtrans"
SPECTRUM	Set to 3 or 5 per translation shown below
MAXADDOWN	As supplied in column "maxaddnsp"
MAXADUP	As supplied in column "maxadupsp"
TYPICDOWN	As supplied in column "typdnsp"
TYPICUP	As supplied in column "typupsp"
STATEABBR	Set to "NJ"
SHAPE	As supplied.

Internal notes on processing:

14. The supplied shape uses geographic coordinate system name GCS_WGS_1984 The NTIA data model requires the same coordinate system. No geographic transformation was required, but the XY Tolerance values differ when the shapefile is imported into the geodatabase. Imported the table schema and the table data in two separate operations, thereby ensuring perfect compatibility with the NTIA data model. The table has the suffix "_tol".
15. NTIA requires shapes to be contained in the NJ state boundary. Although we visually verified that it is the case, we clipped the shape using ESRI: Analysis Tools-> Extract -> Clip with, select feature class refdata_2010.tl_2010_34_state10_wgs. The feature class has the suffix "_clip"
16. Details on spectrum transformation: Sprint provided input columns: spectrum1, spectrum2, spectrum3, spectrum4, spectrum5, spectrum6, spectrum7. Sprint put a "Y" in columns spectrum3 (representing range 1850-1915 MHz) and spectrum5 (representing range 2496–2690 MHz). The NTIA data model has a single column for spectrum. The corresponding NTIA "SPECTRUM USED" coded values are 3 and 5.
17. The only data imputed was the state abbreviation.

Section 6: Clarification Questions and Responses

The midde mile data is almost identical except the last line has 5 instead of 6 for the "Serving Facility Capacity" column


2012_april_data_Confidential_MiddleMile_NJ.txt - WordPad

File Edit View Insert Format Help

```
"Provider Name"   "DBA Name"  "FRN" "Ownership" "Serving Facility Capacity"   "Service Facility Type" "Latitude"  "Longitude" "Elevation"
"Sprint Nextel Corporation"   "Sprint"    "0003-77-45-93"   "1"   "5"   "1"   "40.8622"   "-74.0547"  "0"
"Sprint Nextel Corporation"   "Sprint"    "0003-77-45-93"   "0"   "6"   "1"   "40.6085"   "-74.7147"  "0"
"Sprint Nextel Corporation"   "Sprint"    "0003-77-45-93"   "1"   "6"   "1"   "39.9839"   "-75.0262"  "0"
"Sprint Nextel Corporation"   "Sprint"    "0003-77-45-93"   "0"   "6"   "1"   "40.7425"   "-74.1610á" "0"
```

Confidential_MiddleMile_NJ.txt - WordPad

File Edit View Insert Format Help

```
"Provider Name"   "DBA Name"  "FRN" "Ownership" "Serving Facility Capacity"   "Serving Facility Type" "Latitude"  "Longitude" "Elevation"
"Sprint Nextel Corporation"   "Sprint"    "0003-77-45-93"   "1"   "5"   "1"   "40.8622"   "-74.0547"  "0"
"Sprint Nextel Corporation"   "Sprint"    "0003-77-45-93"   "0"   "6"   "1"   "40.6085"   "-74.7147"  "0"
"Sprint Nextel Corporation"   "Sprint"    "0003-77-45-93"   "1"   "6"   "1"   "39.9839"   "-75.0262"  "0"
"Sprint Nextel Corporation"   "Sprint"    "0003-77-45-93"   "0"   "5"   "1"   "40.7425"   "-74.1610 " "0"
```

Subject: NJ BB data update for Fall 2012
Date: Fri, 13 Jul 2012 09:41:25 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: jack.delaney@sprint.com

Mr. Delaney,

I just wanted to confirm that we have received your data update for the Fall 2012 NJ BB submission to NTIA. Thank you for being "out in front" of this. We do have the following question regarding this update.

As you can see in the attachment, the middle mile data is almost identical to the 2012 April data except the last line has a value of "5" (instead of "6") for the "Serving Facility Capacity" column. Is this intentional?

Sincerely,

Cliff Behrens

Subject: RE: NJ BB data update for Fall 2012
Date: Fri, 13 Jul 2012 14:46:42 +0000
From: Delaney, Jack L [LEG] <Jack.Delaney@sprint.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>

Cliff,

Thanks for alerting me to that. Yes, that's correct. It is a correction. It should have been '5' in the last round. By next round, it should be '6' again, since we are in the process of upgrading the system.

Thanks again,

Jack Delaney

Manager, Systems Operations
Legal Department
Sprint Nextel
Office: 913-315-9705
Cell: 703-906-9533

Subject: Questions about previous data submissions
Date: Fri, 27 Jul 2012 11:49:32 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: jack.delaney@sprint.com

Mr. Delaney,

The NJ Broadband Mapping team has received feedback from the NTIA regarding our 4/11 and 10/11 data submissions. The NTIA contracted the Michael Baker firm who, using third-party data, evaluated the quality of data submissions it received from its grantees. Since the feedback we have received for the last two submissions is consistent, we would like to share it with you. Please note that we were not given copies of the third-party data, so the reasons for mismatches between the data we submitted and these third-party data are not always clear. Our intent is merely to share with you problematic fields, such as provider name or speed tier, that have a lot of mismatches, and do some further inquiry to better validate the provider's data. Obviously, by working more closely with you, we hope to reduce data mismatches in future submissions. Here are some of the questions we have about your data.

Sprint
- Most mismatches result from reporting of max advertised downstream speed tier 3. (Please refer to downstream speed tier table below.) One possibility is that tier 3 understates your downstream speed.
- Most mismatches in your reporting of max advertised upstream speed is for tier 2. (Please refer to upstream speed tier table below.) Might you possibly be understating your upstream speed?

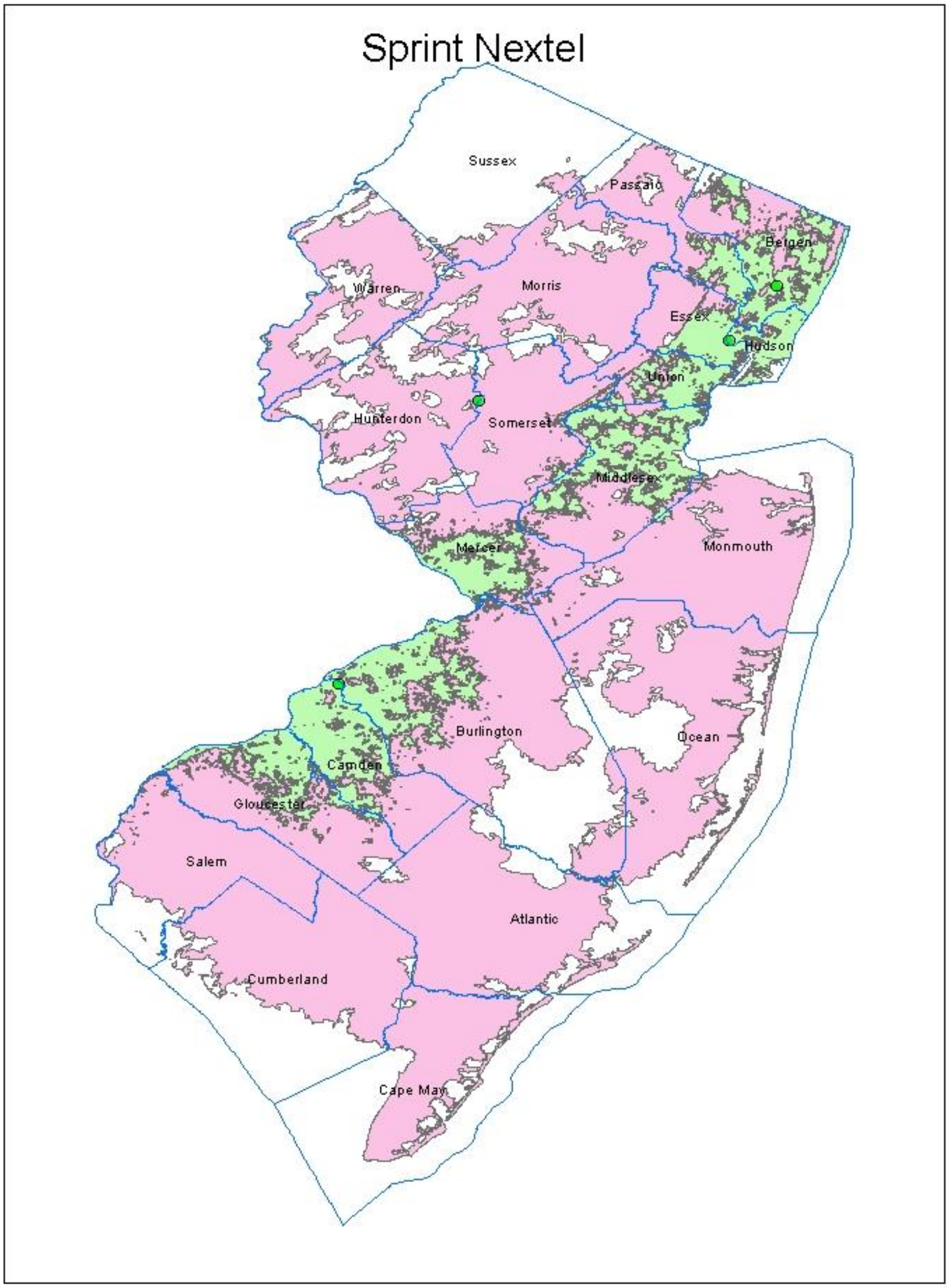
Thank you for your interest and continued support in our NJ BB Mapping program.

Best regards,

Cliff Behrens
Manager - NJ BB Data Collection
Applied Communication Sciences
ConnectingNJ@groups.appcomsci.com
732.699.2380

Section 7: Notes and Open Issues

Section 8: Overview Map of Submitted Data



6.22 Starband Communications

Connecting New Jersey - Broadband Provider Data Report

Provider: Starband
Submission date: October 2012

This report presents details on processing broadband data for delivery to the National Telecommunications and Information Administration (NTIA).

This is a stub report, since data from the previous submission was reused with the spectrum set to 9 being the only change. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

NTIA Table BB_Service_Wireless

Total rows loaded: 1 (shape of The State of New Jersey).

Since there is no change in the data and NTIA data model, the table is copied from the 2012 April table, using an ESRI tool, "ArcToolBox->Data Management Tools->General->Append" with NO_TEST in the Schema Type option.

As per the latest clarification, the value in column "SPECTRUM" was set to 9.

Provider Interactions

```
Subject:     RE: NJ Broadband Data Collection - Fall 2012
Date:  Tue, 24 Jul 2012 18:14:36 -0400
From:  Lesley Cooper - McLean <Lesley.Cooper@spacenet.com>
To:    Connecting NJ <ConnectingNJ@appcomsci.com>


Dear Scott,

This is to advise you that StarBand Communications Inc. does not have any changes to
report at this time.

Regards,

Lesley Cooper
```

Since there is no change in the data and NTIA data model, the table is copied from the 2011 October table, using an ESRI tool, "ArcToolBox->Data Management Tools->General->Append" with NO_TEST in the Schema Type option.

Provider Interactions

From: Lesley Cooper - McLean [mailto:Lesley.Cooper@spacenet.com]
Sent: Monday, January 23, 2012 5:42 PM
To: NJ Broadband Data Collection
Subject: RE: NJ Broadband Data Collection - Spring 2012

Dear Sir/Madam:

As of December 31, 2011, StarBand Communications does not have any changes to report.

Regards,

Lesley

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Friday, February 03, 2012 2:05 PM
To: 'Lesley Cooper - McLean'
Cc: NJ Broadband Data Collection
Subject: RE: NJ Broadband Data Collection - Spring 2012

Lesley,

Does Starband have any information on actual coverage areas, taking into account topography, building shadows, etc? Such data, perhaps from modeling and simulations, could improve the accuracy of the coverage map.

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Lesley Cooper - McLean [mailto:Lesley.Cooper@spacenet.com]
Sent: Tuesday, March 20, 2012 4:58 PM
To: NJ Broadband Data Collection
Subject: RE: NJ Broadband Data Collection - Spring 2012

Dear John,

Sorry for my delay in getting back to you. For each site that StarBand installs, prior to the actual installation our installers will go out to the site and make an assessment as to where the antenna should be placed so that it has adequate line of site.

Hope this helps.

Thanks,

Lesley

Subject: RE: NJ Broadband Data Collection - Fall 2012
Date: Tue, 24 Jul 2012 18:14:36 -0400
From: Lesley Cooper - McLean <Lesley.Cooper@spacenet.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>

Dear Scott,

This is to advise you that StarBand Communications Inc. does not have any changes to report at this time.

Regards,

Lesley Cooper

StarBand Communications

Connecting New Jersey - Broadband Provider Data Report

Provider: StarBand Communications Inc.
Received: March 2011
Submission date: April 2011

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Sections:

45. NDA Status
46. Submission Overview
47. Submission File Details
48. Data Validations and Results
49. Data Transformation and Loading
50. Clarification Questions and Provider Responses
51. Notes and Open Issues

Section 1: NDA Status

NONE

Section 2: Submission Overview

<table>
<tr><th colspan="5">AVAILABILITY DATA</th></tr>
<tr><td rowspan="3">ID</td><td colspan="2">Provider name</td><td colspan="2">StarBand Communications Inc.</td></tr>
<tr><td colspan="2">“Doing business as” name</td><td colspan="2">Not provided</td></tr>
<tr><td colspan="2">FRN</td><td colspan="2">0005087457</td></tr>
<tr><th colspan="5">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="4"></td></tr>
<tr><td>File size</td><td colspan="4"></td></tr>
<tr><td>Speeds</td><td>Type</td><td></td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</td><td>Max advertised up is Code 2 (256 Kbps), down is Code 3 (1.5 Mbps)</td></tr>
</table>

	Typical-upstream		Not provided
	Typical-downstream		Not provided
	Advertised-upstream		
	Advertised-downstream		
	Subscriber-weighted-up		256Kbps
	Subscriber-weighted-down		1.5Mbps
Technology Type	Code 60 (Satellite)		
End-user specification	Not provided		
Comments:			
INTERCONNECTION DATA			
ID			
File size			
Ownership			
Transport Type			
Data Rates/Capacity			
Location			
Comments: Not provided			

Section 3: Submission File Details

Received email explaining their service offering. Satellite service is provided in all of New Jersey.

On subscriber weighted values, they say:

"Since we have only 1 service that meets the definition of broadband service, the weighted average is the same as the average for that service. Upload speed is 256 Kbps and download speed is 1.5Mbps."

Section 4: Validations and Results

No rows of data need to be validated.

Section 5: Data Transformation and Loading

NTIA Table BB_Service_Wireless

Loaded county shapes from reference data for counties in the State of New Jersey based on emailed statements that all counties are covered. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "StarBand Communications Inc."
DBANAME	Set to "StarBand"
FRN	Set to 0005087457
TRANSTECH	Set to 60
SPECTRUM	Set to 7 per translation shown below
MAXADDOWN	Set to 4, see below.
MAXADUP	Set to 2, see below.
TYPICDOWN	Not provided, set to null
TYPICUP	Not provided, set to null
STATEABBR	Set to “NJ”
SHAPE	County shape read from reference data.

Internal notes on processing:

18. Spectrum: No statement was provided. The NTIA data model has a single column for spectrum. Satellite corresponds to NTIA “SPECTRUM USED” code value 7.
19. Speeds: The maximum advertised speeds provided in the emailed brochure are as discussed above For max adv speeds we encoded the submitted down speed as value 4 (range 1.5-3 Mbps) and encoded the submitted up speed as value 2 (range 200 Kbps -- 768 Kbps).

Section 6: Clarification Questions and Responses

1. What is DBA name if different than provider name?

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Friday, March 18, 2011 10:51 AM
To: 'Lesley Cooper - McLean'
Cc: 'NJ Broadband Data Collection'
Subject: Starband NJBB CLarification

Lesley,

One quick clarification: we have your provider name as Starband Communications Inc. Do you have any other "doing-business-as" name that we should include in the submission to the NTIA?

John Wullert

Manager – NJ BB Data Collection

Telcordia Technologies

732-699-2687

From: Lesley Cooper - McLean [mailto:Lesley.Cooper@Spacenet.com]
Sent: Tuesday, March 22, 2011 5:48 PM
To: ConnectingNJ@research.telcordia.com
Subject: RE: Starband NJBB CLarification

John,

No, we do not. StarBand is the provider of consumer broadband. StarBand is a part of another company, Spacenet Inc., but Spacenet is not a provider of consumer broadband services.

Please let me know if you have any further questions.

Lesley

From: Lesley Cooper - McLean [mailto:Lesley.Cooper@Spacenet.com]
Sent: Tuesday, July 12, 2011 11:54 AM
To: ConnectingNJ@research.telcordia.com
Subject: RE: NJ Broadband Data Collection

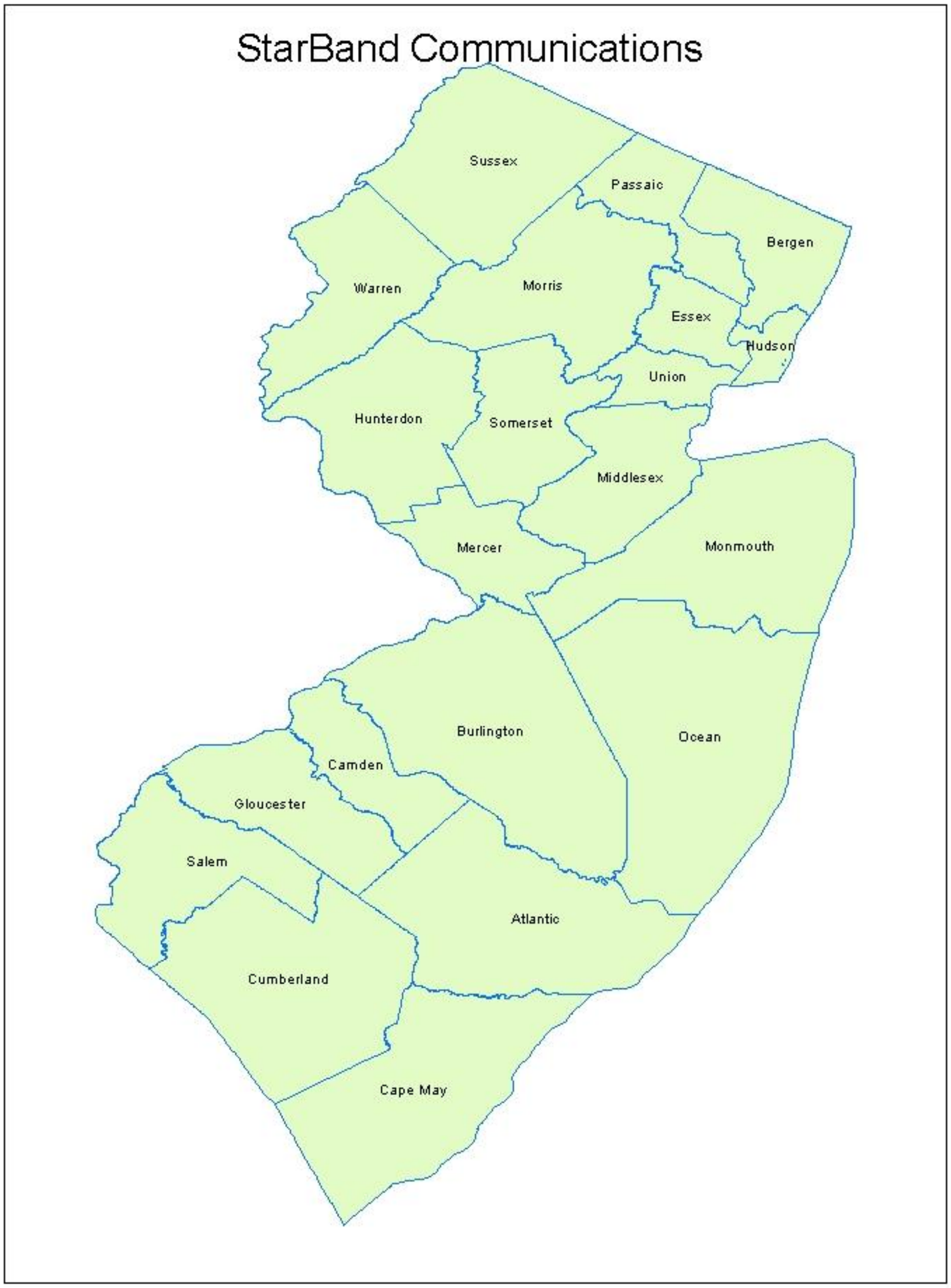
This is to advise you that StarBand Communications does not have any changes to report.

Regards,

Lesley Cooper
Senior Counsel
StarBand Communications

Section 7: Notes and Open Issues

Section 8: Overview Map of Submitted Data



6.23 Tata Communications

Broadband Provider Data Report

Provider: Tata Communications
Received: August 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

None

Section 2: Submission Overview

<table>
<tr><th colspan="5">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td colspan="2">Provider name
“Doing business as” name
FRN</td><td colspan="2">Tata Communications (America) Inc.
Tata Communications (America) Inc.
0009480302</td></tr>
<tr><th colspan="5">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="4">E-mail communications</td></tr>
<tr><td>File size</td><td colspan="4"></td></tr>
<tr><td rowspan="7">Speeds</td><td>Type</td><td></td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</td><td rowspan="7">Received e-mail with address-level information for their only two broadband customers in NJ.</td></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Address</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>Address</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>Not provided</td></tr>
</table>

Technology Type	20 (SDSL)
End-user specification	None
Comments:	
INTERCONNECTION DATA	
ID	None provided
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments:	

Section 3: Submission File Details

Received e-mail with address-level information for their only two broadband customers in NJ (located in Montvale and Secaucus).

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_CensusBlock

Using information from the e-mail, manually prepared an Excel file "TataBBInfo.xls" which was later geocoded, joined to NJ census blocks and loaded into an SDE table providerInput. Subsequently, the BB_Service_CensusBlock table was loaded from providerInput, with the fields (columns) set as detailed bellow:

Table Column	Data Source / Transformation
PROVNAME	Set to "Tata Communications (America) Inc."
DBANAME	Set to "Tata Communications (America) Inc."
PROVIDER_TYPE	Set to 3, as per the e-mail info
FRN	Set to "0009480302"

STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (digits 2-5)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	Set to 20, as per the e-mail info
MAXADDOWN	Set per records provided in the e-mail.
MAXADUP	Set per records provided in the e-mail.
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Copied from Census Bureau 2010, as matched by spatial join on geocoded address point

Section 5: Clarification Questions and Responses

Subject: Re: NJ Broadband Data Collection - Fall 2012
Date: Thu, 26 Jul 2012 15:27:49 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: Diana Peneva <Diana.Peneva@tatacommunications.com>

```
Ms. Peneva,

Thank you for your quick response to our request.

Best regards,

Cliff

On 7/26/2012 2:21 PM, Diana Peneva wrote:
> Dear Cliff,
>
> Tata Communications (America) Inc.("Tata America") typically cannot
provide broadband services to any customer location in less than 30 days
(and it often takes more than 60 days) because it does not own any
facilities that connect to customer locations.  Because Tata America cannot
provide service more quickly without an extraordinary commitment of
resources, Tata America's broadband service is not typically considered
"available" to any additional Maryland addresses. Our only two broadband
customer continue to be located at:
>
```

> 1. 155 Chestnut Ridge Road, Montvale, New Jersey 07645-3Mbps, and
>
> 2. 275 Hartz Way, Secaucus, New Jersey 07094 - 1Mbps
>
> Please let me know if you need any additional information.
> Kind regards,
> Diana
>

Subject: Re: NJ Broadband Data Collection - Fall 2012
Date: Tue, 04 Sep 2012 22:11:27 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: Diana Peneva <Diana.Peneva@tatacommunications.com>

Diana,

Could you please tell use what technology you use to deliver broadband service to each of these two customers?

> 1. 155 Chestnut Ridge Road, Montvale, New Jersey 07645-3Mbps, and
>
> 2. 275 Hartz Way, Secaucus, New Jersey 07094 - 1Mbps

Here are the possibilities:

0= Asymmetric xDSL.
20= Symmetric xDSL.
30= Other Copper Wireline
40= Cable Modem—DOCSIS 3.0.
41= Cable Modem—Other.
50= Optical Carrier/Fiber to the End User
60= Satellite.
70= Terrestrial Fixed Wireless—Unlicensed.
71= Terrestrial Fixed Wireless—Licensed.
80= Terrestrial Mobile Wireless.
90= Electric Power Line.
0 = All Other

Thank you for you assistance,

Cliff Behrens

On 7/26/2012 2:29 PM, Diana Peneva wrote:
> Apology for the typo, I meant New Jersey not Maryland.
> Regards,
> Diana
>

Subject: Re: NJ Broadband Data Collection - Fall 2012
Date: Wed, 05 Sep 2012 22:02:14 -0400

From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: Diana Peneva <Diana.Peneva@tatacommunications.com>

Diana,

Thank you for getting back to me on this.

Regards,

Cliff

On 9/5/2012 11:21 AM, Diana Peneva wrote:
> Dear Cliff,
>
> The technology for 155 Chesnut Ridge Road, Montvale, New Jersey 07645-3Mbps was Connect IP Sec.
>
> The technology 275 Hartz Way, Secaucus, New Jersey 07094 - 1Mbps was Connect IP Sec
>
> Please note that we do not have these customers for the period January - June 2012.
> Please let me know if you need anything further or require any additional assistance.
> Regards,
> Diana
>

Subject: Re: NJ Broadband Data Collection - Fall 2012
Date: Thu, 06 Sep 2012 21:18:20 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: Diana Peneva <Diana.Peneva@tatacommunications.com>

Diana,

We understand Internet Protocol Security (IPsec) to be a protocol suite for securing Internet Protocol (IP) communications by authenticating and encrypting each IP packet of a communication session. For reporting the technology of transmission, the NTIA requests reporting the technology used by the portion of the connection that terminates at the end-user location. If different technologies are used in the two directions of information transfer (‘‘downstream’’ and ‘‘upstream’’), report the connection in the technology category for the downstream direction. The technology of transmission should be entered as an integer based on the following reference:

0= Asymmetric xDSL.
20= Symmetric xDSL.
30= Other Copper Wireline

```
40= Cable Modem-DOCSIS 3.0.
41= Cable Modem-Other.
50= Optical Carrier/Fiber to the End User 60= Satellite.
70= Terrestrial Fixed Wireless-Unlicensed.
71= Terrestrial Fixed Wireless-Licensed.
80= Terrestrial Mobile Wireless.
90= Electric Power Line.
0 = All Other

Cliff
```

Subject: RE: NJ Broadband Data Collection - Fall 2012
Date: Thu, 13 Sep 2012 16:47:05 +0000
From: Angelic Franklin <Angelic.Franklin@tatacommunications.com>
To: Connecting NJ (ConnectingNJ@appcomsci.com) <ConnectingNJ@appcomsci.com>

Cliff,

We use 20—Symmetric xDSL for those two locations.

Please confirm receipt.

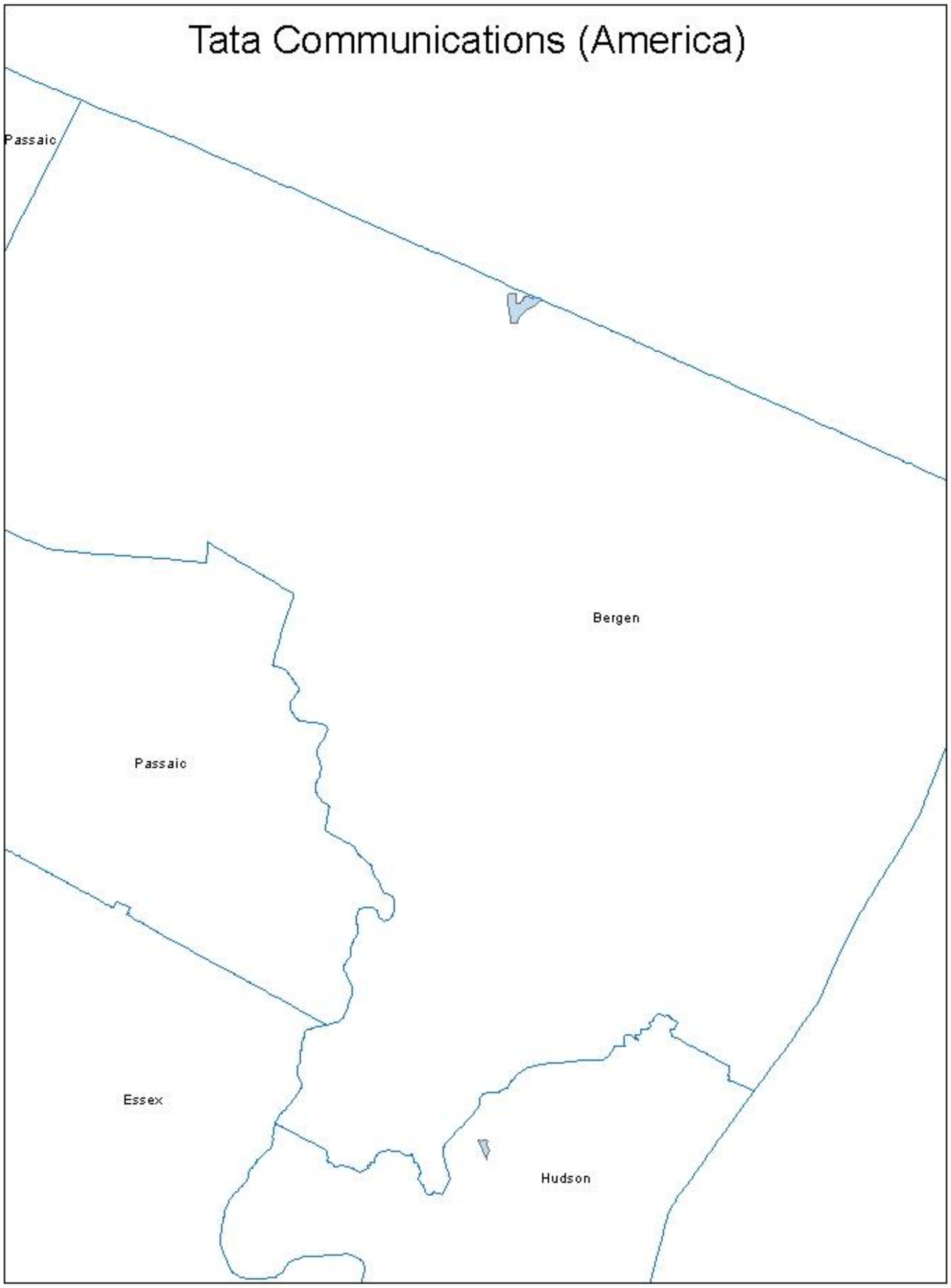
Angelic Franklin
Paralegal
Legal

Tata Communications (America) Inc.
2355 Dulles Corner Boulevard
Suite 700
Herndon, VA 20171
United States of America

Direct 703 657 8413 | Fax 703 657 8340 | IP 808413
Angelic.Franklin@tatacommunications.com

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.24 Time Warner

Broadband Provider Data Report

Provider: Time Warner
Received: August 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NDA established with NJ OIT.

Section 2: Submission Overview

AVAILABILITY DATA			
ID	PROVIDER NAME	Time Warner Cable, LLC	
	DBA NAME	Time Warner Cable	
	FRN	0013430244	
	Holding company name	Time Warner Cable Inc.	
	Holding company number	131352	
FOR WIRELINE			
File types	Time Warner supplied 2 pdf files and a shapefile showing coverage on FIPS census block level.		
Speeds	Type	Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)	
	Upstream max adv	yes (code 5). census block.	
	Downstream max adv	yes (code 9). census block	
	Upstream typical	not provided.	
	Downstream typical	not provided	
	Subscriber-weighted	Provided; however data is proprietary	

		business-confidential information that cannot be further distributed or disseminated.	
Technology Type	40		
Comments:			
INTERCONNECTION DATA: INSTRUCTED TO USE PREVIOUS DATA			
ID			
File size			
Ownership			
Transport Type			
Data Rates/Capacity			
Location			
Comments: **not provided** with initial submission. Sent request for updated information.			

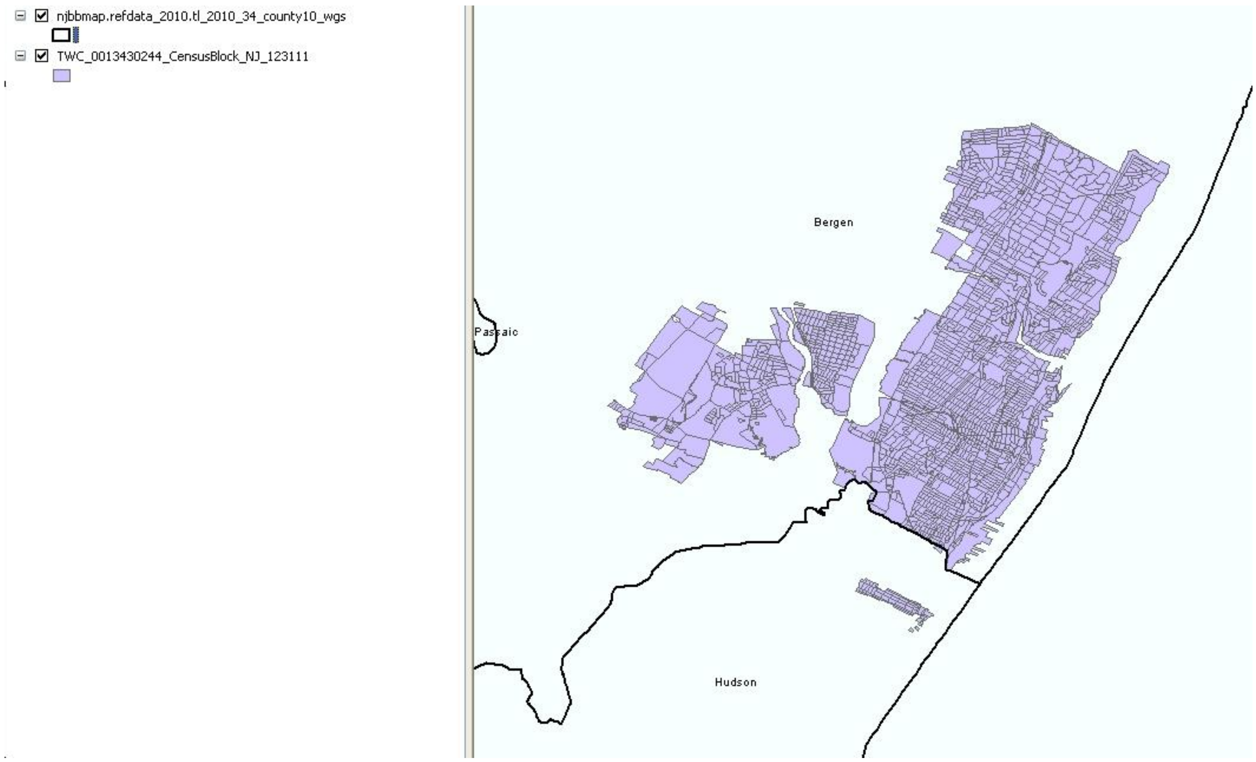
Section 3: Submission File Details

Received 1 archive file by EMAIL:

Name	**Size**
NJ	
0013430244_blendedaverage_NJ_6302012.txt	1 KB
NJ 6th BB Cltr.pdf	150 KB
TWC_0013430244_CensusBlock_NJ_063012.cpg	1 KB
TWC_0013430244_CensusBlock_NJ_063012.dbf	644 KB
TWC_0013430244_CensusBlock_NJ_063012.prj	1 KB
TWC_0013430244_CensusBlock_NJ_063012.shp	529 KB
TWC_0013430244_CensusBlock_NJ_063012.shx	16 KB

Quick loading results: 1973 polygons in shapefile, spanning 2 counties in NJ.

Figure 1. Loaded results



Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

NJ 6th BB Cltr.pdf states that the middle mile data has not been changed. Therefore we copied the 2012 April middle mile data.

The following describes how to create the middle mile data in the previously submitted data which dates from the 2010 October submission.

Loaded from supplied file “0013430244_middlemile_NJ_06302009.txt” (19 rows, only 1 in New Jersey) received in **June 2010** (and apparently unchanged since). The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to “Time Warner Cable LLC” (“LLC” was missing)
DBANAME	As supplied in column ”DBAName”

FRN	Set to “0013430244”
OWNERSHIP	As supplied in column ”Ownership”
BHCAPACITY	As supplied in column ”Serving Facility Capacity”
BHTYPE	As supplied in column ”Serving Facility Type”
LATITUDE	As supplied in column “Latitude”
LONGITUDE	As supplied in column “Longitude”
ELEVFEET	As supplied in column “Elevation”
STATEABBR	Set to “NJ”
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau reference data
SHAPE	Point corresponding to Lat, Long created using ESRI

Internal processing notes from prior report:

13. Created an excel sheet and imported to a geodatabase table.
14. Added points corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
15. We dropped all locations outside the New Jersey state boundary, leaving just one. In this row, the elevation value is 30, and we were told in June 2010 that the connection point is on the 7^{th} floor of a building, so we did not change the value.
16. Added a column with the ID of the containing Year 2000 Census block via a spatial join of the points and the census block shapes from reference data.

NTIA Table BB_Service_CensusBlock

The census block information was loaded from the supplied shape file. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to “Time Warner Cable LLC” (“LLC” was missing in submitted data)
DBANAME	As supplied in column ”DBAName”
PROVIDER_TYPE	Set to 1
FRN	Set to “0013430244”
STATEFIPS	Set to “34”
COUNTYFIPS	Populated from cb_fips (digits 3-5)
TRACT	Populated from cb_fips (next 6 digits)
BLOCKID	Populated from cb_fips (next 4 digits)
FULLFIPSID	As supplied in column cb_fips

TRANSTECH	As supplied in column tech_trans
MAXADDOWN	As supplied in column max_ad_dwn
MAXADUP	As supplied in column max_ad_up
TYPICDOWN	Submitted as “0” in provided data, set to null
TYPICUP	Submitted as “0” in provided data, set to null
ENDUSERCAT	Not provided, set to null
SHAPE	As supplied

Internal notes on processing

1. The shapefile TWC_0013430244_CensusBlock_NJ_063012 contains 1973 rows (polygons). See above for a preview picture.
2. The shapes use XY coordinate system GCS_North_American_1983. Provides census-block shapes and associated speed data. All census block IDs are length 15. All submitted block IDs are unique and were found in Census Bureau Year 2010 reference data. Only technology code 40 is present. Maximum advertised speed codes are present.
3. Geographic coordinate system: The supplied shape uses geographic coordinate system name GCS_North_American_1983. The NTIA transmittal data model requires coordinate system GCS_WGS_1984. To change the projection we applied the geographic transformation NAD_1983_To_WGS_1984_5 (per ESRI KB article 24159). We also had to load the data into a second feature class such that the tolerance value matches the NTIA transmittal model’s value of 0.000000002.
4. Checked that all census blocks were valid NJ blocks and that no duplicates were present.

NTIA Table BB_Service_Overview

The following data were submitted in 0013430244_blendedaverage_NJ_6302012.txt. However, the service provider stated that the data are proprietary, not for public consumption or dissemination in any form. Since we are not sure if the BB_Service_Overview table has proper protection, we did not submit the data in that table and are instead including it here..

```
NAME  DBA   FRN   COUNTY     STATE TECH CODE  SWNOMSPEED

Time Warner Cable LLC Time Warner Cable     0013430244 003   34    40
     7630.1

Time Warner Cable LLC Time Warner Cable     0013430244 017   34    40
     6477.1
```

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Monday, February 27, 2012 10:26 AM
To: 'monique.crawford@twcable.com'
Cc: 'NJ Broadband Data Collection'
Subject: NJ Braodband Clarification

Monique,

We have begun reviewing your latest broadband availability data and noticed that this round you did not include any information on middle mile. Do you have updated middle mile information or should we use the data you submitted in the previous round?

Thanks,

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

Subject: RE: FW: NJ State Broadband Mapping Program - 6th Round
Date: Fri, 7 Sep 2012 14:44:26 -0400
From: Bates, Shelley <Shelley.Bates@oit.state.nj.us>
To: Duffy, Diane <dduffy@appcomsci.com>
CC: Kort, Rania <Rania.Kort@oit.state.nj.us>, Kloss, Scott <Scott.Kloss@oit.state.nj.us>

Diane,

Please include the nominal speed data from Time Warner in our submission to the NTIA. However, include a disclaimer stating that this portion of the data is not for public consumption or dissemination in any form.

Thanks,

Shelley

*From:*Kloss, Scott
Sent: Friday, September 07, 2012 2:40 PM
To: Bates, Shelley

Cc: Kort, Rania
Subject: RE: FW: NJ State Broadband Mapping Program - 6th Round

Shelley,

Below is the email response from Brian requesting we still include the nominal speed data from TWC in the current data submission. Can you please let ACS know what the plan will be?

Thanks,

Scott

*From:*Brian T. Gibbons [mailto:BGibbons@ntia.doc.gov] <mailto:[mailto:BGibbons@ntia.doc.gov]>
Sent: Thursday, September 06, 2012 8:23 PM
To: Kloss, Scott
Cc: Kort, Rania; Akins Lawal; Dorota Wilke
Subject: RE: FW: NJ State Broadband Mapping Program - 6th Round

Scott

The question raised below has not been raised by any other SBI grantee regarding data submissions.

SBI receives sizeable amounts of data each round that is not for public distribution, for example middle mile data which is collected, stored, and not released.

If Time-Warner has previously contributed to the NJ data gathering effort I'm not certain why this is now a concern if the statement below is new to the submission.

It may be a pro forma notice.

SBI recommends you submit the data.

For assurances, you can flag the submission to SBI with Time Warner's expressed prohibition accordingly.

If time permits SBI may review past submissions from NJ and contact you if additional information is needed

Thanks

Brian

Brian T. Gibbons

SBI-OTIA-NTIA

Rm 7846

US Department of Commerce

1401 Constitution Ave NW

Washington DC 20230

202-482-6094-phone

202-482-2156-fax

bgibbons@ntia.doc.gov <mailto:bgibbons@ntia.doc.gov>

URL: http://www2.ntia.doc.gov/SBDD

URL: http://broadbandmap.gov <http://broadbandmap.gov/>

*From:*Kloss, Scott
Sent: Monday, August 20, 2012 3:57 PM
To: Brian T. Gibbons (BGibbons@ntia.doc.gov
<mailto:BGibbons@ntia.doc.gov>)
Cc: Kort, Rania
Subject: FW: FW: NJ State Broadband Mapping Program - 6th Round

Brian,

Here's the email thread regarding the Provider Weighted Nominal Speed data sent in by TWC. The question is whether or not we can submit this data to the NJ or National maps due to them saying it is not for public disclosure. Can you let us know if you've seen this before in other states or what to make of it?

Thanks,

Scott

*From:*Diane Duffy [mailto:dduffy@appcomsci.com]
<mailto:[mailto:dduffy@appcomsci.com]>
Sent: Monday, August 13, 2012 11:11 AM
To: Bates, Shelley
Cc: Behrens, Clifford A; Kloss, Scott; dduffy@appcomsci.com
<mailto:dduffy@appcomsci.com>
Subject: Re: FW: NJ State Broadband Mapping Program - 6th Round

Thanks, Shelley.

Let's add to our agenda for tomorrow a discussion item related to the implications of the confidentiality of this information; i.e., under these restrictions, do we deliver to NTIA and, if so, how?

On 8/13/2012 10:53 AM, Bates, Shelley wrote:

*From:*Crawford, Monique [mailto:monique.crawford@twcable.com]
Sent: Monday, August 13, 2012 10:00 AM
To: Crawford, Monique; Bates, Shelley
Subject: RE: NJ State Broadband Mapping Program - 6th Round

Hello Shelly:

Attached is the Time Warner Cable Confidential Subscriber-Weighted Nominal Speed data showing the blended average of our advertised maximum broadband download speeds as of June 30, 2012 for New Jersey. This information is highly Confidential and is protected under the confidentiality requirements set forth in Section 106 (h) of the Broadband Data Improvement Act and the Nondisclosure Agreement. The information is not for public disclosure.

If you have any questions regarding this submission please let me know.

Best regards,

Monique R. Crawford

Regulatory Affairs

Time Warner Cable

13820 Sunrise Valley Dr.

Herndon, VA 20171

(703) 345-3175 Office

(703) 554-5019 Mobile

(704) 697-4933 E-fax

*From:*Crawford, Monique
Sent: Tuesday, August 07, 2012 3:02 PM
To: 'Shelley.Bates@oit.state.nj.us <mailto:Shelley.Bates@oit.state.nj.us>'
Cc: Crawford, Monique
Subject: NJ State Broadband Mapping Program - 6th Round

Hello Shelly:

Attached is Time Warner Cable's 6th round broadband mapping submission. Please let me know if you have any questions or concerns.

Best regards,

Monique R. Crawford

Regulatory Affairs

Time Warner Cable

13820 Sunrise Valley Dr.

Herndon, VA 20171

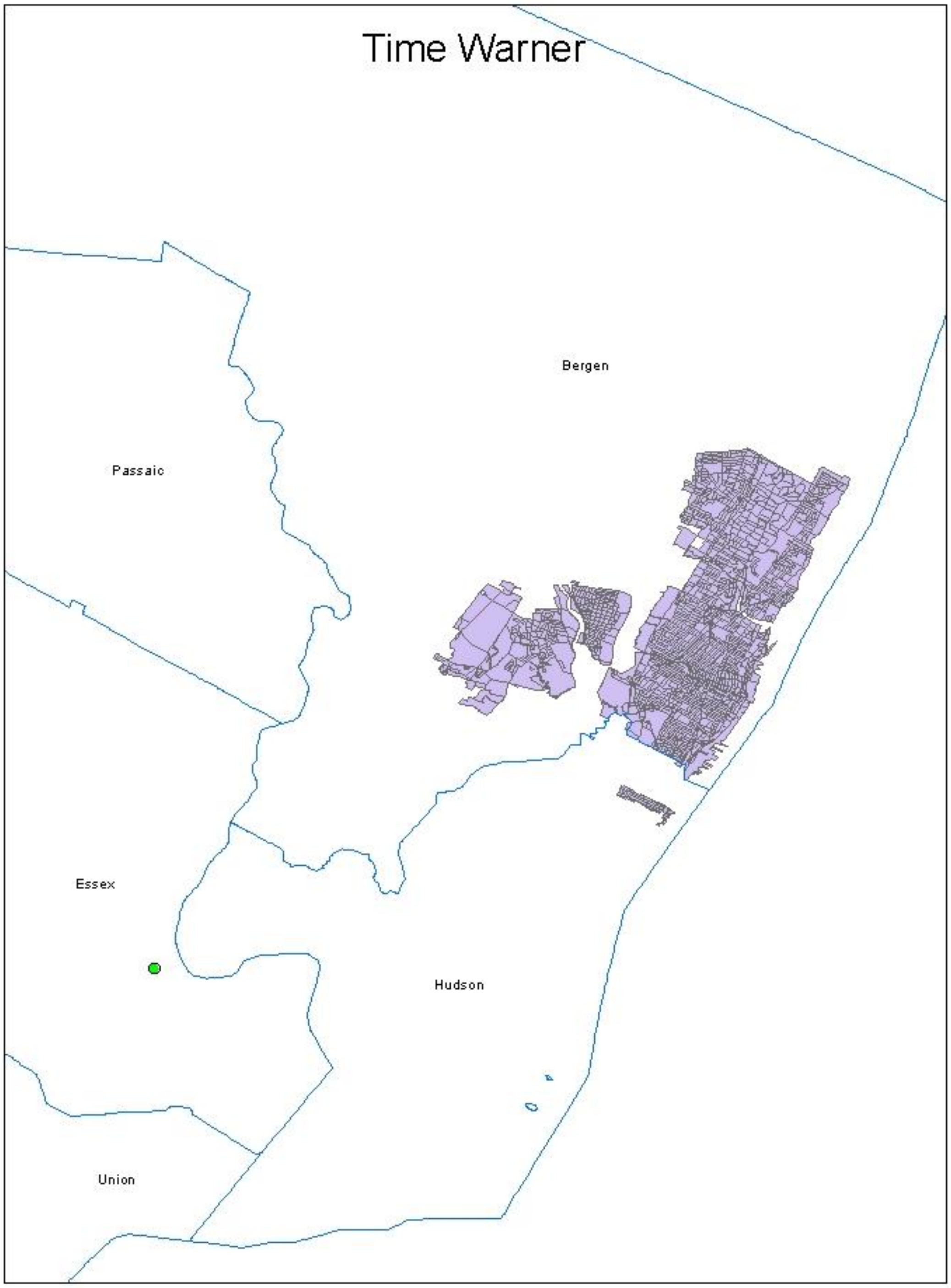
(703) 345-3175 Office

(703) 554-5019 Mobile

(704) 697-4933 E-fax

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.25 T-Mobile

Connecting New Jersey - Broadband Provider Data Report

Provider: T-Mobile
Received: August 2012
Submission date: October 2012

This report presents details on processing broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Executed with NJ OIT.

Section 2: Submission Overview

AVAILABILITY DATA		
ID	PROVIDER NAME	T-Mobile USA, Inc.
	DBA NAME	T-Mobile
	FRN	0006945950
	Holding company name	T-Mobile USA
	Holding company number	130403
FOR WIRELESS		
Filetypes	T-mobile supplies .xls, .txt. and shapefiles (availability). They supply 3 sets of shape files: 2 for HSPA+ coverage and another for 3G coverage.	
Speeds	(see table below)	**Notes: "T-Mobile submitted three sets of map files for this state. The file names correspond with maximum advertised speed data above. HSPA42 represents increased 4G download speed (it does not affect upload speed)."**

Type	Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)
Upstream max adv	yes (shapefiles for both 3G and 4G)
Downstream max adv	yes (shapefiles for both 3G and 4G)
Upstream typical	not found.
Downstream typical	not found.
Subscriber-	Provided as a table of valuesin

	weighted	mbps (not kbps) correlated to 21 FIPS codes (code 80)	
Technology Type	Spectrum (Mhz, FCC code)		Advanced Wireless Services spectrum (1710-1755 MHz; 2100-2155)
Comments:			
INTERCONNECTION DATA			
ID			
File size	10 rows		
Ownership	Code 1		
Transport Type	Type 1		
Data Rates/Capacity	codes 4 and 6		
Location	lat/longs given for all (either A or Z end is in NJ)		
Comments: T-Mobile had reported with their submission that this information would be delayed			

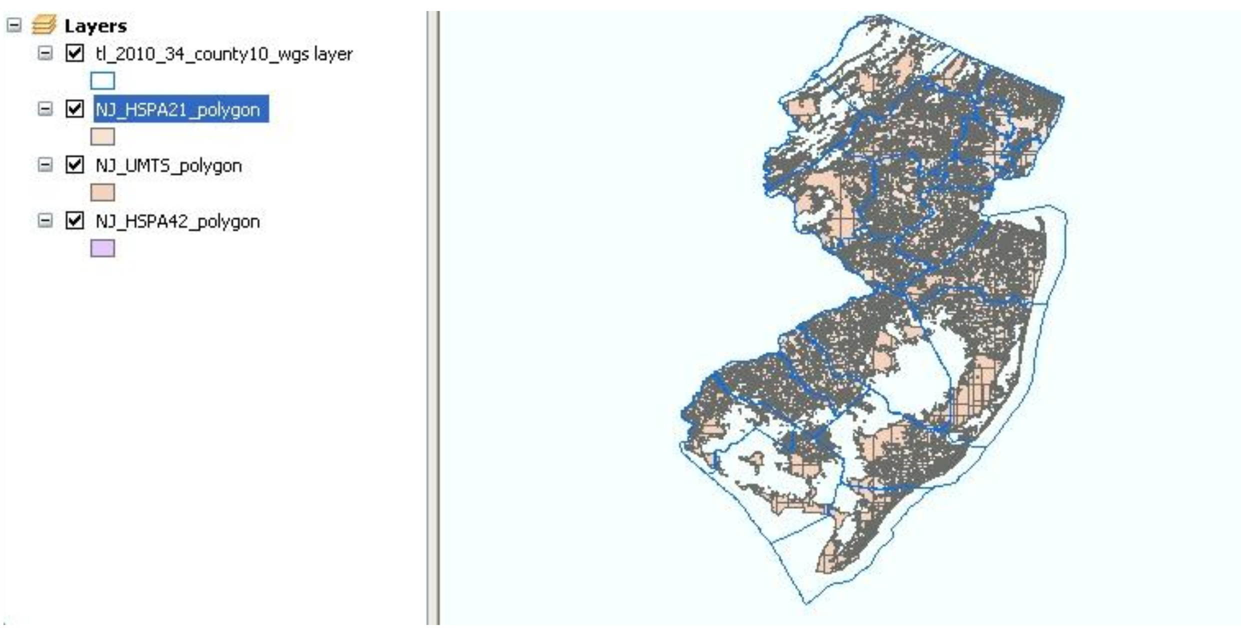


Figure 1. Preview of submitted data in ESRI

Section 3: Submission File Details

The original submission includes the following files:

Name	Size
area_availability_NJ.txt	4 KB
area_availability_NJ.zip	7,023 KB
avg_speed_NJ.xlsx	12 KB
confidential_NJ.txt	1 KB
Cover Letter_NJ.pdf	23 KB
middle-mile_NJ.xlsx	10 KB
NJ_HSPA21_polygon.dbf	105 KB
NJ_HSPA21_polygon.prj	1 KB
NJ_HSPA21_polygon.shp	11,092 KB
NJ_HSPA21_polygon.shx	47 KB
NJ_HSPA42_polygon.dbf	10 KB
NJ_HSPA42_polygon.prj	1 KB
NJ_HSPA42_polygon.shp	5,527 KB
NJ_HSPA42_polygon.shx	25 KB
NJ_UMTS_polygon.dbf	150 KB
NJ_UMTS_polygon.prj	1 KB
NJ_UMTS_polygon.shp	5,980 KB
NJ_UMTS_polygon.shx	18 KB
T-Mobile_BB Data_NJ.zip	7,056 KB

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

Loaded from supplied file “middle_mile_NJ.xlsx” (8 rows). The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to “T-Mobile USA, Inc."
DBANAME	Set to "T-Mobile"
FRN	Set to “0006945950”
OWNERSHIP	As provided in column Ownership (value 1)l
BHCAPACITY	As provided in column Serving Facility Capacity
BHTYPE	As provided in column Serving Facility Type
LATITUDE	Created by geocoding the supplied address

LONGITUDE	Created by geocoding the supplied address
ELEVFEET	Set to “0” (zero)
STATEABBR	As provided in column State
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau reference data
SHAPE	Point created using ESRI tools

Internal notes on processing:

17. Created an excel sheet with the original data, remove the first 3 header lines, add the Latitude and Longitude columns, copied the NJ lat/long from the A or Z lat/long to the Latitude and Longitude columns, and imported to a geo-database table. (If A and Z are all NJ, copy Z which is arbitrarily chosen.)
18. Added points corresponding to each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
19. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the Year 2010 census block shapes from Tiger Line reference data. Ensured that all entries were successfully mapped to 2010 census blocks.
20. Dropped 4 records that were as duplicate census blocks
21. Loaded 4 records.

NTIA Table BB_Service_Wireless

Loaded from the supplied shapefiles NJ_HSPA21_polygon (5944 rows), NJ_HSPA42_polygon (3171 rows), and NJ_UMTS_polygon (2286 rows). The following table explains the transformations that were applied.

Table Column	**Data Source / Transformation**
PROVNAME	Set to "T-Mobile USA, Inc." per area_availability_NJ.txt
DBANAME	Set to “T-Mobile" per area_availability_NJ.txt
FRN	Set to “0006945950”
TRANSTECH	Set to 80 per area_availability_NJ.txt
SPECTRUM	Set to “4” per translation shown below
MAXADDOWN	Set as follows: • HSPA 21 is 6; • HSPA 42 is 7; • UMTS is 4; as specified in file area_availability_NJ.txt
MAXADUP	Set as follows: • HSPA 21 is 4;

	• HSPA 42 is 4; • UMTS is 2; as specified in file area_availability_NJ.txt
TYPICDOWN	Set to null (not supplied)
TYPICUP	Set to null (not supplied)
STATEABBR	As supplied in column “state” with “NJ”
SHAPE	As supplied.

Internal notes on processing:

20. Received three shape files; see above for preview of shapefiles in ESRI. (Note that we do not check duplicate since the shapes will be merged to a single shape for each technology)
    a. NJ_HSPA21
        i. 5944 candidates
    b. NJ_HSPA42
        i. 3171 candidates
    c. NJ_UMTS
        i. 2286 candidates
21. The data rows carry no technology, speed, or other broadband data. This data is provided in a separate file. File “area_availability_NJ.txt” provides technology and spectrum codes that are within the valid set. It also provides maximum-advertised speeds for each wireless technology.
22. File “avg_speed_NJ.xls” provides subscriber-weighted nominal speeds, which we will not be using for this round (no overview table required).
23. Spectrum: NOFA defines 7 spectrum columns. T-Mobile provided a “Y” value in column 4 (Advanced Wireless Services, ranges 1710-1755 MHz; 2100-2155) in file area-availability_NJ.txt, so we coded the value as '4'.
24. The supplied shapes use Z coordinate. We need to remove it using ArcToolbox > Conversion Tools > To Geodatabase-> Feature Class to Geodatabase (multiple) tool. The resulting tables are named with suffix “_z”.
25. The supplied shapes use geographic coordinate system GCS_North_American_1983. The NTIA data model requires coordinate system GCS_WGS_1984. To change the projection we applied the ESRI geographic transformation NAD_1983_To_WGS_1984_5 (per ESRI KB article 24159). The resulting tables are named with suffix “_wgs”.
26. The supplied shapes use tolerance values different from the NTIA transmittal model. The transformed feature classes with suitable tolerances are named with suffix “_tol”.
27. NTIA requires shapes to be contained in the NJ state boundary. Although we can visually verified that it is the case, we clipped the shape using ESRI: Analysis Tools-> Extract -> Clip with, select feature class refdata_2010.tl_2010_34_state10_wgs. The feature class has the suffix "_clip".
28. The NJ_HSPA42 and NJ_UMTS shapefiles contained some identical rows as determined by spectrum, technology, and shape; the rows only differed in the maximum advertised speed. To prevent the problem of duplicate shapes in the merged data, we took the following actions:
    a. Merged shapes in NJ_HSPA21_polygon_wgs_tol_clip into a single shape, using ArcGIS Dissolve tool: Data Management Tools->Generalization->Dissolve (without choosing

anything in the Dissolve_Field(s) option). The transformed table is named with suffix "_z_wgs_tol_clip_Dissolve".

b. Merged shapes in NJ_HSPA42_polygon_wgs_tol_clip into a single shape, using ArcGIS Dissolve tool. The transformed table is named with suffix "_z_wgs_tol_clip_Dissolve".
c. Merged the shapes in NJ_UMTS_polygon_wgs_tol_clip into a single shape, using ArcGIS Dissolve tool. The transformed table is named with suffix "_z_wgs_tol_clip_Dissolve".

29. Validation rules produced a warning with the HSPA42 having a Maximum Advertised Download Speed code of 7(10-25 Mbps). Investigation of the T-Mobile Web site showed that they are advertising average speeds "approaching 10 Mbps" and peak speeds of 27 Mbps. Sent a note to the provider to verify the value. Provider confirmed that those values are correct.

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Tuesday, February 28, 2012 8:21 AM
To: 'jeni.wilcox@t-mobile.com'
Cc: 'NJ Broadband Data Collection'
Subject: NJ Broadband Clarification

Jeni,

As part of the validation of the Broadband Data, the NTIA has defined a set of speed ranges associated with various technologies and asked us to verify any submission values outside those ranges. In the case of the T-Mobile data, the value of 7 (10 to 25 Mbps) associated with download on HSPA42 is outside the NTIA's expected range. Can you please confirm that you are reporting download speeds of greater than or equal to 10 Mbps and less than 25 Mbps?

Thanks,

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Wilcox, Jeni [mailto:Jeni.Santana@t-mobile.com]
Sent: Tuesday, March 20, 2012 12:41 PM

To: NJ Broadband Data Collection
Subject: RE: NJ Broadband Clarification

Hi John,

Sorry, this one slipped by me. Yes, T-Mobile is reporting **≥ 10 mbps < 25 mbps** as the maximum advertised download speed for its HSPA+42 network.

Thank you,

Jeni Wilcox
Senior Specialist, State Regulatory Affairs

Subject: Questions about previous data submissions
Date: Fri, 27 Jul 2012 11:52:45 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: jeni.wilcox@t-mobile.com

Ms. Wilcox,

The NJ Broadband Mapping team has received feedback from the NTIA regarding our 4/11 and 10/11 data submissions. The NTIA contracted the Michael Baker firm who, using third-party data, evaluated the quality of data submissions it received from its grantees. Since the feedback we have received for the last two submissions is consistent, we would like to share it with you. Please note that we were not given copies of the third-party data, so the reasons for mismatches between the data we submitted and these third-party data are not always clear. Our intent is merely to share with you problematic fields, such as provider name or speed tier, that have a lot of mismatches, and do some further inquiry to better validate the provider's data. Obviously, by working more closely with you, we hope to reduce data mismatches in future submissions. Here are some of the questions we have about your data.

T-Mobile
- Most mismatches result from your reporting of max advertised downstream speed tiers 4 & 6. (Please refer to downstream speed tier table below.) One possibility is that you have understated downstream speed in the lowest tiers.
- Most mismatches in your reporting of max advertised upstream speed is for tier 2. (Please refer to upstream speed tier table below.) Might you possibly be understating your upstream speed?

Thank you for your interest and continued support in our NJ BB Mapping program.

Best regards,

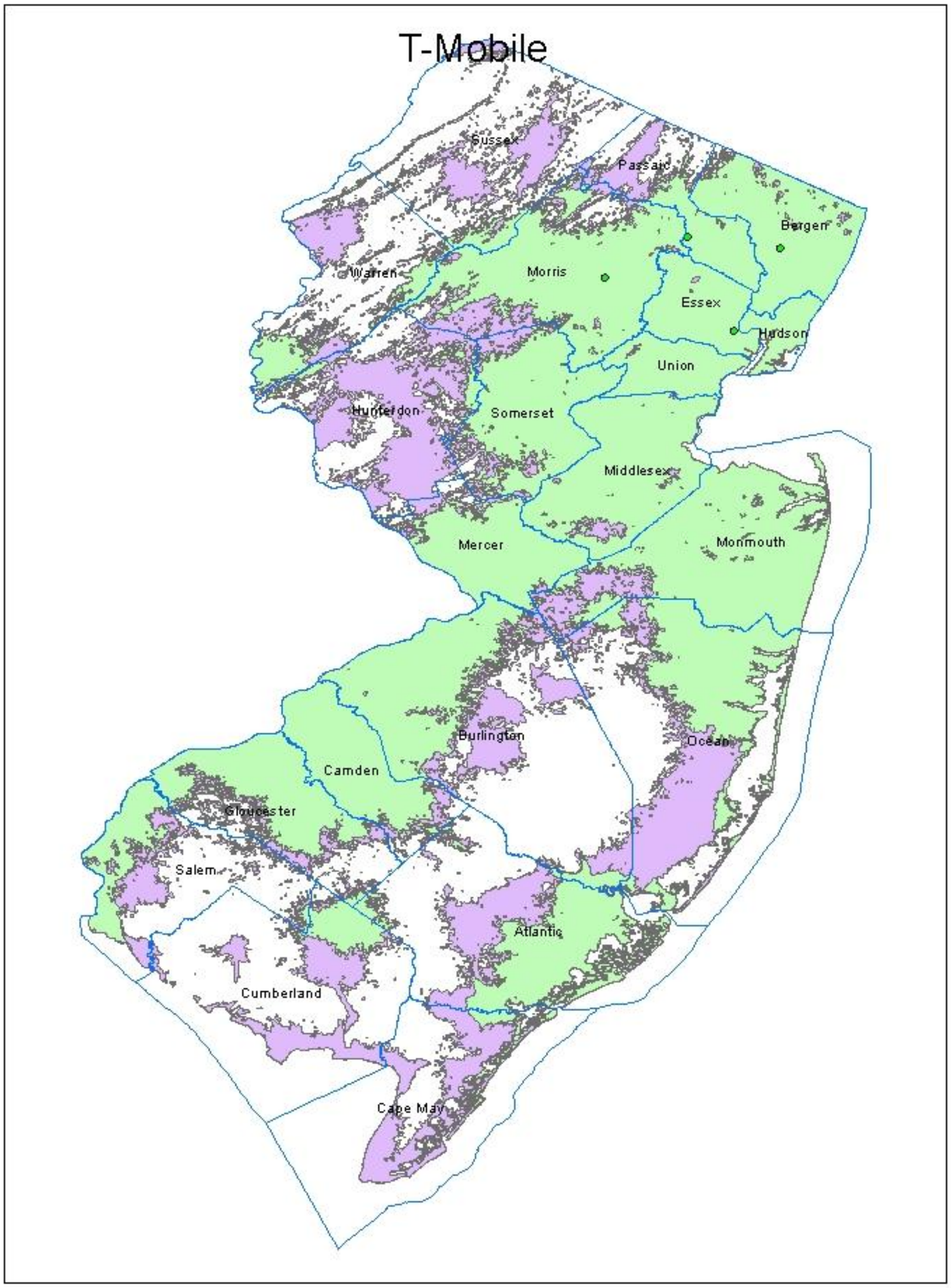
Cliff Behrens
Manager - NJ BB Data Collection
Applied Communication Sciences
ConnectingNJ@groups.appcomsci.com
732.699.2380

Section 6: Notes and Open Issues

This provider has given us three sets of shapes, one for "HSPA21", one for "HSPA42" and one for "UMTS". All are submitted to us as technology code 80 and all in spectrum code 4. But they have different speeds. The validations complain about duplicate rows, based on the shape column and the technology code. Here it seems the technology and spectrum codes do not adequately capture what we have received from the provider.

We solved the problem by using the ArcGIS “Dissolve” tool to merge all the polygons in each submitted feature class into a single polygon. The submission has exactly three rows, one shape for each speed tier, and is not flagged as duplicates.

Section 7: Overview Map of Submitted Data



6.26 tw telecom of New Jersey

Connecting New Jersey - Broadband Provider Data Report

Provider: tw telecom of New Jersey
Received: August 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NONE

Section 2: Submission Overview

AVAILABILITY DATA		
ID	Provider name	tw telecom of new jersey l.p.
	"Doing business as" name	Not provided
	FRN	0004351417
	Holding company name	tw telecom inc.
	Holding company number	160153
FOR WIRELINE		
Filetypes	Text	
File size	3419 bytes, 35 records	
Speeds	(see table below)	

Speeds

Type		Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)
Typical-upstream		Not provided
Typical-downstream		Not provided
Advertised-upstream		Address; values 2..11
Advertised-downstream		Address; values 2..11
Subscriber-weighted-up		Not provided

	Subscriber-weighted-down		Not provided	
Technology Type	30 (Other copper) and 50 (fiber)			
End-user specification	4 (medium – large enterprise) in all cases			
Comments:				

INTERCONNECTION DATA	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments: None provided	

Section 3: Submission File Details

Received 1 file by secure upload:

Size	**Name**
3970	NJBB_0004351417_AddressLevelAvailability.txt

The file has 41 records. All are addresses; no apartment/suite/unit numbers are provided. Some addresses are repeated, sometimes with different speed numbers, suggesting that these entries are customer service addresses. Several are the addresses of multi-tenant buildings. Technology code 30 is present with symmetric speeds, codes range from 4 to 7. Technology code 50 is present with symmetric speeds; codes range from 4 to 11. This is a result of the provider collecting information about the services subscribed to by current customers at these addresses.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_CensusBlock

Loaded from supplied file "NJBB_0004351417_AddressLevelAvailability.txt". The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	As supplied in column "Provider Name", but removed "l.p." from the end of the address.
DBANAME	Not supplied; set same as PROVNAME
PROVIDER_TYPE	Set to 1
FRN	As supplied in column "FRN", with leading zeroes appended
STATEFIPS	Set to "34" (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (digits 3-5)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code (next 5 digits)
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	As supplied in column Technology of Transmission
MAXADDOWN	For technology 30: Set to 7, the max val in MaxAdDown For technology 50: Set to 11, the max val in MaxAdDown
MAXADUP	For technology 30: Set to 7, the max val in MaxAdDown For technology 50: Set to 11, the max val in MaxAdDown
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Copied from Census Bureau TigerLine 2000, as matched by spatial join on geocoded address

Internal processing notes:

22. Geocoded the addresses using the Google geocoder to obtain a Latitude, Longitude pair for each.
23. Created an excel sheet and imported it to a geodatabase table.
24. Added point shapes corresponding to each Latitude, Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
25. Added a column containing the ID of the containing year 2010 census block via a spatial join of the point shapes and the census block shapes from reference data. All addresses were

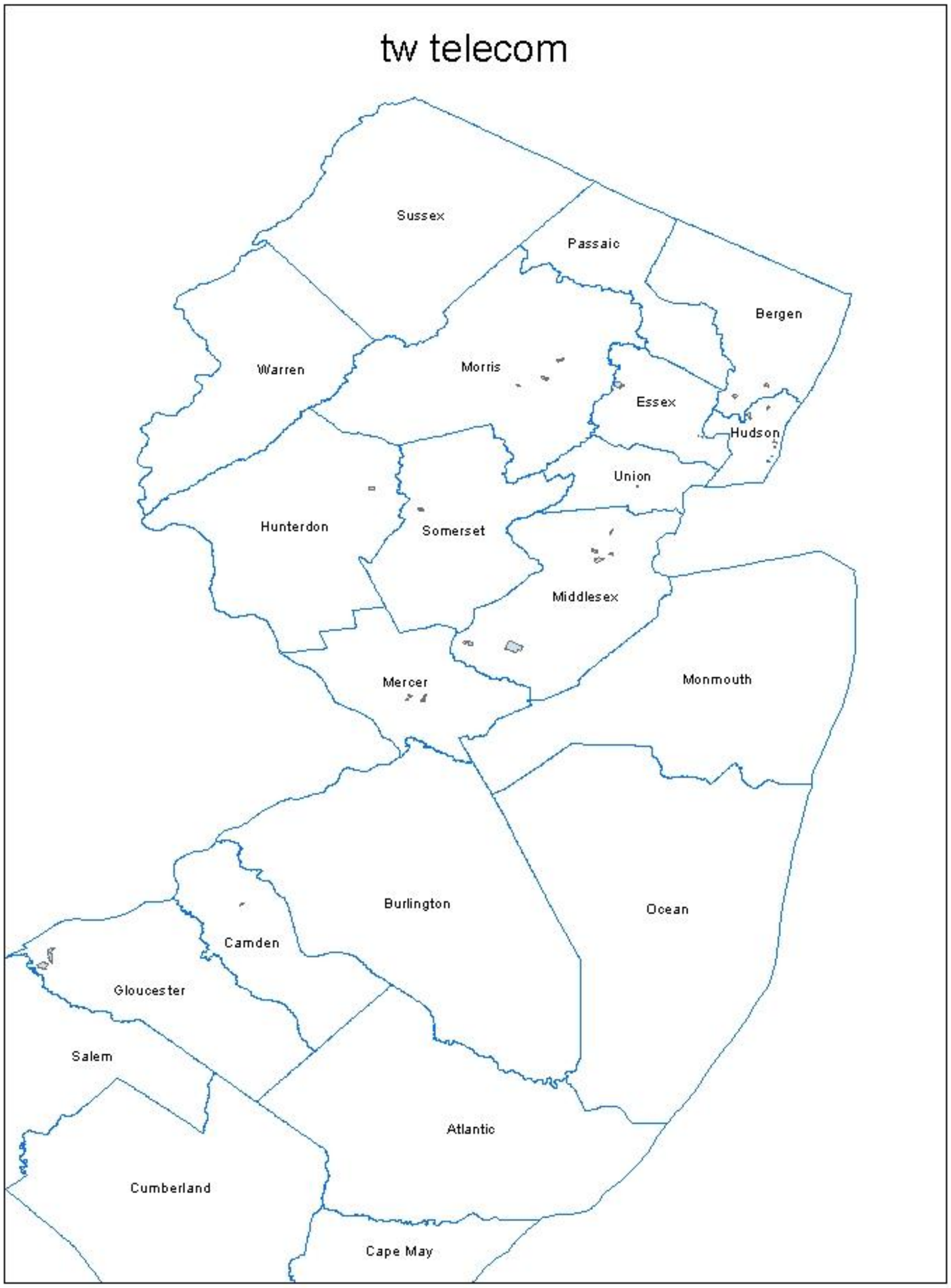
successfully joined with a census block.

26. Discarded rows with duplicate census blocks, generated from the multiple entries at the same addresses
27. Verified that all census blocks were in New Jersey and that no census block was greater than 2 square miles
28. Loaded 28 records into the transfer model table.

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.27 Verizon

Broadband Provider Data Report

Provider: Verizon
Received: August 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

Verizon executed an NDA with NJ OIT.

Section 2: Submission Overview

AVAILABILITY DATA		
ID	Provider name	Verizon Online LLC
	"Doing business as" name	Verizon
	FRN	0012254363
	Holding company name	Verizon Communications Inc.
	Holding company number	131425
FOR WIRELINE		
Filetypes	Text and excel	
File size	See below	

Speeds

Type		Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode, etc)
Typical-upstream		Not provided
Typical-downstream		Not provided
Advertised-upstream		Census Block
Advertised-downstream		Census Block
Subscriber-weighted-up		Not provided
Subscriber-weighted-		Not provided

	down			
Technology Type	DSL (10) and FTTP (50)			
End-user specification	Not provided			
Comments:				

INTERCONNECTION DATA	
ID	
File size	Excel file, 2 POP rows provided, see below
Ownership	Specified in cover letter as being owned by Verizon's affiliate, MCI Communications Services, Inc.
Transport Type	Not provided
Data Rates/Capacity	Not provided
Location	Address
Comments: Sent email to Verizon requesting additional information on Middle Mile points.	

Section 3: Submission File Details

Received these files via email, sent to Shelley Bates in an encrypted zip archive.

Size	**Name**
131,072	NJ - Broadband Data Cover Letter (8-6-12).pdf
6,791,528	NJ - Wireline Service By Census Block with Speeds (June 2012).txt
143,837	NJ - Wireline Service By Street Segment with Speeds (June 2012).txt
2,580	NJ - Pricing (June 2012).txt

30,123 NJ - POP List (June 2012).pdf

Section 4: Data Validation Transformation and Loading

NTIA Table BB_ConnectionPoint_MiddleMile

Started with information supplied in Excel Spreadsheet "NJ - POP List (June 2011).pdf". Since the data is the same as the previous submission, we copied the previous data.

The following table explains the transformations that were applied in the previous submission.

Table Column	Data Source / Transformation
PROVNAME	Set to "Verizon Online LLC""
DBANAME	Set to "Verizon"
FRN	Set to "0012254363"
OWNERSHIP	Set to 0, owned, based on cover letter information
BHCAPACITY	Set to null
BHTYPE	Set to null
LATITUDE	Created by geocoding the supplied addresses
LONGITUDE	Created by geocoding the supplied addresses
ELEVFEET	Set to "0" (zero)
STATEABBR	Set to "NJ"
FULLFIPSID	ID of containing census block from Year 2010 Census Bureau TigerLine reference data
SHAPE	Created using ESRI ArcDesktop

Internal notes on processing:

29. We geocoded the addresses to obtain latitude, longitude value pairs. Both addresses were found. Verizon did not supply information on the elevation, serving facility capacity, and service facility type of these addresses. Sent request to Verizon regarding this information.
30. Created an excel sheet and imported to a geodatabase table.
31. Added points corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog's "Create Feature Class from XY Table" option.
32. Added a column containing the ID of the containing year 2010 census block via a spatial join of the points and the census block shapes from reference data.

NTIA Table BB_Service_CensusBlock

Loaded from supplied text file "NJ - Wireline Service By Census Block with Speeds (June 2012).txt". The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to "Verizon Online LLC"
DBANAME	Set to "Verizon"

PROVIDER_TYPE	Set to 1
FRN	Set to "0012254363"
STATEFIPS	Set to "34" (NJ)
COUNTYFIPS	Populated from 2010_Census_Block_FIPS_Code (Digits 3-5)
TRACT	Populated from 2010_Census_Block_FIPS_Code (next 6 digits)
BLOCKID	Populated from 2010_Census_Block_FIPS_Code (next 4 digits)
BLOCKSUBGROUP	Set to null
FULLFIPSID	First 15 digits of 2010_Census_Block_FIPS_Code See discussion of Census blocks below.
TRANSTECH	As supplied in column Technology_of_Transmission
MAXADDOWN	As supplied
MAXADUP	As supplied
TYPICDOWN	Set to null
TYPICUP	Set to null
SHAPE	Copied from Year 2000 Census Bureau reference data, As matched by Census block 2000 ID

Internal processing notes:

1. No anomalies were noted in the data

NTIA Table BB_Service_RoadSegment

Loaded from supplied text file "NJ - Wireline Service By Street Segment with Speeds (June 2012).txt" and from road segments discovered in large census blocks our calculations put at slightly larger than two square miles (See item 2 above). The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to "Verizon Online LLC"
DBANAME	Set to "Verizon"
PROVIDER_TYPE	Set to 1
FRN	Set to "0012254363"
ADDMIN	Set to the least of the address numbers, if any

ADDMAX	Set to the greatest of the address numbers, if any
PREDIR	Set to null (no value supplied)
STREETNAME	As supplied (has all street components, not just name)
STREETTYPE	Set to null (no value supplied)
SUFFDIR	Set to null (no value supplied)
CITY	Set to null (no value supplied)
STATECODE	Set to “NJ”
ZIP5	Set to null (no value supplied)
ZIP4	Set to null (no value supplied)
TRANSTECH	As supplied
MAXADDOWN	As supplied
MAXADUP	As supplied
TYPICDOWN	Set to null (no value supplied)
TYPICUP	Set to null (no value supplied)
TLID	As supplied
SHAPE	Copied from Census Bureau TigerLine 2010, As matched by County + Tiger Line ID

Internal notes on processing:

1. All rows were supplemented with a line-segment shape from the Census Bureau’s TigerLine data set.
2. We removed 110 records from the Verizon submitted data that were duplicates, based on county and tlid.
3. We removed 12 records from the Verizon submitted data that had entries in the tlid field that did not match our list of street segments in large census blocks.

Section 5: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Tuesday, February 21, 2012 8:48 AM
To: 'laura.a.shine@verizon.com'
Cc: 'Clemons, Keefe B'
Subject: Question on NJ Broadband Data from Verizon

Laura and Keefe,

I believe we raised this issue in the past, but the NTIA wants us to ensure that we have the most accurate and complete data possible. The data you submitted on the middle mile access points (NJ - POP List (Dec 2011).xls) does not include information on elevation, serving facility capacity, or service facility type at these addresses. Would you be willing and able to provide this information?

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Clemons, Keefe B [mailto:keefe.b.clemons@verizon.com]
Sent: Tuesday, February 21, 2012 9:43 AM
To: 'NJ Broadband Data Collection'; Shine, Laura A
Subject: RE: Question on NJ Broadband Data from Verizon

John:

The data we provided is consistent with the data that we have provided for all prior rounds of data collection, and is consistent with the level of detail we provide in every state in which we provide this data. Given the sensitivity of this information, we are not prepared to provide additional information regarding our middle mile facilities.

Feel free to contact me if you have any additional questions.

Sincerely,

Keefe

Keefe B. Clemons

General Counsel - Northeast Region

Verizon

140 West Street, 27th Floor

New York, New York 10007-2109

(212) 321-8136 (Phone)

(212) 962-1687 (Fax)

keefe.b.clemons@verizon.com

Subject: Questions about previous data submissions
Date: Fri, 27 Jul 2012 11:34:33 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: keefe.b.clemons@verizon.com

Mr. Clemons,

The NJ Broadband Mapping team has received feedback from the NTIA regarding our 4/11 and 10/11 data submissions. The NTIA contracted the Michael Baker firm who, using third-party data, evaluated the quality of data submissions it received from its grantees. Since the feedback we have received for the last two submissions is consistent, we would like to share it with you. Please note that we were not given copies of the third-party data, so the reasons for mismatches between the data we submitted and these third-party data are not always clear. Our intent is merely to share with you problematic fields, such as provider name or speed tier, that have a lot of mismatches, and do some further inquiry to better validate the provider's data. Obviously, by working more closely with you, we hope to reduce data mismatches in future submissions. Here are some of the questions we have about your data.

Provider Name: Verizon Online LLC; DBA Name: Verizon
- Most mismatches on max advertised downstream speed involve tiers 4, 5 & 6 for ADSL. (Please refer to downstream speed tier table below.)
- Most mismatches on max advertised upstream speed involve tiers 2 (ADSL) & 7 (Optical Fiber). (Please refer to upstream speed tier table below.)

Might these mismatches have to do with the way you are identifying ADSL speed tiers?

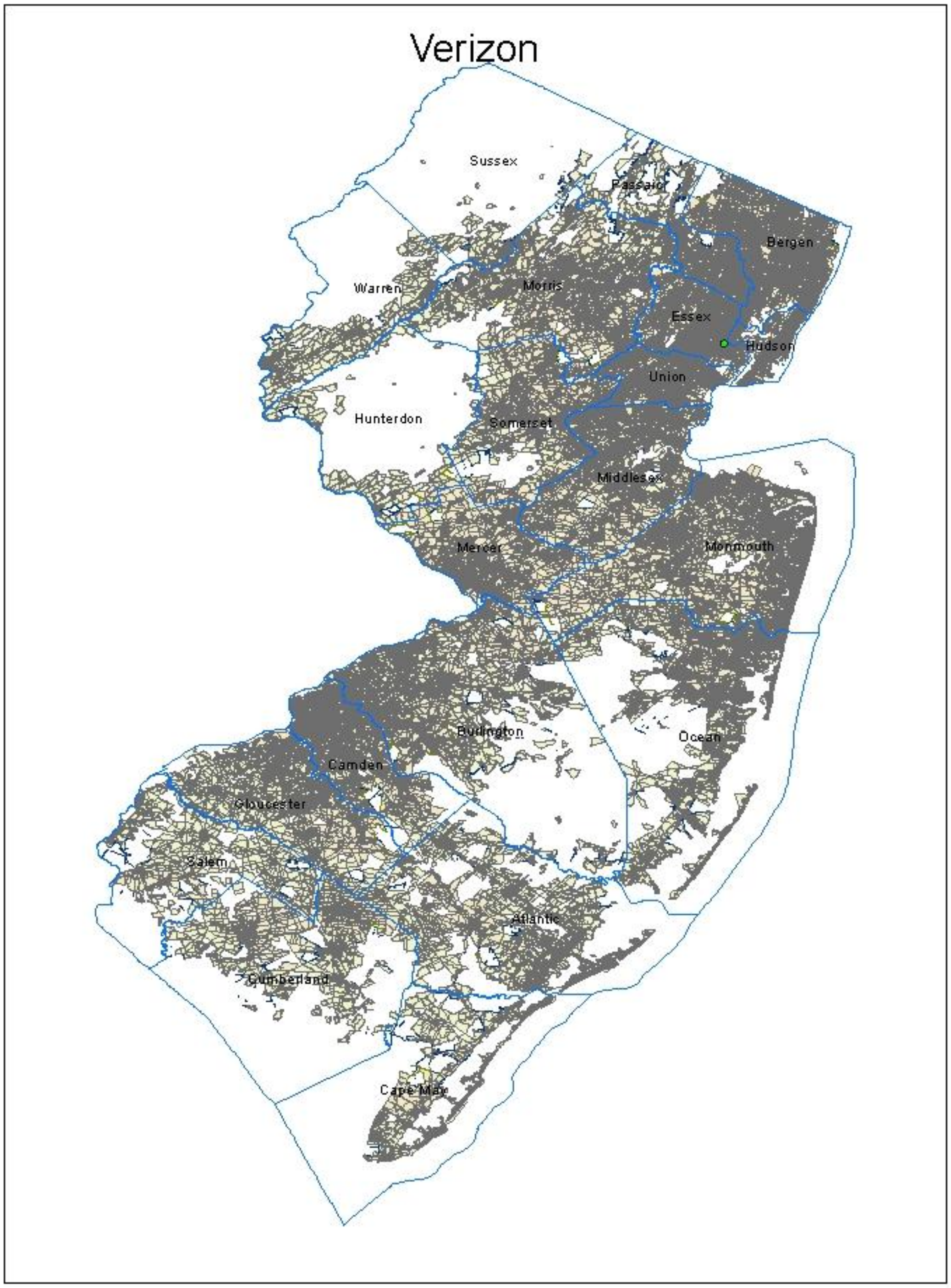
Thank you for your interest and continued support in our NJ BB Mapping program.

Best regards,

Cliff Behrens
Manager - NJ BB Data Collection
Applied Communication Sciences
ConnectingNJ@groups.appcomsci.com
732.699.2380

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.28 Verizon Wireless

Connecting New Jersey - Broadband Provider Data Report

Provider: Verizon Wireless
Received: July 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NDA was executed.

Section 2: Submission Overview

AVAILABILITY DATA		
ID	Provider name	Cellco Partnership
	"Doing business as" name	Verizon Wireless
	FRN	0003290673
	Holding company name	Verizon Communications Inc.
	Holding company number	131425
FOR WIRELESS		
Filetypes	shapefile collection: shp/dbf/prj/shx, mdb, gdb, imagefile etc. Two sets of data provided – one for EVDO and one for LTE (this was not explicitly stated - infered from the file names).	Supplied 2 shapfiles (zip archive) with 21 and 39 rows. Shapefiles use projection GCS_WGS_1984..
Speeds		

Type	Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)	
Upstream max adv	201 - 767 kbps	
Downstream max adv	768 kbps - 1.49 mbps	
Upstream typical	500k-800kbps	
Downstream	600kpbs-1.4mbps	

	typical		
	Subscriber-weighted	Not provided	Ranges provided instead of single values. Lower end of the Down Typical range is OUTSIDE of the Broadband speed definition (will use upper end values for the time being).
Speeds	Type	Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode)	
	Upstream max adv	3.00 - 5.99 mbps	Ranges provided instead of single values.
	Downstream max adv	600k - 9.99 mbps	
	Upstream typical	2mbps -5mbps	
	Downstream typical	5mbps -12mbps	
	Subscriber-weighted	Not provided	
Technology Type	Spectrum (Mhz, FCC code)		Code 80 [Cellular (824-849Mhz, 869-894 Mhz); PCS 1850-1990 Mhz; AWS (1710-1755Mhz, 2110-2155Mhz); 700 (757-758Mhz, 776-779Mhz, 787-788Mhz, 805-806Mhz)] One of the provided Spectrum ranges (1st set) is 869-894 Mhz, which is not within ranges defined for that spectrum The shapefiles are named "NJ_evdo" and NJ_lte suggesting that the availability is only for EVDO and LTE. Verizon Wireless documents on the web suggest the company uses spectrum 850 MHz and 1900 MHz for their EVDO.
Comments:			

INTERCONNECTION DATA	
ID	
File size	

Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments:	

Section 3: Submission File Details

A link to download the data was supplied by email.

Received overview file "VerizonWireless - Email Speed_Technology Informatoin.pdf" with spectrum and speed information.

Received 2 zip files:

- NJ_evdo.zip (1,493,718 bytes)
- NJ_lte.zip (2,572,820 bytes)

2 shapefiles contain the following contents. The NJ_EVDO shapefile has 21 polygons for each county, and the NJ_lte shapefile has 39 polygons.

Size	Name
498	NJ_evdo.dbf
145	NJ_evdo.prj
324	NJ_evdo.sbn
132	NJ_evdo.sbx
2046156	NJ_evdo.shp
11512	NJ_evdo.shp.xml
268	NJ_evdo.shx

Size	Name
10575	NJ_lte.dbf
145	NJ_lte.prj
500	NJ_lte.sbn

148	NJ_lte.sbx
3669928	NJ_lte.shp
9798	NJ_lte.shp.xml
412	NJ_lte.shx

Cover letter "Verizon Wireless Broadband Statistics.pdf" is missing in this submission.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_Wireless

Loaded from the supplied shapefiles. The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	As supplied in Word document
DBANAME	As supplied in Word document
FRN	Set to "0003290673"
TRANSTECH	Set to 80 per Word document
SPECTRUM	NJ_EVDO: Set to "3" per translation shown below VZW_NJ_LTE: Set to "2"
MAXADDOWN	NJ_EVDO: Set to "3", see below. VZW_NJ_LTE: Set to "7" per email clarification
MAXADUP	NJ_EVDO: Set to "2", see below. VZW_NJ_LTE: Set to "5" per email clarification
TYPICDOWN	NJ_EVDO: Set to "3", see below. VZW_NJ_LTE: Set to "6" per email clarification
TYPICUP	NJ_EVDO: Set to "2", see below. VZW_NJ_LTE: Set to "5" per email clarification
STATEABBR	Set to "NJ"
SHAPE	As supplied.

Internal notes on processing:

30. Shapefile NJ_evdo: The total shape apparently covers the entire state of New Jersey. Some

differences are visible along the water body edges. No need to check duplicates since they will be coalesced into 1 polygon. The supplied shape uses geographic coordinate system name GCS_WGS_1984. The NTIA data model requires the same coordinate system. No geographic transformation was required.

31. Shapefile NJ_lte: The shape covers portions of central-Northern New Jersey; the NJ Turnpike appears to be covered for its entire length. No need to check duplicates since they will be coalesced into 1 polygon.The supplied shape uses geographic coordinate system name GCS_WGS_1984. The NTIA data model requires the same coordinate system. No geographic transformation was required.
32. The XY Tolerance value differs on the supplied data from the required NTIA model. Imported the table schema and the table data in two separate operations, thereby ensuring perfect compatibility with the NTIA data model. The tables have the suffix "_tol".
33. Coalesced the EVDO single-part polygons into one multi-part polygon using the ArcGIS ESRI: Data Management Tools->Generalization->Dissolve (with choosing state in the Dissolve_Field(s) option), which resulted in a new feature class with the suffix "_dissolved".
34. Coalesced the LTE single-part polygons into one multi-part polygon using the ArcGIS ESRI: Data Management Tools->Generalization->Dissolve ((with choosing state in the Dissolve_Field(s) option), which resulted in a new feature class with the suffix "_dissolved".
35. NTIA requires shapes to be contained in the NJ state boundary. Although we visually verified that it is the case, we clipped the shapes using ESRI: Analysis Tools-> Extract -> Clip with, select feature class refdata_2010.tl_2010_34_state10_wgs. The feature class has the suffix "_clip"
36. Spectrum:
    a. NJ_EVDO: Verizon Wireless provided a statement in their cover letter about their licensed spectrum. Searching on the web indicates that EV-DO uses frequencies 850MHz and 1900Mhz. The NTIA data model has a single column for spectrum. No mapping is provided for frequency 850MHz. Frequency 1900MHz corresponds to NTIA "SPECTRUM USED" code value 3.
    b. VZW_NJ_LTE: Verizon wireless web site advertises "nationwide contiguous 700 Mhz 4G spectrum. The NTIA coding table provides value 2 for 700Mhz spectrum.
37. Speeds:
    a. NJ_EVDO: The maximum advertised speeds provided in the cover letter are 768 kbps - 1.49 mbps down and 201 - 767 kbps up. The typical speeds are provided as ranges: 600k to 1.4 Mbps down and 500Kbps-800Kpbs up. For both max adv and typical speeds we encoded the submitted down speed as value "3" (range 768k-1.5Mbps) and encoded the submitted up speed as value "2" (range 200-768kbps). This matches the values provided in the email from Anne Neville data 2/21/2012.
    b. VZW_LTE_NU: The supplied Word document suggests speeds are "10 times EVDO". The maximum advertised speeds provided in the cover letter are 600 - 9.99 mbps down and 3.00 - 5.99 mbps up. The typical speeds are provided as ranges: 5 - 12 Mbps down and 2 - 5 Mbps up. For max adv speeds we had originally encoded the submitted down speed as value "6" (range 6-10Mbps) and encoded the submitted up speed as value "5" (range 3-6mbps). Based on the email from Anne Neville data 2/21/2012, we modified the down speed to code "7". Compliant with the same NTIA email directive, we encoded typical down speed as "6" (range 6 mbps – 10 mbps), and typical up speed as "5" (range 3 mbps – 6 mbps).

38. The only data imputed was the state abbreviation.

Section 5: Clarification Questions and Responses

We received a warning on the wireless shape record for the combination of downstream speed code of "7" (10-25 Mbps) with a transtech code of "80" (Mobile Wireless). The maximum advertised speeds provided in the cover letter that came with the provider's submission are 600 - 9.99 mbps down and 3.00 - 5.99 mbps up. The typical speeds are provided as ranges: 5 - 12 Mbps down and 2 - 5 Mbps up. For max adv speeds we had originally encoded the submitted down speed as value "6" (range 6-10Mbps) and encoded the submitted up speed as value "5" (range 3-6mbps). Based on the email from Anne Neville data 2/21/2012, we modified the down speed to code "7". In addition, we previously had assigned the same set of values for maximum advertised speeds to typical speeds for both Verizon Wireless 3G and 4G LTE services. In this submission, the first for which we actually have typical speeds for this provider, we complied with the directions given in the previously referenced email, and encoded typical 4G LTE down speed as "6" (range 6-10Mbps) and up speed as "5" (range 3-6mbps).

Subject: Questions about previous data submissions
Date: Fri, 27 Jul 2012 11:45:50 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: francis.malnati@verizonwireless.com

Mr. Malnati,

The NJ Broadband Mapping team has received feedback from the NTIA regarding our 4/11 and 10/11 data submissions. The NTIA contracted the Michael Baker firm who, using third-party data, evaluated the quality of data submissions it received from its grantees. Since the feedback we have received for the last two submissions is consistent, we would like to share it with you. Please note that we were not given copies of the third-party data, so the reasons for mismatches between the data we submitted and these third-party data are not always clear. Our intent is merely to share with you problematic fields, such as provider name or speed tier, that have a lot of mismatches, and do some further inquiry to better validate the provider's data. Obviously, by working more closely with you, we hope to reduce data mismatches in future submissions. Here are some of the questions we have about your data.

Verizon Wireless/Cellco
- Most mismatches result from your reporting of max advertised downstream speed tiers 3 & 7. One possibility is that 3 understates downstream speed and 7 overstates it. (Please refer to downstream speed tier table below.)
- Most mismatches in your reporting of max advertised upstream speed is for tier 2. (Please refer to upstream speed tier table below.) Might you possibly be understating your upstream speed?

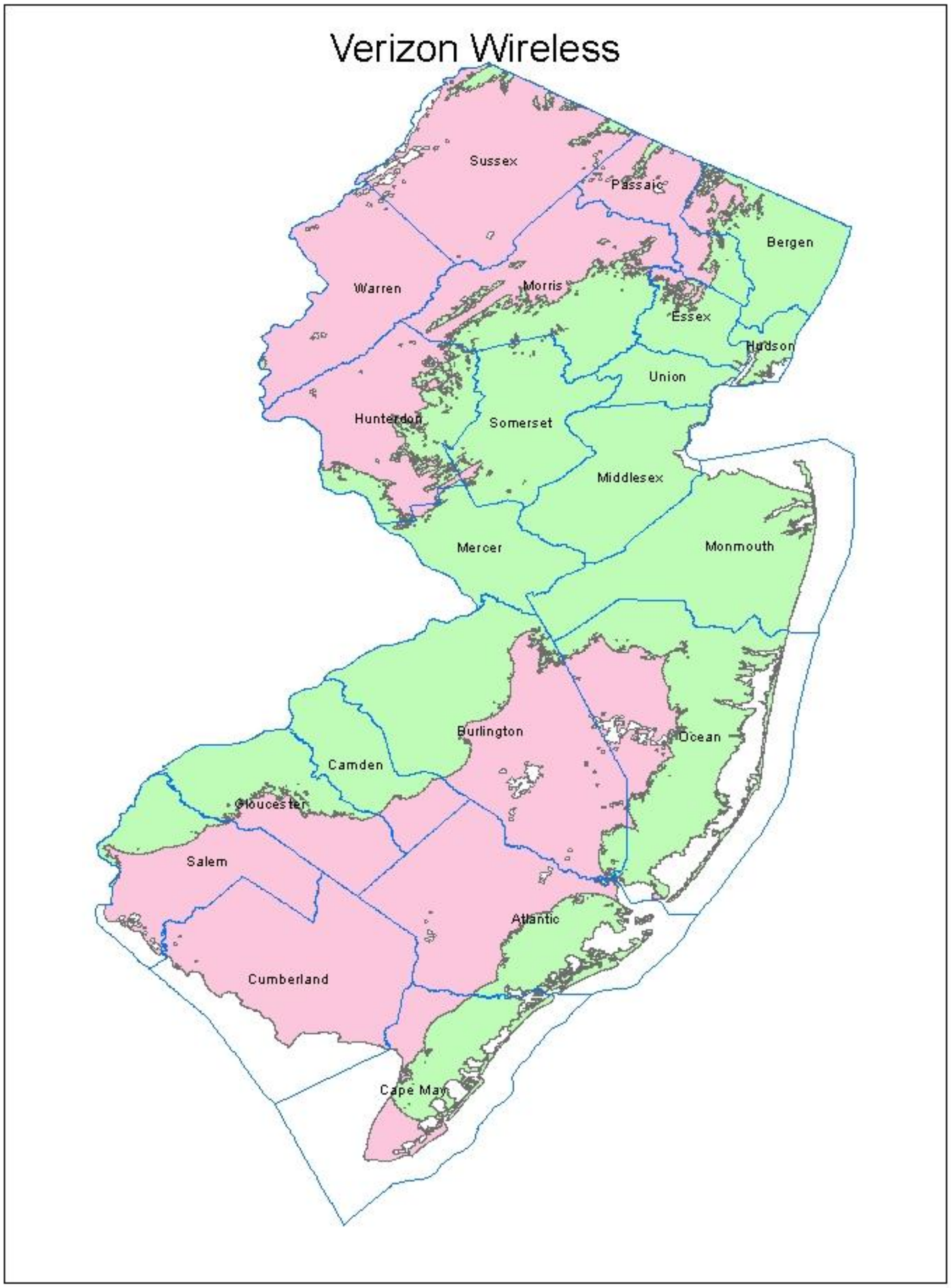
Thank you for your interest and continued support in our NJ BB Mapping program.

Best regards,

Cliff Behrens
Manager - NJ BB Data Collection
Applied Communication Sciences
ConnectingNJ@groups.appcomsci.com
732.699.2380

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.29 Voxitas

Connecting New Jersey - Broadband Provider Data Report

Provider: Voxitas
Received: August 2010
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

For October 2012:

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Section 1: NDA Status

Executed.

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td>ID</td><td>Provider name
“Doing business as” name
FRN</td><td>Netlogic, Inc.
Voxitas
0006825954</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2">Excel spreadsheet</td></tr>
<tr><td>File size</td><td colspan="2">9767 bytes, 4 data rows</td></tr>
<tr><td>Speeds</td><td><table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>Not provided</td></tr>
<tr><td>Advertised-</td><td></td><td>Not provided</td></tr>
</table></td><td>Address rows with speed entries were provided, probably the speed promised to the customer. Not averaged over an area so not typical; no advertised speeds provided.</td></tr>
</table>

	downstream		
	Subscriber-weighted-up	Not provided	
	Subscriber-weighted-down	Not provided	
Technology Type	Not provided; Web site search indicates and provider confirmed "Copper – Other"		
End-user specification	Not provided		
Comments:			
INTERCONNECTION DATA			
ID			
File size			
Ownership			
Transport Type			
Data Rates/Capacity			
Location			
Comments: Not provided			

Section 3: Submission File Details

Received 1 file by secure upload.

Size	Name
9767	NJBroadband.xlsx

The file has 4 (four) rows of data. All have customer names and addresses. Three records describe DS1 service, one describes something else. Speeds listed are probably the provisioned speeds, not typical or advertised. No cover letter with DBA name, FRN, or other company data is present. No coded representations of data such as end user type, technology of transmission, etc. are provided.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_CensusBlock

Loaded from supplied file “NJBroadband.xlsx” (4 rows). The following table explains the transformations that were applied to load the target table.

Table Column	**Data Source / Transformation**
PROVNAME	Set to “Netlogic, Inc.”
DBANAME	Set to “Voxitas”
RESELLER	Set to “N”
FRN	Set to “0006825954”
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from Census Block FIPS Code (first 3 digits)
TRACT	Populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Populated from Census Block FIPS Code
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	Set to “30”
MAXADDOWN	As supplied in column Downstream
MAXADUP	As supplied in column Upstream
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Copied from Census Bureau TigerLine 2000, as matched by spatial join on geocoded address

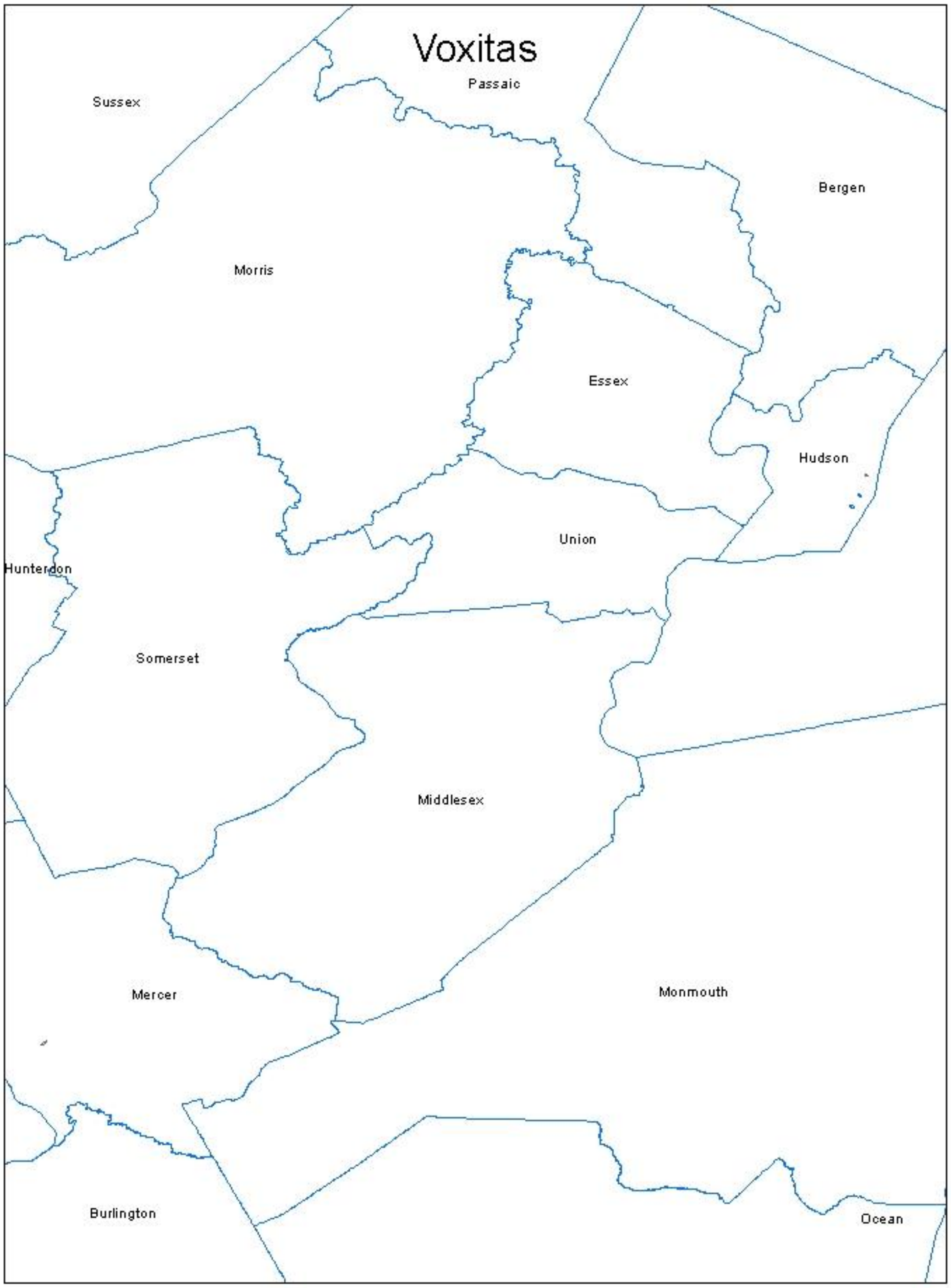
Internal processing notes:

33. Following steps were performed when data was initially submitted and results were reused in this round
    a. Geocoded the addresses using the Google geocoder.
    b. Created an excel sheet and imported to a geodatabase table.
    c. Added point shapes corresponding to each Latitude,Longitude pair by creating a feature class from the table using ArcCatalog’s “Create Feature Class from XY Table” option.
    d. Added a column containing the ID of the containing year 2000 census block via a spatial join of the point shapes and the census block shapes from reference data.
    e. Discarded NN rows with duplicate census blocks.
34. Ran NTIA validations and all passed

Section 5: Clarification Questions and Responses

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.30 ViaSat

Connecting New Jersey - Broadband Provider Data Report

Provider: ViaSat, Inc.
Received: July 2012
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Section 1: NDA Status

NONE

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td rowspan="3">ID</td><td>Provider name</td><td>ViaSat, Inc.</td></tr>
<tr><td>“Doing business as” name</td><td>ViaSat, Inc.</td></tr>
<tr><td>FRN</td><td>0004963088</td></tr>
<tr><th colspan="3">FOR WIRELESS</th></tr>
<tr><td>Filetypes</td><td colspan="2">text file, shape file</td></tr>
<tr><td>File size</td><td colspan="2"></td></tr>
<tr><td>Speeds</td><td>
<table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td>Not provided (‘0’)</td></tr>
<tr><td>Typical-downstream</td><td></td><td>Not provided (‘0’)</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>yes. Entire state.</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>yes. Entire state</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>Not provided</td></tr>
</table>
</td><td>Submitted shape file describing the entire state of NJ with attributes for technology and maximum advertised up/down speed codes. Spectrum is listed as “Satellite”.

Second submission from WildBlue included values in Mbps for maximum advertised up/down speeds:
Download: 1.5 Mbps
Upload: 0.25 Mbps

These correspond to the speed</td></tr>
</table>

		tiers 4 and 2, respectively.
Technology Type	Code 60 (Satellite)	
End-user specification		
Comments: From the provider's input package: WildBlue notes that of the possible 'Spectrum Used' options provided, none list Ka-Band as an option for Satellite Providers.		
INTERCONNECTION DATA: NONE		
ID		
File size		
Ownership		
Transport Type		
Data Rates/Capacity		
Location		
Comments: Not provided		

Section 3: Submission File Details

Size	**Name**
116	ViaSat_AreaAvailability_NJ_region.shx
654	ViaSat_AreaAvailability_NJ_region.dbf
165	ViaSat_AreaAvailability_NJ_region.prj
179,268	ViaSat_AreaAvailability_NJ_region.shp

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_Wireless

The following table explains the transformations that were applied.

Table Column	Data Source / Transformation
PROVNAME	Set to "ViaSat, Inc."

DBANAME	Set to "ViaSat, Inc."
FRN	~~Set to 0007843766~~ Set to 0004963088
TRANSTECH	Set to 60
SPECTRUM	Set to 9 per translation shown below
MAXADDOWN	As provided, confirmed from speed data
MAXADUP	As provided, confirmed from speed data
TYPICDOWN	Not provided, set to null
TYPICUP	Not provided, set to null
STATEABBR	Set to “NJ”
SHAPE	County shape read from reference data.

Internal notes on processing:

39. Spectrum: WildBlue uses Ka-Band spectrum (uplink in the 29.5 – 30 gigahertz band and downlink in the 19.7 – 20.2 gigahertz band). While this is not specifically included in the list of satellite frequencies associated with Code 9, we used code 9 anyway. This is a change from previous submissions. (from the last submission)
40. The shape file contains 2 polygon shapes.
41. The supplied shape file uses geographic coordinate system name GCS_North_American_1983. The NTIA data model requires GCS_WGS_1984 geographic coordinate system. Thus transformation is required. The XY Tolerance value differs on the supplied data from the required NTIA model. Imported the table schema and the table data in two separate operations, thereby ensuring perfect compatibility with the NTIA data model. The table has the suffix “_wgs_tol”.
42. NTIA requires shapes to be contained in the NJ state boundary. Although we visually verified that it is the case, we clipped the shape using ESRI: Analysis Tools-> Extract -> Clip with, select feature class refdata_2010.tl_2010_34_state10_wgs. The feature class has the suffix "_clip"
43. Validation rules produced a warning on the wireless shape record for the combination of downstream and upstream speed code of 7 (10-25 Mbps)

    with a transtech code of 60 (Satellite). Provider said that in most locations, speeds are significantly in excess of the speeds set forth in the NTIA Tiers for “Satellite Technology” so they are reporting the actual maximum advertised upload and download speeds. Provider confirmed that they launched two new services named Exede 5 and Exede 12 and Exede 12 has a maximum advertised upload speed of 3 Mbps and a maximum advertised download speed of 12 Mbps.

Section 5: Clarification Questions and Responses

Subject: Round 6 Broadband Mapping Project New Jersey
Date: Tue, 24 Jul 2012 21:45:30 +0000
From: Hill, Janel <Janel.Hill@viasat.com>
To: connectingnj@appcomsci.com <connectingnj@appcomsci.com>

Greetings,

The attached data is being submitted by ViaSat, Inc. for Round 6 of the Broadband Mapping Program. Please note the following:

1.ViaSat, Inc. is the parent company of ViaSat Communications, Inc. which was formerly known as WildBlue Communications, Inc. Prior submissions were made in the name of WildBlue Communications. Please update your state's map to reflect that ViaSat, Inc. is now the name of the provider.

2.ViaSat provides high speed internet service over several ka band satellites which together cover the entire United States.

3.The speed of the service depends on which satellite is covering the particular area. The attached data consists of the maximum advertised upload and download speeds at the census block level. In most locations, ViaSat's speeds are significantly in excess of the speeds set forth in the NTIA Tiers for "Satellite Technology" so we are reporting the actual maximum advertised upload and download speeds.

4.During the first quarter of 2012, ViaSat launched two new services named Exede 5 and Exede 12. Exede 5 has a maximum advertised upload speed of 1 Mbps and a maximum advertised download speed of 5 Mbps. Exede 12 has a maximum advertised upload speed of 3 Mbps and a maximum advertised download speed of 12 Mbps. The attached data shows which of the two services are available on a census block basis. In limited geographic areas, neither of the two new services are available, in which case the data reflects the maximum advertised upload and download speeds for ViaSat's legacy service called the WildBlue service. The WildBlue service has a maximum advertised upload speed of 256 Kbps and a maximum advertised download speed of 1.5 Mbps.

5.The attached data is current as of June 30, 2012.

Thank you for the opportunity to participate. We look forward to seeing ViaSat's updated information included in your state's broadband map. If you have any questions, feel free to contact me.

Kind Regards,

Janel Hill//

Paralegal | ViaSat, Inc | 6155 El Camino Real | Carlsbad, CA 92009

janel.hill@viasat.com| 760-476-4716

From: Connecting NJ [mailto:ConnectingNJ@appcomsci.com]
Sent: Wednesday, July 25, 2012 10:03 AM
To: Hill, Janel
Subject: Re: Round 6 Broadband Mapping Project New Jersey

Janel,

We have a couple of questions regarding your name change:

1. We are using "0007843766" for your FRN. Should we use this or do you have another?
2. What is your DBA name? Should we also use ViaSat for this?

Thanks,

Cliff

Subject: RE: Round 6 Broadband Mapping Project New Jersey
Date: Wed, 25 Jul 2012 20:41:37 +0000
From: Hill, Janel <Janel.Hill@viasat.com>
To: Connecting NJ <ConnectingNJ@appcomsci.com>

Hi Cliff,

The filing is being sent by ViaSat, Inc., which is the parent company of ViaSat Communications, Inc. It is not a DBA situation but rather, a parent/subsidiary relationship.

We have two FRN's, please use these:

ViaSat: 0004963088
ViaSat Communications: 0007843766

Kind Regards,

Janel Hill
Paralegal | ViaSat, Inc | 6155 El Camino Real | Carlsbad, CA 92009 janel.hill@viasat.com | 760-476-4716

Subject: Re: Round 6 Broadband Mapping Project New Jersey
Date: Mon, 20 Aug 2012 12:48:34 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: Hill, Janel <Janel.Hill@viasat.com>

Janel,

The NTIA provides its grantees with a script that is used to validate data submissions. When the script produces warnings, we make an attempt to understand the reason. In the case of the ViaSat data, we received a warning and the following recommendation:

transtech = 60 AND maxaddown IN ('3','4','5') AND maxadup IN ('2','3','4')

In your latest submission, your data stated transtech=60, maxaddown=7, and maxadup=5. We interpret the warning to mean that, as far as the NTIA is concerned, these speeds are too fast for transtech=60; in other words, these speeds aren't possible for satellite broad band service? FYI, in your last data submission, you stated transtech = 60, maxaddown = 4 and maxadup = 2 for all of New Jersey.

We can report the warning in our data report but, before we do, I thought I would give you a chance to explain what you think are the possible reasons you believe these faster speeds are valid.

Thanks,

Cliff

Subject: RE: Round 6 Broadband Mapping Project New Jersey
Date: Mon, 20 Aug 2012 18:00:31 +0000
From: Strauss, Pamela <Pamela.Strauss@viasat.com>
To: 'ConnectingNJ@appcomsci.com' <ConnectingNJ@appcomsci.com>
CC: Hill, Janel <Janel.Hill@viasat.com>

Hi Cliff. Janel forwarded your email to me. As Janel explained below in the email she sent with the data, during the first quarter of 2012, ViaSat launched two new services named Exede 5 and Exede 12. Exede 5 has a maximum advertised upload speed of 1 Mbps and a maximum advertised download speed of 5 Mbps. Exede 12 has a maximum advertised upload speed of 3 Mbps and a maximum advertised download speed of 12 Mbps. Almost the entire state of New Jersey (with the exception of one small area of around 35 sq. miles) has access to Exede 12.

ViaSat's new services have been made possible by ViaSat's launch of a new state-of-the-art satellite in late 2011. It is true that the speeds for the new services are faster than anything previously available through satellite internet.

Please let me know if you have additional questions.

Pam Strauss
Associate General Counsel
ViaSat, Inc.
349 Inverness Drive South
Englewood, CO 80112
Direct: 720-493-6248
pam.strauss@viasat.com

Subject: Re: Round 6 Broadband Mapping Project New Jersey
Date: Mon, 20 Aug 2012 14:10:10 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: Strauss, Pamela <Pamela.Strauss@viasat.com>
CC: Hill, Janel <Janel.Hill@viasat.com>

Pam and Janel,

Thank you for this clarification. I will be sure to include it in our data report so that the NTIA has a comprehensive view of these state-of-the-art satellite capabilities.

Best regards,

Cliff

Subject: Re: Round 6 Broadband Mapping Project New Jersey
Date: Wed, 22 Aug 2012 12:28:30 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: Strauss, Pamela <Pamela.Strauss@viasat.com>
CC: Hill, Janel <Janel.Hill@viasat.com>

Pam,

I was wondering whether you could please provide a map or data (in any form) that delimited that 35 sq. miles without access to Exede 12?

Cliff

Subject: Re: Round 6 Broadband Mapping Project New Jersey
Date: Wed, 22 Aug 2012 15:53:34 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: Hill, Janel <Janel.Hill@viasat.com>

Janel,

This helps a lot. You have been really great to work with on this data submission. We really appreciate your efforts and those of your colleagues at ViaSat to answer our questions.

Thanks again!

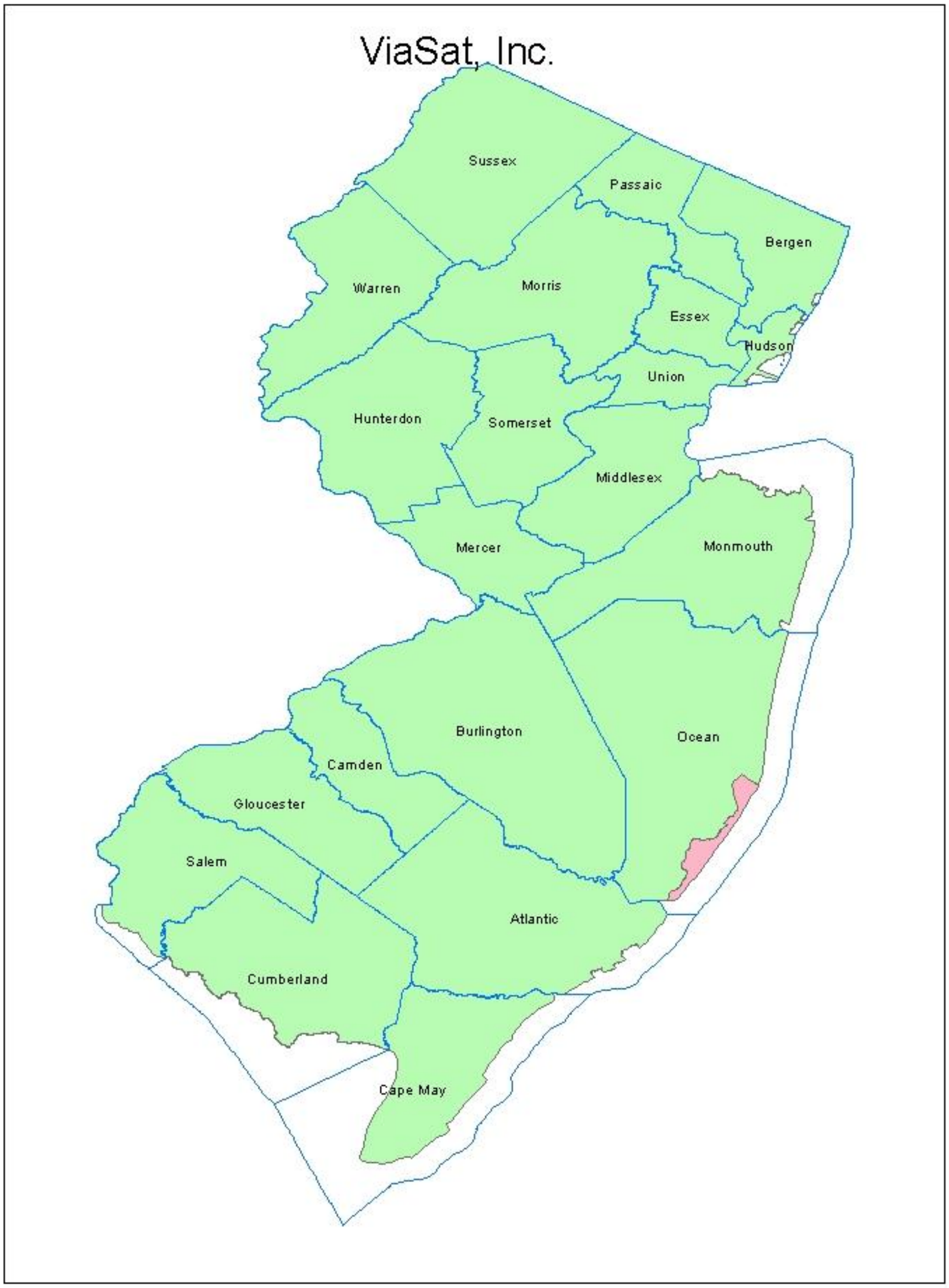
Cliff

On 8/22/2012 3:50 PM, Hill, Janel wrote:
> Hi Cliff,
>

> This is the answer I got from our GIS Analyst who pulled the mapping data together for me:
>
> "...I am 99% confident that New Jersey is entirely covered by Exede 12. However, since we reported to the census block level, there are 4 census block boundaries that I believe extend out into the ocean. Since that area does not fall within our Exede 12 beams, that strip of census black fell out and was included in ProPlus. Unfortunately, this happens when boundaries don't match up exactly to the data in another file. If I look at our data, the beam boundary slices through those census blocks, but I am pretty confident that those blocks are not entirely on land. I didn't want to make the assumption since I am not familiar with that area (i.e, are there vacation islands that people live on part of the year out there)? Usually if the census block extends into water, there is a population count."
>
> Please let me know if this helps, or if you need any more information.
>
> Kind Regards,
>
> Janel Hill
> Paralegal | ViaSat, Inc | 6155 El Camino Real | Carlsbad, CA 92009
> janel.hill@viasat.com | 760-476-4716
>

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.31 Xchange Telecom

Connecting New Jersey - Broadband Provider Data Report

Provider: Xchange Telecom
Received: March 2011
Submission date: October 2012

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

Section 1: NDA Status

None

Section 2: Submission Overview

<table>
<tr><th colspan="3">AVAILABILITY DATA</th></tr>
<tr><td rowspan="3">ID</td><td>Provider name</td><td>Xchange Telecom Corp</td></tr>
<tr><td>“Doing business as” name</td><td>Xchange Telecom</td></tr>
<tr><td>FRN</td><td>0006831713</td></tr>
<tr><th colspan="3">FOR WIRELINE</th></tr>
<tr><td>Filetypes</td><td colspan="2"></td></tr>
<tr><td>File size</td><td colspan="2"></td></tr>
<tr><td>Speeds</td><td>
<table>
<tr><th>Type</th><th></th><th>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</th></tr>
<tr><td>Typical-upstream</td><td></td><td></td></tr>
<tr><td>Typical-downstream</td><td></td><td></td></tr>
<tr><td>Advertised-upstream</td><td></td><td>2 Mbps (code 4)</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>10 Mbps (code 7)</td></tr>
<tr><td>Subscriber-weighted-</td><td></td><td></td></tr>
</table>
</td><td>Information provided via email exchange (see below).

Provider originally indicated that their coverage was limited to the area supported by a single central office. In further exchanges, the provider indicated that their coverage is limited to city of Lakewood and that they cover the entire city limits.</td></tr>
</table>

	nominal speed
Technology Type	ADSL (code 10)
End-user specification	In response to inquiry, provider reported residential and small business.
Comments:	
INTERCONNECTION DATA	
ID	
File size	
Ownership	
Transport Type	
Data Rates/Capacity	
Location	
Comments:	

Section 3: Submission File Details

Received no file submission, only statements by email.

Section 4: Data Validation, Transformation and Loading

NTIA Table BB_Service_CensusBlock

Based on the emailed statement coverage area, we selected all of the census blocks in Lakewood Township, Ocean county, New Jersey. We submitted all census blocks less than 2 square miles in this municipality. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	Set to "Xchange Telecom Corp" per email response
DBANAME	Set to "Xchange Telecom"
PROVIDER_TYPE	Set to 2 (reseller leasing plant from Verizon)
FRN	Set to "0006831713" per email response
STATEFIPS	Set to "34" (NJ)

COUNTYFIPS	Pre-populated from Census Block FIPS Code (digits 3-5)
TRACT	Pre-populated from Census Block FIPS Code (next 6 digits)
BLOCKID	Pre-populated from Census Block FIPS Code (next 5 digits)
BLOCKSUBGROUP	Set to null
FULLFIPSID	Populated from Census Block FIPS Code
TRANSTECH	Set to 10 (ADSL) per email
MAXADDOWN	Set to code 7 per email
MAXADUP	Set to code 4 per email
TYPICDOWN	Set to null, not provided
TYPICUP	Set to null, not provided
SHAPE	Census block

Internal processing notes:

42. Created a file with a municipality name that matches exactly the "name" column in the Year 2010 Census Bureau TigerLine database.
43. Joined against reference data to discover census blocks, for a total of 1012 blocks.
44. Verified that all the census blocks discovered for Lakewood Township are smaller than 2 square miles, so no road segments were loaded.
45. Validation script produced a warning on 1012 census blocks regarding downstream speed code of 7 (10-25 Mbps). We were unable to obtain any confirmation of advertised speeds from provider Web site, because it required entry of a specific phone number. The provider confirmed via email that they offer 10 Mbps download speeds.

Section 5: Clarification Questions and Responses

Key provider Data submission messages:

From: Duvid Rottenberg [mailto:drottenberg@xchangetele.com]
Sent: Tuesday, March 08, 2011 3:36 PM
To: ConnectingNJ@research.telcordia.com
Cc: 'Shelley Bates'
Subject: RE:

John,

We are a UNE-L company, we lease the loop from Verizon and provide broadband for the end user on the leased circuits. I believe we do cover the whole city of Lakewood.

Duvid Rottenberg

Xchange Telecom, Corp.

drottenberg@xchangetele.com

(646) 722-7258

From: Duvid Rottenberg [mailto:drottenberg@xchangetele.com]
Sent: Monday, March 14, 2011 4:31 PM
To: ConnectingNJ@research.telcordia.com
Cc: 'Shelley Bates'
Subject: RE:

2 Mbps Upstream and 10 Mbps downstream.

Duvid Rottenberg

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Monday, March 14, 2011 4:46 PM
To: 'Duvid Rottenberg'; 'ConnectingNJ@research.telcordia.com'
Cc: 'Shelley Bates'
Subject: RE:

Thanks for this.

One other question – do you serve both residential and business customers?

John

From: Duvid Rottenberg [mailto:drottenberg@xchangetele.com]
Sent: Monday, March 14, 2011 4:57 PM
To: ConnectingNJ@research.telcordia.com
Cc: 'Shelley Bates'
Subject: RE:

Yes we do.

Duvid Rottenberg

From: Duvid Rottenberg [mailto:DRottenberg@xchangetele.com]
Sent: Wednesday, February 29, 2012 1:20 PM
To: NJ Broadband Data Collection
Subject: RE: New Jersey Broadband Data Collection - Third Notice

You can reuse our previous data.

Thank You,

Duvid Rottenberg

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Wednesday, February 29, 2012 2:07 PM
To: 'Duvid Rottenberg'
Cc: NJ Broadband Data Collection
Subject: RE: New Jersey Broadband Data Collection - Third Notice

Duvid,

The data we have states that you cover all of Lakewood township, offering DSL service, with download speeds of 10 Mbps and upload speeds of 2 Mbps. Is that all correct?

Thanks,

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Duvid Rottenberg [mailto:DRottenberg@xchangetele.com]
Sent: Wednesday, February 29, 2012 2:10 PM
To: NJ Broadband Data Collection
Subject: RE: New Jersey Broadband Data Collection - Third Notice

Yes.

Thank You,

Duvid Rottenberg

Subject: Fwd: NJ Broadband Data Collection - Fall 2012
Date: Mon, 30 Jul 2012 12:03:17 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: NJ Broadband Data Collection <ConnectingNJ@appcomsci.com>

All,

I talked to D. Rottenberg this morning and he instructed us to use previous data since Xchange Telecom only provides service in Lakewood and nothing has changed since last submission.

Cliff

-------- Original Message --------
Subject: NJ Broadband Data Collection - Fall 2012
Date: Thu, 12 Jul 2012 12:36:11 -0400
From: Connecting NJ <ConnectingNJ@appcomsci.com>
To: drottenberg@xchangetele.com

Mr. Rottenberg,
We are writing to you on behalf of the New Jersey Office of Information Technology (NJ-OIT) which is responsible for collecting broadband availability data for the National Telecommunications and Information Administration (NTIA) State Broadband Data and Development Grant Program.

We thank you for your participation in the previous round of broadband data collection. We now ask once again for your assistance by submitting data describing your broadband service offerings in the State of New Jersey. To meet the NTIA's data submission timeline, we will need your data submission no later than Friday, August 10, 2012. The data should represent your broadband service offerings as of 6/30/2012.

For this round, the NTIA is particularly interested in receiving from providers "typical" downstream and upstream speeds. By the NTIA definition, "typical" is the "data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed can achieve consistently during expected periods of heavy network usage."

We encourage you to submit data via our secured Web server at http://connectingnj.state.nj.us/. If this presents a problem, please contact us via email and we can make other arrangements.

As mentioned in the previous request, the organization collecting and validating this data on behalf of NJ OIT is now Applied Communication Sciences, formerly Telcordia Advanced Technology Solutions. This is a result of the acquisition of Telcordia by Ericsson. The same people will be the collecting and validating the data, but the email address has changed.

We look forward to hearing from you. Please feel free to contact us with any questions, comments or suggestions.

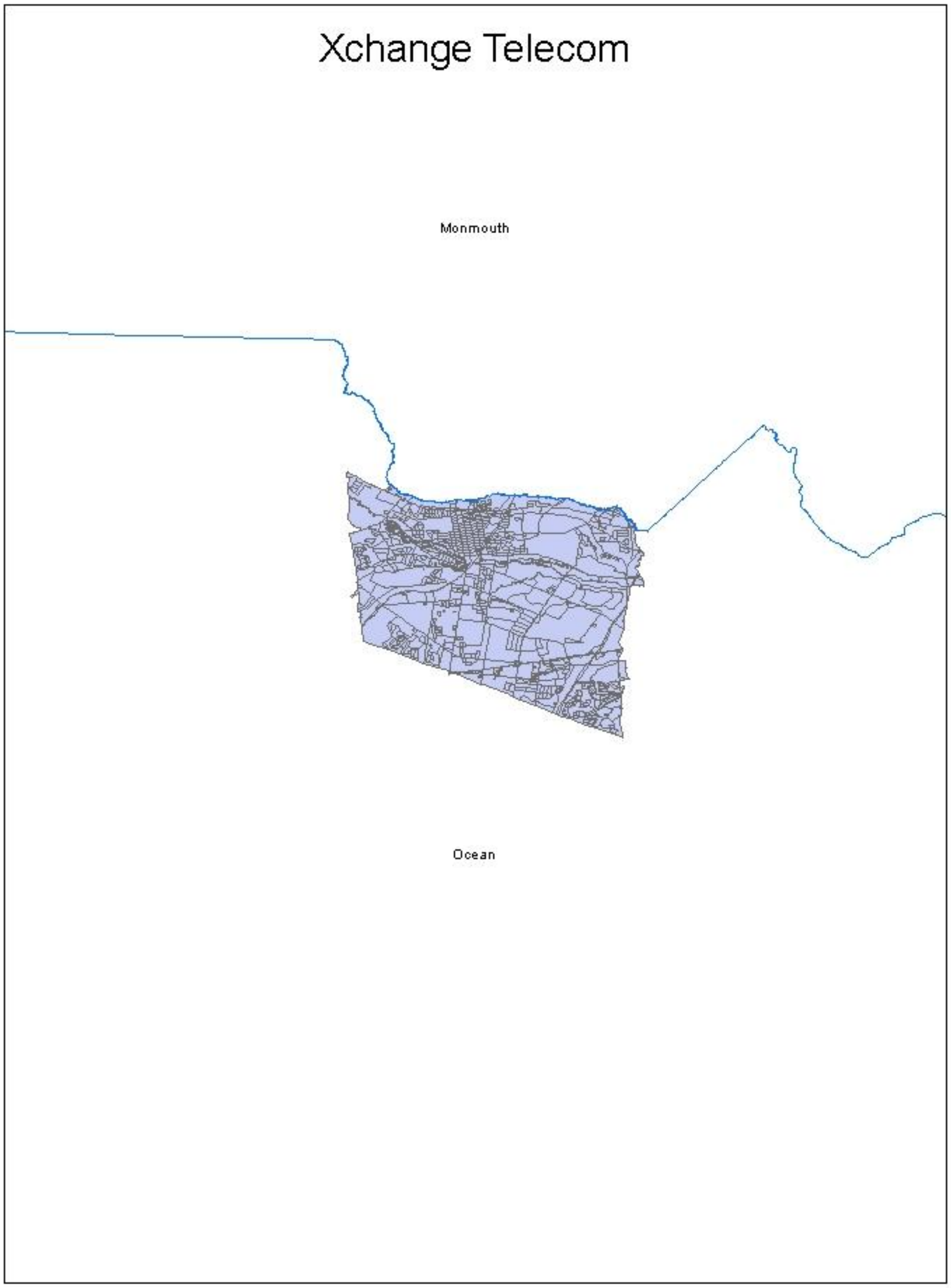
Sincerely,

Cliff Behrens
Manager - NJ BB Data Collection
Applied Communication Sciences
ConnectingNJ@groups.appcomsci.com
732.699.2380

Scott Kloss
Program Manager
NJ Office of Information Technology
scott.kloss@oit.state.nj.us
609.292.4171

Section 6: Notes and Open Issues

Section 7: Overview Map of Submitted Data



6.32 XO Communications

Connecting New Jersey - Broadband Provider Data Report

Provider: XO Communications
Received: July 2011
Submission date: October 2012

This report presents details on processing broadband data for delivery to the National Telecommunications and Information Administration (NTIA).

For October 2012:

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

For April 2012:

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins below. Notable differences from the processing done on the previous submission are listed next.

The provider reported that there were no changes to the reported data. Given that the data we have was submitted in August 2010, we verified with the provider that there were no changes to the coverage area and speeds that they offered.

NTIA Table BB_Service_CensusBlock

Since there is no change in the data and NTIA data model, the table is copied from the 2011 October table, using an ESRI tool, "ArcToolBox->Data Management Tools->General->Append" with NO_TEST in the Schema Type option.

Provider Interactions

From: Adams, Sharon E [mailto:Sharon.E.Adams@xo.com]
Sent: Wednesday, February 01, 2012 12:02 PM
To: 'NJ Broadband Data Collection'
Subject: RE: NJ Broadband Data Collection - Spring 2012

Neither XO nor Nextlink have any new or revised data to report.

Thanks,

Sharon Adams

From: NJ Broadband Data Collection [mailto:ConnectingNJ@groups.appcomsci.com]
Sent: Friday, February 03, 2012 10:15 AM
To: Adams, Sharon E
Cc: 'NJ Broadband Data Collection'
Subject: RE: NJ Broadband Data Collection - Spring 2012

Sharon,

The last time that you submitted data to us was in August of 2010. Are you saying that the area covered by XO services, and the service speeds offered over that area, have not changed in the last year and a half? I just want to make sure that we can accurately reflect the capabilities you have available in the state of New Jersey.

Thanks,

John Wullert

Manager - NJ BB Data Collection

Applied Communication Sciences

732-699-2687

From: Adams, Sharon E [mailto:Sharon.E.Adams@xo.com]
Sent: Friday, February 03, 2012 1:42 PM
To: 'NJ Broadband Data Collection'
Subject: RE: NJ Broadband Data Collection - Spring 2012

Yes.

Thanks,

Sharon Adams

Connecting New Jersey - Broadband Provider Data Report

Provider: XO Communications

Submission date: October 2011

This report presents details on processing broadband data for delivery to the National Telecommunications and Information Administration (NTIA).

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins below. Notable differences from the processing done on the previous submission are listed next.

The provider reported that there were no changes to the reported data. Given that the data we have was submitted in August 2010, we verified with the provider that there were no changes to the coverage area and speeds that they offered.

NTIA Table BB_Service_CensusBlock

1. Column " blocksubgroup" was dropped.
2. Column "endusercat" was added; set to null because data was not supplied.

Notes

1. Discarded 28 records with missing or slow maximum download speed codes.
2. Total rows loaded: 879

Connecting New Jersey - Broadband Provider Data Report

Provider: XO Communications

Submission date: April 2011

This report presents details on processing broadband data for delivery to the National Telecommunications and Information Administration (NTIA).

This is a stub report, since data from the previous submission was reused unchanged. The complete report from the previous submission begins on the next page. Notable differences from the processing done on the previous submission are listed next.

NTIA Table BB_Service_CensusBlock

1. Column "reseller" was dropped.
2. Set the new column "provider_type" to value 1 ("Broadband provider as described in the NOFA")
3. Set the max advertised speed code values (down and up) to 9, which is the maximum value among all records provided to us.
4. Dropped non-measured typical up/down speed code values.

Provider Interactions

From: Adams, Sharon E [mailto:Sharon.E.Adams@xo.com]
Sent: Tuesday, March 01, 2011 4:11 PM
To: ConnectingNJ@research.telcordia.com
Subject: RE: NJ BB Data Collection - Spring 2011

Hi John,

I don’t have any new data to report.

Thanks,

Sharon Adams

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Tuesday, March 01, 2011 4:23 PM
To: Adams, Sharon E
Cc: ConnectingNJ@research.telcordia.com
Subject: RE: NJ BB Data Collection - Spring 2011

Sharon,

Are you saying that we can use the data you submitted last time (that it reflects your network capabilities as of 12/31/2011)?

John Wullert

Manager – NJ BB Data Collection

Telcordia Technologies

732-699-2687

From: Adams, Sharon E [mailto:Sharon.E.Adams@xo.com]
Sent: Tuesday, March 01, 2011 4:41 PM
To: ConnectingNJ@research.telcordia.com
Subject: RE: NJ BB Data Collection - Spring 2011

Yes, the previous data can be used again.

Thanks,

Sharon Adams

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Friday, March 18, 2011 9:34 AM
To: 'Adams, Sharon E'
Cc: 'NJ Broadband Data Collection'
Subject: XO NJBB Data Clarification

Sharon,

We have performed our initial review of your data and have a clarification question:

> We see several locations where your download speeds are a tier 2, which the NTIA does not consider broadband. This appears that it might be the provisioned speed sold to the customer. Is there a higher, advertised speed that you could provision to these locations if the customer

asked? One option would be for us to use the highest speed you deliver in a larger area as the maximum advertised speed. Would that accurately represent your ability to deliver service?

John Wullert

Manager – NJ BB Data Collection

Telcordia Technologies

732-699-2687

From: Adams, Sharon E [mailto:Sharon.E.Adams@xo.com]
Sent: Thursday, July 07, 2011 9:56 AM
To: ConnectingNJ@research.telcordia.com
Subject: NJ Broadband Data Collection

Good morning,

Neither XO Communications Services, Inc. nor Nextlink Wireless, Inc. have any updates to previously submitted data. Please advise what steps need to be taken in order to ensure these companies compliance.

Kind regards,

Sharon Adams

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Thursday, July 07, 2011 11:13 AM
To: 'Adams, Sharon E'
Cc: 'connectingNJ@research.telcordia.com'
Subject: RE: NJ Broadband Data Collection

Sharon,

Thanks for the quick response. Your email message is sufficient notification for us to proceed using the data you have already submitted.

Note that we will be applying additional validation and verification procedures during this round and will get back to you if any issues arise with the data you supplied.

John Wullert

Manager – NJ BB Data Collection

Telcordia Technologies

732-699-2687

XO Communications

Connecting New Jersey - Broadband Provider Data Report

Provider: XO Communications
Received: August, 2010
Submission date: October 2010

This report presents details on processing of the broadband data for delivery to the National Telecommunications and Information Administration.

Sections:

52. NDA Status
53. Submission Overview
54. Submission File Details
55. Data Validations and Results
56. Data Transformation and Loading
57. Clarification Questions and Provider Responses
58. Notes and Open Issues

Section 1: NDA Status

Executed.

Section 2: Submission Overview

AVAILABILITY DATA		
ID	Provider name "Doing business as" name FRN	XO Communications, LLC Provided, but looks weird 0006275945
FOR WIRELINE		
Filetypes		
File size		

<table>
<tr><td rowspan="7">Speeds</td><td>Type</td><td></td><td>Spatial Resolution (address, street seg, census block, RSA/MSA, zipcode,etc)</td></tr>
<tr><td>Typical-upstream</td><td></td><td>census block</td></tr>
<tr><td>Typical-downstream</td><td></td><td>census block</td></tr>
<tr><td>Advertised-upstream</td><td></td><td>census block</td></tr>
<tr><td>Advertised-downstream</td><td></td><td>census block</td></tr>
<tr><td>Subscriber-weighted-up</td><td></td><td>Not provided</td></tr>
<tr><td>Subscriber-weighted-down</td><td></td><td>Not provided</td></tr>
<tr><td>Technology Type</td><td colspan="3">Entered codes 1, 2, and 3, which are not valid NOFA TechTrans codes.</td></tr>
<tr><td>End-user specification</td><td colspan="3">Business (444 entries), Residence (5 entries)</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td colspan="4">INTERCONNECTION DATA</td></tr>
<tr><td>ID</td><td colspan="3"></td></tr>
<tr><td>File size</td><td colspan="3"></td></tr>
<tr><td>Ownership</td><td colspan="3"></td></tr>
<tr><td>Transport Type</td><td colspan="3"></td></tr>
<tr><td>Data Rates/Capacity</td><td colspan="3"></td></tr>
<tr><td>Location</td><td colspan="3"></td></tr>
<tr><td colspan="4">Comments: Not provided</td></tr>
</table>

Section 3: Submission File Details

Received 1 file by SECURE UPLOAD.

Size	**Name**
41358	NJBroadbandData63009.xlsx

Section 4: Validations and Results

The spreadsheet provides census block IDs and associated max adv and typical speeds. The last two rows of the sheet are different from the 447 data rows proceeding them, and one of those last two is in New York. The DBA name looks unusual and the technology of transmission codes are not valid. After receiving clarification by email we created a corrected spreadsheet based on the original submission as follows:

1. Dropped the last two rows that have addresses instead of provider name, DBA name, etc.
2. Changed DBA Name entries to “XOCSI”
3. Changed technology of transmission codes: 1 to 10, 2 to 20, and 3 to 30.

Section 5: Data Transformation and Loading

NTIA Table BB_Service_CensusBlock

Loaded from the supplied spreadsheet. The following table explains the transformations that were applied to load the target table.

Table Column	Data Source / Transformation
PROVNAME	As supplied in column “Provider Name”
DBANAME	As supplied in column “DBA Name”
RESELLER	Set to “N”
FRN	As supplied in column “FRN”, after adding leading zeros
STATEFIPS	Set to “34” (NJ)
COUNTYFIPS	Populated from column census_block (1st 3 digits)
TRACT	Populated from column census_block (next 6 digits)
BLOCKID	Populated from column census_block (last 4 digits)
BLOCKSUBGROUP	Set to null
FULLFIPSID	As supplied in column census_block
TRANSTECH	As supplied in column Tech Code
MAXADDOWN	As supplied in column MaxDownload
MAXADUP	As supplied in column MaxUpload
TYPICDOWN	As supplied in column TypDownload
TYPICUP	As supplied in column TypUpload

SHAPE Copied from Census Bureau TigerLine 2010,
As matched by Census block ID

Internal processing notes:

1. No duplicate census blocks were found.

Section 6: Clarification Questions and Responses

From: NJ Broadband Data Collection [mailto:ConnectingNJ@research.telcordia.com]
Sent: Tuesday, September 13, 2011 4:07 PM
To: 'Adams, Sharon E'
Cc: ConnectingNJ@research.telcordia.com
Subject: RE: NJ Broadband Data Collection

Sharon,

We realized that we have a potential issue with processing the data you submitted previously. The NTIA has transitioned from using the 2000 census block geometry to the 2010 census block geometry. While it is possible for us to translate your prior data, there is a high risk of overstating or understating your actual coverage area due to the many-to-many mappings between the two sets of census blocks.

Is it possible for you to provide your data using the 2010 geometry?

John Wullert

Manager – NJ BB Data Collection

Telcordia Technologies

732-699-2687

From: Adams, Sharon E [mailto:Sharon.E.Adams@xo.com]
Sent: Tuesday, September 13, 2011 4:10 PM
To: ConnectingNJ@research.telcordia.com
Subject: RE: NJ Broadband Data Collection

Hi John,

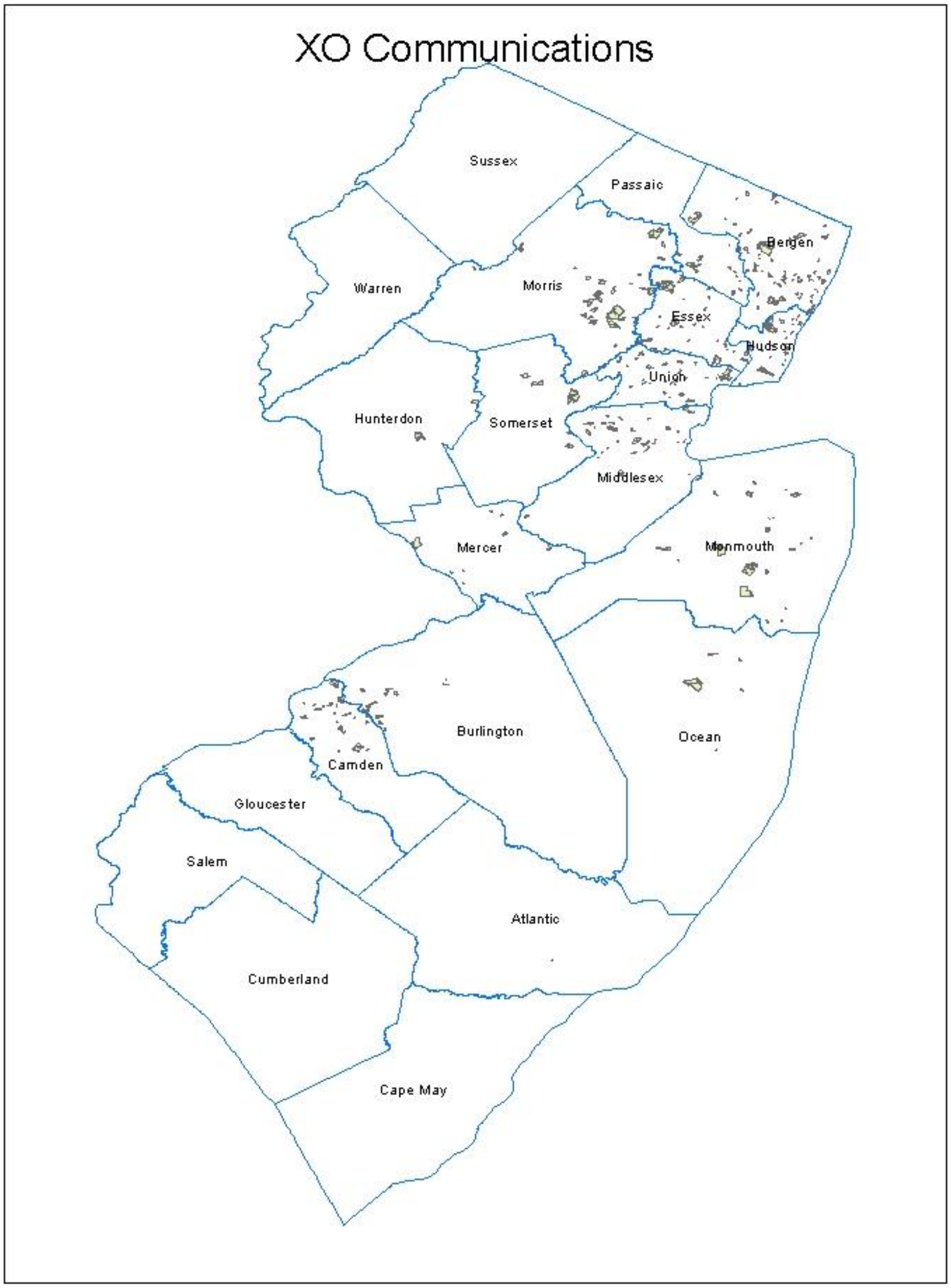
It's fine to restate our data with the new census block geometry. I do not have the new 2010 geometry to restate the data.

Thanks,

Sharon Adams

Section 7: Notes and Open Issues

Section 8: Overview Map of Submitted Data



7 Appendix B: Community Anchor Institution Processing

7.1 Summary

For each category of community anchor institution, we generally obtained data from two sources. One source was a reference source that provided a list of institutions with name, address and ID number where applicable. This reference source was expected to be nearly complete, representing all the institutions of the specified type in the state. The other source provided the broadband information. In many cases, the broadband information was supplied by the institutions via our Web site.

There were exceptions, however, to these procedures. In the case of Higher Education, we obtained the broadband access information from NJEdge, an organization that collects data via its own survey. In the case of State Government, we obtained a list of broadband circuits provided to the state by Verizon; there was no reference list for comparison. We similarly had no reference list for local government and non-governmental organizations; we used only data collected via our Web site for these classes of institution.

There were a couple of significant changes in the data and methodology for this round of submission that are described in further detail in the following sections. First, we obtained broadband data for public schools from the NJ Department of Education (NJDOE) based on the survey responses they received from the public schools. Secondly, we obtained a list of healthcare institutions from NJOIT that we used as the reference list instead of one we obtained from the NJ HHS and NJHA previously. In addition to hospitals, this list includes pharmacies and clinical laboratories.

For each CAI category, the following table provides the number of records we obtained from the reference source, the number of broadband access records we obtained, the total number of records we submitted to the NTIA and the number of complete records, with verified address information and broadband access information.

Table 1 CAI Submission Summary

CAI Category	Reference Records	Broadband Records	Total Records Submitted	Complete Records Submitted
School K-12 (Public) School K-12 (Private)	2686 (DOE) 1159 (NCES)	2428 (DOE) 796 (Web)	3762	2465
Libraries	461 (IMLS)	89	460	43
Medical/Healthcare	9265	5	8604	5
Public Safety	343 (NJ 911 Comm.)	120	337	76
University	160	39	159	34

	(NCES IPEDS)	(NJEdge)		
Other – State and Local Government		2007 (state gov't) 54 (Web)	1694	1694
Other – Non Government	0	8	8	8

7.2 Local Government and Non-Government Organizations

The procedure and data in this section are unchanged from the previous submission.

1. There were no new submissions to the web site since the October 2011 report. Accepted data were submitted by 54 local government and 8 non-governmental organizations via our specially designed Web site. We merged data submitted to this Web site for April 2011 delivery with that submitted between April and September. The flow named SubmittedCAI_GovNGO_Process.arroyo was used to process the data. (Files lib_20110323-edit.xml and lib_20110907.xml) Data collected included:
   i. Community Anchor Institution Category
   ii. Community Anchor Institution Name (System, Branch)
   iii. Address: Street, City, State, Zip, County
   iv. Contact info: Name, Phone, Email, Web address
   v. Wi-Fi access
   vi. Broadband info: Provider, Technology, Upstream and Downstream speeds
   vii. Comment
2. Generated Latitude and Longitude via geo-coding using Yahoo geocoder API.
   a. Ensured no errors were present, that at least one entry was returned and that quality metric was over 75. Also ensured that result was in New Jersey and that city and zip were not both blank. Output is in file Submitted_GovNGO_CAIs.xls.

7.3 State Government

The procedure and data in this section are unchanged from the previous submission.

1. Obtained a listing of 2007 connections provided by the primary broadband service provider, Verizon, to the state. List of connections included the following data:
   a. Service address
      i. This field included an indication of the office or department being served and an extremely abbreviated version of the address
      ii. e.g.: "(SPNL)STATE OF NJ-TLS 19 LANDIS AV, UP DRFLD T"
   b. Speed (single value, 1.5 to 1000 Mbps)
   c. Technology (ATM, Ethernet, Frame Relay, PRI, Point-to-Point)
2. Used an automated process to expand the town names in the Service Address field (flow for steps 2-6 is in file VerizonList_Geocode.arroyo; input file is Broadband Mapping Prod Sum 2500 Feb 11_Addressed_Ida_Murray4.xlsx)
   a. For example, replaced "PRSPY" with "Parsippany" and "FR LN" with "Fair Lawn"
   b. Improved the mapping of abbreviated city names to their expansions

i. BRIG: Brigantine
ii. BRDTN: Bordentown
iii. DVR: Dover
iv. HMTN: Hammonton
v. LWR TWP: Lower Township
vi. MAN: Manchester
vii. MANT: Mantua
viii. MIDL TWP: Middle Township
ix. MIDLTN TWP: Middletown
x. OAKLN: Oaklyn
xi. PIT: Pitman

3. Extracted address information from Service Address field by removing the following:
   a. Digits following and including a pound sign (e.g., NJ STATE PAROLE DIST **#6** 210 S BROAD)
   b. P.O Box NNNN,
   c. Anything in parentheses (e.g., **(SPNL)**STATE OF NJ:OIT 90 STATE HWY NO 183)
   d. Any string consisting solely of letters, backslashes, colons, dashes, ampersands and spaces prior to the first number string in the address (e.g., **SONJ:DOE** 7 GLENWOOD AV, E O BLDG FLR 4;DES SUITE 401-402)
   e. Any string after the first comma (e.g., 7 GLENWOOD AV, **E O BLDG FLR 4;DES SUITE 401-402**
   f. Text prior to and including an ampersand (e.g., **NJ STATE DOT @** ROUTE 23)
   g. Replacing AV, with AVE,
   h. Any text between commas (e.g., 3810 NEW JERSEY AV, **WILD DES DEPT LABOR,**)
   i. Any number preceded by “PROJECT” or “PRJCT”
4. Merged city information and state information with extracted addresses.
5. Generated Latitude and Longitude via geo-coding using Yahoo geocoder API.
   a. Ensured no errors were present, that at least one entry was returned.
   b. Ensured that state was New Jersey and that city and state values were populated.
6. For those that failed test with Yahoo geocoder API, attempted to match with Google geocoder API.
   a. Ensured no errors were present, that at least on entry was returned.
   b. Ensured that state was New Jersey and that city and state values were populated.
7. Resulted in successful geocoding of 1941 of the 2007 entries. Entries that could not be geocoded were ones with no street address and those whose street addresses were deliberately disguised.
   a. Results are in file Verizon_Geocoded_new.xls.

7.4 Healthcare

In this submission, the healthcare category was expanded to include hospitals, pharmacies and clinical laboratories.

1. Obtained a listing of 1174 hospitals from NJ OIT (All Licensed Acute Care Facilities 3 12 12.xls). List of hospitals included the following data:
   a. Facility Name
   b. Address: Street, City, State, Zip

2. The hospitals were geocoded using the Yahoo Goecoder API (HospitalProcess.arroyo). The output was checked to ensure that the street address was not blank, the state was New Jersey and the city was not blank. This resulted in successful geocoding of 1128 hospitals.
3. Obtained listing of 2010 pharmacies from NJ OIT (2012-06 pharmacies.csv) which included the following data:
    a. Pharmacy Name
    b. Address: Street, City, State and Zip
4. The pharmacies were geocoded using the Yahoo Goecoder API in the flow PharmacyProcess.arroyo. The output was checked to ensure that the street address was not blank, the state was New Jersey and the city was not blank. This resulted in successful geocoding of 1940 pharmacies.
5. Obtained listing of 6081 clinical laboratories from NJ OIT. The source was the Centers for Medicare and Medicaid that provides the list of medical labs through the Clinical Laboratory Improvement Amendment (CLIA). The list (CLIA Labs 2012-08-14_edit.xlsx) provides name, address and location of laboratory.
    a. The name, address, type of lab and location were extracted using CLIA_Labs_Process.arroyo.
    b. Of this list, we eliminated the labs that were located in hospitals and pharmacies because of the overlap with the other sub-categories and because the NTIA data model only identifies a single category for all healthcare institutions.
    c. The remaining labs were geocoded using the Yahoo Geocoder API and the Google Geocoder API. This resulted in successfully geocoding 5554 labs using the flow CLIA_Labs_Geocode.arroyo.
6. The three lists formed the reference list of healthcare institutions.
7. Merged reference data with data collected from 5 hospitals via our hosted Web site to merge address and ID information with speed and Wi-Fi availability information. We merged data submitted to Web site for April 2011 delivery with that submitted between April and September. No new data after September 2011. (Files lib_20110323-edit.xml and lib_20110907.xml)
    a. Performed exact match between and submitted data on institution name
        i. Facilitated matching by Converting names to upper case, removing certain common words (THE, HOSPITAL, MEDICAL, CENTER, SYSTEM, HEALTHCARE), removing double spaces and trimming leading and trailing spaces.

    This portion of the process occurs in SubmittedCAI_Healthcare_Process.arroyo.
    Output is in file Healthcare_Submitted_Matched.xls.
8. Produced about 8600 healthcare records at the end of the processing with 5 that included broadband information.

7.5 Higher Education

1. Obtained the following data from the named sources in August 2012
    a. List of higher education institutions from National Center for Education Statistics IPEDS Data Center (http://nces.ed.gov/collegenavigator/?s=NJ). Table included information on 160 institutions with the following fields:
        i. Institution Name
        ii. Address: Street, City, County, State, ZIP
        iii. IPEDS ID

    Final input data, including a few manual edits (see below) is in file CollegeNavigator_Search_NJ_2012-08-17_edit.xlsx

   b. Generated Latitude and Longitude via geo-coding using Yahoo geocoder API (flow IPEDS_HigherEd_Geocode.arroyo).
      i. Ensured no errors were present, that at least one entry was returned
      ii. Ensured that state was New Jersey and that city and state values were populated.
   c. For those that failed test with Yahoo geocoder API, attempted to match with Google geocoder API (Flow IPEDS_HigherEd_Geocode.arroyo)
      i. Ensured no errors were present, that at least on entry was returned
      ii. Ensured that state was New Jersey and that city and state values were populated.
   d. All 159 institutions were properly geocoded.
2. Obtained an updated list of members of NJEdge (Format-edited version is in file Mapping Bandwidth_Mb_07162012_edit.xlsx). Table included information on 52 institutions, most of which (39) were unique state, community or private institutions of higher learning. Information from NJEdge included:
      i. Institution Name
      ii. Address
      iii. Technology Type
      iv. Upstream and downstream speeds
3. Merged IPEDS and NJEdge data to match institution data with broadband access information (HigherEd_Merge.arroyo)
   a. Performed exact match on institution name
      i. Facilitated matching by Converting names to upper case and trimming excess spaces
   b. Of those NJEdge data entries that did not match, used approximate matching based on institution name
      i. Preprocess prior to approximate match involved
         1. Removing strings COLLEGE, UNIVERSITY, NEW JERSEY
         2. Removing any punctuation
      ii. Matched using Levenshtein Distance metric with threshold of 4.
   c. Reviewed unmatched NJEdge data manually and identified three additional matches.
4. Successfully merged data from 37 NJEdge institutions into IPEDS data
   a. Note that remaining NJEDGE institution (Fairleigh Dickenson) has different address than either of the campuses in the IPEDS data.
   b. Note that Rutgers entry in NJEdge data has different address than the IPED entries

Final output is in file HigherEd_Geocoded_RateMatched_07162012.xls

7.6 Libraries

1. Obtained the following data from the named sources
   a. Obtained the file Public Libraries Survey Fiscal Year 2010 from http://harvester.census.gov/imls/data/pls/index.asp. Used file puout10a.txt
      i. Manually extracted 462 records for the state of New Jersey
      ii. Used the following data items:
         1. FSCSKEY
         2. FSCS_SEQ
         3. LIBNAME
         4. ADDRESS

5. CITY
6. ZIP
7. LATITUDE
8. LONGITUDE

Manually changed the town name for W. Patterson Library to new official name of Woodland Park.

b. Data submitted by 89 library organizations via specially designed Web site. No new data was submitted after September 2011. Corrected the category type for Summit Public Library, which was mis-categorized as a hospital. Data collected included same fields listed above for Local Governmental organizations

2. Merged library survey data with data collected from libraries via our hosted Web site to merge address and ID information with speed and Wi-Fi availability information (SubmittedCAI_Library_Process.arroyo).
   a. Performed exact match between survey and submitted data on library name
      i. Facilitated matching by Converting library names to upper case, cutting submitted names to fixed-field length of survey data (60 characters) and trimming excess spaces
   b. For those submitted data entries that did not match, performed an approximate match based on library name
      i. Preprocess prior to approximate match involved
         1. Removing strings P.L., FREE, PUBLIC, LIBRARY, TOWNSHIP, TSWP, PUB, LIB, THE, SYSTEM
         2. Removing any punctuation
         3. Converting NO/SO at start of line to NORTH and SOUTH respectively
      ii. Matched using Levenshtein Distance metric with threshold of 3.
   c. Manually changed the names of some libraries to make them consistent between reference data and submitted entries with respect to library name (town name vs. specific name).
   d. Successfully matched all but ten submitted entries to Library Survey Data
      i. Remaining ten were branches of Newark Public Library, but all were submitted with the same address, so they could not be successfully geocoded.

   Results (LibraryPlusSubmitted.xls) include 469 Library entries. This is larger than the 462 from the survey because some libraries submitted more than one broadband provider.

7.7 Private K-12 Schools

1. Obtained the following data from the named sources:
   a. Latest list of private K-12 education institutions from National Center for Education Statistics Private School Universe Survey (http://nces.ed.gov/surveys/pss/privateschoolsearch/). Table included information on 1159 institutions with the following fields:
      i. Name
      ii. Address: Street, City, State, ZIP
      iii. PSS_ID
   b. Data submitted by schools via specially designed Web site. There was no new data submitted after September 2011. Data collected included same fields listed above for Local Governmental organizations. Total number of Public and Private schools submitting information was 796.
   c. Data from the USAC eRate program was not used in this submission.

2. Merged NCES private school with data collected from private schools via our hosted Web site to merge address and ID information with speed information (SubmittedPrivateSchool_Process.arroyo and PrivateSchool_Process.arroyo).
    a. Performed exact match between NCES and submitted data on institution name and zip code
        i. Facilitated matching by:
            1. Converting school names to upper case
            2. Removing string , NJ
            3. Converting string SAINT to ST
    b. For those submitted data entries that did not match NCES data, performed an approximate match based on institution name
        i. Preprocess prior to approximate match involved
            1. Replacing string SCHOO or SCHO with SCHOOL
            2. Replacing string HIGH SCHOOL with HS and string ELEMENTARY with ELEM
            3. Removing strings SCHOOL, THE, REGIONAL, HIGH, ACADEMY and ACA
            4. Trimming excess spaces
        ii. Matched using Levenshtein Distance metric with threshold of 3.
    c. Successfully merged data from submitted private school into NCES institutions
        i. Manual comparison resulted in matching of additional institutions
        ii. Remaining institutions were ambiguous or not present in the NCES data.
3. School records were geocoded using the Yahoo geocoder API.
4. Generated 1154 records to submit, of which 57 were merged with submitted broadband data.
    a. Output file is PrivateSchool_GeoMatched.xls

7.8 Public K-12 Schools

We obtained the reference list and broadband records for public and charter schools from NJ DOE and geolocation information for public and charter schools from the NJ Geographic Imagery Network (NJGIN) team. NJGIN and NJ DOE provided two sources data that were merged to get the geolocation and NCES ID of the schools.

1. Obtained the following data from the named sources:
    a. List of schools with broadband data provided by NJ DOE (StateOIT_ARRA_Broadband.csv). This table contained records of 2428 schools with the following fields:
        i. School Name
        ii. Combined_Code that comprises of a concatenation of county, district and school.
        iii. WiFi availability
        iv. ISP Provider Name
        v. Technology
        vi. Downstream Speed
        vii. Upstream Speed
    b. Geolocation data for 3784 schools that included public, private and charter schools. The data included the following fields:
        i. School Name
        ii. Address
        iii. Latitude
        iv. Longitude

v. County Code (2 digits)
vi. District Code (4 digits)
vii. School Code (3 digits)
viii. Type of school – Public, Private or Charter

The last 3 codes were concatenated to get the Combined Code. However, neither this list nor the broadband data contained the NCES ID which is information required by the NTIA. Therefore, a third list provided by the NJ DOE was used to obtain the NCES ID.

c. List of public K-12 and charter schools in New Jersey (NJ SCH EXTRACT.XLSX) from NJ DOE. Table included information on 2641 institutions with the following fields:
    i. Name
    ii. FIPS State Code
    iii. Two codes ID 4 LEA ID (State) and ID 5 School ID (State), that when combined gave the combined ID used by the DOE in identifying schools.
    iv. Two codes ID 1 LEA ID (NCES) and ID 529 School ID (NCES) that when combined give the NCES ID of the school.

    Because information was not available for private schools, the NJ GIN geolocation information was only used for public and charter schools in this submission.

The data from the website and eRATE data were no longer needed in this submission for public schools as the NJ DOE provided all the necessary data providing greater coverage than the other sources.

2. Merged the two data sources listed in items b and c above to get the list of public schools with goelocation and NCES ID (NJ_Schools_Process.arroyo). The key for merging the two lists was the Combined Code used by the NJ DOE that consists of county, district and school codes.
    a. 2464 records were matched between the two lists
    b. Many of the records in the NJ GIN list could not be matched. Of these, the 67 that were public or charter schools were added to the list of schools.
    c. 178 schools were not in the NJ GIN list. Of these, we were able to geocode 155 schools using Yahoo geocoder API.
        i. Ensured no errors were present, that at least on entry was returned and that quality metric was over 75.
        ii. Ensured that state was New Jersey and that city and/or zip value was populated.
        iii. This process yielded a total of 2686 schools with geolocation.
3. The NJ DOE list of schools with broadband data was merged with the list of schools generated in step 2. The two lists were merged using the Combined Code as the key (Schools_NJDOE_Merge.arroyo). 2421 of the 2428 NJ DOE records were matched.

    Output file is PublicSchools_GeoMatched.xls. It has a total of 2686 schools, 2421 with broadband data.

7.9 Public Safety Organizations

The procedure and data in this section are unchanged from the previous submission.

1. Obtained the following data from the named sources:
    a. List of local and state public safety organizations obtained from NJ State 911 Commission. (Reused data from April 2011 - PSAP's & PSDP's_Geocoded.xls) Table included information on 343 institutions with the following fields:
        i. Name
        ii. Address: Street, City, State, ZIP, County

iii. NCES_ID

b. Data submitted by 120 public safety organizations via specially designed Web site. Data collected included same fields listed above for Local Governmental organizations

2. Generated on 911 Commission Data Latitude and Longitude via geo-coding using Yahoo geocoder API.
   a. Ensured no errors were present, that at least on entry was returned and that quality metric was over 75.
3. Merged 911 Commission data with PSAP data collected from via our hosted Web site (120 entries) to merge address and ID information with speed information.
   a. Performed exact match between 911 and submitted data on institution name
      i. Facilitated matching by:
         1. Converting names to upper case
         2. Removing the Strings DEPARTMENT, DEPT, TOWNSHIP, TWP
         3. Removing punctuation and double-spaces
         4. Replacing string PD with POLICE and string BOROUGH with BORO
   b. Performed manual merging to integrate additional submitted records that were not matched.
      i. Successfully merged 85 submitted PSAP entries with 911 Commission data.

   Output in file PSAP_911_Matched.xls

7.10 Additional CAI Processing

All of the CAI data was put through additional processing and validation that achieved the following:

a. Extracted the building number from the street address
b. Checked and verified that all records had a 5 digit zip code
c. Eliminated records that had only PO Boxes for their street addresses
d. Verified that all the records were in New Jersey
e. Removed duplicate entries
f. Checked if the downstream speed was greater than or equal to the upstream speed. There were 163 records where this failed. In these cases, the upstream speed was made equal to the downstream speed in the submitted records. The records that had down less than up are as listed in Table 2. They span almost all of the CAI categories.

This processing resulted in elimination of many records and yielded the final count of submitted records as shown in Table 1.

Table 2 CAI Records with Downstream Speed Less than Upstream Speed

Anchorname	Address	caicat	Transtech	Down	Up
#19 DANIEL F RYAN SCHOOL	320 HIGHLAND AVE	1	50	9	10
ABUNDANT LIFE CHRISTIAN SCHOOL	43 S JEFFERSON RD	1	40	8	9
ALL SAINTS ACADEMY	189 BALDWIN RD	1	40	5	7
AQUINAS ACADEMY	388 S LIVINGSTON AVE	1	41	3	4
ASSUMPTION CATHOLIC SCHOOL	MEREDITH AND JACQUES STS	1	40	6	7
Bergen Blvd. School	Bergen Blvd.	1	50	9	10
Charter-TECH High School	413 New Road	1	40	7	8
CORPUS CHRISTI SCHOOL	215 KIPP AVE	1	50	8	10

Ethel A. Jacobsen Elementary School	200 Barnegat Avenue	1	41	5	6
Etta Gero No 9 Elementary School	140 First Street	1	50	9	10
Franklin Elementary School	1809 Street Georges Avenue	1	50	8	9
Grace M. Breckwedel Middle School	13 Augusta Street	1	41	4	6
Grover Cleveland Elementary School	486 East Milton Avenue	1	50	8	9
HOLY SPIRIT SCHOOL	970 SUBURBAN RD	1	0	4	6
Jeffrey Clark School	7 Quaker Road	1	41	7	8
Long Beach Island Elementary School	20th Street & Central Avenue	1	41	5	6
Madison Elementary School	944 Madison Avenue	1	50	8	9
MARIST HIGH SCHOOL	1241 KENNEDY BLVD	1	50	8	10
MOSHE AARON YESHIVA HIGH SCHOOL	34 CHARLES ST	1	41	7	9
N. A. Bleshman Regional Day School - Paramus	333 E Ridgewood Avenue	1	90	10	11
NOTRE DAME INTERPAROCHIAL SCHOOL	312 1ST ST	1	41	8	10
Number 10, Roosevelt Elementary School	266 Harrison Street & Park Avenue	1	50	9	10
Number 11, Cruise Memorial Elementary School	Gregory/Madison Avenues	1	50	9	10
Number 15 Kindergarten School	374 Broadway	1	50	9	10
Number 16 Kindergarten School	657 Main Avenue	1	50	9	10
Number 17	95-99 Dayton Avenue	1	50	9	10
Number 1, Thomas Jefferson Elementary School	Broadway & Van Houten Avenue	1	50	9	10
Number 2 Elementary School	48 Bergen Street	1	50	9	10
Number 3, Mario J Drago	18 Belmont Place	1	50	9	10
Number 4, Lincoln Middle School	Boulevard & Lafayette Avenue	1	50	9	10
Number 5 Middle School	168 Monroe Street	1	50	9	10
Number 6, Martin Luther King, Jr.	85 Hamilton Avenue	1	50	9	10
Number 7, Grant Elementary School	Summer Street & Myrtle Avenue	1	50	9	10
Number 8, Pulaski Elementary School	100 Fourth Street	1	50	9	10
OAKWOOD SCHOOL	62 HANCE AVE	1	50	8	10
ORATORY PREPARATORY SCHOOL	1 BEVERLY RD	1	10	4	6
Passaic High School	170 Paulison Avenue	1	50	9	10
Program 1-Hearing Impaired	531 Stevens Avenue	1	90	10	11
Program 2-Multiply Handicapped	327 East Ridgewood Avenue	1	90	10	11
Program 3-Emotionally Distur.	327 East Ridgewood Avenue	1	90	10	11
Program 5-Life Skills	327 East Ridgewood Avenue	1	90	10	11
Program 6-Autistic	355 East Ridgewood Avenue	1	90	10	11
Rahway High School	1012 Madison Avenue	1	50	8	9

Rahway Intermediate School	Kline Place	1	50	8	9
RANNEY SCHOOL	235 HOPE RD	1	50	7	9
Regional Day School at Millburn	Spring & Willow Streets	1	90	10	11
Ridgefield Memorial High School	Walnut Street	1	50	9	10
Roosevelt Elementary School	811 Street George Avenue	1	50	8	9
RUTGERS PREPARATORY SCHOOL	1345 EASTON AVE	1	50	7	9
Samuel Mickle Elementary School	559 Kings Highway	1	41	7	8
SCHOOL OF SAINT ELIZABETH	30 SENEY DR	1	41	5	7
Shaler School	455 Shaler Boulevard	1	50	9	10
Slocum/Skewes School Elementary School	Prospect Avenue	1	50	9	10
Soaring Heights Charter School	1 Romar Avenue	1	40	7	8
ST AUGUSTINE OF CANTERBURY SCHOOL	45 HENDERSON RD	1	41	6	7
ST BENEDICT'S PREPARATORY SCHOOL	520 MARTIN LUTHER KING JR BLVD	1	20	5	7
ST JOHN THE APOSTLE SCHOOL	VALLEY RD	1	0	4	6
ST JOSEPH REGIONAL HIGH SCHOOL	40 CHESTNUT RIDGE RD	1	0	8	9
ST MARY SCHOOL	32A CARROLL AVE	1	20	4	6
ST MARY SCHOOL	30 ELIZABETH ST	1	50	5	6
ST PETER SCHOOL	415 ATLANTIC AVE	1	40	3	5
The Ethical Community Charter School	75 Broadway	1	41	6	8
WALDORF SCHOOL OF PRINCETON	1062 CHERRY HILL RD	1	40	6	7
Watchung Hills Regional High School	108 Stirling Road	1	50	7	8
William P. Tatem Elementary School	265 Lincoln Avenue	1	40	6	7
YAVNEH ACADEMY	155 N FAIRVIEW AVE	1	50	8	10
Zane North Elementary School	801 Stokes Avenue	1	40	6	7
ALFRED H. BAUMANN FREE PUBLIC LIBRARY	7 BROPHY LANE	2	20	4	6
BERNARDSVILLE PUBLIC LIBRARY	1 ANDERSON HILL ROAD	2	20	3	5
BLOOMINGDALE PUBLIC LIBRARY	101 HAMBURG TURNPIKE	2	20	4	6
CEDAR GROVE PUBLIC LIBRARY	ONE MUNICIPAL PLAZA	2	20	3	5
CHESTER LIBRARY	250 WEST MAIN STREET	2	41	4	6
CLIFTON PUBLIC LIBRARY	292 PIAGET AVENUE	2	50	7	9
COLLINGSWOOD PUBLIC LIBRARY	771 HADDON AVENUE	2	10	3	4
DOVER FREE PUBLIC LIBRARY	32 E. CLINTON STREET	2	41	3	4
DWIGHT D. EISENHOWER PUBLIC LIBRARY	537 TOTOWA ROAD	2	20	3	5
EMANUEL EINSTEIN PUBLIC LIBRARY	333 WANAQUE AVENUE	2	20	3	5
FAIRFIELD FREE PUBLIC LIBRARY	261 HOLLYWOOD AVENUE	2	20	3	5
GLOUCESTER COUNTY LIBRARY SYSTEM	389 WOLFERTS STATION RD.	2	0	8	10
HUNTERDON COUNTY LIBRARY	314 STATE ROUTE 12	2	0	4	5
JOHNSON PUBLIC LIBRARY	274 MAIN STREET	2	41	4	6
LITTLE FALLS PUBLIC LIBRARY	8 WARREN ST	2	20	4	6
MOUNT LAUREL LIBRARY	100 WALT WHITMAN AVENUE	2	50	7	9

NEWARK PUBLIC LIBRARY	5 WASHINGTON AVE	2	50	9	11
NORTH HALEDON PUBLIC LIBRARY	129 OVERLOOK AVENUE	2	20	3	5
OCEAN COUNTY LIBRARY	101 WASHINGTON STREET	2	0	9	11
RINGWOOD PUBLIC LIBRARY	30 CANNICI DRIVE	2	20	4	6
SOMERSET COUNTY LIBRARY SYSTEM	NORTH BRIDGE STREET AND VOGT ROAD	2	20	6	9
TEANECK PUBLIC LIBRARY	840 TEANECK ROAD	2	41	3	6
WANAQUE PUBLIC LIBRARY	616 RINGWOOD AVENUE	2	20	3	5
WAYNE PUBLIC LIBRARY	475 VALLEY ROAD	2	50	7	9
WOODBURY PUBLIC LIBRARY	33 DELAWARE STREET	2	30	3	5
CentraState Medical Center	901 W Main St Freehold, NJ 07728-2537 United States	3	50	7	9
Cooper Hospital/University Medical Center	1 Cooper Plz Camden, NJ 08103-1461 United States	3	0	4	6
Saint Barnabas Medical Center	94 Old Short Hills Rd Livingston, NJ 07039-5606 United States	3	50	9	11
SAINT BARNABAS MEDICAL CENTER	94 OLD SHORT HILLS ROAD,LIVINGSTON NJ 07039	3	50	9	11
BERGENFIELD POLICE	198 North Washington Avenue, Bergenfield, NJ 07621	4	10	4	5
CARLSTADT POLICE	500 Madison Avenue, Carlstadt, NJ 07072	4	50	7	8
CLIFTON POLICE	900 Clifton Avenue, Clifton, NJ 07011	4	50	8	10
CLOSTER POLICE	295 Closter Dock Road, Closter, NJ 07624	4	50	7	9
EAST ORANGE POLICE	61 North Munn Avenue, East Orange, NJ 07019	4	0	3	4
EAST WINDSOR POLICE	80 One Mile Road, East Windsor Township, NJ 08520	4	50	8	10
EDGEWATER POLICE	916 River Road, Edgewater, NJ 07020	4	41	3	5
EWING POLICE	2 Jake Garzio Drive, Ewing, NJ 08628	4	50	8	9
FAIR LAWN POLICE	801 Fair Lawn Avenue, Fair Lawn, NJ 07410	4	50	8	10
GARFIELD POLICE	411 Midland Avenue, Garfield, NJ 07026	4	41	7	9
GUTTENBERG POLICE	6808 Park Avenue, Guttenberg, NJ 07093	4	41	6	7
HARRISON POLICE	318 Harrison Avenue, Harrison, NJ 07029	4	40	5	6
HIGHLAND PARK POLICE	222 South Fifth Avenue, Highland Park, NJ 08904	4	41	5	7
JACKSON POLICE	102 Jackson Drive, Jackson Township, NJ 08527	4	30	7	9
JEFFERSON POLICE	1033 Weldon Road, Jefferson Township, NJ	4	50	7	9

	07849				
LINDEN POLICE	301 North Wood Avenue, Linden, NJ 07036	4	40	8	9
MEDFORD POLICE	91 Union Street, Medford, NJ 08055	4	41	8	9
METUCHEN POLICE	500 Main Street, Metuchen, NJ 08840	4	20	3	5
MIDDLESEX BORO POLICE	1200 Mountain Avenue, Middlesex, NJ 08846	4	41	6	7
MILLBURN POLICE	435 Essex Street, Millburn, NJ 07041	4	10	6	7
MOUNT OLIVE POLICE	204 Flanders Drakestown Road, Mount Olive, NJ 07828	4	30	3	5
NEPTUNE POLICE	25 Neptune Blvd, Neptune Township, NJ 07753	4	40	5	7
NEW BRUNSWICK POLICE	25 Kirkpatrick Street, New Brunswick, NJ 08901	4	30	3	5
NORTHWEST BERGEN CENTRAL DISPATCH	30 Garber Square, Ridgewood, NJ 07450	4	20	3	5
OAKLAND POLICE	292 Route 202, Oakland, NJ 07436	4	41	6	7
OCEAN CITY POLICE	835 Central Avenue, Ocean City, NJ 08226	4	41	3	5
PENNSAUKEN POLICE	2400 Bethel Avenue, Pennsauken, NJ 08109	4	40	8	10
POINT PLEASANT BEACH POLICE	416 New Jersey Ave, Point Pleasant Beach, NJ 08742	4	40	5	6
PRINCETON BORO POLICE	1 Monement Drive, Princeton, NJ 08540	4	41	6	8
RANDOLPH POLICE	502 Millbrook Avenue, Randolph Township, NJ 07869	4	30	3	5
RIVER VALE POLICE	334 River Vale Road, River Vale, NJ 07675	4	50	7	8
ROCKAWAY POLICE	65 Mount Hope Road, Rockaway, NJ 07866	4	41	8	10
ROSELLE PARK POLICE	110 East Westfield Avenue, Roselle Park, NJ 07204	4	50	3	5
SAYREVILLE POLICE	1000 Main Street, Sayreville, NJ 08872	4	41	6	7
SEASIDE HEIGHTS POLICE	116 Sherman Av, Seaside Heights, NJ 08751	4	50	5	7
SECAUCUS POLICE	1203 Paterson Plank Road, Secaucus, NJ 07094	4	40	7	8
SOMERS POINT POLICE	1 West New Jersey Ave, Somers Point, NJ 08244	4	40	5	9
UNION COUNTY POLICE	300 North Avenue East, Westfield, NJ 07090	4	50	3	5
VINELAND POLICE	111 North 6th Street, Vineland, NJ 08360	4	41	7	9
WALLINGTON POLICE	54 Union Boulevard, Wallington, NJ 07057	4	50	3	5

WEST CALDWELL POLICE	21 Crinton Road, West Caldwell, NJ 07006	4	10	3	5
Bernards Township	1 Collyer Ln Basking Ridge, NJ 07920-1442 United States	6	50	8	10
Boro of Belmar	601 Main St Belmar, NJ 07719-2701 United States	6	50	7	9
Borough of Avalon	3100 Dune Dr Avalon, NJ 08202-1706 United States	6	50	5	6
Borough of Buena	616 Central Ave Minotola, NJ 08341-1008 United States	6	40	3	4
Borough of East Newark	34 Sherman Ave East Newark, NJ 07029-2718 United States	6	0	4	6
Borough of West Long Branch	965 Broadway West Long Branch, NJ 07764-1504 United States	6	41	5	7
City of Bordentown	324 Farnsworth Ave Bordentown, NJ 08505-1709 United States	6	10	5	8
City of Jersey City	Jersey City, NJ 07306 United States	6	30	4	6
City of South Amboy	140 N Broadway South Amboy, NJ 08879-1642 United States	6	41	8	10
City of Ventnor City	6201 Atlantic Ave Ventnor City, NJ 08406-2734 United States	6	41	7	9
Hardyston Township	149 Wheatsworth Rd Hamburg, NJ 07419-2607 United States	6	0	3	4
Hightstown Borough	148 N Main St Hightstown, NJ 08520-3220 United States	6	41	8	10
Montgomery Township	2261 US-206 Belle Mead, NJ 08502-4012 United States	6	50	7	9
Otto Kaufman Community Center	356 Skillman Rd Skillman, NJ 08558-1521 United States	6	41	7	8
Rockaway Township	51 Mount Hope Rd Rockaway, NJ 07866-1634 United States	6	50	8	10
Toms River Township	33 Washington St Toms River, NJ 08753-7642 United States	6	50	4	6
Township of Clark	430 Westfield Ave Clark, NJ 07066-1732 United States	6	41	5	7
Township of Gloucester	1261 Chews Landing Rd Clementon, NJ 08021-2807 United States	6	50	4	6
Township of Monroe	125 Virginia Ave Williamstown, NJ 08094-1756 United States	6	41	4	6

Township of Moorestown	2 Executive Dr, Ste 9A Moorestown, NJ 08057-4216 United States	6	30	5	7
Upper Saddle River Police Department	368 W Saddle River Rd Upper Saddle River, NJ 07458-1621 United States	6	41	3	5
West Amwell Township	150 Rocktown Lambertville Rd Lambertville, NJ 08530-3203 United States	6	40	5	7
Precious Littles Early Childhood Development Center, Inc.	1099 S Orange Ave Newark, NJ 07106-1509 United States	7	20	4	5
Southern New Jersey Perinatal Cooperative	2922 Atlantic Ave, Fl Second Atlantic City, NJ 08401-6306 United States	7	30	4	6
Southern New Jersey Perinatal Cooperative	2600 Mt Ephraim Ave, Ste 401 Camden, NJ 08104-3210 United States	7	30	4	6
Southern New Jersey Perinatal Cooperative	2500 McClellan Blvd, Ste. 250 Merchantville, NJ 08109 United States	7	30	4	6

7.11 Summary of DOE Data Review

Contact: D E Duffy
September 20, 2012

The major focus of this brief review is on data quality with the goal of identifying questionable data records for further follow-up by the State of New Jersey. A couple of high-level summaries are provided at the end to identify schools with the lowest speeds. Quality assessments which identified questionable records are flagged with **FOLLOW UP REQUESTED**.

1. There are 5 records that are exact duplicates across all fields in the NJ DOE data. We omitted duplicate records for the following schools:
    - Buckshutem Road School
    - Shore Regional High School
    - Brick Township High School
    - John P. Holland Charter
    - Environment Community Opportunity

2. There was one geographic coding error due to an incorrect zip code for the Millville Public Charter School at 1101 Wheaton Avenue in Millville, NJ. The zip code was given as 08333. The correct Millville zip code is 08332 (one digit different) and we made this correction.

3. **FOLLOW UP REQUESTED:** There were 7 records where the transtech code was zero. We do not know definitively whether this means that the broadband status is Unknown (that is, there may or may not be broadband at this school) or whether it means that the broadband status is No (that is, it has been confirmed that there is no broadband at this school). For the October 1 submission to the NTIA, we coded these 7 records as Unknown. This decision was made largely due to the fact that there is a regional high school, a

middle school and a charter school on this list, so we find it somewhat unlikely that it would have been confirmed that none of these had broadband capability. The 7 schools are:

- Estell Manor Elementary School in Estell Manor NJ
- Kittatinny Regional High School in Newton NJ
- Monmouth Beach Elementary School in Monmouth Beach NJ
- Renaissance Regional Leadership CS in Vincentown NJ
- Vineland Public Charter School in Vineland NJ
- Collingswood Middle School in Collingswood NJ
- Downe Township Elementary School in Newport NJ

It is worth noting that, of these 7 schools, the first one only – Estell Manor – was coded as having an ISP provider of “Comcast”. The other 6 schools had zero coded for their ISP provider. Note also that these schools were coded with 0 for both the download speed and the upload speed.

4. **<u>FOLLOW UP REQUESTED:</u>** There are 19 records with transtech coded as 90, which is the code for broadband over powerline technology (BPL). This is an unexpected outcome as we don’t have any information about BPL providers operating within the state of New Jersey. These records are further suspect because each one of them is also flagged by the verification and validation script with warnings to indicate that there may be potential speed mismatches between the transtech code and the reported speeds. All 19 of these records are associated with Bergen County; however, not all the town addresses lie within Bergen County. Here are the details on these 19 records:
   - 7 records are located in Lodi, NJ and are identified as Lodi Public Schools. These records appear to include 5 lower schools, 1 middle school, and 1 high school and they all have their provider coded as “other”.
   - 5 records are associated with Bergen County Vocational Technical Schools. Of these, 2 schools are in Hackensack, 2 schools are in Paramus and 1 school is in Teterboro. These 5 records all have their provider coded as “Verizon” and we do not believe Verizon offers BPL-based services.
   - 7 records are identified as Bergen County Special Services. These 7 records are further subdivided as follows:
     - 5 records are in Paramus and identified with schools which address hearing impaired, multiply handicapped, emotionally disturbed, life skills and autistic. These 5 records also have the provider coded as “Verizon”.
     - 1 record is identified as the Norman A Bleshman Regional Day School in Paramus and, again, the provider is coded as “Verizon”.
     - 1 record is identified at the Millburn Regional Day School in Millburn, NJ with the provider coded, again, as “Verizon”. Millburn, NJ is in Essex County so the indication of Bergen County is inaccurate.

5. **<u>FOLLOW UP REQUESTED</u>**: There are 45 records for which the download speed has been coded in a lower tier than the upload speed. Broadband technologies are either symmetric (in which case down speed and up speed are in the same tier) or asymmetric (in which case down speed is at a higher tier than up speed). The NTIA validation and acceptance script does not reject these records; however this issue was brought up at the NTIA webinar on September 19. These 45 records are as follows:

- 16 of these records are identified as Passaic City Public Schools. All 16 of these records have the provider identified as "Cablevision"; the transtech as "50" which is Optical Carrier or Fiber to the End User; the download tier as 9; and the upload tier as 10.
- 7 of these records are identified as the same Bergen County Special Services schools discussed above in the previous item. These records all have the provider identified as "Verizon"; the transtech as 90 which or BP; the upload speed at the highest tier of 11 and download speed at tier 10.
- 6 records are identified as in the Rahway Public School District. All 6 of these records have the provider identified as "Comcast"; the transtech as "50" which is Optical Carrier or Fiber to the End User; the download tier as 8; and the upload tier as 9.
- 4 records are identified as Ridgefield Public Schools. All 4 of these records have the provider identified as "Cablevision"; the transtech as "50" which is Optical Carrier or Fiber to the End User; the download tier as 9; and the upload tier as 10.
- 2 records are associated with the East Greenwich Township Board of Education in Mickleton, NJ. Both of these records have the provider identified as "Comcast"; the transtech as "41" which is Cable Modem – Other; the download tier as 7; and the upload tier as 8.
- 2 records are associated with Collingswood Public Schools in Collingswood NJ. Both of these records have the provider identified as "Comcast"; the transtech as "40" which is Cable Modem – DOCSIS 3.0; the download tier as 6; and the upload tier as 7.
- 2 records are associated with the Long Beach Island Consolidated School District. One of these schools is in Surf City, NJ and one is in Ship Bottom, NJ. Both of these records have the provider identified as "Comcast"; the transtech as "41" which is Cable Modem – Other; the download tier as 5; and the upload tier as 6.
- The 6 remaining records are as follows:
    - Watchung Hills Regional High School; Cablevision; Optical Carrier or Fiber to the End User; download tier 7; upload tier 8.
    - A Jamesburg Public School in Jamesburg, NJ; Comcast; Cable Modem – Other; download tier 4; upload tier 6.
    - Hoboken Dual Language Charter School in Hoboken, NJ; Cablevision; Cable Modem – Other; download tier 5; upload tier 6.
    - The Ethical Community Charter School in Jersey City, NJ; Verizon; Cable Modem – Other; download tier 6; upload tier 8.
    - Charter Tech High School for the Performing Arts in Somers Point, NJ; Comcast; Cable Modem – DOCSIS 3.0; download tier 7; upload tier 8.
    - Soaring Heights School in Jersey City, NJ; Comcast; Cable Modem – DOCSIS 3.0; download tier 7; upload tier 8.

It is worth noting that for the October, 2012, submission we are using the following methodology for any CAI record with upload speed higher than download speed: We are replacing the upload speed tier with the download speed tier. This is documented in our methodology report.

6. There are a number of more sophisticated validation and verification checks that we can perform based upon combinations of provider, transtech, downspeed and upspeed.
    - First we note that the data do not include any records with the following four possible transtech codes: "60" for Satellite; "70" for Terrestrial Fixed – Unlicensed; "71" for Terrestrial Fixed –

Licensed; or “80” for Terrestrial Mobile Wireless”. Further, the case of transtech coded as “90” for BPL is covered in item 4 above.

- The remaining data includes only these transtech codes: “10” for Asymmetric xDSL; “20” for Symmetric xDSL; “30” for Other Copper Wire; “40” for Cable Modem -- DOCSIS 3.0, “41” for Cable Modem – Other; and “50” for Optical Carrier / Fiber to the End User.
- AT&T is not a cable provider. Hence, we would not expect records where the service provider is “AT&T” and the transtech is “40” for Cable Modem -- DOCSIS 3.0, or “41” for Cable Modem – Other. We have confirmed that there are no such records.
- **FOLLOW UP REQUESTED:** Cablevision and Comcast are both cable providers. Hence, we would not expect records with the service provider as “Cablevision” or “Comcast” and a transtech of “10” for Asymmetric xDSL; “20” for Symmetric xDSL; or“30” for Other Copper Wire. We identified 4 suspect records as follows:
    - Great Oaks Charter School in Newark, NJ, has Cablevision and transtech 10.
    - South Harrison Township Elementary School in Harrisonville, NJ, has Comcast and transtech 10.
    - Sterling High School in Somerdale, NJ, has Comcast and transtech 30.
    - The International Charter School of Trenton has Comcast and transtech 30.
- Service Electric Cable, Service Electric Television and Time-Warner Cable are all cable providers. As such, we would not expect records with any of these three providers and a transtech of “10” for Asymmetric xDSL; “20” for Symmetric xDSL; or“30” for Other Copper Wire. We have confirmed that there are no such records within the data.
- **FOLLOW UP REQUESTED**: Verizon is not a cable provider. Hence, we would not expect records where the service provider is “Verizon” and the transtech is “40” for Cable Modem -- DOCSIS 3.0, or “41” for Cable Modem – Other. There are 3 unexpected records:
    - Robert L Craig School in Moonachie, NJ has Verizon and transtech 41.
    - Elysian Charter School in Hoboken, NJ has Verizon and transtech 41.
    - Ethical Community Charter School in Jersey City, NJ has Verizon and transtech 41.
- **FOLLOW UP REQUESTED**: Transtech 20 is Symmetric xDSL. Since this is an explicitly symmetric technology, one would expect all records with a transtech of 20 to have the same tier for down and up speeds. There are 7 unexpected records:
    - There are 5 records associated with Rutherford Public Schools in Rutherford, NJ which have a transtech of 20, a downspeed of 8 and an upspeed of 7. All of these records have the service provider coded as “Other.”
    - Weymouth Township Elementary School in Dorothy, NJ has a transtech of 20, a downspeed of 4 and an upspeed of 3. The service provider is coded as “Verizon”.
    - Unity Charter School in Morristown, NJ, has a transtech of 20, a downspeed of 4 and an upspeed of 3. The service provider is coded as “Verizon”.
- It is worth noting that we have not, at this time, analyzed the data to check that records with transtech of 10 for Asymmetric xDSL have different speed tiers for downspeed and upspeed. The reason for this is the following – While it is true that transtech 10 is an explicitly asymmetric technology, speeds are coded not as actual speed values but as tiers. Speed tier 4, for example, denotes a speed that is greater than 1.5 Mbps and less than 3 Mbps. It is possible, at least in theory, to have asymmetric speeds both of which fall within this range.

7. As part of our data processing work for the NTIA deliverable, we use reference data sources and matching techniques to identify the NCES (National Center for Educational Statistics) codes for schools. There were 17 schools in the DOE data for which we did not identify an NCES code. Details are below and, as you can see, all 17 are non-traditional schools of various types.
    - 16 of the 17 schools were identified as an adult, evening, continuing education, or alternative high school, vocation technical school or learning center.
    - 1 school is the MCVS Health Careers Center in Hamilton, NJ in Mercer County.

8. Summary of download speeds
    - 93% of schools (~2250) have reported download speeds of at least 10 Mbps (tier 7 or higher).
    - 78% of schools (~1890) have download speeds of at least 25 Mbps (tier 8 or higher).
    - 59% of schools (~1425) have download speeds of at least 50 Mbps (tier 9 or higher).

9. There is no immediately obvious geographic pattern to the schools which reported the very lowest download speeds. The 8 schools with the lowest reported download speeds (tier 2 or tier 3 and less than 1.5 Mbps) are located as follows:
    - One in River Edge, Bergen County
    - Two in Berlin Township, Camden County
    - One in Greenwich, Cumberland County
    - One in Mine Hill, Morris County
    - Two in Sussex County – One in Sandytown-Walpack and one in Walkill Valley

10. There are about 30 schools with download speeds of 1.5 and 3 Mbps (tier 4). They are distributed among New Jersey counties as follows:
    - 6 in Bergen
    - 4 in Passaic
    - 4 in Sussex
    - 3 in Atlantic
    - 3 in Somerset
    - 3 in Union
    - 2 in Camden
    - 2 in Mercer
    - 1 in Burlington
    - 1 in Essex
    - 1 in Hudson
    - 1 in Middlesex
    - 1 in Morris

8 Appendix C: Third-Party Comparisons

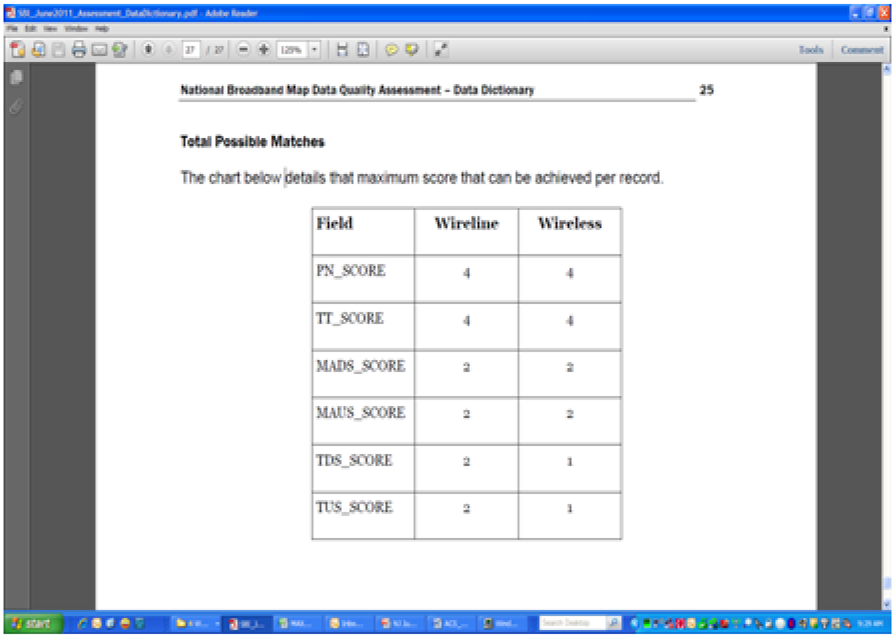
8.1 Analysis of Discrepancies between June 2011 Submission and Third-Party Data

NJ June 2011 Assessment Summary

- Based on government provided assessment that used data from third party sources for comparison
  - Appears that there were 4 sources, not all provided all the data
  - Data dictionary indicates max possible comparisons for each field (slide 3)
  - Note that even within these, the number of available data sources were lower for some records
- Database overview:
  - New fields appended to submitted datasets (BB_Service_Address, BB_Service_CensusBlock, BB_Service_RoadSegment)
    - PN_SCORE (provider name comparison score)
    - TT_SCORE (transtech comparison score)
    - MADS_SCORE (Max adv upstream tier comparison score)
    - MAUS_SCORE (Max adv downstream tier comparison score)
    - TDS_SCORE (Typical upstream tier comparison score)
    - TUS_SCORE (Typical downstream tier comparison score)
  - Score field values
    - 0 – no match
    - 1 to 4 – number of matches
    - ? – un-scored record (no analytics)
  - Comparison data is not provided – only resulting match or no match
  - When PN_M_COUNT=0, TT_T_COUNT, MADS_T_COUNT, MAUS_T_COUNT are set to 0

Notes on Comparison Data

- Summary tables of unmatched records in NJ_June2011_Summary.pdf cover both wireline and wireless
- Wireless_by_Block table gives the wireless data by census block (2010 Census blocks)
- Wireless results include the number of comparison datapoints available for each element
  - *_M_COUNT: number of matches in our data, e.g. TT_M_COUNT
  - *_T_COUNT: number of possible matches, i.e. number of comparisons that were made for each field, upper bound of achievable score for each record, e.g. TT_T_COUNT
- Issues with comparison analysis results
  1. Wireline data does not include number of available comparison values, i.e. upper bound on achievable score for each record
  2. With wireless, where upper bound is provided, how to interpret results where we achieved a score > 0 but less than the bound – appears that reference datasets were not aligned
  3. Database only provides number of mismatches - No way of telling which providers overstated their speed vs understated


National Broadband Map Data Quality Assessment – Data Dictionary 25

Total Possible Matches

The chart below details that maximum score that can be achieved per record.

Field	Wireline	Wireless
PN_SCORE	4	4
TT_SCORE	4	4
MADS_SCORE	2	2
MAUS_SCORE	2	2
TDS_SCORE	2	1
TUS_SCORE	2	1

BB_Service_CensusBlock Comparison Summary

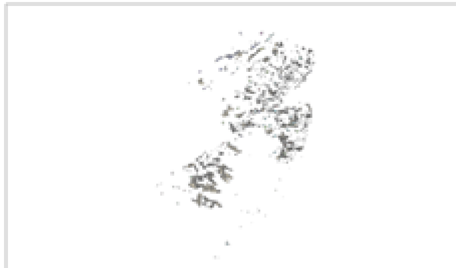
Total records - 525296

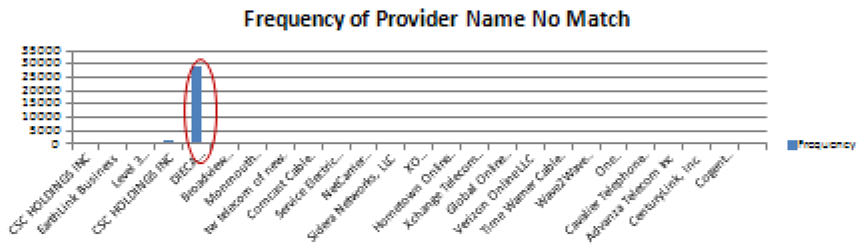
Field	Score=4	Score=0	Score < 4	Score =7
Provider Name	4142	32645	521152	2
Trans Tech	3797	94854	521497	2
Max Adv Down	0 [1]	317278	525294	2
Max Adv Up	0[1]	248281	525294	2
Typical Down				
Typical Up				

[1] Score of 4 is not possible for this element

Provider Name No Match

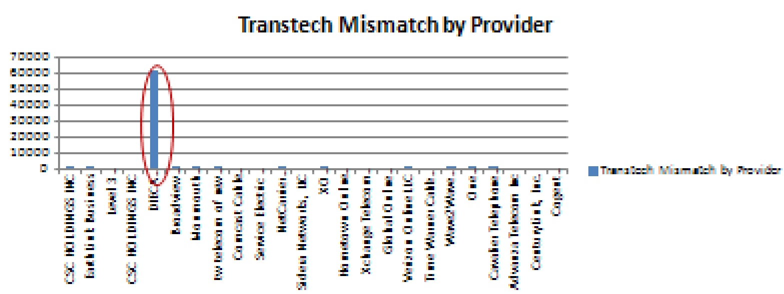
PN_SCORE=0
BB_Service_CensusBlock



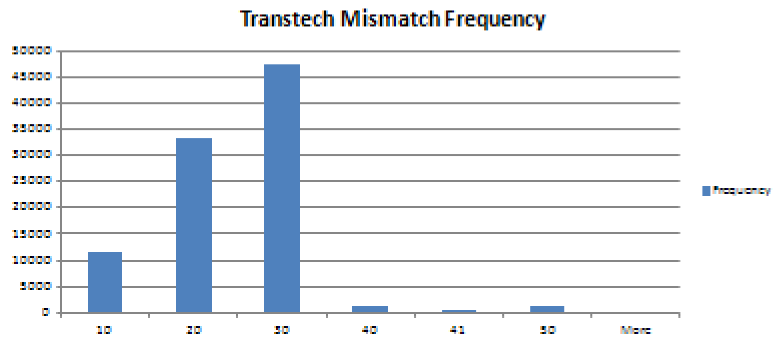


Transtech No Match

- Analyzed db BB_Service_CensusBlock
- Transtech mismatches are counted only for the cases where provider name matched
- TT_SCORE=0 when PN_SCORE>0
- Again DIECA has the most mismatches



Transtech Mismatch by TT Type

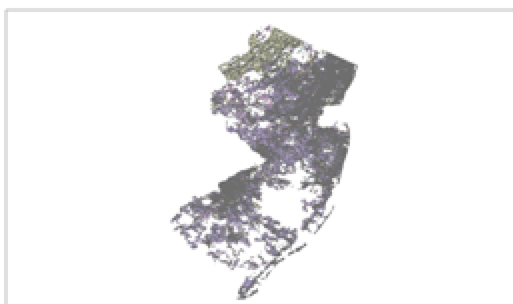


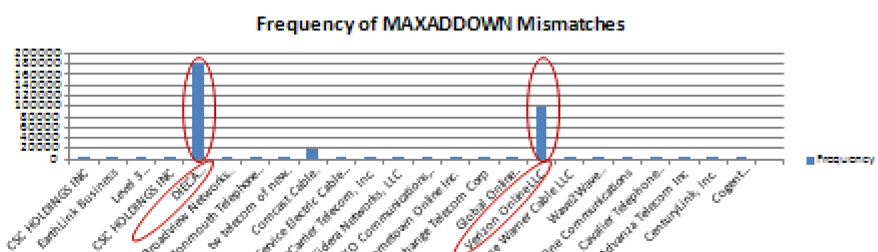
TT_SCORE=0
BB_Service_CensusBlock

Transtech Code	Meaning
10	ADSL
20	SDSL
30	Other Copper
40	Cable Model DOCSIS 3.0
41	Cable Model - Other
50	Optical Fibre

Max Adv Down Mismatch

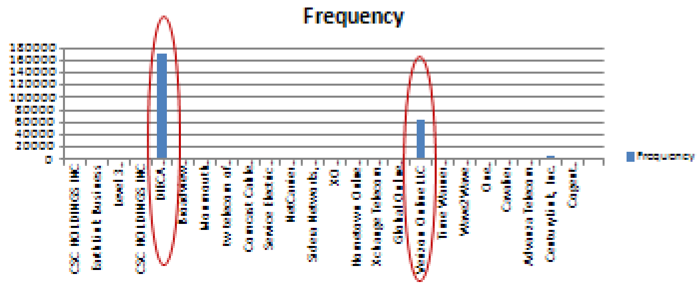
MADS_SCORE=0
BB_Service_CensusBlock





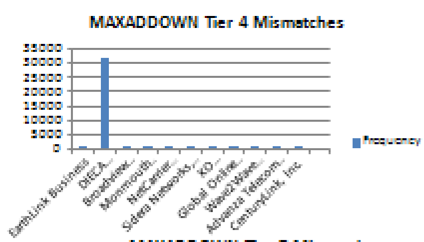
Max Adv Up Mismatch

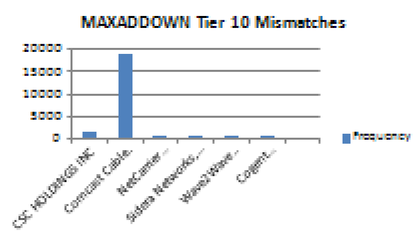
MAUS_SCORE=0
BB_Service_CensusBlock

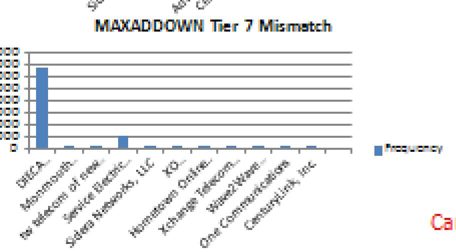


MAXADDOWN Non-Green Tiers

- Assessment summary report showed that Tiers 4, 7 and 10 had the most mismatches of concern (NJ reported tier > comparison data, yellow, orange or red)





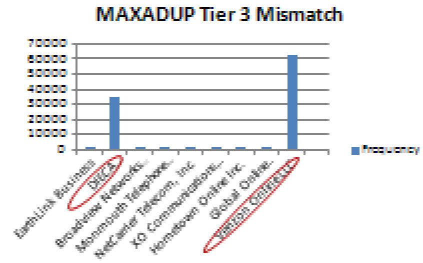


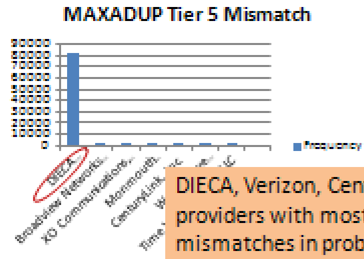
DIECA, Service Electric, Comcast Cable - providers with most mismatches in problem tiers

Cannot separate colors (incl green) within Tier

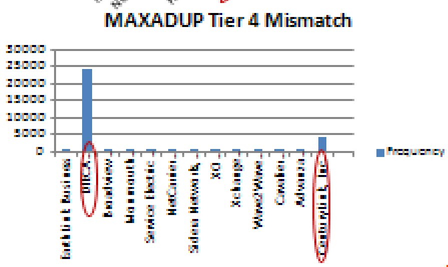
MAXADUP Non-Green Tiers

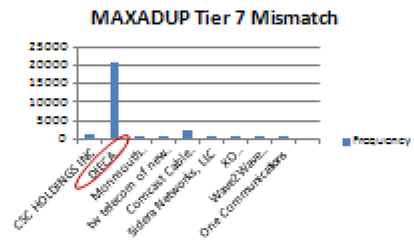
- Assessment summary report showed that Tiers 3, 4, 5 and 7 had the most mismatches of concern (NJ reported tier > comparison data, yellow, orange or red)





DIECA, Verizon, Centurylink - providers with most mismatches in problem tiers





Cannot separate colors (incl green) within Tier

Wireline Stats for Some Providers

BB_Service_CensusBlock analysis
TT_SCORE column values are after eliminating PN_SCORE=0
MADS_SCORE and MAUS_SCORE after eliminating TT_SCORE=0

Provider	Total Records	PN_SCORE=0	TT_SCORE=0	MADS_SCORE=0	MAUS_SCORE=0
Comcast	62834	0	34	19002	2241
CSC Holdings	60904	1332	759	0	0
DIECA	219164	29275	60992	93674	79684
Verizon Online	159874	18	336	100069	62493

Wireless Statistics

Element	Total Records	M_COUNT < T_COUNT	M_COUNT=0
PN	1596895	461022	446887
TT	1596895	78625	19
MADS	1596895	676290	669260
MAUS	1596895	338917	338917

Wireless Statistics by Provider

	Total Records	PN_M_COUNT=0	TT_M_COUNT=0	MADS_M_COUNT *	MAUS_M_COUNT *
Hughes	169588	126880	0	10215	754
AT&T	167813	0	0	167813	48
Leap Wireless	52217	19	0	493	493
Cellco (Verizon)	254289	0	19	171008	171008
Clearwire	65567	3	0	65564	0
Global Online Electronic Services	1	1	0	0	0
Sprint Nextel	173048	0	0	107521	107521
StarBand	169588	169191	0	124	0
T Mobile	375091	1057	0	232137	144708
Wave2Wave	105	12	0	52	52
WildBlue	169588	149724	0	0	0

* After eliminating records with provider name mismatches

Hughes

- All PN_M_COUNT=0 records were associated with PN_T_COUNT=1
  - Only one data source was available for comparison in the affected census blocks

Wireless Statistics

	MADS Speed Tier	MAUS Speed Tier
Hughes	4	2
AT&T	4	3
Cellco (Verizon)	6 5	5 4
Clearwire	5	3
Sprint Nextel	3	2
T Mobile	7 6 4	4 4 2

Transtech Mismatch Count

Wireless & Satellite

Transtech=80 TT_M_COUNT < TT_T_COUNT	Transtech=70 TT_M_COUNT < TT_T_COUNT	Transtech=60 TT_M_COUNT < TT_T_COUNT	Transtech=50 TT_SCORE < PN_SCORE	Transtech=30 TT_SCORE < PN_SCORE	Transtech=20 TT_SCORE < PN_SCORE	Transtech=10 TT_SCORE < PN_SCORE
Terrestrial Mobile Wireless	Terrestrial Fixed Wireless - Unlicensed	Satellite	Fibre	Other Copper	SDSL	ADSL
78625	0	0	12012	29311	27881	12737
78625	0	0	14585	29550	27882	12749

- Numbers in second row in table are obtained from querying GDB (wireless and wireline) for each Transtech code
- Numbers in the bottom row are from NTIA's table "Un-matched Technology Of Transmission Records"
- Wireless numbers match what's in NTIA's table exactly
- Wireline numbers are off by varying degrees, most are close except Transtech=50
- Note: Transtech table counts all mismatches, for all the comparison datasets, not enough to have one match
  - Wireless database provides the target count and so is easy to get
  - For wireline ended up using PN_SCORE as indirect measure of target set for each record – possible cause of deviation

Verizon Wireless Transtech Comparison

- All transtech mismatches in wireless are only in Transtech=80 (Wireless mobile)
  - total 78625 records
- All are for Cellco Partnership (Verizon)
- Our data has it as Transtech =80, their comparison data has them spread across Transtech=10, 20, 30 and 50! (all wireline transtech codes)
- All of these are records where provider name had no mismatch
- Issue: If provider name matched to Cellco Partnership (uniquely wireless provider) how could the reference transtech codes be in the wireline space?

8.2 Analysis of Discrepancies between December 2011 Submission and Third-Party Data

What's New?

To improve the usefulness of the Awardee file geodatabase, the following changes have been made to the format that was presented in the June 2011 SBI version of the Awardee file geodatabase.

1. The file geodatabase contains data current as of December 31, 2011.
2. Scores for BB_Service_RoadSegment are now shown at the Census Block level. This will provide the Awardee with a better understanding of the scoring for road segments that traverse multiple Census Blocks.
   a. The census block level scoring is contained in a new table named RoadSeg-ment_by_Block.
   b. The RoadSegment_by_Block table can be queried similar to the Wireless_by_Block table as described in the *How to Query Road Segment and Wireless Records* section of this document.
   c. The following fields have been dropped from BB_Service_RoadSegment
      i. PN_SCORE
      ii. TT_SCORE
      iii. MADS_SCORE
      iv. MAUS_SCORE
      v. TDS_SCORE
      vi. TUS_SCORE
3. The following field names in the Wireless_by_block and RoadSegment_by_Block tables have been added or updated to better reflect the original SBI field names
   a. PROVNAME (updated)
   b. DBANAME (added)
   c. FRN (added)
   d. TRANSTECH (updated)
   e. MAXADDOWN (added)
   f. MAXADUP (added)
   g. TYPICDOWN (added)
   h. TYPICUP (added)

Dec 2011 Umatched MADS

============Un-matched Maximum Advertised Downstream Records============

	Comparison Speed Tier																					
	Tier 1		Tier 2		Tier 3		Tier 4		Tier 5		Tier 6		Tier 7		Tier 8		Tier 9		Tier 10		Tier 11	
SBI Speed Tier	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Tier 1		0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Tier 2	0	0.0%		0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Tier 3	0	0.0%	0	0.0%		0.0%	75,311	8.1%	33,932	3.7%	103,559	11.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Tier 4	0	0.0%	0	0.0%	5,317	0.6%		0.0%	11,402	1.2%	50,296	5.4%	94,692	10.2%	20	0.0%	0	0.0%	13	0.0%	0	0.0%
Tier 5	0	0.0%	0	0.0%	5,100	0.6%	29,080	3.1%		0.0%	94,876	10.2%	55,281	6.0%	11	0.0%	0	0.0%	1	0.0%	0	0.0%
Tier 6	0	0.0%	0	0.0%	387	0.0%	6,622	0.7%	7,025	0.8%		0.0%	106,932	11.5%	2	0.0%	0	0.0%	0	0.0%	0	0.0%
Tier 7	0	0.0%	0	0.0%	2,043	0.2%	13,731	1.5%	7,994	0.9%	96,983	10.5%		0.0%	231	0.0%	0	0.0%	5	0.0%	0	0.0%
Tier 8	0	0.0%	0	0.0%	532	0.1%	819	0.1%	234	0.0%	0	0.0%	250	0.0%		0.0%	0	0.0%	7	0.0%	0	0.0%
Tier 9	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	282	0.0%	0	0.0%		0.0%	65,388	7.1%	0	0.0%
Tier 10	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	44	0.0%	57,173	6.2%	0	0.0%		0.0%	0	0.0%
Tier 11	0	0.0%	0	0.0%	0	0.0%	0	0.0%	10	0.0%	0	0.0%	288	0.0%	347	0.0%	0	0.0%	0	0.0%		0.0%

- 926133 mismatches (mismatch for each source is counted separately)
- Only ~25% of these are non-green (15% yellow, 8% orange and 2% red)
- Tiers 5, 7 and 10 have most non-green mismatches
- Biggest differences from June 2011 are in the green cells

Dec 2011 Umatched MAUS

======Un-matched Maximum Advertised Upstream Records======

	Comparison Speed Tier																					
	Tier 1		Tier 2		Tier 3		Tier 4		Tier 5		Tier 6		Tier 7		Tier 8		Tier 9		Tier 10		Tier 11	
SBI Speed Tier	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Tier 1		0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Tier 2	0	0.0%		0.0%	136,890	24.3%	126,851	22.5%	103,378	18.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Tier 3	0	0.0%	15,596	2.8%		0.0%	268	0.0%	68	0.0%	10	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Tier 4	0	0.0%	797	0.1%	15,521	2.8%		0.0%	494	0.1%	34	0.0%	29	0.0%	28	0.0%	0	0.0%	13	0.0%	0	0.0%
Tier 5	0	0.0%	0	0.0%	5,106	0.9%	24,316	4.3%		0.0%	10	0.0%	5	0.0%	11	0.0%	0	0.0%	1	0.0%	0	0.0%
Tier 6	0	0.0%	0	0.0%	387	0.1%	101	0.0%	16	0.0%		0.0%	0	0.0%	2	0.0%	0	0.0%	0	0.0%	0	0.0%
Tier 7	0	0.0%	0	0.0%	2,043	0.4%	8,791	1.6%	12,998	2.3%	405	0.1%		0.0%	104,348	18.5%	0	0.0%	3,433	0.6%	0	0.0%
Tier 8	0	0.0%	0	0.0%	532	0.1%	819	0.1%	234	0.0%	0	0.0%	0	0.0%		0.0%	0	0.0%	7	0.0%	0	0.0%
Tier 9	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%		0.0%	13	0.0%	0	0.0%
Tier 10	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%		0.0%	0	0.0%
Tier 11	0	0.0%	0	0.0%	0	0.0%	0	0.0%	10	0.0%	0	0.0%	200	0.0%	347	0.1%	0	0.0%	0	0.0%		0.0%

- 546112 mismatches total (mismatch for each source is counted separately)
- Only 15.6% are non-green (9.9% yellow, 3.4% orange and 2.4% red)
- Tiers 3, 4, 5 and 7 have the most non-green mismatches

Dec 2011 Transtech Mismatches

======Un-matched Technology of Transmission Records======

	Comparison TRANSTECH																					
	10		20		30		40		41		50		60		70		71		80		90	
SBI TRANS TECH	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
10	0	0.0%	1,353	0.9%	9,652	6.1%	58	0.0%	0	0.0%	4,777	3.0%	0	0.0%	0	0.0%	0	0.0%	5,709	3.6%	0	0.0%
20	22,287	14.1%	0	0.0%	7,589	4.8%	4	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
30	26,511	16.8%	4,950	3.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
40	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	407	0.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
41	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
50	10,249	6.5%	0	0.0%	2,924	1.9%	1,873	1.2%	520	0.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	3,962	2.5%	0	0.0%
60	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
70	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
71	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
80	26,346	16.7%	0	0.0%	13,994	8.9%	0	0.0%	0	0.0%	14,866	9.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
90	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

- 158027 mismatches total (includes wireline and wireless)
- All mismatches are in transtech codes 20, 30, 50 and 80
- Queries on the GDB indicate that these results are obtained by the query ‘TT_M_COUNT < TT_T_COUNT and PN_M_COUNT>0’
  - Wireless records have insignificant number of TT mismatches where TT_M_COUNT=0

Overview of Mismatches in Wireline Records

Dec 2011 Data - Total Records in Wireline Census Block gdb: 528401

Field	Score=4	Score=2	Score=0	Score < 4	Score < 2	Score =7
Provider Name	4120		43078	524279		2 (Netlogic)
Trans Tech	3507		68062	481814		2
Max Adv Down		64990	313906		463409	2
Max Adv Up		139643	271564		388756	2

June 2011 Data - Total records: 525296

Field	Score=4	Score=0	Score < 4	Score =7
Provider Name	4142	32645	521152	2
Trans Tech	3797	94854	521497	2
Max Adv Down	0 [1]	317278	525294	2
Max Adv Up	0[1]	248281	525294	2

Mismatches have changed slightly since the previous assessment

PN_SCORE = 0

Provider Name	Frequency
CSC HOLDINGS INC	18
EarthLink Business	523
Level 3 Communications, LLC	138
CSC HOLDINGS INC	965
DIECA Communications, Inc.	39857
Monmouth Telephone & Telegraph	109
tw telecom of new jersey	2
Comcast Cable Communications, LLC	55
Service Electric Cable TV of NJ Inc.	468
NetCarrier Telecom, Inc.	88
XO Communications, LLC	400
Hometown Online Inc.	6
Xchange Telecom Corp	358
Global Online Electronic Services, Inc.	4
Verizon Online LLC	291
Advance Telecom Inc	12

TT_SCORE = 0 /PN_SCORE ≠ 0

Provider	Frequency
CSC HOLDINGS INC	224
Level 3 Communications, LLC	26
CSC HOLDINGS INC	92
DIECA Communications, Inc.	66403
Monmouth Telephone & Telegraph	9
tw telecom of new jersey	1
NetCarrier Telecom, Inc.	10
XO Communications, LLC	23
Hometown Online Inc.	4
Xchange Telecom Corp	44
Verizon Online LLC	1206
Advanza Telecom Inc	20

TT	Frequency
10	6181
20	29810
30	31280
40	92
50	699

Transtech Code	Meaning
10	ADSL
20	SDSL
30	Other Copper
40	Cable Modem DOCSIS 3.0
41	Cable Modem - Other
50	Optical Fibre

Not much of a difference from June 2011

MADS_SCORE=0/TT_SCORE ≠ 0

Provider	Frequency
CSC HOLDINGS INC	417
CSC HOLDINGS INC	5
DIECA Communications, Inc.	85590
Monmouth Telephone & Telegraph	242
tw telecom of new jersey	16
Comcast Cable Communications, LLC	19290
Service Electric Cable TV of NJ Inc.	166
NetCarrier Telecom, Inc.	30
XO Communications, LLC	225
Hometown Online Inc.	281
Xchange Telecom Corp	346
Verizon Online LLC	96113
Time Warner Cable LLC	7
CenturyLink, Inc.	38

Max Adv Down	Frequency
3	1236
4	19770
5	84731
6	29160
7	27664
8	1758
9	18734
10	19295
11	418

MAUS_SCORE=0/TT_SCORE ≠ 0

Provider	Frequency
CSC HOLDINGS INC	417
CSC HOLDINGS INC	5
DIECA Communications, Inc.	71894
Monmouth Telephone & Telegraph	242
tw telecom of new jersey	16
Comcast Cable Communications, LLC	2783
Service Electric Cable TV of NJ Inc.	166
NetCarrier Telecom, Inc.	11
XO Communications, LLC	225
Hometown Online Inc.	54
Xchange Telecom Corp	309
Verizon Online LLC	77366
Time Warner Cable LLC	7
CenturyLink, Inc.	6929

Max Adv Up Tier	Frequency
2	20015
3	19362
4	10941
5	29196
6	506
7	78381
8	1592
9	13
11	418

Wireline Stats by Provider

TT_SCORE values are after eliminating PN_SCORE=0
MADS_SCORE and MAUS_SCORE after eliminating TT_SCORE=0

Dec 2011 Assessment

Provider	Total Records	PN_SCORE=0	TT_SCORE=0	MADS_SCORE=0	MAUS_SCORE=0
Comcast	66069	35	0	19290	2783
CSC Holdings	62501	983	316	422	422
DIECA	219164	39857	66403	85590	71894
Verizon Online	160123	291	1206	96113	77366

June 2011 Assessment

Provider	Total Records	PN_SCORE=0	TT_SCORE=0	MADS_SCORE=0	MAUS_SCORE=0
Comcast	62834	0	34	19002	2241
CSC Holdings	60904	1332	759	0	0
DIECA	219164	29275	60992	93674	79684
Verizon Online	159874	18	336	100069	62493

Dieca Focused Analysis - 1

Provider Name (Mis)Matches

Total Records	PN_SCORE>2	PN_SCORE=2	PN_SCORE=1	PN_SCORE=0
219314	0	68	179389	39857

Transtech (Mis)Matches

Total Records	TT_SCORE>2	TT_SCORE=2	TT_SCORE=1	TT_SCORE=0
219314	0	45	113009	66403

Transtech Mismatch Distribution

Transtech	# records	TT_SCORE=0
10	66260	5366
20	54920	29786
30	98134	31251

Dieca has very few records that match more than one source

Dieca Focused Analysis - 2

MADS Tier	# Records	# Mismatch
3	10387	1085
4	36914	6258
5	101557	35949
6	24517	13760
7	43216	26958
8	2723	1580

MAUS Tier	# Records	# Mismatch
2	23477	6733
3	51513	15777
4	24746	3473
5	87900	28965
6	1315	499
7	27640	14867
8	2723	1580

Verizon Focused Analysis - 1

Provider Name (Mis)Matches

Total Records	PN_SCORE=4	PN_SCORE=3	PN_SCORE=2	PN_SCORE=1	PN_SCORE=0
160123	2964	104545	45293	7030	291

Transtech (Mis)Matches

Total Records	TT_SCORE=4	TT_SCORE=3	TT_SCORE=2	TT_SCORE=1	TT_SCORE=0
160123	2351	83343	58176	14756	1206

Transtech Mismatch Distribution

Transtech	# records	TT_SCORE=0
10	98818	767
50	61305	439

Verizon Focused Analysis - 2

MADS Tier	# Records	# Mismatch	Transtech Code
4	13469	13282	All are 10
5	63580	48723	All are 10
6	21769	15393	All are 10
9	61305	18714	All are 50

MAUS Tier	# Records	# Mismatch	Transtech Code
2	13469	13282	All are 10
3	85349	3453	All are 10
7	61305	60631	All are 50

High percentage of Verizon records have speed mismatches

Comcast Focused Analysis - 1

Provider Name (Mis)Matches

Total Records	PN_SCORE=4	PN_SCORE=3	PN_SCORE=2	PN_SCORE=1	PN_SCORE=0
66069	1057	38963	24106	1908	35

Transtech (Mis)Matches

Total Records	TT_SCORE=4	TT_SCORE=3	TT_SCORE=2	TT_SCORE=1	TT_SCORE=0
66069	1057	38963	24106	1908	0

Comcast Focused Analysis - 2

MADS Tier	# Records	# Mismatch	Transtech Code
10	66069	19290	All are 40

MAUS Tier	# Records	# Mismatch	Transtech Code
7	66069	2783	All are 40

Comcast has only one MADS tier of 10 and one MAUS tier of 7 in our data

Wireless Statistics

Dec 2011 Assessment

Element	Total Records	M_COUNT < T_COUNT	M_COUNT=0
PN	1618164	472647	472647
TT	1618164	55206	10
MADS	1618164	583402	583402 (702494)
MAUS	1618164	339424	339424 (458516)

June 2011 Assessment

Element	Total Records	M_COUNT < T_COUNT	M_COUNT=0
PN	1596895	461022	446887
TT	1596895	78625	19
MADS	1596895	676290	669260
MAUS	1596895	338917	338917

Wireless Provider Name Mismatches by Provider

Provider	Total Records	PN_M_COUNT=0
Leap Wireless International, Inc.	52359	630
Cellco Partnership	256988	8
StarBand Communications Inc.	169588	169237
T-Mobile USA, Inc.	384706	1204
WildBlue Communications, Inc.	169588	153749
Jersey Shore Wireless	5702	3352
Hughes Network Systems, LLC	168588	144465
Clearwire Corporation	66463	2

All 3 with poor PN matching are satellite providers, Transtech = 60

Wireless – MADS and MAUS Mismatches

Provider	Total Records	MADS_M_COUNT=0	MAUS_M_COUNT=0
Cellco Partnership	256988	191450	103378
Sprint Nextel Corporation	174583	108140	108140
StarBand Communications Inc.	169588	124	0
T-Mobile USA, Inc.	384706	210657	127574
Global Online Electronic Services, Inc.	1	1	1
Hughes Network Systems, LLC	168588	6569	331
Clearwire Corporation	66463	66461	0

- Cellco (Verizon), Sprint Nextel and T-Mobile have the most mismatches
- Cellco, T-Mobile, AT&T and others have a large number of records where MADS_T_COUNT =0 or MAUS_T_COUNT=0 (not included in the table)
- Numbers in the table are a result of the query MADS_M_COUNT = 0 and MADS_M_COUNT<MADS_T_COUNT and TT_M_COUNT>0

Cellco Partnership (Verizon) Analysis

MADS Speed Tier	# Records	# Mismatches	Transtech Code
3	168903	103378	All are 80
7	88085	88072	All are 80

MAUS Speed Tier	# Records	# Mismatches	Transtech Code
2	168903	103378	All are 80
5	88085	0	All are 80

Sprint Nextel Analysis

MADS Speed Tier	# Records	# Mismatches	Transtech Code
3	108160	108140	All are 80
5	66423	0	All are 80

MAUS Speed Tier	# Records	# Mismatches	Transtech Code
2	108160	108140	All are 80
3	66423	0	All are 80

- Sprint has significant mismatches, but only in the lowest tier
- Sprint is not overstating speeds

T-Mobile Analysis

MADS Speed Tier	# Records	# Mismatches	Transtech Code
4	154225	126851	All are 80
6	132784	78587	All are 80
7	97697	5219	All are 80

MAUS Speed Tier	# Records	# Mismatches	Transtech Code
2	154225	126851	All are 80
4	230481	723	All are 80

8.3 Questions to Resolve Discrepancies with FCC

The six questions below (in italics) were reviewed on August 21, 2012 in a teleconference call involving ACS, NJ OIT, FCC and Michael Baker personnel. FCC responses are provided for each question.

1. *By far, the bulk of mismatches in the wireline data were from a single provider - Dieca Communications DBA Covad Communications - and in all the comparison fields. Deica/Covad has merged with Megapath and has subsequently explained to us that they provide facilities-based services which are then branded and sold by others. We would be interested in any information NTIA can provide on what FRN or names are being compared against Deica's data.*

   Provider names and FRNs are compared to Form 477 data to perform location matches. Mismatches often result from errors in the Form 477 data. Moreover, mismatches aren't often valid for MVN data.

2. *All transtech code mismatches in the wireless data were found to be associated with the provider called "Cellco Partnership" with DBA name of Verizon Wireless. NJ's submitted data has the transtech code of 80 that corresponds to "Wireless Mobile". From the Transtech mismatch table in the summary report, it appears that this data was being compared against records with transtech codes spanning across values in the wireline space. Can you confirm or correct our understanding, and, if this is a case of comparing wireless data against wired records, please advise as to how to correct?*

   With the Form 477 data, sometimes different services are grouped under the same FRN, e.g., data for DSL and "other copper" may be confounded. The problem is likely in the third-party data, so we can ignore these discrepancies.

3. *The bulk of provider name mismatches in wireless data came from satellite providers - Hughes, WildBlue and Starband. In addition, about 87% of the satellite provider records (445795 out of 508674) had provider name mismatches.Additional information on what they were compared against is needed to better understand the reason for this.*

   This problem likely has the same explanation as 1 above.

Finally, ACS would like to get clarification on the following aspects in order to help us in our analysis and interpretation:

4. *The wireless data include the number of sources that were available for comparison for each record and each compared element (T_COUNT).This helps in determining the true number of mismatches. However, the wireline data do not include such information and just include the score, without any indication of how many comparison sources were used. So, it is not clear if a score of 1 indicates a full match to a single available data source or only a match to a subset of sources.*

   NTIA will look into this issue for the Oct. 20012 submission.

5. *In the case of wireless, how should we interpret cases where M_COUNT 0 (indicating at least one match) but the M_COUNT < T_COUNT? This implies that the comparison sources were not in agreement.*

   This probably isn't a problem with the data submission. This happens more often in the wireless domain. One of the third party data sources used for wireless comparisons is FCC speed tests, which often have fewer records and the census block coverage is uneven.

6. *The summary results indicate by color code (grades from green to red) the amount by which the submitted data overstated the speed tier in comparison with the third party sources. However, it is not clear how to correlate this to specific providers because the geodatabase only indicates that a mismatch exists but does not indicate the comparison values of the speed tiers. Can you provide provider-specific color-coded data?*

   This problem is recognized and is already in the "NTIA court," i.e., is under consideration.

New Mexico State Broadband Initiative

Mapping Methodology: October 1, 2012

Prepared for:
Department of Information Technology
715 Alta Vista Street
Santa Fe, NM 87502
Program Manager: Gar Clarke
Contact: george.clarke@state.nm.us

Prepared by:
Earth Data Analysis Center
The University of New Mexico
MSC01 1110
1 University of New Mexico
Albuquerque, NM 87131-0001
Technical Lead: Shirley Baros
Contact: sbaros@edac.unm.edu

New Mexico State Broadband Initiative
Mapping Methodology: October 1, 2012

Table of Contents

New Mexico State Broadband Initiative
Mapping Methodology: October 1, 2012

Introduction

The State of New Mexico (hereafter, NM or State), through its agents Earth Data Analysis Center (EDAC [Mapping Team]) at The University of New Mexico and NM Department of Information Technology (DoIT), submitted the October 1, 2012 New Mexico Broadband (NMBB) Program data package, in compliance with the National Telecommunications and Information Administration (NTIA) State Broadband Initiative Program (SBI).

Data Submittal Description

The NMBB October 1, 2012 data submission includes:

- NMBB _DeliverableMemo_2012_10_01.pdf: This document describes NMBB data submittal components, state-restricted data fields, and contact information.
- NM_SBDD_2012_10_01.gdb: The NMBB geodatabase was created to NTIA standards and includes FGDC-compliant metadata for the database layers.
- NM_DataPackage_2012_06_30.xlsx: The FCC-prepared data-package spreadsheet consists of three worksheets for overview and checklist, record count, and provider table.
- NM_2012_10_01.txt: The data receipt file generated from running the Check Submission Tool, lists pass/fail for received data-submission layer and field entries.
- NM_ReadMe_2012_10_01.txt: This readme gives a brief description on the error or warning messages generated by the Check Submission Tool.
- NM_Methodology_2012_10_01.pdf: The Methodology document is included in the submitted package.
- NM_Changes_ and_Corrections_ 2012_10_01.pdf: The document corresponds to a readme document, especially for Internet Service Provider (ISP) information.
- NMBB_Provider_ Data_ Request_Template.xls: The data-request spreadsheet contains an overview and upload instructions in addition to eight worksheets for different types of service, subscriber speed, and community anchor institutions.

All files were zipped together and submitted as NM_SBDD_20121001.zip.

SBDD Geodatabase Layer	Number of Records: October 1, 2012
BB_Service_Address	0*
BB_Service_Road_Segment	6941
BB_Service_CensusBlock	160300
BB_Service_CAInstitutions	2964
BB_Service_Wireless	37
BB_Service_Overview	154
BB_ConnectionPoint_LastMile	0*
BB_ConnectionPoint_MiddleMile	469

***** Due to restrictions in the Non-disclosure Agreement (NDA) with New Mexico Internet Service Providers (ISPs), New Mexico cannot populate the Service Address and Last-Mile feature classes in the NMBB Geodatabase.

Provider Participation

The NMBB Program, in July 2012, requested broadband data for the October 2012 (Round 6) submittal from sixty-four (64) companies, which represented sixty-nine (69) NM Internet Service Providers (ISPs).

A total of thirty-seven different ISPs, representing thirty-two companies, responded to this data request. Of those, thirty-two ISPs (representing twenty-seven companies) provided data and the others indicated no changes to their previously-submitted data. One ISP was identified as not being a broadband provider due to the fact that the provided speeds did not meet broadband requirements. Six (6) ISPs contact information has been changed and we were not able to obtain their correct contact information.

Additionally, Baja Broadband Operating Company, LLC acquired US Cable of Coastal-Texas, LP., ViaSat, Inc. acquired Wildblue Communications, Inc. and Zayo Group acquired 360networks (USA), Inc.

Internet Service Providers	Number: October 1, 2012
Contacted	69
Responded: Provided Data	33
Responded: No Changes to Data	5
Responded: Will not Participate	0
Responded: Not NM Broadband Provider	1
Did Not Respond: Previously Submitted Data	7
Did Not Respond	23

See *Appendix A: Table of New Mexico Internet Service Providers* for those ISPs included in the data request and the participating ISPs.

Data Verification Techniques

Consistency Checks

- EDAC reviewed data provided by NM ISPs for completeness (and/or consistency), per NTIA Data Transfer Model requirements. The NMBB Program contacted ISPs by e-mail to request any missing information.
  This review included comparing newly provided data with the provider's previous data sets. Discrepancies or inconsistencies were noted and addressed through e-mail correspondence with the provider. *Appendix B: ISP-Data Verification and Validation* presents examples of these e-mails.
  See sections *1. Data Collection, 1.5 Data Evaluation* and *2. Data Validation, 2.1 Data Assessment, 2.6 Final Data Validation*.
- For those ISPs who provided block- or segment-level coverage, the Mapping Team checked for coverage containment within known service boundaries.
  See section *3. Data Processing, 3.3 GIS Data Verification*.
- For ISPs providing wireless coverage, the Team checked for coverage containment to New Mexico. (*3.3 GIS Data Verification*)

- If an ISP provided Census Block shapefiles, the Team checked the area of the block to confirm that it fell into the categories for area less than 2 sq mi or greater than 2 sq mi.
  (*3.3 GIS Data Verification*)
- The Mapping Team performed speed checks on data received from the ISPs to make sure they met broadband requirements.
  (*3.3 GIS Data Verification*)
- Topology is validated after loading the data into the geodatabase to identify any inconsistencies in data.
  See section *3. Data Processing, 3.6 Validate Geodatabase*.

Geocoding

- The Mapping Team geocoded address data using different reference street data sets to determine which road reference data set provided the best match. Sometimes a combination of reference data sets was used to obtain better address match rates.
  See section *3. Data Processing, 3.1, 3.2 GIS Data*.
- Unmatched records were sent to the ISP as part of the validation process, with a request for better address information.
  See section *3. Data Processing, 3.3, 3.4 GIS Data Verification, Updates, and Edits*.

NM ISP Feedback Loop

- After processing ISP data, the Mapping Team sent Feedback maps for approval. Any issues for how the service area was represented on the map, such as addition or removal of service, were addressed and corrected, as appropriate. Revised maps then were sent to the provider for review and approval. Feedback maps also included propagation-model results for Wireless broadband.
  See section *3. Data Processing, 3.3, 3.4 GIS Data Verification, Updates, and Edits*.
  See *Appendix C: Feedback and Propagation Model Map*.

Workflow Processing Scheme

New Mexico acknowledges the importance of understanding data reliability and integrity as the Provider data are processed for NTIA submittal. The NMBB Data Workflow and Processing Scheme includes four broad stages:

1. Obtain – Acquire raw Provider data.
2. Validate – Check for internal data consistency and for consistency with external data sources.
3. Process – Develop Geographic Information System (GIS) data and update NTIA Geodatabase.
4. Report – Submit the final Geodatabase to NTIA.

These stages and their relationships are depicted in the diagram below, and are discussed in the sections that follow. The October 1, 2012 Data Workflow and Processing Scheme did not change from the April 2011 scheme and so retained the V3.0 designation.

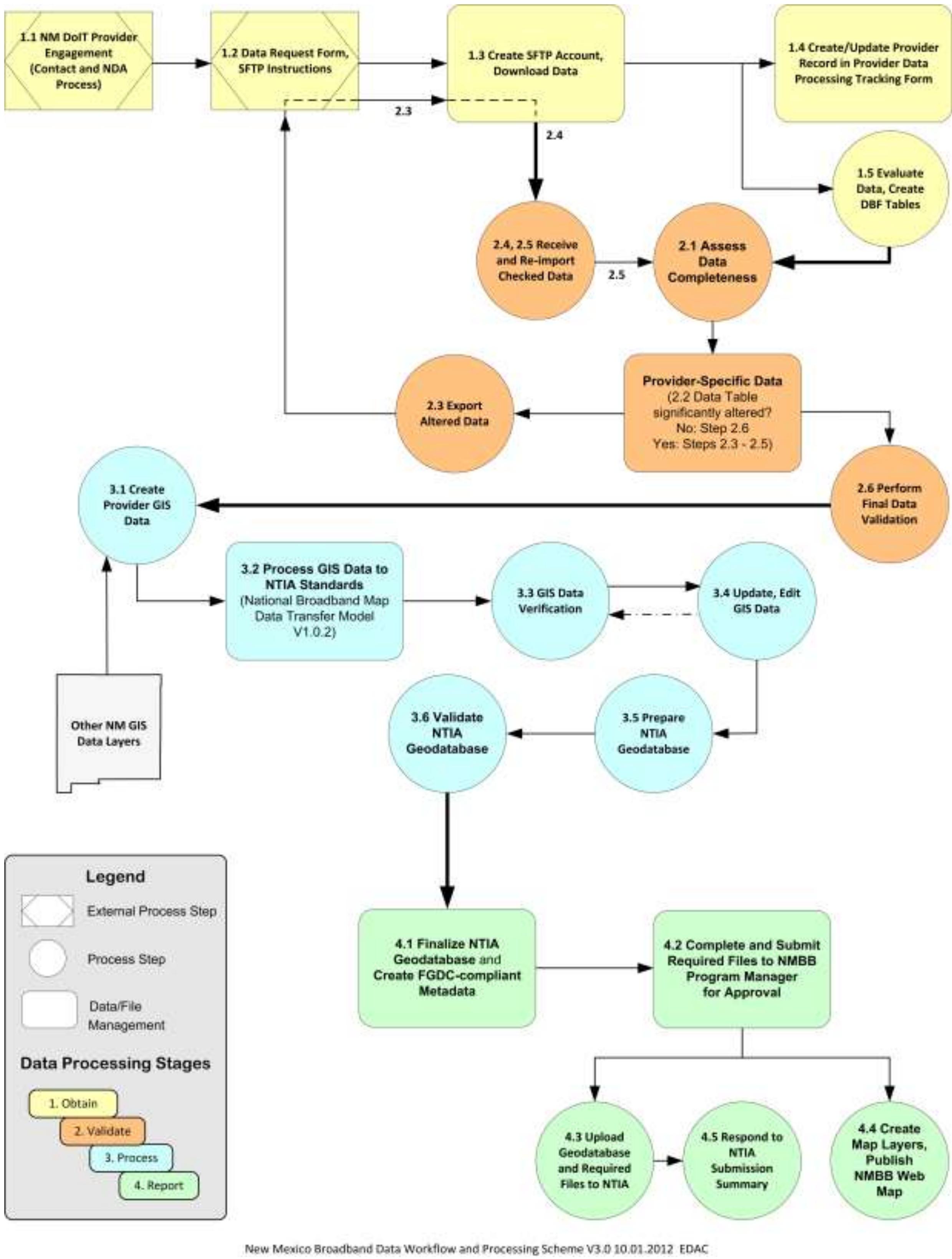


Figure 1 New Mexico Broadband Workflow and Processing Scheme

1. Data Collection

1.1 Provider Engagement

The NM Department of Information Technology established contact with each New Mexico Broadband Provider and negotiated a signed NDA with the State and with EDAC, as required.

1.2 Data Request

EDAC sent an e-mail requesting broadband data to sixty-eight NM companies (seventy-three ISPs) in July 2012, and a reminder e-mail in August to those who had not responded. In addition to an NMBB Program overview and formal request for data, the message included a Web link for the NM Broadband Data Request Form (MS Excel Worksheet); this form included instructions for completing the eight data worksheets and for securely uploading Provider data to the EDAC Secure FTP site.

Data Request Schedule

NMBB Round 6 Data Collection Announcement	07/09/2012
NMBB ISP Data Collection Due	08/31/2012
NMBB Feedback Maps to ISPs for Approval	09/13/2012
NMBB ISP Feedback Due	09/21/2012
NTIA Round 6 Data Due	10/01/2012

1.3 Data Receipt

EDAC created a Secure File Transfer Protocol (SFTP) site for broadband data upload, and created an account on the site for each NM Provider. Each Provider is assigned a unique username and password; this account information is stored in the NMBB SFTP Account Management form.

Provider data arrive in numerous formats, including NMBB or Provider spreadsheets, shapefiles, CAD files, and text files. These data are downloaded from the SFTP site to the EDAC network.

1.4 Provider and Data Tracking

EDAC creates or updates the specific Provider record in a Provider Data Processing Tracking Form. Throughout the data process, each Tracking Form step is recorded with analyst initials and date of task completion. Steps include:

- Record Provider name information and the assigned 2-digit Primary Key (PKey).
- Record the Holding Company Name, DBA Name, FRN (if available), and whether Community Anchor Institutions data are provided.
- Record type of files submitted; date of data submission and the initials of the receiving GIS analyst; and how data were submitted (e.g., FTP or physical medium).

1.5 Data Evaluation

EDAC evaluates the uploaded Provider data for consistency with the NTIA data model and previously submitted data and creates database-format tables.

2. Data Validation

2.1 Data Assessment

EDAC assesses the submitted data for completeness according to the National Broadband Map Data Transfer Model V1.0.2:

- Identify fields (names, types);
- Fill in missing data, if possible; and
- Check field codes, and standardize the values where appropriate.

2.3 Data Export

If the data are incomplete, based upon the above assessment steps, EDAC performs the *If required* steps, below; otherwise, EDAC proceeds with data validation. Changes and assumptions are documented.

If required:

- 2.2 Was the Data Table significantly altered? If yes, go to step 2.3. If no, go to step 2.6.
- 2.3 Return data in standardized format to the Provider for completion.
- 2.4 Receive modified data back from Provider.
- 2.5 Re-import data.

2.6 Data Validation

EDAC performs the final data validation for each Provider's data set: all missing data filled in; all field codes checked and standardized where appropriate. EDAC checks the ISP's provider name and FRN number using FCC's Commission Registration System (CORES) database. https://fjallfoss.fcc.gov/coresWeb/publicHome.do

3. Data Processing

3.1, 3.2 GIS Data

EDAC creates and verifies Provider-specific GIS data, using ArcGIS 10 software and third-party data sets.

- New Mexico Road Centerline (NM RCL) data files [Geocoding; Primary Roads Data Set]
- NM Telephone Exchange Boundaries 911 [Census Blocks Processing]
- U.S. Census TIGER/Line shapefiles [Geocoding]
- NAVTEQ Road data files [Geocoding]
- ESRI Road shapefiles [Geocoding]
- ESRI Cable Boundaries data file [Census Blocks Processing]
- Ancillary consistency checks include comparison with other data sources that are available through the New Mexico geospatial clearinghouse – Resource Geographic Information System (RGIS; http://rgis.unm.edu)
- Propagation model results

EDAC processes the GIS data according to the National Broadband Map Data Transfer Model V1.0.2.

Middle Mile Points

- ISPs provide the geographic coordinates for Middle Mile points. Those points are exported as shapefiles and a spatial join is performed against Census 2010 Blocks to obtain FULLFIPSID.
- Data sets are further processed by adding required fields based on the NTIA Data Model.

Census Blocks

- ISP data were requested for the Census 2010 Blocks, rather than the Census 2000 Blocks.
- If an ISP provides the Census Block IDs, then those tables are spatially joined with the Census 2010 Data and the blocks are extracted. Then, the Census Blocks (Area < 2 sq mi) are extracted.
- If the ISP provides address-specific data, those addresses are geocoded against the New Mexico Road Centerline (NM RCL) address locator. Unmatched addresses are processed against third-party data sets, such as the NAVTEQ Road data purchased by the State as a part of the NMBB project, and ESRI Road data. All of those matched records are appended together to obtain a single address data set. The address points are aggregated spatially to the Census Blocks, and the Census Blocks (Area < 2 sq mi) are extracted.
- If an ISP provides shapefiles of Census Blocks, EDAC verifies those to make sure they are less than 2 sq mi in area.
- If an ISP provides telephone exchange boundaries instead of addresses, then those boundaries are verified with the NM Telephone Exchange Boundaries 911 data set, and Census Blocks (Area < 2 sq mi) that lie within those boundaries are extracted. If an ISP provides the CO/RT locations, then a buffer of 1800 ft is drawn, and the Census Blocks (Area < 2 sq mi) that intersect with the buffer area are extracted.
- If an ISP provides service areas instead of addresses for Cable, then the service areas are verified with the ESRI Cable Boundaries data file. Census Blocks (Area < 2 sq mi) that lie within the boundaries are extracted.
- If an ISP does not provide data for this data-submittal round, data processed for the previous rounds are used for the current submittal.
- Data sets are further processed by adding required fields based on the NTIA Data Model.

Road Segments

- If an ISP provides address-specific data, EDAC geocodes those points (using a process similar to that explained above in *Census Blocks*). The address points are aggregated spatially to Census Blocks, and the blocks with area greater than 2 sq mi (Area > 2 sq mi) are extracted. NM RCL roads within those Census Blocks are exported, and the geocoded address points are spatially joined with adjacent road segments within a distance of 25 ft (or 30 ft for rural areas). The road segments with joined address points are selected and exported.
- If an ISP provides road segment data with address ranges, any one of the address range values (TO/FROM) for the road is taken and the data are geocoded. Or, if no address ranges are provided, the address file is joined with the NM RCL roads, based on Street Name, City, and Postal Code and the matched records are extracted. This involves manual data processing.
- If an ISP provides Tiger/Line roads data, those roads are extracted from the U.S. Census Tiger/Line shapefile by joining them based on the TLID (Tiger/Line ID). NM RCL road data that

match the Tiger/Line roads are exported. If there are no matched roads in RCL data then Tiger/Line roads are submitted to NTIA.

- If an ISP provides Telephone Exchange Boundaries or CO/RT locations or Cable service area boundaries, road segments for these data sets are not processed due to uncertainty about the NMBB procedures for these cases. EDAC checks for ISP-provided address-specific data and, if those data are present, processes the data using the first-listed *Road Segments* step. Otherwise, those roads are not further processed.
- Data sets are further processed by adding required fields based on the NTIA Data Model.

Community Anchor Institutions

- EDAC created an Anchor Geodatabase that has data for all the Community Anchor Institutions, such as Schools, Libraries, Health Care, Higher Education, Public Safety Facilities, Government Agencies, and Non-governmental Institutions throughout the State of New Mexico. These data were obtained from different sources, including the Public School Facilities Authority (PSFA), New Mexico State Library, Homeland Security Information Program (HSIP), and NM Resource Geographic Information System Program (RGIS).
- EDAC developed a Community Anchor Site Assessment (CASA) crowd-sourcing application to collect information about Institutions and their Broadband Internet Access in the State of New Mexico. These results are added to the Anchor Database after locations are validated against satellite and aerial imagery.
- The UNM Bureau of Business and Economic Research (BBER) created and conducted a digital-literacy survey to obtain non-governmental-organization (NGO) community support data. EDAC supplemented the Anchor Geodatabase with these NGO data.
- Broadband data provided by the ISPs are also included in the geodatabase. EDAC uses the third-party USAC (Universal Service Administrative Company) data set for broadband information for Schools and the NM State Library data set for broadband information for Libraries.
- The Anchor Geodatabase is further processed to meet the NTIA requirements. NCES IDs for schools, IPEDS IDs for higher education, and IMLS IDs for libraries are obtained from the respective Web sites and are joined with records in the geodatabase.
- Data sets are additionally processed by adding required fields based on the NTIA Data Model.

Wireless

- If an ISP has multiple spectra, the provided polygon is duplicated for each spectrum and then appended together to obtain a single shapefile with stacked geometry.
- If an ISP provides only tower locations (address or coordinates) instead of shapefiles showing their wireless coverage, EDAC generates wireless coverage using SiteSync propagation modeling software. For this, we request additional information from the ISP, such as: Location (address or coordinates), Antenna pattern (omni-directional, 180, 120, 90, etc.), Transmit frequency (MHz), Transmit Antenna Gain (dBi), and Antenna elevation.
- If an ISP provides tower location (address or coordinates), transmit radius and no other above mentioned variables, those locations are mapped and a buffer is drawn with the transmit radius.

- Wireless-coverage polygons with area less than 0.125 sq mi, whether ISP-provided or modeled, are eliminated from the coverage, per NTIA specifications.
- If an ISP indicates providing Satellite services state-wide, a state boundary file is added to the database, processed per NTIA requirements.
- If an ISP provides KMZ (or KML) files, those files are converted to shapefiles and are further processed to remove the polygons with area less than 0.125 sq. mi.
- Data sets are further processed by adding required fields based on the NTIA Data Model.

Overview

- This set of notes applies to wire-line data, only.
- If an ISP provides the Subscriber Weighted Nominal (SWNOM) Speed of respective technology types for the counties it serves, those values are joined with the County boundary file from the U.S. Census Tiger/Line shapefiles.
- If an ISP provides the technology of transmission, number of subscribers, and the maximum advertised speed for the Counties it serves, the SWNOM Speed is calculated and the values are joined with the County boundaries shapefile.
- These county files from each ISP are appended together to obtain a statewide stacked geometry. Data are further processed by adding required fields based on the NTIA Data Model.

3.3, 3.4 GIS Data Verification, Updates, and Edits

Processed data are developed as Provider-specific spreadsheet and GeoPDF products. As the first step in New Mexico's Provider feedback loop, EDAC places each Provider's products on the SFTP site and requests that Providers verify accuracy and identify needed edits and corrections. Four (4) ISPs responded to the verification request in the October 1, 2012 data submission cycle.

GIS and modeled data are updated and edited, based on Provider feedback, and modified data products (spreadsheet and GeoPDF) are delivered to the Provider through the SFTP site for final verification and to complete the feedback loop.

3.5 NTIA Geodatabase Preparation

EDAC produces a final "clean" GIS data set from the processed and Provider-specific, versioned feature data sets, and then prepares the NTIA Geodatabase from these finalized GIS data. Crowd-sourced data were not used for preparation or validation.

3.6 NTIA Geodatabase Validation

EDAC validates the geodatabase by performing the validation checks provided below and by running the geodatabase through the SBDD_CheckSubmission tool. EDAC then assigns Quality Assurance/Quality Control (QA/QC) values.

- Repair Geometry
- Validate Topology
- Check Provider identification fields by Frequency tool and Summarize tool
- Check for Provider Name, Census Block, and Transmission Technology. Each ISP (Provider Name) should have only one Census Block per Transmission Technology.

- Check for Null values in Transmission Technology codes, PROVIDER_TYPE, FULLFIPSID, STATEFIPS, COUNTYFIPS, TRACT, BLOCKID, GEOUNITTYPE, STATECOUNTYFIPS fields
- Check for Null values in OWNERSHOP, BHCAPACITY, BHTYPE, TRANSTECH, ANCHORNAME, ADDRESS (BLDGNBR, STREETNAME), CITY, ZIP5, STATE, Latitude, Longitude fields
- Check Maximum advertised and typical down/upload speed fields for null values and for valid domain values: MAXADDOWN/TYPDOWN < MAXADUP/TYPUP; MAXADDOWN < '0' OR MAXADDOWN > '11'
- BHCAPACITY <0 and >9, BHTYPE <0 and >4, CAICAT <1 and >7
- Check for SPECTRUM values <1 and >10
- Speed Tiers:
    - DSL download speed tier: if 7 or higher, contact ISP to verify
    - Cable Modem – DOCSIS 3.0 should not be 7 or lower
    - Cable Modem – Other should not be 9 or higher
    - Fixed Wireless download speed tier should not be 8 or higher

4. NMBB Report and Submittal

4.1 Finalized NTIA Geodatabase and Metadata

EDAC finalizes the Geodatabase per NTIA standards (National Broadband Map Data Transfer Model V1.0.2) and creates the associated metadata.

4.2 NMBB Program Manager

The NMBB Program Manager receives the finalized Geodatabase through the SFTP site and approves the files for submittal to NTIA.

EDAC completes and delivers all files to the NMBB Program Manager, as required by the Program. Files include correspondence logs with NM Providers, documentation for Web mapping activities, and the Provider-specific Data Processing Tracking Form.

4.3 NTIA Submittal

The Geodatabase and required files (data transmittal memorandum, Provider data request template [not a required file], data package spreadsheet, check-submission receipt, methodology, and changes and corrections) are uploaded, using the FCC/NTIA SFTP site.

4.4 NMBB Map Layers

Following the NTIA submittal, EDAC creates GIS map layers from the Geodatabase and publishes them to the New Mexico Broadband Program Mapping site, www.nmbbmapping.org/mapping/.

4.5 Response: NTIA Submission Summary

NM DoIT and EDAC developed a document template to respond to the NTIA Submission Summary, both to address NTIA-identified issues or gaps and to request clarification and additional information. New Mexico responds within one week of receiving NTIA's Submission Summary.

NMBB System Security

System Security

The NM Broadband Server is a fully patched Windows Server 2008. The server is protected by Symantec Endpoint Protection and a double firewall.

The first layer of firewall protection is a Cisco hardware firewall that protects the Server from any intrusion from outside the EDAC network. This firewall only allows connections on Ports 80 and 22.

- Port 80 allows Web browsing.
- Port 22 allows Secure FTP. SFTP service is fully encrypted with SHA1 stored passwords.

The Windows software firewall is configured to allow access on Ports 80, 22, 443, and 3389.

- Port 443 gives EDAC developers the ability to configure ArcGIS Server from within the EDAC network.
- Port 3389 gives EDAC system administrators the ability to configure the base Windows server from within the EDAC network.

Server Connections

Connect to the Server from the outside:

- HTTP: No authentication (simple Web browsing).
- SFTP: Authentication required and fully encrypted.

Connect to the Server from within the EDAC network:

- HTTPS: Authentication required and fully encrypted.
- RDP: Authentication required and fully encrypted.
- SMB: Port 445, Windows file-share port.

Virtual Machine and Networked Drive Back-ups

The NMBB Virtual Machine (VM) is a dedicated server.

Back-up: Development Networked Drive (not published)

- Daily: A differential back-up to a tape server is performed; the tape server is connected to a secure tape library.
- Friday/Weekend: A full back-up of the networked drive is performed to the secure tape server.

Back-up: Virtual Machine (published)

- Daily: The entire VM is backed up by VDR (VMware Data Recovery [application]) to a secure, self-contained data store.
- Weekly: The entire VM is backed up to a TrueCrypt volume in remote storage.

Physical Security

NM Broadband Server physical security is accomplished through:

- Controlled-environment floor space in a locked, code-protected room for system servers, and

- An uninterrupted power supply (UPS).

Lessons Learned

EDAC analyzed the results of prior data collections efforts and identified those methods that had the highest success rate and implemented those methods in the October 2012 data collection process. EDAC continues evaluating and updating data validation procedures to meet requirements for the data model.

NMBB Web Map

The New Mexico Broadband Map (www.nmbbmapping.org/mapping/) is developed as part of the NMBB Program for the State of New Mexico. This Web map displays all of the processed ISP broadband data that are submitted to NTIA for the National Broadband Map, and the processed statewide satellite-service data.

Figure 2 (below) is a screen-capture image of the New Mexico Broadband Map V 3.0 with Data Update: 1 April 2012 [map data are updated following each NTIA data submittal]. Map layers for DSL (green), Cable (dark red), Fiber (magenta), and Copper Wire (cyan) broadband coverage are displayed with Tribal Land Boundaries and the Streets base map. Fiber, Fixed Wireless, Mobile Wireless, and Satellite layers are not displayed. Tools include: layer selection; base map selection; dynamic legend; slider-bar and custom zoom; drag-and-drop and directional pan; full, previous, and next extent; identify; find address; scale bar; and print map. Additionally, the mapping site provides a feedback tool, help (online user guide), program information, and New Mexico's disclaimer.

Figure 3 (below) depicts a screen-capture image of the New Mexico Broadband Map V 3.0, which displays fixed wireless broadband coverage in Roswell, NM, generated using the SiteSync propagation modeling software.

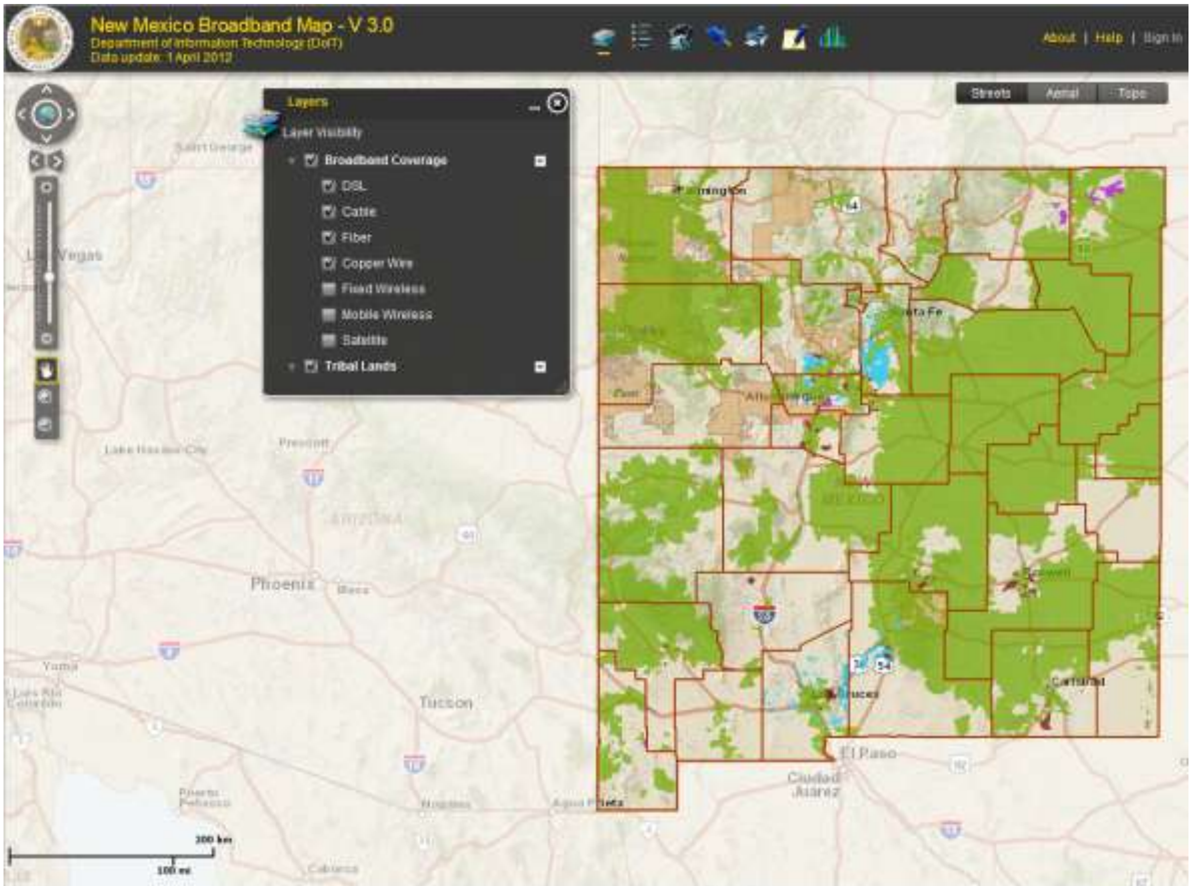


Figure 2 New Mexico Broadband Map V 3.0, www.nmbbmapping.org/mapping/; accessed 24 October 2012

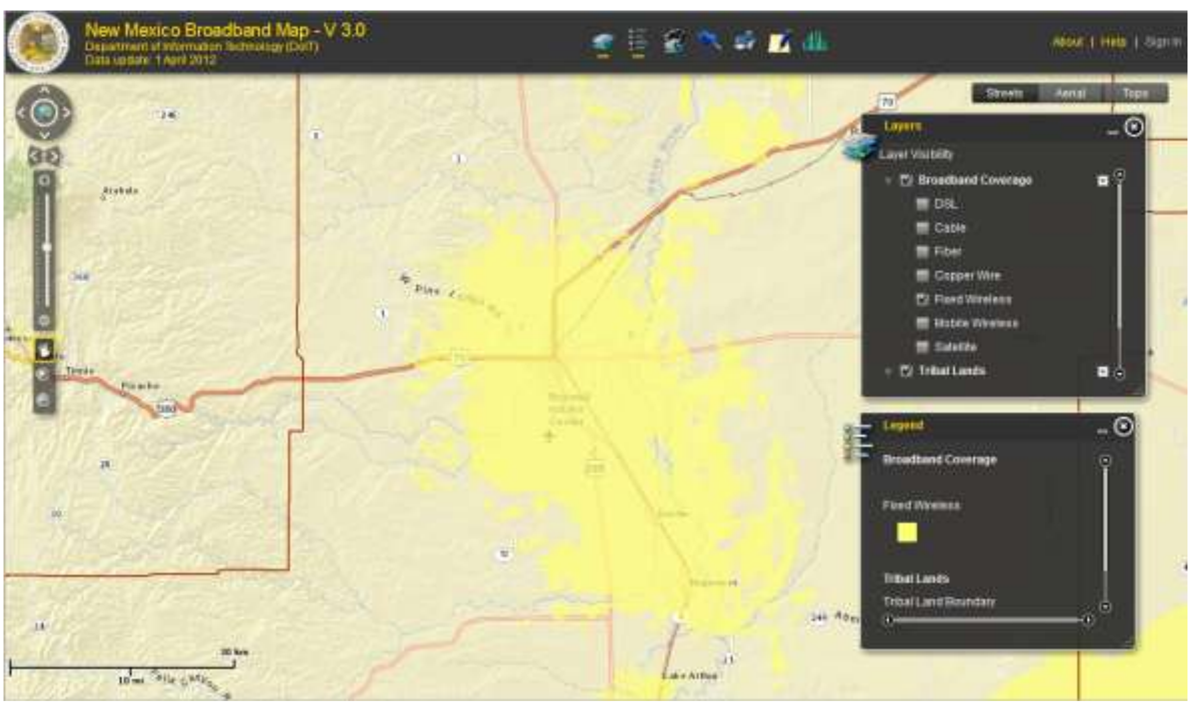


Figure 3 New Mexico Broadband Map: Modeled propagation for Fixed Wireless coverage; accessed 25 September 2012

Appendix A: Table of New Mexico Internet Service Providers

Internet Service Providers listed in black text were participating providers in NTIA Data Round 6. Providers listed in blue text did not respond to NTIA Data Round 6 data requests.

Identified New Mexico Internet Service Providers: NTIA Data Submittal, October 1, 2012	
Agave Broadband LLC	Tularosa Communications, Inc.
AT&T Corp, Inc.	TW Telecom of New Mexico, LLC
AT&T Mobility LLC	Valley Telecom Group (Copper Valley Telephone, Inc.)
Baca Valley Telephone Company, Inc.	Valley Telecom Group (Valley Telephone Cooperative, Inc.)
Baja Broadband	Verizon Wireless
Cable One	ViaSat, Inc.
CenturyLink	Windstream Communications SouthWest
Comcast	WNM Communications
Cricket Communications, Inc.	Yucca Telecom (Roosevelt County Rural Telephone Cooperative, Inc.)
Cyber Mesa Telecom	Yucca Telecom (Yucca Telecommunication Systems, Inc.)
Dell Telephone Cooperative, Inc.	Zayo Group
DIECA Communications, Inc. (Covad Communications Company)	
ENMR Telephone Cooperative	Action INTELEX
Frontier Navajo Communications (Navajo Communications Company, Inc.)	AmigoNet
Higher-Speed Internet, LLC	Azulstar, Inc.
Hughes Network Systems	BlackRock Networks, LLC
Kit Carson Electric	Brainstorm Internet
La Canada Wireless Association	CityLink Fiber Holdings, LLC
La Jicarita Rural Telephone Cooperative	Cnet Internet
Leaco Rural Telephone Cooperative	CNSP Internet
Level 3 Communications, LLC	Desertgate Internet
MATI Networks (Mescalero Apache Telecom, Inc.)	Huntleigh Telecommunications Group, Inc.
Penasco Valley Telecommunications	La Tierra Communications, Inc.
Plateau Telecommunications, Inc.	Lobo Internet Services, LTD.
PTCI (Panhandle Telephone Cooperative, Inc.)	MetTel
PVT Networks	Oso Grande Communications
Sacred Wind Communications, Inc.	RioLink, LTD
Sierra Communications (a subsidiary of Baca Valley Telephone)	SCS Connect
Southwestern Wireless	SentivaNet
Sprint	Southwest Cyberport
Suddenlink Communications	Spinn.Net
StarBand Communications, Inc. (Spacenet, Inc.)	TaosNet, LLC
T-Mobile	Tewa Communications
Time Warner Cable	Trilogy
Transworld Network, Corp	Virtual Los Alamos

Appendix B: Table of Abbreviations and Acronyms

BB	broadband
BBER	[UNM] Bureau of Business and Economic Research
CAD	Computer-aided Design
CO/RT	Central Office/Rural Terminal
DBA	Doing Business As
dBi	decibel isotropic
DoIT	[NM] Department of Information Technology
DSL	Digital Subscriber Line
EDAC	[UNM] Earth Data Analysis Center
FCC	Federal Communications Commission
FGDC	Federal Geographic Data Committee
FRN	FCC Registration Number
ft	foot
FTP	File Transfer Protocol
GDB, gdb	Geodatabase; Geodatabase file extension
GIS	Geographic Information Systems
HSIP	Homeland Security Information Program
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
ID	[unique] identifier
IMLS	Institute of Museum and Library Services
IPEDS	Integrated Postsecondary Education Data System
ISP	Internet Service Provider
MHz	megahertz
NCES	National Center for Education Statistics
NDA	Non-Disclosure Agreement
NGO	Non-governmental Organization
NM	New Mexico, State of New Mexico
NMBB	New Mexico Broadband [Program]
NM DoIT	New Mexico Department of Information Technology
NTIA	National Telecommunications and Information Administration
PDF, pdf	[Adobe] Portable Document Format and file extension
PSFA	[NM] Public School Facilities Authority
QA/QC	Quality Assurance/Quality Control
RCL	[NM] Road Centerlines
RDP	Remote Desktop Protocol
RGIS	[NM] Resource Geographic Information System
SBI	State Broadband Initiative
SFTP	Secure File Transfer Protocol

SHA1, sha1	Secure Hash Algorithm 1
SMB	Server Message Block
sq mi	square mile(s)
SWNOM	Subscriber Weighted Nominal [Speed]
TIGER	[U.S. Census] Topologically Integrated Geographic Encoding and Referencing (system)
TXT, txt	Text file extension
UNM EDAC	The University of New Mexico Earth Data Analysis Center
UPS	uninterrupted power supply
USAC	Universal Service Administrative Company
VDR	VMware Data Recovery (application)
VM	Virtual Machine
Web	World Wide Web
XLS, xls	Microsoft Excel file extension
ZIP, zip	Zipped file extension

OFFICIAL OCTOBER 2012 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE STATE OF NEVADA

CONNECT Nevada®

October 1, 2012

TABLE OF CONTENTS

October 1, 2012

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

As the State Broadband Designated Entity, in partnership with the Nevada Broadband Task Force, please accept this submission from Connected Nation on behalf of the state of Nevada's State Broadband Initiative (SBI) Grant Program, known as Connect Nevada.

The Connect Nevada program and its collective stakeholder community continue to be faithful and energized contributors to the National Telecommunications and Information Administration's (NTIA) SBI program. Now more than ever, the significance of complete and validated data as compiled through the Federal Communications Commission's (FCC) National Broadband Map is instrumental in forging the innovation economy of the 21st century. As the Commission relies upon this unique resource to distribute monies under the Connect America Fund, through the Universal Service Fund reform, the Connect Nevada program equally values this data in informing meaningful program interventions relating to broadband access, adoption, and use initiatives. Truly, this coordination embodies the spirit of the SBI and demonstrates the joint effort of the NTIA, FCC, state governments, industry, and non-profits like Connected Nation as it continues to serve as a key tool for the American public and policymakers. We are proud of the role that Connect Nevada has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit broadband providers, consumers, and businesses nationwide.

The artifacts that comprise this submission should be found to be compliant with the October 1, 2012, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connect Nevada: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in

			Census Blocks of No Greater Than Two Square Miles in Area
Appendix A:	1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles
Appendix A:	1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A:	3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A:	4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A:	4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)		n/a	Accuracy and Verification Report
n/a		DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a		n/a	List of Changes and Corrections to the Dataset
n/a		n/a	Non-Participating Provider (NPP) Narratives
n/a		n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the April 2012 SBI data submission for the Connect Nevada program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on August 9, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance
New to the semi-annual submission for October 2012 is a more robust version of the ReadMe text file. As per the template released on the Grantee Workspace on May 18, 2012, this file contains a high-level summary of the items contained within the submission, including the exact file deliverables, a description of the errors and warnings from the Check Submission report, and extraneous information of which the NTIA and other users of the dataset should be made aware.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the April 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That practice continues in this submission as technology and speed combinations are reviewed and scrutinized; any questionable information supplied by providers is reviewed more in depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

Also in this submission is a narrative describing the data and coverage estimation of a non-participating provider. While Connect Nevada continues outreach to all providers prior to each submission period, the need to submit broadband service data for all providers regardless of their participation is evident as the SBI program continues into this sixth round of data submissions. The submission of this estimated broadband service area for providers that have not supplied data to Connect Nevada is essential in being able to portray a more accurate depiction of the current broadband landscape.

In addition to the requirements mentioned above, please find this methodology paper to be inclusive of the ongoing section pertaining to industry mergers and acquisitions – specifically this section details any and all mergers or acquisitions that have taken place in Nevada since the April 2012 submission. The intent of this updated section is to provide a better understanding of how the broadband provider landscape has changed since the last submission cycle.

This October 2012 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for approximately 98.21 percent of the Nevada provider community, or 55 of 56 total providers. There are 54 participating providers and one additional non-participating provider whose estimated coverage areas have been submitted. Of the 54 participating providers, 21 supplied an update to their network or coverage area(s), while 28 have reported no change. The remaining 5 represent providers who previously supplied data but were non-responsive in the October 2012 update effort; therefore their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact record is contained herein. The provider that is not represented in the attached datasets was non-responsive to multiple contact attempts.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connect Nevada principals that all commercially reasonable efforts were made to account for 100 percent of the known Nevada broadband provider community, pursuant to this semi-annual data update submission.

Connect Nevada has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Nevada conducts field validation efforts. To date, 39(69.64 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connect Nevada website, (www.connectnv.org), continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connect Nevada website encountered 4,426 unique visits during this reporting period (14,436 total to date for the life of the grant awarded on December 20, 2009). Additionally, this pronounced Web activity netted 4 broadband inquiries over this same reporting period (44 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connect Nevada website and the Connect Nevada interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connect Nevada mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Nevada to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connect Nevada has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Outreach was conducted during this data update reporting period by Connect Nevada to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect Nevada website. During this reporting period Connect Nevada has developed a number of new relationships with statewide associations such as the University of Nevada, Reno Raggio Research Center for STEM Education and the State of Nevada Department of Public Safety State Fire Marshal Administration, to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. It became apparent that these relationships are beneficial to the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connect Nevada will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connect Nevada has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connect Nevada is also working hard to clarify CAI information associated with wireless broadband. NTIA has requested in-depth questioning of CAI listing a wireless broadband service as their sole form of connectivity. This follow-up allows us to better understand the reason for adopting the wireless broadband service.

From our work in Nevada, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connect Nevada efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connect Nevada program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Nevada, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,

Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

DATA ACQUISITION: NEVADA COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this sixth reporting period of the SBI, Connect Nevada, working in close coordination with the state of Nevada, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connect Nevada has continued to identify and process CAI data obtained through an ongoing statewide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connect Nevada through Esri ArcGIS software.

Connect Nevada continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connect Nevada website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the state as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the state client. Connect Nevada will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link:
http://www.surveymonkey.com/s/7RSHPBS

In addition to the survey, Connect Nevada has developed a number of new relationships with statewide associations such as University of Nevada, Reno Raggio Research Center for STEM Education, and State of Nevada Department of Public Safety State Fire Marshal Administration to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connect Nevada will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connect Nevada has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connect Nevada conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect Nevada continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect Nevada works with the Nevada Broadband Task Force to identify existing relationships that can support CAI outreach.

Connect Nevada has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Nevada project as well as self-awareness of their own CAI connectivity (specifically upload and download speeds). Connect Nevada will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the Nevada Broadband Task Force will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the state.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	881	881	818	158	156	152
Libraries	108	108	100	61	64	64
Healthcare	5,045	5,045	4,684	27	4,888	4,888
Public Safety	127	127	119	10	11	11
Higher Ed Institutions	81	81	72	38	39	39
Other Government	881	881	847	71	117	117
Other Non-Government	907	907	845	20	59	61
Total	8,030	8,030	7,485	385	5,334	5,332

Since the last reporting period, Connect Nevada identified and deleted 665 Community Anchor Institutions. Several business (i.e. pharmacies, grocery stores, Target, Sam's Club, etc.) that were listed in the nongovernment category were removed; these businesses are not considered anchor institutions. In addition, 50 CAIs were incorrectly assigned to the nongovernment category. These CAIs were reassigned to the appropriate category.

During the coming months, CAI data collection will be supported by regular reporting to the Connect Nevada team. The CAI data is proving an invaluable resource to all components of the Connect Nevada effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on August 9, 2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.

Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the state of Nevada.

Inventory of Deliverables, Connect Nevada: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the state of Nevada have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Nevada as a polygon of the state boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development is underway at CN as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

Datasets for In-Kind Match

Connect Nevada received an in-kind match contribution to assist with SBI mapping goals which has been beneficial to the program in the following ways:

As part of an in-kind contribution, Connect Nevada received a dataset from the Lyon County School District containing Lyon County student records. This dataset provides statistics illustrating the number of parents who have checked on their child's progress via an online system set-up and maintained by the school. - $100.

Connect Nevada received a dataset from the state containing total population for counties, cities, and towns as part of an in-kind contribution that will be utilized by the project to assist with its mapping and planning goals. - $10,592.

Connect Nevada received a dataset from the state, containing age, sex, race, and Hispanic origin estimates and projections for 2010-2030 as part of an in-kind match contribution to assist the project with its mapping and planning goals. - $29,332.

Connect Nevada obtained a dataset containing Nevada healthcare Community Anchor Institution (CAI) data. Since the dataset was developed using federal funds, it was not valued nor was it counted as match toward the program.

As part of an in-kind contribution from the Nevada Department of Transportation, Connect Nevada received a dataset containing 2011 road segments. This was instrumental in processing the 2010 Census road data. Since the dataset was developed using federal funds, it was not valued nor was it counted as match toward the program.

As part of an in-kind contribution from the Nevada Department of Taxation, Connect Nevada received a dataset that contained all registered business locations with a sales or use tax account in the state. Connect Nevada used this dataset to create an in-depth analysis of business locations by sector and by rural/non-rural counties. This dataset will continue to be used to inform future Connect Nevada surveys and research reports. - $125,339.

NEVADA FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets and Trips;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and
- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff conducted on-site validation tests in Nevada on the following providers: Above All Communications (d.b.a. Express Internet); Air-Internet, Inc.; Arizona Nevada Tower Corporation; AT&T Inc.; Avant Wireless LLC; Baja Broadband LLC; Beehive Telephone Company Inc.; CalNeva Broadband LLC; CC Communications; CenturyLink; Charter Communications; Citizens Telecommunications Company of Nevada (d.b.a. Frontier Communications of Nevada); Clearwire Corporation; Cox Communications; ETAN Industries (d.b.a. Clark Cablevision and CMA Cablevision); EZZnet, Inc.; Great Basin Internet Services; High Desert Internet Services; Highlands Wireless Inc.; Hot Spot Broadband Inc.; InfoWest (d.b.a. A & J Hardy Enterprises, Inc.; Comnett Computer Services, and Peak Internet Services); JAB Wireless (formerly d.b.a. KeyOn Wireless and Wells Rural Electric Telephone); Las Vegas Net; Leap Wireless (d.b.a. Cricket License Company LLC); Lincoln County Telephone; Moapa Valley Telephone Company; Mt. Wheeler Power; Oasis Online Inc.; Performance Computing Internet; Reliance Connects (d.b.a. Rio Virgin Telephone & Cablevision); Robinson Communication Corporation (d.b.a. Oregon-Idaho Utilities, Inc. and Humboldt Telephone Company); Schatnet Internet LLC; Sprint Nextel; TelePacific Communications (d.b.a. Nextweb and Covad); T-Mobile USA Inc.; Vegas Wi-Fi Communications LLC; Verizon Wireless; WENR Corporation (f.k.a. Satview Broadband, Ltd.); and Yonder Media.

In addition to the field verification tests that have been conducted, Connect Nevada has also conducted work in the field to collect information for the non-participating provider, Avant Wireless, which, by nature of the methodology required for this collection, is also included in the above list.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 39 companies (out of a universe of 56 viable providers) totaling 69.64 percent within the state of Nevada. This percentage also considers the non-participating provider (NPP) records submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Provider" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on August 9, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

AT&T Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 24 Mbps service; screenshot below.

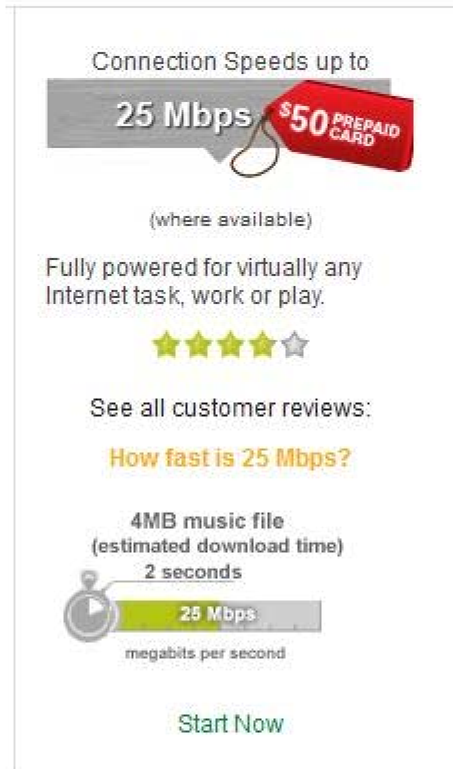
Compare Internet Packages

	Pro	Elite	Max	Max Plus	Max Turbo
Standard Monthly Rate	$38*	$43*	$48*	$53*	$63*
Downstream Speed	Up to 3 Mbps	Up to 6 Mbps	Up to 12 Mbps	Up to 18 Mbps	Up to 24 Mbps

AT&T Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider confirmed that tier 7 service is available.

CalNeva Broadband, LLC
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 4, lower than expected value range for the technology.
Resolution: Provider representative confirmed that service area is DOCSIS 3.0, but lower speeds are still in use.

CenturyLink
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below.



Filer Mutual
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

DSL - 12Mbps

The ultimate package built to meet the heaviest demands - this package is built for gaming, multiple Netflix streams or Netflix HD, a home office, and several device hookups. With all of this speed you will meet the needs of anything that comes your way! Along side this we'll be there every step of the way if you need support!

- Gaming
- Netflix HD
- Streaming Media
- Home Office
- Multiple Devices

$79.95

Great Basin Internet Services
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

STARTER	1 x 1 (down vs. up mbps speed)	$24.95 (monthly)
	2 x 1 (down vs. up mbps speed)	$29.95 (monthly)
	4 x 2 (down vs. up mbps speed)	$39.95 (monthly)
	8 x 2 (down vs. up mbps speed)	$49.95 (monthly)
	12 x 3 (down vs. up mbps speed)	$69.95 (monthly)

Hot Spot Broadband
Issue: Fixed wireless platform with maximum advertised download speed in tiers 7 and 10, higher than expected value range for the technology.
Resolution: Provider confirmed that most areas have up to 20 Mbps download and upload service and some areas in Reno and Sparks have 100 Mbps download and upload service.

Lincoln Communications, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative confirmed that tier 7 service is indeed available.

MegaPath
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps service; screenshot below.

> DSL service provides download speeds up to 20 Mbps over a nationwide, multi-redundant private network that optimizes performance and security. DSL is an ideal broadband solution for small and medium-sized businesses that download large files or use the Internet extensively.

Moapa Valley Telephone
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

Bundle	Description	Pricing
1	6 Mb Internet	$59.95
2	10 Mb Internet	$69.95
3	15 Mb Internet	$79.95

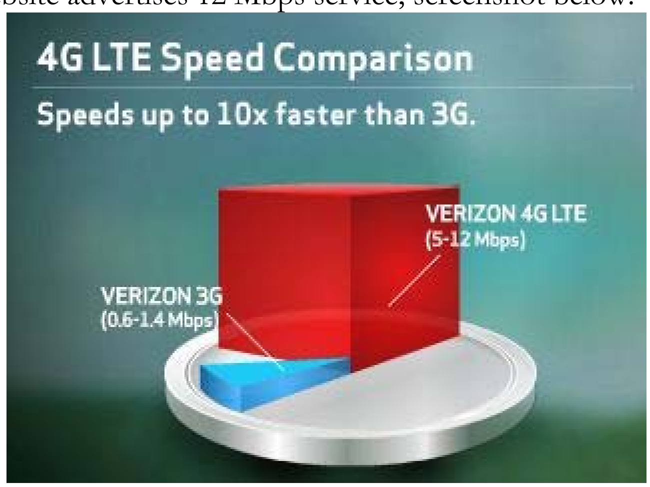
Rio Virgin Telephone
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

Nevada	ADSL				
Introductory DSL Pricing	3.0Mb down/1.0Mb up	6.0Mb down/1.0Mb up	9.0Mb down/1.0Mb up	12.0Mb down/1.0Mb up	768Kb down/768Kb up
Total DSL/Internet Recurring Charge	$34.95	$39.95	$47.95	$54.95	$24.95
*DSL Activation Service Order Charge	**$185.00**	$185.00	$185.00	$185.00	$185.00

T-Mobile USA, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises download speed greater than tier 6; screenshot below.

> T-Mobile customers with 4G phones are already experiencing data speeds that are comparable to or faster than the speed of a home broadband network. And with recent improvements to our 4G network-doubling our theoretical download speeds-we're giving our customers enhanced 4G data speeds. We've seen average download speeds on our HSPA+ 42 Mbps-capable data stick approaching 10 Mbps with peak speeds of 27 Mbps, and download speeds approaching 8 Mbps with peak speeds of 20 Mbps on our upcoming HSPA+ 42 Mbps-capable smartphones.

Verizon
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.



Data Submission and Coverage Estimation of Non-Participating Provider

As part of its ongoing broadband mapping efforts, CN has developed a series of processes with the goal of submitting coverage estimation mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of platform type (cable modem, DSL, fixed wireless, etc.). This state specific collection of coverage estimation methodology papers (see Appendix A) demonstrates the estimated broadband service territory for the providers in this state that have either been non-responsive or that have refused to participate in the SBI mapping initiative.

Accuracy and Verification: Provider Validation Methodology

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a statewide level, static maps of statewide and county-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Additionally, non-participating provider narratives that were submitted in previous mapping cycles are subjected to the same level of scrutiny. Occasionally, a provider may elect to voluntarily participate (thus eliminating the need for future data estimation activities in the field). However, more often than not, the NPP narrative is updated with a combination of data gleaned from the provider's website, data obtained through FCC research and/or data collected/verified in the field by a CN staff engineer.

Estimates derived from provider-validated data indicate that approximately 0.93 percent of Nevada households do not have terrestrial fixed broadband service available, and approximately 0.36 percent of Nevada households have neither mobile nor fixed broadband service available.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 3.53 percent of rural Nevada households do not have terrestrial fixed broadband service available, and approximately 0.87 percent of rural Nevada households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard. This research often proves to be exceptionally effective when estimating the coverage area of an NPP.
6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).

10. Antenna pattern (e.g. omni-directional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).
15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).
23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hillshade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

BROADBAND INQUIRIES METHODOLOGY

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connect Nevada website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information requested by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at other such time as is practical and appropriate. GIS and

ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,600 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connect Nevada project has received a total of 4 inquiries (44 grant inception to date). As more inquiries are submitted to Connect Nevada, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

My ConnectView Methodology

My ConnectView is an online, interactive mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connect Nevada project launched My ConnectView on April 2, 2012, and has received 692 visits this reporting period; to date the interactive mapping applications have received 2,744 visits.

Speed Test Methodology

The 265 speed tests that are represented in the Connect Nevada Speed Test Report during this reporting period (1,210 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Nevada speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connect Nevada project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connect Nevada with the information on where broadband services are available. Second, unlike theoretical speed information which was received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the state of Nevada.

Providers Deemed Non-Viable

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the October 2012 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	21Globe, Inc.	www.21globe.com/is/access/	General Reseller of DSL and backhaul.
2	360networks	http://www.360networks.com/	Acquired by another company.
3	650Net	www.650net.net/	Dial-up only except CA DSL Reseller.
4	A & J Hardy Enterprises, Inc.	http://comnett.net	Acquired by InfoWest.
5	A 007 Access	www.a007.com/	D.B.A. of Cyberonic Communications Inc. reselling DSL and mobile wireless; general reseller of Quest DSL and mobile wireless; DSL does not qualify as the max advertised speed is 768 kbps x 128 kbps.
6	A-1 Vegas.com	www.zekes.com	d.b.a. Zeke's Internet Service resells Qwest DSL.
7	AAA Internet Service	n/a	No longer in business.
8	Aaccess Network Communications	www.aaccess.net/	Not a broadband provider; provides services for business IT, home computer, web design.
9	Access123.net	n/a	No longer in business.
10	ACERX.NET	www.acerx.net/	General reseller of cable, DSL, and satellite broadband access.
11	ACI, Inc.	http://www.aci.net	Reseller; unresponsive to multiple attempts to gather data.
12	ACS Wireless	n/a	No longer in business.
13	Advanced Communications Integration	http://www.aci.net/	Company is currently not a viable provider.
14	Airewaves Broadband, LLC	n/a	No longer in business.
15	Airmail247.com	www.airmail247.com/	Business mailing list search site; not an ISP.

16	American Wireless Networks, Inc.	n/a	American Wireless does not provide broadband access in Nevada. The company is out of business.
17	Amigo.Net	www.amigo.net/cms/	Qwest reseller in Alamosa, CO offering fixed wireless in CO and NM.
18	Antioch Wireless Broadband	n/a	Resells DSL and cellular service in Antioch, IL only.
19	Arrowheadnet.com	www.arrowheadnet.com/	Domain registration and web-hosting company.
20	ATEK Communications	www.atekcommunications.com	Not an ISP; ATEK is a national data contractor specializing in structured data cabling and fiber optic distribution designs and installations.
21	bargainisp.net	www.bargainisp.net/	Generic web directory site; company does not offer broadband.
22	Big Kahuna Network	n/a	No longer in business.
23	Broadband National	www.broadbandnational.com	Nonfacilities-based general reseller of DSL and satellite for 36 companies (e.g. ACC Business, HughesNet, et al.).
24	CAC MediaNet, Inc.	www.cac.net/	DSL reseller; d.b.a. First Step
25	California Broadband Cooperative, Inc.	www2.ntia.doc.gov/grantee/california-broadband-cooperative-inc	$81 million BIP/BTOP grant to construct 10 Gbps middle mile fiber network that would mainly follow U.S. Route 395 from Carson City to Topaz Lake; project 5% done as of 8/11 report.
26	Camino-Net Internet Services	www.camino-net.com	Reseller; no longer in business; was dial-up only.
27	CCIS.net	www.ccis.net	Verizon reseller in DE and NJ.
28	Celito Communications	www.celito.net/	Raleigh, NC company supplying tech services to businesses (networks, VoIP, and broadband access) in North Carolina.
29	Cheetah Wireless Technologies, Inc.	www.cwti.us/cheeweb/homepage/	LV.Net has assumed CWTI's assets and is operating its networks.

30	Cleartouch.Com	www.cleartouch.com/	Reseller of DSL and cable and mobile wireless broadband for various national providers.
31	Clover Cable	n/a	Not an ISP; cable television line construction in Las Vegas, NV.
32	Colorado River Internet	n/a	No longer in business.
33	Comtech Communications Systems	www.comtechlv.com	Not an ISP; business telephone systems.
34	Connecting America	www.coam.net/	Dial-up ISP.
35	Corridor Communications	www.corridorcomms.ca	URL redirects to http://www.cciwireless.ca/, CCI Wireless, a Canadian company providing broadband access to Alberta.
36	Cyberonic Internet Communications, Inc.	http://www.cyberonic.com/	Reseller; A 007 Access (above) is d.b.a. of Cyberonic.
37	Deltaforce	www.deltaforce.net	Dial-up provider located in Raleigh, NC.
38	deluxehost.com	www.deluxe-host.com	Offers web hosting only.
39	DGUI	www.dgui.com/	No longer in business; domain name for sale.
40	Dial National	www.dialnational.com/	Inactive URL; out of business.
41	Dialer.net	www.dialer.net/internet_access/United_States.html	International reseller of dial-up and 3G wireless reseller.
42	DSL @ Interlync	www.interlync.com	Reseller of business DSL, T-1 and wireless.
43	DTS-NET.COM	www.dts-net.com/	Reseller; provides wholesale and retail telecommunications services.
44	Elko Broadband	n/a	No URL found; no info.
45	estream Wireless	www.estreamwireless.net/	Reseller; no longer in business.
46	ETI LLC	www.cyberenet.net/	General reseller of DSL services from infrastructure owned by Verizon, AT&T, and Covad.

47	Exwire	www.exwire.com/	Wi-Fi hotspot network where Exwire customers can easily access the Internet at several cafes, ski resorts, and other convenient public locations throughout Truckee and Lake Tahoe with Wi-Fi enabled devices.
48	Fast Dependable Access	www.fda.net/	No longer in business.
49	Go Mango Technologies	n/a	Can find no evidence that Go Mango is a company providing broadband in Nevada.
50	Hubwest Protected Networks LLC	www.hubwest.com	Dial-up and web hosting only; not a WISP; merged with Southwest Cyberport.
51	Imbris, Inc.	www.imbris.com	Broadband referral site.
52	IMGISP.NET	www.imgisp.net/	Broadband referral site.
53	In the Air Data	n/a	No URL found; no info.
54	Incredible Networks	n/a	No URL found; no info.
55	Inercom Communications Inc.	www.inercom.com	No longer in business.
56	Integra Telecom	http://www.integratelecom.com	Facilities-based B2B provider of communication and networking services in the western United States.
57	Interactiveinfo.com Inc.	www.rocketbroadband.com	Redirects to drumbeatnetworks.com, a Buffalo, NY company designing, developing, and managing the network infrastructure; offers cable television services in NY only.
58	iRadical	n/a	No URL found.
59	Ironwood Communications	www.ironwoodcommunications.com	Direct TV.
60	ISPartner.net	n/a	No URL found.
61	Jenco Speed Web	www.jencospeed.net	Ohio WISP only.
62	Jetstream Wireless	n/a	No URL found.
63	LANwaves	n/a	No longer in business.
64	LARIAT.NET	www.lariat.net/	WISP in Wyoming only.

65	LCSisp.com	www.lcsisp.com/index.cfm	National dial-up only.
66	Light Link Broadband	www.light-link.net/	Redirects to www.digis.net, a provider of fixed wireless broadband internet in Utah.
67	Lightyear Network Solutions, LLC	www.lightyear.net/	Telecommunications network company.
68	LinkAmerica.Net	www.linkamerica.net/	Shopping site.
69	MainBoard	www.mainboard.cc/internet.htm	VA-based computer store; general reseller; not a WISP
70	Maine Cable and Wireless	www.mainecableandwireless.com	Broadband referral site
71	Marcin Company	n/a	No URL found; no info
72	Millenicom Inc.	www.millenicom.com/internet_access.html	Resells mobile wireless on Sprint network EVDO cards.
73	Nanomega.Com	www.nanomega.com	Redirects to GoDaddy; out of business.
74	Nanosecond, Inc.	www.nanosecond.com	Provides computer repair, website design, website hosting, SEO, e-mail, and technology consulting.
75	Net Nevada	www.netnevada.net/	D.B.A. Intuitive Logic, providing IT management and consulting and solutions including colocation, remote network backup and monitoring, shared server hosting, and bandwidth aggregation
76	NetAccess, Inc.	www.nas.net/	Not a WISP; business portal site
77	Netriplex	www.netriplex.com/	Data center.
78	NetSpeed Online	www.netspeed-online.net	No URL found; no info.
79	NetVoice	www.netvoice.net/	VoIP search site.
80	Nevada Comstock Communications, LLC	nevadacomstock.com	Phone systems.
81	Nevada Hospital Association	www.nvha.net/	Not a broadband provider.
82	Nevada Telecommunications Association	www.nevtelassn.org	Not a broadband provider.
83	Nextlink Wireless, Inc.	www.nextlink.com	Acquired by XO Communications.

84	NextWeb, Inc.	n/a	Acquired by another company.
85	Northwest ISP	www.northwestisp.com/	No longer in business.
86	NuTel Broadband Corporation	www.nutelbroadband.com/	No evidence that this company offers broadband services in Nevada; it appears that this company was extremely vocal in 2006 then disappeared.
87	Overarch Broadband	www.overarch.com/	Broadband access in Idaho.
88	Pacific Internet Exchange	www.pie.us/, www.pacificinternetexchange.com	URLs not active; no longer in business.
89	Paknet Limited	www.ptcl.com.pk/pd_content.php?pd_id=279	Subsidiary of Pakistan Telephone Company; no USA services.
90	Planet Online	www.planetonline.net/	Offers website hosting services.
91	PremoWeb	www.premoweb.com/about_us/contact_us.html	URL inactive, out of business.
92	PrimeVision Communications, LLC	www.myprimevision.net	URL inactive, out of business.
93	Priority Wire & Cable	www.prioritywire.com	Not an ISP; priority wire and cable is a distributor of wire and cable serving electrical, utility, telecommunications, mining, and welding wholesale distributors.
94	Pyramid Lake Paiute Tribe	n/a	Not operational, BIP/BTOP funded project to deploy fiber-optic middle mile network across 742 square mile reservation.
95	Pyramid Net	http://www.pyramid.net/	Offers service, but below broadband threshold.
96	Rapid Cable	n/a	Rapid Cable was recently acquired by CalNeva Broadband in December 2008.
97	Renaissance Networks	www.renaissancenetworks.com/	IT support company based in New Mexico; not a WISP.
98	Sierra Internet Services, Corp.	http://www.sierranv.net/	Reseller of DSL services.
99	Silver State Internet	www.ssinternet.net	URL inactive; out of business.

100	Simply Dialup A Metrogeek Company	www.simplydialup.com/	Dial-up only; not a broadband supplier.
101	Sky Technologies, Inc.	www.skyforall.com	Dish network reseller.
102	SkyBridge Wireless	n/a	Not an ISP; renamed SkyBridge Technology Group; acquired aviation business.
103	Sling Broadband	www.slingbroadband.com/	Florida WISP.
104	SONNET Networking, LLC	www.sonnet.com/	California WISP.
105	Sparkplug Las Vegas, Inc.	www.airband.com/	Provides fixed wireless broadband to businesses.
106	Speakeasy, Inc.	www.speakeasy.net/	Business phone systems; not an ISP.
107	Spring Creek Wireless	www.springcreekwireless.com/index.htm	WiFi access for mobile home court in Spring Creek.
108	StarNetWX	www.starnetinc.com/	Dial-up and VoIP.
109	Surferz.Net	www.surferz.net/	Dial-up in upstate NY only; not a WISP.
110	Switch Communications Group LLC	www.switchnap.com/	Colocation; NOC services.
111	T1 Shopper	www.t1shopper.com/	Search engine for general reseller.
112	The-OnRamp.Net	www.the-onramp.net/	Access provider below NTIA definition.
113	Total Access Networks, Inc.	www.totalaccess.net	Fixed wireless provider in Elgin, TX.
114	TSISP.NET	www.tsisp.net	Shopping site.
115	U.S. TELEPACIFIC CORP	www.telepacific.com	Acquired by MegaPath.
116	UNEV Communications, Inc.	n/a	UNEV (Lovelock) does not offer Internet Access.
117	United Cable Management, Inc.	n/a	Out of business March 2011.
118	University Corporation for Advanced Internet Development	www2.ntia.doc.gov/grantee/university-corporation-for-advanced-internet-development	Currently ineligible under the parameters and guidance of the SBI grant program.

119	UNUM Telecommunications, Inc.	www.utinet.net/	URL inactive; out of business.
120	USA Airnet, Inc.	www.usaairnet.com	URL inactive; out of business.
121	Velocitus	www.velocitus.net	URL inactive; out of business.
122	Verde Communications	www.sparkplug.net/	Acquired by Sparkplug in July 2007.
123	Washoe Weblinks	www.washoeweblink.com	URL inactive; out of business.
124	Wireless Roanoke, Inc.	www.wirelessroanoke.com/	URL inactive; out of business.
125	Wireless TelCorp, Inc.	www.wirelesstelcorp.com/	Fixed wireless provider with offices in TX, NV, and NC.
126	Wireless Think Tank	www.wirelessthinktank.com/	URL inactive; out of business.
127	wisbin	www.wisbin.com/	Wisconsin ISP resells DSL.
128	WUE Inc.	www.lctsys.com/index.php?page=home	WUE provides mobile cellular and wireless services.
129	www.AmericanAngel.us	www.americanangel.us/	URL inactive; out of business.
130	YEYZOO.NET	www.yeyzoo.net/	URL inactive; out of business.
131	YLISP (Your Local ISP)	www.itsyournet.com	Provider inactive; no longer in business.
132	YourT1Wifi.com	www.yourt1wifi.com/	Providing service In Idaho, Washington, and Alaska.
133	ZOOM Internet Services, LLC	n/a	Acquired by another company.

Appendix A: Estimation of Non-Participating Provider: Avant Wireless, LLC

AVANT WIRELESS, LLC

As part of its ongoing broadband mapping efforts, Connected Nation has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) mapping program.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to Avant Wireless LLC (Avant), a wireless Internet service provider (WISP), located in Carson, Nevada with a service area around Reno, Washoe Valley, Spanish Springs, Palomino Valley, Pleasant Valley, and Stead Airport. The narrative will include information regarding how and where CN obtained publicly available data.

Background

Avant was initially contacted on February 11, 2010, and was less than courteous at the time. Although the provider representative voluntarily provided a contact e-mail address, the next telephonic contact attempt on February 25, 2012, ended abruptly when the provider hung-up the phone. On April 17, 2011, the provider responded to an e-mail effectively refusing to participate in the Connect Nevada and SBI project. This pattern was repeated on August 4, 2011, thus prompting CN to flag this provider for the development of a future coverage estimation document for submission to NTIA.

On December 8, 2011, a CN staff member completed desktop research and conducted on-the-ground site verification and data collection activities. Subsequently, on March 5, 2012, this data was used to create a wireless propagation model for submission during the April 2012 mapping submission to NTIA.

During this submission period, 2 additional contact attempts were made (July 11 and August 1, 2012) soliciting updated data and approval or rebuttal of the previously created coverage estimation document. On August 4, 2012, the provider responded by e-mail indicating that they continue to decline to participate.

The Issue

Despite 3 additional contact attempts with Avant, the provider has predicated its unwillingness to participate in the Nevada broadband mapping initiative.

CN has continued to closely monitor the provider's website to identify any changes in the coverage area or maximum advertised speeds but, as of this submission, has not located any new evidence of recent changes to either the coverage area or the maximum advertised speeds. To that end, CN is resubmitting this coverage estimation narrative, substantially in its original format, and will continue to monitor the provider's website as well as ensure ongoing outreach until either the expiration of the SBI grant or until such time as the provider voluntarily contributes data.

<u>Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing</u>

CN has built a file based on research information and, as time progressed, enriched the file with information obtained through the public domain and (as previously mentioned) through on-the-ground data extraction and site verification activities. For example, CN reviewed the provider's website (www.avantwireless.com) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system for Avant Wireless LLC, Avant Wireless and Avant * (where * indicates wildcard search) yielded no FRN **(Exhibit C)**.

Exhibit A: Service Plans

<u>Typical Residential service is $45.95/month and $150 Installation fee</u>
<u>1 Install Rate</u>
Basic One-time Installation $150 standard $200-$400 for special/business installations, $300 typical • If customer purchases equipment (not recommended*) installation is free • If customer purchases equipment monthly, one time installation fee is $75 • Beyond Basic Installation contact us for details
<u>2 Equipment Purchase Price</u> (Not Recommended*)
• Radio, antenna, power supply and cable $249.99 + tax
<u>3 Equipment Lease Price</u>
• Radio, antenna, power supply and cable $17 + tax for 12 months
Choose Only One of the above 3 options
<u>Monthly Service Fees</u> (Residential) this is guaranteed rate, speed will typically be around Max speed.
128 kilobits/sec min rate - **7** megabits/sec Max • $45.95/month • $60/month Mt Rose area
2. 1 megabit/sec min rate - **10** megabits/sec Max • $60/month
*We do not recommend customer purchase or lease of equipment as the customer will not be covered for equipment failure after 3 months. The option is provided for customers who have special requirements for ownership of equipment on their property.

Exhibit B: Service Area as Presented on Provider's Website

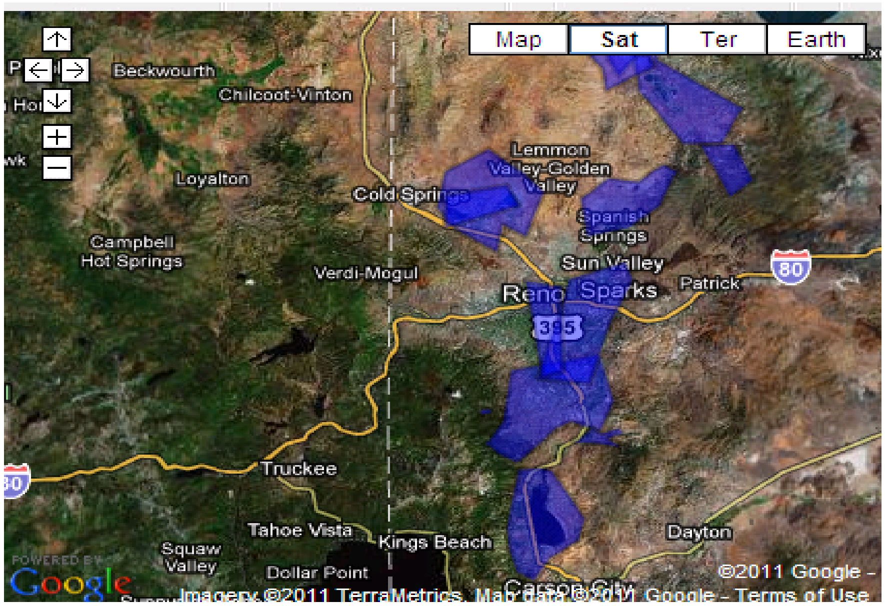
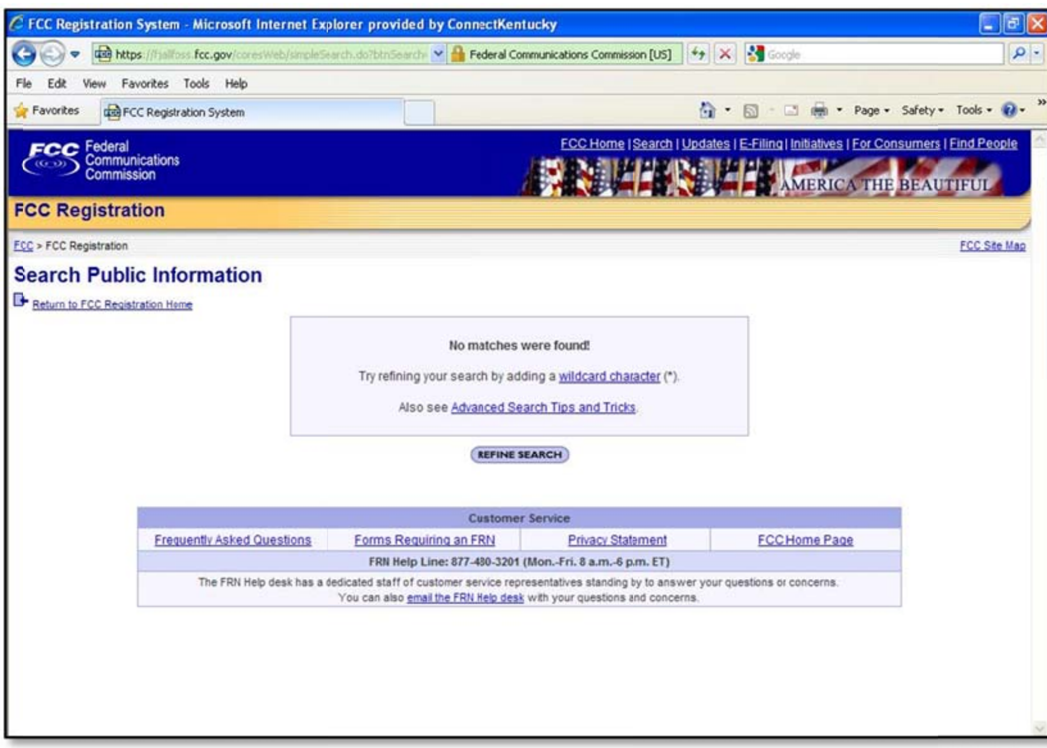


Exhibit C: Federal Registration Number Search Results



Preliminary Identification of Provider's Coverage Area

During the October 2011 mapping cycle, CN extracted the Avant service area polygons from the provider's website (Exhibit B) and submitted the polygons to NTIA. Information from that website was utilized to create a spectrum analysis testing route.

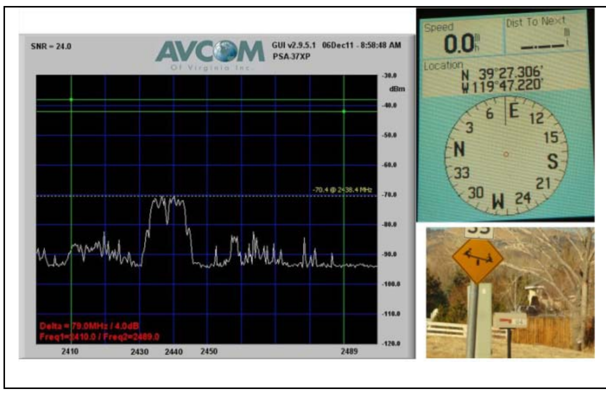
<u>Testing Techniques</u>

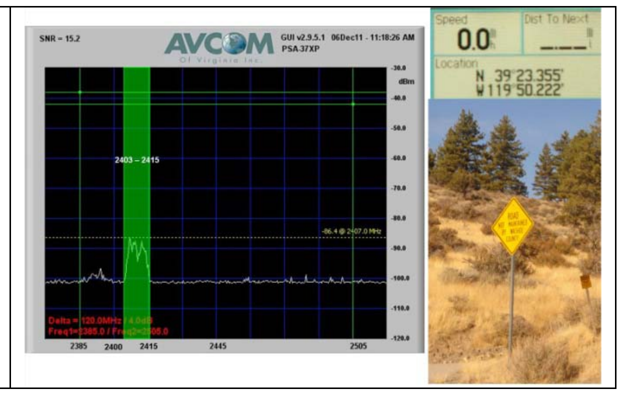
CN staff then developed a spectrum analysis data collection and site validation plan **(Exhibit D)**, based on information derived from Avant's coverage depiction from its website. Once in the field, the CN engineer measured signal strength at 33 different locations throughout South Reno, Washoe Valley, along Mt Rose Highway, parts of downtown Reno, Sparks, Spanish Springs, and Palomino Valley. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands. Each validation point was scrutinized for frequency of operation to ascertain if multiple frequencies were being utilized by the provider. A screen image of the operating frequency (or frequencies) was captured and general notes were recorded for each location **(Exhibit E)**.

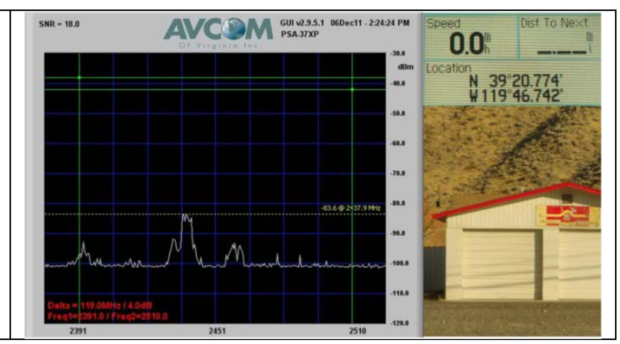
Exhibit D: Avant Spectrum Analysis Survey Locations

Exhibit E: Avant Field Verification Tests and Notes

Site #	Date	Provider	(N) Lat Decimal	(-)(W) Long Decimal	Peak Freq	Peak Sig Strength	Spectrum Analyzer	Time	Images
21	12/6/11	Avant Wireles	39.379217	-119.836500	2424.4	-63.6	Avcom PSA	11:32 AM	Yes
22	12/6/11	Avant Wireles	39.377800	-119.836483	2434.3	-65.6	Avcom PSA	11:37 AM	Yes
23	12/6/11	Avant Wireles	39.391817	-119.767400	2431.9	-60.4	Avcom PSA	12:19 PM	Yes
24	12/6/11	Avant Wireles	39.364617	-119.732750	2436.4	-88.0	Avcom PSA	12:41 PM	Yes
25	12/6/11	Avant Wireles	39.250400	-119.824850	2438.8	-82.0	Avcom PSA	1:17 PM	Yes
26	12/6/11	Avant Wireles	39.277433	-119.756767	2410.2	-89.6	Avcom PSA	1:32 PM	Yes
27	12/6/11	Avant Wireles	39.276467	-119.787233	2462.5	-95.0	Avcom PSA	1:56 PM	Yes
28	12/6/11	Avant Wireles	39.289083	-119.784600	2410.2	-80.8	Avcom PSA	2:02 PM	Yes
29	12/6/11	Avant Wireles	39.302933	-119.783950	2452.9	-80.8	Avcom PSA	2:04 PM	Yes
30	12/6/11	Avant Wireles	39.315150	-119.785633	2442.5	-83.6	Avcom PSA	2:12 PM	Yes
31	12/6/11	Avant Wireles	39.346233	-119.779033	2437.9	-83.6	Avcom PSA	2:24 PM	Yes
32	12/6/11	Avant Wireles	39.319800	-119.809800	2414.3	-78.8	Avcom PSA	2:38 PM	Yes
33	12/7/11	Avant Wireles	39.520183	-119.780017	2421.9	-53.2	Avcom PSA	11:09 AM	Yes

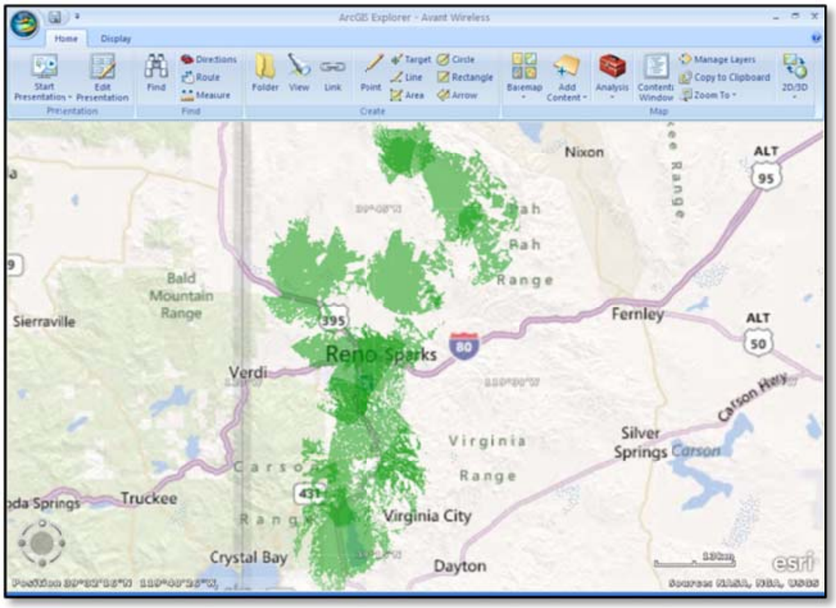






<u>Results and Submission for October 2012</u>
The publicly available data was transferred to the CN Provider Information file. A composite propagation study was completed **(Exhibit F)** based on the service area map polygons extracted from the provider's website and based on the field verification data established during the data collection exercise.

Exhibit F: Avant Coverage Estimation (Propagation Model)



Appendix B: Broadband Provider Log

Broadband Provider Log

Complete	76
Non-Responsive/Refused	1
In Progress	0
Count of Datasets by Status	**77**
Total Unique Providers Represented	**56**

Provider Name	Platform	Status	NDA Execution Date	Notes
Absolute Best Communications, LLC	Fixed Wireless	Data Added to Statewide Inventory		[AUG-27-12 Jess Cary] Correction: Initial submission of provider's coverage, but they were in service previously.
Air-Internet, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[AUG-27-12 Jess Cary] Correction: Initial submission of provider's coverage, but they were in service previously.
Arizona Nevada Tower Corporation	Fixed Wireless	Data Added to Statewide Inventory	3/8/2010	[AUG-27-12 Jess Cary] Change: Provider added tower.
AT&T Inc.	DSL	Data Added to Statewide Inventory	12/16/2009	[AUG-27-12 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
AT&T Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[AUG-27-12 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[AUG-27-12 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Charter Communications, Inc.	Cable	Data Added to Statewide Inventory	12/15/2009	[AUG-10-12 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Citizens Telecommunications Company of Ne	DSL	Data Added to Statewide Inventory	1/22/2010	[AUG-12-12 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; partially new dataset provided for October 2012 submission.
CoxCom, Inc.	Cable	Data Added to Statewide Inventory	2/3/2010	[AUG-27-12 Jess Cary]Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Great Basin Internet Services, Inc.	Fixed Wireless	Data Added to Statewide Inventory	4/6/2010	[AUG-27-12 Jess Cary] Change: Provider added additional tower.
Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/6/2010	[AUG-27-12 Jess Cary] Change: Provider expanded coverage area.
MegaPath Inc.	DSL	Data Added to Statewide Inventory	2/15/2010	[AUG-30-12 Jess Cary] Correction: Submitting data for the first time, but service was offered previously.
MetroPCS Wireless, Inc.	Mobile Wireless	Data Added to Statewide Inventory	2/10/2012	[AUG-27-12 Jess Cary] Change: Provider expanded coverage area.
Schatnet Internet LLC	Fixed Wireless	Data Added to Statewide Inventory		[AUG-27-12 Jess Cary] Change: Provider added additional tower.
Spacenet Inc.	Satellite	Data Added to Statewide Inventory		[SEP-6-12 Jess Cary] Correction: Initial submission of provider's coverage, but they were in service previously.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[AUG-27-12 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[AUG-27-12 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Vegas Wifi Communications LLC	Fixed Wireless	Data Added to Statewide Inventory	4/7/2010	[AUG-27-12 Jess Cary] Change/Correction: Provider added additional tower and decreased overall speed down to tier 5.
Verizon Communications, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[AUG-27-12 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.

ViaSat, Inc.	Satellite	Data Added to Statewide Inventory	1/8/2010	[AUG-17-12 Jess Cary] Correction: Coverage area remained the same, but tier 5 download/3 upload was reduced while tier 4 download/2 upload was increased.
WaveDirect Telecommunications, LLC	Fixed Wireless	Data Added to Statewide Inventory		[AUG-20-12 Jess Cary] Correction: Initial coverage submission for provider that has previously been in service.
CoxCom, Inc.	Backhaul	Backhaul Provider Only Processing Complete	2/3/2010	
MegaPath Inc.	Backhaul	Backhaul Provider Only Processing Complete	2/15/2010	
Sprint Nextel Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/14/2010	
T-Mobile USA, Inc.	Backhaul	Backhaul Provider Only Processing Complete	1/8/2010	
Hot Spot Broadband, Inc.	Fixed Wireless	Speed Only Update; Data Processing Complete		[AUG-27-12 Jess Cary] Change: Provider upgraded infrastructure and can now offer tier 9 download speeds and tier 8 upload speeds.
Avant Wireless LLC	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
Above All Communications, LLC	DSL	No Update to Provide		
Above All Communications, LLC	Fixed Wireless	No Update to Provide		
Arizona Nevada Tower Corporation	Fixed Wireless	No Update to Provide	3/8/2010	
Baja Broadband Holding Company, LLC	Cable	No Update to Provide	2/22/2010	
CalNeva Broadband, LLC	Cable	No Update to Provide	4/8/2010	
CC Communications	DSL	No Update to Provide	6/11/2010	
CC Communications	Fiber	No Update to Provide	6/11/2010	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Citizens Telecommunications Company of Ne	Backhaul	No Update to Provide	1/22/2010	
Clearwire Corporation	Fixed Wireless	No Update to Provide	3/3/2010	
Clearwire Corporation	Mobile Wireless	No Update to Provide	3/3/2010	
ETAN Industries	Cable	No Update to Provide		
Ezznet, Inc.	Fixed Wireless	No Update to Provide		
Filer Mutual Telephone Company	DSL	No Update to Provide	2/9/2010	
Fort Mojave Telecommunications, Inc.	DSL	No Update to Provide		
Fort Mojave Telecommunications, Inc.	Fiber	No Update to Provide		
High Desert Internet Services	Fixed Wireless	No Update to Provide		
Highlands Wireless Inc.	Fixed Wireless	No Update to Provide		
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
InfoWest, Inc.	Fixed Wireless	No Update to Provide		
Jab Wireless, Inc.	Fixed Wireless	No Update to Provide	6/14/2010	[JUL-10-12 Dwayne Goodman] Jab Wireless acquired all KeyOn Communications, Inc. assets; now becoming a broadband provider for the state.
LasVegas.Net LLC	Fixed Wireless	No Update to Provide		
Lincoln Communications, Inc.	DSL	No Update to Provide	3/5/2010	
Lincoln Communications, Inc.	Fiber	No Update to Provide	3/5/2010	
Martell Telecommunications	DSL	No Update to Provide	3/23/2010	
Moapa Valley Telephone	DSL	No Update to Provide	2/22/2010	
Moapa Valley Telephone	Fiber	No Update to Provide	2/22/2010	
Mt. Wheeler Power	DSL	No Update to Provide	4/5/2010	
Mt. Wheeler Power	Fixed Wireless	No Update to Provide	4/5/2010	
Oasis Online, Inc.	Fixed Wireless	No Update to Provide		
Rio Virgin Telephone Company	DSL	No Update to Provide		
Rio Virgin Telephone Company	Fiber	No Update to Provide		
SMS Computing, Inc.	Fixed Wireless	No Update to Provide	3/19/2010	
Tele-NET.net LLC	Fixed Wireless	No Update to Provide		
tw telecom of nevada, llc	Backhaul	No Update to Provide	4/27/2010	
Verizon Communications, Inc.	Backhaul	No Update to Provide	12/14/2009	
WENR Corporation	Cable	No Update to Provide	1/11/2010	
Wireless Beehive, LLC	DSL	No Update to Provide	4/5/2010	
Wireless Beehive, LLC	Fixed Wireless	No Update to Provide	4/5/2010	
XO Communications, LLC	Backhaul	No Update to Provide	6/2/2010	
Yonder Media	Fixed Wireless	No Update to Provide		
Yonder Media	Fixed Wireless	No Update to Provide		
Charter Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data	12/15/2009	
Cogent Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data		
Level 3 Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
Nevada System of Higher Education	Backhaul	No Update Provided - Use Last Submission Data		
Robinson Communications Corporation	DSL	No Update Provided - Use Last Submission Data	2/25/2010	
Zayo Bandwidth, LLC	Backhaul	No Update Provided - Use Last Submission Data		
Mason Valley Quicknet, LLC	Fixed Wireless	Non-Responsive to Multiple Attempts		8 contact attempts were made this period between July 7, 2012 and August 14, 2012.

"White Paper" from *New York* describing Round 6 (Fall, 2012) Data Submission to the NTIA under the SBI

October 1, 2012

Executive Summary

The Broadband Mapping Team at the New York State Office of Cyber Security (OCS) is pleased to submit our Round 6 (Fall 2012) data for the State Broadband Initiative (SBI).

Our goals for Round 6 were to: 1) Gain new participants and maintain the very high level of participation from our current participants; 2) Add to and enhance our data verification methods and; 3) improve the completeness and quality of the data delivered. We believe we have met those goals.

We had 84 providers participate in the Spring 2012, Round 5 submission. That number has increased to 86 in Round 6. VSAT Systems LLC (dba Skycaster) and Stealth Communications were added this round. We still anticipate adding new participants in future rounds because we will be continuing dialog with some fixed wireless companies that we know about but have not yet begun participating; new start-ups are possible; and other regional or national providers new to NYS may be discovered.

Notable among the improvements made in data collection and verification this round is that:

- we realized the largest incremental increase in the amount of broadband service attributes we were able to collect from Community Anchor Institution;
- we noticed a significant increase in the quality of new and updated maximum advertised speed data we collected; and
- we implemented two new verification methods and are energized to continue to find innovative ways to validate and identify inconsistencies in provider reported availability data.

The remainder of this paper provides a summary of our data collection results and describes our methodology for performing data verification.

Provider Participation Summary Tables for Round 6:

0	**Potential Providers identified**
2	**Actual Providers identified**
86	**Total Participating Providers with data in the submission**
67	Wireline Providers
20	Wireless Providers (2 are both Wireless & Wireline)
1	Provider is middle-mile only
42	Providers submitted Middle Mile Data

Technology Type	Wireline Census Block Provider Count	Wireline Service Availability by Census Block	Wireline Street Segment Provider Count	Wireline Service Availability by Street Segment	Wireless Provider Count	Wireless Services by Shapefile	Middle Mile Provider Count	Middle Mile Points
Asymetric xDSL	38	300,214	34	25,063	0	0	26	1,497
Symetric xDSL	2	62,405	1	52	0	0	0	0
Other Copper Wireline	2	87,666	2	251	0	0	0	0
Cable Modem - DOCSIS 3.0	6	227,363	5	15,787	0	0	3	10
Cable Modem - Other	12	51,966	11	13,294	0	0	1	1
Optical Carrier/Fiber to the End User	24	128,338	18	2,447	0	0	8	674
Satellite	0	0	0	0	4	5	0	0
Terrestrial Fixed Wireless - Unlicensed	0	0	0	0	10	17	1	12
Terrestrial Fixed Wireless - Licensed	0	0	0	0	1	1	0	0
Terrestrial Mobile Wireless	0	0	0	0	6	17	2	15
Other (middle-mile only)	0	0	0	0	0	0	1	2

Verification List:

1. Automated verification
    a. Domain and topology rules in delivery geodatabase
    b. Submission scripts
    c. Feature dataset cross checks
2. Provider website research
3. Virtual Field Inspections (using Google Streetview)
4. Crowd-sourced data
    a. NYS Speed Test data points
    b. FCC Speed Test records
    c. NYS Broadband Map feedback
5. Use of government data sources
    a. DEC2011_AssessNY.gdb
    b. FCC Aggregated 477 Data
    c. NYS DMV data
    d. NYS Lottery terminal data

    e. NYS Streets and Address ranges
    f. NYS Address Points
    g. NYS Orthoimagery
    h. NYS Public Service Commission Cable Franchise Agreements data
6. Commercial data sources
    a. TomTom Data ILEC, CLEC and Rate Center Exchange Boundary data
    b. Online look up tools for middle mile & central office locations
    c. NAVTEQ address points
    d. Pictometry oblique aerial imagery/Google's Street View
    e. APNIC Whois database (publically available IP Address search engine)

7. Select Community Anchor Institution (CAI) locations
8. Provider verification maps
9. Clip wireless data to NTIA recommended NYS Boundary
10. Removal of 'uninhabited areas'
11. Other Grantee State Broadband Maps and National Broadband Map

Explanation of Verification Activities:

1. **Automated verification** was accomplished via the following methods:
    a. <u>Domain and topology rules in delivery geodatabase</u> automatically validate features and validate topology
    b. <u>Submission Scripts</u>: Repeatedly running the NTIA supplied Python script, the Massachusetts modified Python submission script and frequency statistics script, as well as a New York modified version of the NTIA submission script combining elements of the NTIA and Massachusetts scripts
    c. Feature dataset cross-checks: ESRI 'Frequency' tool used on Provider Name, DBA Name, FRN across feature datasets with cross comparisons to ensure consistency across all of these datasets

2. **Provider Website Research**: The team continues to use the providers' websites verify provider data submitted for the SBI mapping program. Data most frequently checked are maximum advertised speeds and whether the service offering is business or residential. That later classification is important to NY because our mapping team differentiates business only service on our state map and our Broadband Program Office has recently used that distinction in developing criteria for a capacity building grant.

3. **Virtual Field Inspections (using Google Streetview)**
Two members of the Broadband mapping Team were trained by members of our Public Utilities Commission staff on how to identify cable and fiber lines amongst the telephone and power lines on utility poles. There are certain distinctive wiring patterns and equipment boxes that identify where cable or fiber is present. After viewing representative schematics and photographs, the trainees spent time identify equipment and cables with Google Streetview. Afterwards, the PUC staff took the trainees into

the field to field verify the same equipment. This new knowledge and techniques were subsequently used to investigate areas where a provider's presence on a road was called into question via one of our other verification methods. This is a time intensive verification method but was found to be very effective when field verification was deemed to be the only other way to investigate a discrepancy.

4. **Crowd-sourced data**

   a. NYS Speed Test data points and attributes were used to verify provider reported availability. The NYS speed test website includes a data collection form which requests:

      i. Street address at which the test was taken
      ii. Service provider
      iii. Service technology

   After satellite provider records and sub-broadband speed records were removed, 6,822 records were successfully geocoded and used for verification. Four levels of verification were established for points that fell within areas of reported service availability. They are:

   Code 1 = Provider and technology matched
   Code 2 = Provider matched and technology unknown
   Code 3 = Provider matched but technology is mismatched
   Code 5 = Provider and technology unknown but Broadband is available at the location

   Each census block and street segment availability record involved with this verification activity was assigned one of the above codes.

   b. FCC speed test records were used to verify provider reported availability. FCC speed test records lack provider information but we were able to successfully establish the provider via a publically available IP Address search engine (the APNIC Whois Database). Those records were then used to verify provider reported availability in the same manner as was used with the NYS speed test points. Because the technology was not known, the highest verification code assigned was 2 (Provider Matched and Technology = 'Unknown'). Here is a statistical summary.

	Number	Percentage
Total Number of FCC Wireline Speed Test Points	69,922	N/A
Total Number / Percentage Successfully Geo-coded	39,946 / 69,922	57%
Total Number / Percentage Successfully IP Searched	21,766 / 39,946	54%

   c. NYS Broadband Map feedback:

   Our NYS Broadband map has been a tremendous asset for our program by engaging the public to communicate their personal knowledge and experiences of their local broadband scene. On February 15, 2012, our state mapping website was updated with more methods to gather public feedback. These included three new prominent buttons on the front page, including the *Report an Unserved Address* button. This function gathers the user's address and places a dot on the map at their location—and it is viewable in our "Public Feedback" layer. A red dot corresponds with an unserved wireline report, and a yellow dot corresponds with an unserved wireless report. Along with this new functionality, the public was given an additional chance to leave comments for the broadband team, as well as contact information so they can be responded to with a personal e-mail or phone call. During Round 6, investigative efforts to identifying and removing suspect census blocks and street segments continued. Using public feedback and the providers' own websites ("availability checkers"), specific census blocks were targeted and researched. If the Provider's availability checker corroborated an unserved wireline report, and additional checks done on a representative sample of address points within that same census block also indicated the block was unserved (by that provider), the block was removed from that provider's availability coverage. This specific type of verification and editing can only be done for providers who have a publically accessible availability checkers. Many providers do not have availability checkers on their websites. And for the ones that do have checkers, several have now added functionality to blocks users (IP addresses) who cross some threshold of checks in a single day or some other time period. This caused us to now use these checkers strategically, with less frequency.

Although our user enhancements for gathering public feedback made the process of reporting in easier for the general public, the volume of feedback initially did not edge upward that significantly. But, an August 14th broadband summit organized by a local county's department of economic development and the broadband-minded US Congressman from the region proved to be an impetus to triggering a burst of reports. A few newspaper articles after the broadband meeting instructing people to use the State broadband map also helped keep the public feedback continuing to flow. Lately, a sparsely populated town in the Catskills Mountains has been determined on making their broadband-challenged situation known on our public map. While about 22 response-necessary public e-mails were fielded from July 1st through August 13th, since then there have been no fewer than 180. Therefore, as of this writing, we have nearly doubled the public e-mail received in this one round compared with the total of the previous two. In addition, our mapping team fielded a number of phone calls from broadband lacking folks and their information was used to create additional unserved address reports. Despite the increased volume, it is still a priority for us to respond in a timely manner to each and every public feedback notification where a contact e-mail or phone number is provided.

5. **Use of government data sources:**

DEC2011_AssessNY.gdb: The NTIA Assessment Database from Round 5 can be used to verify provider reported availability, technology type, max advertised download and max advertised upload speeds in Census 2010 blocks. A field was added to the tables in the NTIA assessment database files to record a combined score of the matched records for census blocks, street segments, and wireless. Using a binary system, records were assigned a coded value from 0 to 6 as indicated in the table below.

PN	TT	MADS	MAUS	OCS	
x	x	x	x	**0**	Unscored
0	0	0	0	**1**	No Match
> 0	0	0	0	**2**	PN
> 0	> 0	0	0	**3**	PN and TT
> 0	> 0	> 0	0	**4**	PN, TT, MADS
> 0	> 0	0	> 0	**5**	PN, TT, MAUS
> 0	> 0	> 0	> 0	**6**	All Scored Elements

PN: Provider Name
TT: Transmission Technology
MADS: Maximum Average Download Speed
MAUS: Maximum Average Upload Speed
OCS: Office of Cyber Security Score

The first division was made of records that were either scored or un-scored. They were given a code of 0. Next, records that had no matches with the comparison data and scored 0 in all of the elements were coded 1. Thereafter, any element that scored > 0 in the NTIA assessment database was considered a match and records were assigned a coded value of 2 to 6 to indicate the combination of matched elements.

It should be noted that census blocks and street segments reported by New York State to the NTIA include blocks where a provider could serve in the "7 to 10 day" window and not just current subscribers. It is not revealed in the **DEC2011_AssessNY.gdb** documentation whether the comparison data used by the NTIA to compile the statistics differentiated between availability and subscribers.

Now that this methodology has been developed using the R5 verification data, we can apply it to R7. We plan to use the R6 verification data that is received from NTIA to guide our outreach to providers in R7. Any provider whose submission remains unchanged and who have blocks or street segments with OCS scores below 3 will be asked to verify that those blocks are correct.

a. **Aggregated FCC 477 data** were used in Round 5 to identify providers by tract, speeds above and below 3 mbps, and business vs. residential offerings. In Round 6 we used this previous data as a benchmark to review new data received. We will update our findings when new A477 data is made available to grantees.

b. The **NYS Department of Motor Vehicles** supplied three datasets for our independent verification activities. A list of 2,080 unique Satellite Offices, Dealer Locations and Inspection Station Locations were used to verify provider reported availability. *All of these facilities have broadband connections.*

The Dealer and Inspection Location datasets did not have provider or technology information associated with the locations. Therefore, the highest verification code assigned to any Census Blocks containing the points and Street Segments within 500 feet of the points was a 5 because we were only able to confirm that there was broadband at those locations. However, the DMV Satellite Offices dataset came with provider information, so any Census Blocks containing the points and Street Segments within 500 feet of the points that matched the provider name were assigned a verification code of 2.

c. **The NYS Lottery** supplied a dataset to add to our independent verification sources. The majority of the Lottery data we received did not have provider or technology information associated with it, so it could not be determined if many of the sites *actually* had access to a broadband connection. However, there were 276 Lottery terminal locations that had provider information associated with them. These locations were *confirmed* to have broadband connections and therefore any Census Blocks containing the points and Street Segments within 500 feet of the points that matched the provider name were given a verification code of 2.

d. **NYS Streets and Address Ranges** is a dataset we use to submit all of our provider data in census blocks > $2mi^2$. They are also used as part of our geocoding. Street address ranges are also used in verification of provider data by testing addresses along segments with online provider service look-up tools ("availability checkers").

e. **NYS Address Points** were used in the verification of provider data from public reports through investigation of in-block addresses and then testing those addresses with online provider service look-up tools.

f. **NYS Orthoimagery** was used as an aid during provider data processing.

g. **NYS Public Service Commission Cable Franchise Agreements data** were used in the verification of cable broadband availability. The dataset contains information about which cable providers are franchised by municipality and indicates if they provide cable broadband in the municipality or not. This dataset was used during data processing as a frame of reference for the cable broadband data we received and to flag and correct possible overstatement of provider data.

6. **Commercial data sources:**

a) **TomTom ILEC, CLEC and Rate Center Exchange Boundary data** were used to verify provider reported availability. The TomTom data included boundaries for many of the broadband providers we have received data from. During data processing, TomTom boundaries for each provider included in the dataset were overlaid onto the provider blocks and street segments footprint to ensure that the availability data sent to us by the providers fell reasonably within the respective boundary in the commercially available TomTom data. All of the provider footprints that had matching boundaries in the TomTom data fell within their respective boundary. In one case, Verizon New York, the ILEC boundary was used to remove outlier data. Discontinuous blocks and streets submitted that fell more than one mile outside Verizon's ILEC boundary was removed. The TomTom Exchange Boundary data was used to further improve broadband availability and middle mile data for Frontier Communications. Their DSLAM data is CLLI-coded which are tied to specific exchanges. By using the exchange boundary dataset we were able to improve the accuracy of many of Frontier's DLSAM and Central Office locations, and thereby improve the blocks and streets broadband data for Frontier overall.

b) **Online look up tools for middle mile & central office locations:** Additional publicly available CLLI code location lookups were used to supplement the refinement of Frontier's DSLAM locations: *Marigold Technologies* Central Office Lookup Tool (http://www.marigoldtech.com/lists/co.php) and *TelcoData.us* (http://www.telcodata.us/) online search tools. Further research into these or other publicly available datasets may help us add to, refine, and verify our middle mile and broadband availability data for all of our facilities-based broadband providers.

c) **NAVTEQ Address Points** were also used as an aid during provider data processing, for geocoding address data, and also in the verification of provider data by testing addresses with online provider service look-up tools

d) **Pictometry oblique aerial imagery/Google's Street View**: In the process of improving the CAI point location accuracy, we are using the CAI's website, Bing's Bird View (Pictometry Oblique Aerial Imagery) and Google's Street View function to provide us information to accurately put the points on the rooftop of the building. The CAI website can provide information about name, address, and exterior pictures of the CAI. With this information, we can use Google's Street View to identify the exact location of the building, either by matching the pictures or looking at signs. If Google's Street View failed to provide enough clues to be certain, we will use the Bing's Bird View to identify the exterior look of the building and try to match that with the pictures from the homepage. Additionally, we can look for adjoining clues such as a playground around the building if we are looking to improve a school CAI point.

e) **APNIC Whois database,** as mentioned above, was used add provider information to FCC speed test records.

7. **Select CAI locations** were used to verify provider reported availability. Through our continuing relationship with the University at Albany's Center for Technology in Government (CTG), we acquired new, complete broadband service details for 2,481 CAIs during the Round 6 data gathering process. Each of these records was used to verify the provider reported data. Where the information matched, the highest verification code was assigned (1 = Provider and technology matched). We also selected Colleges, Hospitals, Federal Correctional Facilities, State Prisons and State Police Stations from our total collection of previously identified CAIs to be used as an additional verification data source. While we do

not have complete service details for some of these facilities, we strongly believe all have broadband connections.

8. **Provider verification maps:** For providers with significant changes from the previous round, we created review maps showing Round 6 availability aggregated to census blocks and street segments. The providers were given at least five days to respond and initiate any changes or corrections. Changes were made based on provider feedback. Changes were documented for future reference. These OCS generated maps were later compared to the provider footprints in the geodatabase to ensure that the data loaded correctly. Many of the providers have multiple review maps, so each of these maps had to be examined and compared to the corresponding area in the data.

9. **Clipping all wireless data to the** NTIA recommended **NYS boundary file** to help ensure topological compliance for all wireless availability to be wholly within New York State.

10. **Removal of 'uninhabited areas':** These areas have been classified as land where development cannot occur, and where household wireline broadband will not be needed at any foreseeable time. If the center of a census block with no population or housing units falls within an uninhabitable area, the entire census block ≤ $2mi^2$ or all street segments within an identified block > $2mi^2$ are classified as uninhabited. We remove uninhabited blocks and streets from the provider submission data. The classifications of uninhabited lands include, but are not limited to: water, wilderness lands, reforestation areas, as well as portions of state parks, federal nuclear sites, and recreation areas.

11. **Other Grantee State Broadband Maps** and the **National Broadband Map were** used to compare and identify providers and coverage areas particularly along NYS boundaries

New York Methodology Outreach List:

As directed by the SBI Program Office in the March 26, 2012 delivery webinar, New York has included only providers who submitted data, or those who have been identified as true potential providers, in our Round 6 Data Package.xls.

The following "outreach list" is a summary of providers not included in Data Package.xls. This list represents the volume of companies that New York has researched, contacted and, in some cases, received data from in previous and current data cycles. The list includes:

- Companies found to be "not a provider"
- Providers who do not serve New York
- Broadband equipment companies
- Providers who chose to opt-out of the program
- Resellers

Providers are identified by DBA name, provider type, and status. Comments are included for additional details. **There are no changes to this table from last round.**

Filing Company DBA	Provider Type: Broadband=1 Reseller=2 Other=3 N/A=4	Provided Data Will provide data Will Not provide data Non-Responsive	Comments (Correspondence)
2nd Century Communication	4	Will Not Provide Data	Purchased by Covad
3M Telecom Systems Division	4	Will Not Provide Data	Supplier of equipment to broadband providers
8x8, Inc.	4	Will Not Provide Data	Voice only.
A.R.C. Networks, Inc	4	Will Not Provide Data	Cannot identify this company or what they provide
ABA Net, LLC	4	Will Not Provide Data	Voice services
ACC Business	2	Will Not Provide Data	Emailed to indicate they cannot participate
ACC National Telecom	4	Will Not Provide Data	Voice/data infrastructure company
Access One, Inc.	2	Will Not Provide Data	Business only reseller.
Access Point, Inc.	2	Will Not Provide Data	Reseller.
Accessline Communications Corporation	4	Will Not Provide Data	Voice only.
ACCESSLINE COMMUNICATIONS CORPORATION	4	Will Not Provide Data	voice/telephoney services
Ace Innovative Networks	2	Will Not Provide Data	Have contacted previously but reseller status was low priority for R5.
Ace Innovative Networks, Inc.	2	Will Not Provide Data	Reseller of Verizon.
Acella, Inc.	4	Will Not Provide Data	Voice only.
ACN Communications	4	Will Not Provide Data	Reseller "requires a pre-existing connection"
ACN Digital Phone	4	Will Not Provide Data	Voice/phone only.
Adelphia Cable	1	Will Not Provide Data	Does not provide services to NYS customers
Aeroblaze Broadband	4	Will Not Provide Data	Website listed will not open, no Google results.
Airband	4	Will Not Provide Data	Does not operate or have a market in New York
Airespring, Inc.	2	Will Not Provide Data	"Airespring, Inc. is a reseller of underlying carriers Only."
Allegiance Telecom, Inc.	4	Non-Responsive	Purchased by Qwest; no answer through two phone lines
Alliance Group Services, Inc.	3	Will Not Provide Data	Quote: Connects CLECs and ILECs to global network
AlreadyNet	3	Non-Responsive	Discovered in R5. Not a Provider
American Fiber Network, Inc. (AFN)	3	Will Not Provide Data	Company solely provides EVDO wireless cards
American Fiber Systems, Inc.	3	Will Not Provide Data	Sold to Zayo
American Telephone Co. LLC	4	Will Not Provide Data	"Not a provider" on Form C.
American Tower	3	Will Not Provide Data	Wireless tower company/infrastructure
Amextel	4	Will Not Provide Data	Voice services
AMp Networks LLC	4	Will Not Provide Data	Very unclear what they provide.
ANPI	3	Will Not Provide Data	Infrastructure/backbone- not end user.
Apptix, Inc.	4	Will Not Provide Data	Voice only.

Aptela, Inc.	4	Will Not Provide Data	Voice only.
Atlantech Online, Inc.	2	Will Not Provide Data	Reseller, few NY customers, not willing to participate.
Atlantic Telecommunications Services Corp.	4	Will Not Provide Data	Company provides cable services related to the NYS legislature (6/29/10 phone)
Backbone Communications Inc.	2	Non-Responsive	Reseller to businesses only; concentrated in NYC.
Bandwidth.com	2	Will Not Provide Data	CLEC. Buys services in bulk & resells portions to various customers
BCN Telecom Inc	4	Will Not Provide Data	Voice services
Bell Canada	4	Will Not Provide Data	Does not provide services to NYS customers
Bellsouth	4	Will Not Provide Data	Bellsouth serves 9 southern states; is related to AT&T.
Belmont Telecom	4	Will Not Provide Data	VoIP Wholesale, Long Distance, Roaming.
BestWeb Corp.	2	Will Not Provide Data	Not interested in participating.
BetterWorld Telecom LLC	3	Will Not Provide Data	Outside of NY state.
Birch Communications, Inc.	3	Will Not Provide Data	Outside of NY state.
Blue Wireless	1	Non-Responsive	Discovered from Tom Tom data summary. Left message with Rene Whalen. No Response.
BridgeCom International, Inc.	4	Will Not Provide Data	Purchased by Broadview Network Holdings
Bridgevoice, Inc.	4	Will Not Provide Data	International voice carrier.
Broadband Dynamics, LLC	2	Will Not Provide Data	Cannot determine what this company does- most likely reseller
Broadcore, Inc.	2	Will Not Provide Data	Reseller, data will be provided through Level 3.
Broadstar, LLC	3	Will Not Provide Data	Offers broadband within rental/condo communities. not public, more a reseller to communities
Broadview Networks	2	Will Not Provide Data	
BroadvoxGo!, LLC	3	Will Not Provide Data	Trunking and VoIP. not a provider.
Broadwing Communications	2	Will Not Provide Data	Broadwing's data will be provided by Level3
BT COMMUNICATIONS SALES LLC	4	Will Not Provide Data	Cannot identify services provided.
Budget Phone	4	Will Not Provide Data	Pre-pay phone- not a provider. Cannot identify website.
Buffalo Wireless	3	Non-Responsive	Not a Provider
BullsEye Telecom	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
Burlington Telecom	3	Will Not Provide Data	Not a broadband provider in NY.
Business Automation Technologies	2	Will Not Provide Data	Reseller, no NY customers
Business Productivity Solutions	4	Will Not Provide Data	Cannot determine services. Not a broadband provider.
Cable Positive	4	Will Not Provide Data	Provides educational programming about HIV/AIDS

Cable Services Company, Inc.	4	Will Not Provide Data	Provides broadband construction services, not broadband.
Cablevision Systems	4	Will Not Provide Data	This company provides internal networking and voice systems.
Call Catchers Inc.	4	Will Not Provide Data	Virtual receptionist- not a provider, not in NY.
Catskill Mountain Cablevision	4	Will Not Provide Data	Now owned by Mid-Hudson Cable
Cause Based Commerce Incorporated	4	Will Not Provide Data	Voice only.
Cavalier Telephone; Cavalier Business Communications; Cavalier Telephone and TV	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
CBN Connect, Inc.	3	Will Not Provide Data	Infrastructure/Backbone
Chain Lakes Cable	4	Will Not Provide Data	Company does not provide broadband to NYS customers.
Charter Communications Plattsburgh	4	Will Not Provide Data	
Cincinnati Bell	1	Will Not Provide Data	Discovered on FCC 477 list; does not offer wireline service in NY.
Cingular Wireless	3	Will Not Provide Data	Provides data through AT&T
Citizens Cablevision	4	Will Not Provide Data	Provides through Citizens Telephone of Hammond
Comcast Networks	3	Will Not Provide Data	
CommPartners, LLC	3	Will Not Provide Data	VoIP, co-location, reseller.
Communication Solutions Partners	3	Will Not Provide Data	Internet reseller previously researched. Website not active any longer.
Communications Network Billing, Inc.	4	Will Not Provide Data	Phone only
Comp Direct USA	3	Will Not Provide Data	Has nothing to do with broadband.
Computer SOS	4	Will Not Provide Data	Does not offer wireless to end user, only wireless networking.
ConnectMe, L.L.C.	4	Will Not Provide Data	Has nothing to do with broadband.
Cordia Communications Corp.	4	Will Not Provide Data	Phone only
CornerStone Telephone Company	2	Will Not Provide Data	Re-seller of Verizon services
Cox Communications	3	Will Not Provide Data	Does not provide services to New York State.
Crown Castle International	3	Will Not Provide Data	Does not provide end user services. Infrastructure only.
CSP Telecom	4	Will Not Provide Data	Voice services only.
Current Communications	4	Will Not Provide Data	Discovered on WISPA list, No wireless offerings.
Custom Network Solutions	3	Will Not Provide Data	Telecom solutions, T1, VoIP, Reseller.
cyberMIND	4	Will Not Provide Data	Does not provide broadband services.
Cypress Communications, Inc.	3	Will Not Provide Data	Not a BB provider. Trunking/colocation, etc.
DANC	4	Will Not Provide Data	DANC is primarily a backbone infrastructure company
Deposit Cable Television Inc.	4	Non-Responsive	Phone out of service; no online information (3/22/10)
Devine Communications, Inc.	4	Will Not Provide Data	Cannot identify company. Does not provide broadband.
DFT Communications/Netsync	2	Will Not Provide Data	
DHAKA TELECOMMUNICATION CORP	4	Will Not Provide Data	Bangladesh Not a NY/US provider

diDi Wireless Communications	4	Non-Responsive	Not a Provider
Direcway	3	Non-Responsive	Satellite service, not BB speed ave 500kbps as of this date, check again for future rounds...see if available in NYS
Dish Network	3	Will Not Provide Data	Television only
Douglas Computing Tech	2	Will Not Provide Data	Reseller, few NY customers, not willing to participate.
Downsville Community Antenna	4	Will Not Provide Data	Planning to close in summer 2010
Doylestown Cable TV	3	Will Not Provide Data	Does not serve NY.
Dream Catcher Communications	4	Will Not Provide Data	Provides advertising & marketing to NYS agencies and government offices
DSCI	2	Will Not Provide Data	Business only reseller. Left message.
DSL Communications, LLC	3	Will Not Provide Data	Cannot determine companies services.
DSL Extreme	2	Non-Responsive	Identified as a reseller, low priority for R4 outreach.
DSL.net	4	Will Not Provide Data	Company dissolved in December 2009.
DSLi	3	Will Not Provide Data	Serves S. Florida only
Earthlink	2	Will Not Provide Data	Reseller
East 2 West Networks Inc.	4	Non-Responsive	Phone disconnected; web site cannot be found.
East Telecom, Inc.	4	Will Not Provide Data	No website or contact information
ECR Voice, LLC	4	Will Not Provide Data	Phone services only.
Electric Lightwave	2	Will Not Provide Data	Purchased by Integra Telecom, which serves only the Northwest
Empire City Subway	3	Will Not Provide Data	Not a broadband provider.
Empire One Telecom (EOT)	2	Will Not Provide Data	Reseller
Encompass Communications	4	Will Not Provide Data	Calling Card Services
Endstream Communications, LLC	3	Will Not Provide Data	Does not supply end-user internet.
Engineered Communication Systems, Inc	4	Will Not Provide Data	Cannot verify company type- no valid website.
Enhanced Communications Network, Inc.	4	Will Not Provide Data	Voice only. From website: leading telecommunications carrier providing local service in California, New Jersey and New York.
Enventis Telecom Inc.	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
Equant, Inc.	4	Will Not Provide Data	Not a broadband provider.
Ernest Communications	4	Will Not Provide Data	Business only reseller.
Eschelm Telecom	3	Will Not Provide Data	Owned by Integra Telecom, which serves only the Northwest
Eureka Telecom	4	Will Not Provide Data	Cannot identify company- Eureka Telecom or Eureka Broadband.
EURO CONNECT	4	Will Not Provide Data	Voice services only.
Evercom Systems, Inc.	3	Will Not Provide Data	Does not provide broadband services.
eVolve Business Solutions LLC	4	Will Not Provide Data	VoIP only.

Evolve IP, LLC	3	Will Not Provide Data	Cloud computing- not a provider.
ExteNet Systems	3	Will Not Provide Data	Identified as broadband equipment business for wireless companies.
FASTNET	4	Will Not Provide Data	Discovered on WISPA list, may be part of PAETEC and does not have wireless.
Fidelity Voice Services LLC	3	Will Not Provide Data	Not a provider for NY.
Fionda VOIP, LLC	4	Will Not Provide Data	VoIP company- may not be in NY.
First Communications, LLC	3	Will Not Provide Data	Fiber backbone in NY. Will make contact for R5 for middle-mile.
Fribley Enterprises	4	Will Not Provide Data	Phone out of service; no online information
Gafachi	3	Will Not Provide Data	Provides wholesale VoIP services to providers and resellers.
GAW High Speed Internet	4	Will Not Provide Data	Does not appear to serve NY
Global Capacity Group, Inc.	4	Will Not Provide Data	Provides network services to telcom industry. Not a provider to end users.
Global Crossing	4	Will Not Provide Data	Letter indicates they cannot provider in 7-10 days.
Global Protection Communications Systems	3	Will Not Provide Data	Provides fiber infrastructure.
Globalinx	4	Will Not Provide Data	Reseller, VOIP. No applicable to program.
Globalnet Telecom, Inc.	4	Will Not Provide Data	Hosted PBX provider- no broadband.
GlobalPhone Corp.	4	Will Not Provide Data	Hosted PBX provider- no BB
Gore Mountain Cable TV	3	Will Not Provide Data	Cable TV only- PSC lists their franchises as 'No Broadband'
Granite Telecommunications, LLC	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
Great North West Telegraph Co	4	Will Not Provide Data	Company is closed.
GreatCall, Inc.	3	Will Not Provide Data	No data- cell/voice only
GTC Communications	3	Will Not Provide Data	Cannot identify company.
Hancel, Inc.	4	Will Not Provide Data	Cannot find any information on this company.
Hancock Video	3	Will Not Provide Data	Hancock Video does not provide broadband.
Hickory Tech	4	Will Not Provide Data	Added in R5, found on 477 data. Does not serve NY.
High-Speed Solutions	2	Will Provide Data	Reseller
Hilltop Communications, Inc.	3	Will Not Provide Data	Part of GTEL (Germantown Telephone)
Horizonone Communications, Quantumlink Communications, Voip Communications, Optic Communications, ANI Networks	4	Will Not Provide Data	Voice services only.
Hotwire Communications, Ltd.	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
Hudson Valley DataNet	3	Will Not Provide Data	Merged with Lightower Fiber networks.
Hughes Network Systems	1	Will Not Provide Data	Satellite company; did not send data.
iBasis	4	Will Not Provide Data	Voice services.
iCore Networks, Inc.	4	Will Not Provide Data	Phone services.

IDT Corporation	4	Will Not Provide Data	Phone services.
IKANO	3	Will Not Provide Data	No end-users. Infrastructure only.
InPhonex.com, LLC	4	Will Not Provide Data	Phone services.
Insight Broadband	3	Will Not Provide Data	Serves only Ohio and Kentucky
Integra Telecom	3	Will Not Provide Data	Provides broadband in the Northwest
Integrated Services, Inc.	4	Will Not Provide Data	Voice services.
Intellifiber Networks	3	Non-Responsive	Infrastructure fiber for business and providers. No end users. Will look for middle mile in future rounds.
Interface Security Systems, LLC	4	Will Not Provide Data	Not a provider.
InterGlobe Communications	2	Will Provide Data	Reseller- low priority for R4 outreach
Internet Professionals & Network Solutions (IPNS)	2	Will Provide Data	Reseller- low priority for R4 outreach
Internet@ntc, Inc.	4	Will Not Provide Data	No idea who or what they are/do.
Interstate FiberNet, Inc.	4	Will Not Provide Data	Part of Deltacom- now part of Earthlink Business. Business only.
ION	3	Will Not Provide Data	Infrastructure only.
IP Communications, LLC.	4	Will Not Provide Data	Phone services.
IP Networked Services, Inc.	3	Will Not Provide Data	Business only reseller.
IPC Network Services, Inc.	4	Will Not Provide Data	Network equipment business- not a provider
Jet Wave Corporation	3	Will Provide Data	Email sent to Mr. Klein- cannot find any information on this company.
Jivetel Communications	4	Will Not Provide Data	Voice only.
Kosmaz Technologies LLC	4	Will Not Provide Data	Voice services only.
LaunchNet	2	Will Provide Data	Reseller
LCR Telecommunciations, LLC	4	Will Not Provide Data	Wholesale long distance.
LDC Telecommunications Inc	4	Will Not Provide Data	Cannot identify company. website blocked.
LDMI Telecommunications, Inc.	3	Will Not Provide Data	Same address as Talk America; website goes to Cavalier.
LI Sky	4	Non-Responsive	Discovered in R5. Not a Provider
Light Tower Fiber Long Island LLC	1	Will Not Provide Data	Cannot provide service within 7-10 days.
LightEdge Solutions, Inc.	3	Will Not Provide Data	Does not provide broadband to NY customers, does not wish to participate.
Lightspeed Fiber Network	3	Will Not Provide Data	Lightspeed closed; phone transfers to Thalle Industries Inc., which does not provide broadband services.
LightSquared LP	3	Will Not Provide Data	Wireless backbone/wholesaler.
Lightyear Network Solutions, LLC	2	Will Not Provide Data	Reseller- may not fit 7-10 day req.
Line Systems, Inc.	2	Will Not Provide Data	Reseller.

Localnet	4	Will Not Provide Data	Dial up service only
Looking Glass Networks, Inc.	3	Will Not Provide Data	Acquired by Level3 Communications in 2006
Luzip Telecom Inc.	4	Will Not Provide Data	Voice only.
M5 Networks, Inc.	4	Will Not Provide Data	Voice only.
Magellan Hill	4	Will Not Provide Data	Telecom management company.
Matrix Telecom, Inc.	4	Will Not Provide Data	Reseller.
McGraw Communications, Inc.	3	Will Not Provide Data	Business only reseller, co-location, etc.
MCI Communications Services, Inc.	3	Will Not Provide Data	Voice only- data services provided by Verizon.
MCImetro Access Transmission Services LLC	3	Will Not Provide Data	Cannot identify.
Mediacom	4	Will Not Provide Data	Does not provide broadband to NY customers
Megapath	2	Will Not Provide Data	Requested removal from call list.
Meriplex Communications, Ltd.	2	Will Not Provide Data	Reseller, no NY customers
Metropolitan Fiber System of New York	1	Will Not Provide Data	Verizon Business Global letter indicates MFS cannot provide in 7-10 days
Metropolitan Telecommunications Holding Company	3	Will Not Provide Data	Reseller, does not provide broadband.
MFS of New York, Inc.	3	Will Not Provide Data	Verizon Business Global letter indicates MFS cannot provide in 7-10 days
Middleburgh Telephone	3	Will Not Provide Data	Seamless Geoport Communications does not provide BB
Milestone Communications of NY	3	Will Not Provide Data	Does not provide broadband to NY customers
Millicorp	4	Will Not Provide Data	VoIP and voice only.
Mitel Netsolutions Inc.	2	Will Not Provide Data	Reseller.
MIX NETWORKS, INC.	4	Will Not Provide Data	Voice services.
MKL.net	4	Non-Responsive	Discovered in R5. Not a Provider
My Tel Co, Inc.	4	Will Not Provide Data	part of Cordia- VoIP only.
Navigator Telecommunications, LLC.	4	Will Not Provide Data	Voice services
NBC TV	3	Will Not Provide Data	NBC TV - does not provide broadband services
NECC TELECOM	4	Will Not Provide Data	Voice/long-distance service.
Net One International, Inc.	4	Will Not Provide Data	Voice/long distance/calling cards
NetCarrier	4	Will Not Provide Data	Voice/pbx/data. not a bb provider.
Netifice Communications	3	Will Not Provide Data	purchased by Megapath in 2006
Netlogic, Inc.	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
Netsville	4	Will Not Provide Data	Discovered on WISPA list. Does not provide wireless to end user- networking only.
Network Billing Systems LLC	2	Will Not Provide Data	Reseller.
Network Communications International Corp.	4	Will Not Provide Data	Provides voice services for inmate/correctional population
Network Innovations	1	Will Not Provide Data	Provides broadband in MA & NH; very limited data service in NY

Network Operator Services, Inc	3	Will Not Provide Data	Cannot identify this company.
Network Service Billing, Inc.	4	Will Not Provide Data	Voice/long-distance services
New Edge Networks	2	Will Not Provide Data	Reseller that cannot provide within 7-10 days.
New Jersey DataNet Telecom, LLC	3	Will Not Provide Data	From our research: New Jersey DataNet Telecom, LLC, was the CLEC subsidiary of DataNet Communications Group. Lightower Fiber Acquired DataNet Communications Group.
New York RSA 2 Cellular Partnership (Verizon Wireless)	3	Will Not Provide Data	Provides data through Verizon wireless/Cellco Partnerships
NexGen Networks Corporation	2	Will Provide Data	Non responsive in previous rounds.
NextGen Telephone	4	Will Not Provide Data	From their website: &NextGen Telephone has ceased operations effective January 24, 2011."
Nextlink Wireless	2	Will Not Provide Data	
NextWave Wireless	2	Will Not Provide Data	No end user service
nexVortex,Inc.	2	Will Not Provide Data	Reseller.
NightOwl Internet Gateway	3	Will Not Provide Data	Email indicated company provides BB primarily in Missouri; not in NYS
NobelTel	4	Will Not Provide Data	Voice services only
North Penn Telephone	3	Will Not Provide Data	Offices located in NY, does not serve NY.
Northeast Optic Networks	3	Will Not Provide Data	Merged with Sidera
Northland Networks	2	Will Not Provide Data	Northland leases all of its facilities from its parent company, Oneida County Rural Telephone. (3/9/10 email)
Northstar Telecom	3	Will Not Provide Data	Called previously- not responsive. May not provide in NY.
NOS Communications, Inc.	4	Will Not Provide Data	Toll free and out-bound telephone services
NOSVA Limited Partnership	4	Will Not Provide Data	Same as NOS communications- voice services only.
NTCNet Telecom, Inc.	3	Will Not Provide Data	From research: NTCNet Telecom, Inc. is a small CLEC that operates as a subsidiary of Newport Telephone Company.
Nuvox	4	Will Not Provide Data	
NYSYS Broadband	1	Will Not Provide Data	Discovered on WISPA list. Business only fixed wireless in Rochester area. Called 12/14 and left voicemail.
Ojo Service LLC	4	Will Not Provide Data	Video/voice service.
OLS Inc.	4	Will Not Provide Data	Cannot identify this company or its services.
Omnipoint Communications	3	Will Not Provide Data	Small northeast wireless company, acquired by VoiceStream which is now T-Mobile.
One Communications	2	Will Not Provide Data	
One Source Networks	2	Will Not Provide Data	Global partner- reseller.
OneLink Communications, Inc.	4	Will Not Provide Data	Company located in Puerto Rico
Online Image	4	Will Not Provide Data	Discovered on WISPA list. Does not supply BB.
OnWav, Inc	2	Will Not Provide Data	Reseller- does not serve NY.

Open Access	4	Will Not Provide Data	Discovered on WISPA list. Website redirects to Lightower Fiber
Open Access Inc.	3	Will Not Provide Data	Open Access is now LightTower Communications
Optimum TV	3	Will Not Provide Data	Company provides data through CSC holdings
Pac-West Telecomm, Inc.	3	Will Not Provide Data	Broadband Infrastructure
PAD Business Solutions	2	Will Not Provide Data	Reseller, does not serve many NY customers, does not wish to participate.
PAETEC	2	Will Not Provide Data	Company acquired by Windstream.
Pannon Telecom, Inc.	4	Will Not Provide Data	International voice/phone
PCCW Global, Inc.	3	Will Not Provide Data	HKT is Hong Kong Telephone- PCCW is subsidiary.
Peerless Network of New York, LLC	3	Will Not Provide Data	Backbone voice services.
PeoplePC	2	Non-Responsive	Non responsive in previous rounds.
Phone.com, LLC	4	Will Not Provide Data	Voice only.
PNG Telecommunications	4	Will Not Provide Data	Phone services only
posTrack Technologies, Inc.	4	Will Not Provide Data	Voice services for colleges.
PowerDSL	3	Will Not Provide Data	Likely reseller, web search returns inactive website and little results.
PowerNet Global	2	Will Not Provide Data	Likely reseller, very unclear website
Premier Wireless	1	Will Not Provide Data	Premier Wireless was closed
Proximiti Technologies, Inc.	3	Will Not Provide Data	Primarily voice and phone tracking Offers internet as reseller.
QTel	4	Will Not Provide Data	VoIP- provides DSL in select areas only.
QuantumShift Communications, Inc.	3	Will Not Provide Data	Manages carrier service. Not a provider.
Qwest Communications Company	3	Will Not Provide Data	Qwest is now Century Link. http://www.centurylink.com/index.html
RAI Telecom, Inc.	3	Will Not Provide Data	VoIP services.
Razorline LLC	4	Will Not Provide Data	May not be in NY. Voice services.
Real Linx	2	Will Not Provide Data	Reseller
Reliance Globalcom	2	Non-Responsive	Reseller
RGT Utilities, Inc.	4	Will Not Provide Data	Utility company in Calif. cannot identify website or more information.
RGTS (Rockefeller Group Technology Solutions)	2	Will Not Provide Data	Provides broadband to specific businesses, does not wish to be on the map, has confidentiality concerns; Legal department advised them not to participate (6/29/10 phone)
RNK Communications	4	Will Not Provide Data	Reseller/voice services- difficult to identify services provided. Not and end user BB provider.
SAVVIS Communications	3	Will Not Provide Data	Cloud, Colocation, VoIP, etc. No BB provider. Acquired by CenturyLink.

SBA Communications Corp.	3	Will Not Provide Data	Provides tower site management and locations for cell and wireless companies.
SBC	4	Will Not Provide Data	phone goes directly to AT&T.
Semperon	2	Will Not Provide Data	Reseller with network partnerships
Silv Communication Inc.	4	Will Not Provide Data	Worldwide telephone service. Not a BB provider.
SinglePipe Communications	4	Will Not Provide Data	Company hard to find. Possible merge- voice services only.
Smart Choice Communications	2	Will Not Provide Data	Cooperative, but waiting until reseller decision made.
S-One Communications, Inc.	3	Will Not Provide Data	Cannot identify this company or services it provides.
Spa Net	3	Will Not Provide Data	Discovered on WISPA list but does not advertise wireless on website.
Spectrotel, Inc.	2	Will Not Provide Data	Reseller.
Speedus	4	Will Not Provide Data	Discovered on WISPA list. Nothing to do with BB service.
Stage 2 Networks	4	Will Not Provide Data	Voice and Hosted business phone
Sterling Telecom	2	Will Not Provide Data	Quote website: Wholesaler of Verizon Phone Service to Businesses.
Stratos Offshore Services Company	3	Will Not Provide Data	Provides communication services to US military and government entities outside of the country.
T2 Technologies	2	Will Not Provide Data	Reseller, may be business only. Not sure where/who they serve.
TCE Net	1	Will Not Provide Data	Company has 12 wireless customers, is not advertising to expand, will phase out these customers. Primarily serves dial up customers.
TCO Network, Inc.	2	Will Not Provide Data	Reseller, may be business only.
TCSweb Communications	4	Will Not Provide Data	Discovered on WISPA list. Website not active, no good Google results.
TDS Telecom	3	Will Not Provide Data	Provides data under 6 other subsidiaries
Tekmenwireless	3	Will Not Provide Data	Not a BB Provider
Telco Experts, LLC	2	Will Not Provide Data	
TelCove	3	Will Not Provide Data	Website redirects to Level 3.
Telcove	3	Will Not Provide Data	Website redirects to Level 3.
Telecom	2	Will Not Provide Data	From internet: dba Telecom and Verizon
Telefonica USA	3	Will Not Provide Data	Reseller, does not provide broadband.
Telekenex, Inc.	2	Will Not Provide Data	Business only reseller.
TelePacific	3	Will Not Provide Data	Reseller, no NY customers
Teleport Communications	3	Will Not Provide Data	Cannot identify company or services they provide.
Telergy Metro	3	Will Not Provide Data	Acquired by Con Ed communications, which was acquired by RNC.
Telesphere Networks Ltd.	4	Will Not Provide Data	Telephony services.

Telnes Broadband	2	Non-Responsive	Reseller, few NY customers, not willing to participate.
Telovations, Inc.	3	Will Not Provide Data	Reseller, no NY customers
TELZEQ Communications	4	Will Not Provide Data	Provides voice services and phone equipment
The Flat Planet Phone Company Inc.	4	Will Not Provide Data	Voice/telephoney/ PBX
Thinking Phone Networks, LLC	4	Will Not Provide Data	Voice only.
TNCI	2	Will Not Provide Data	Business only reseller.
Towerstream	1	Will Not Provide Data	Opt out - business only. Too much work to participate.
Transbeam	2	Non-Responsive	Reseller
Tremcom International, Inc.	4	Will Not Provide Data	Voice services, long distance, etc.
TruCom Corporation	3	Will Not Provide Data	Cannot identify this company or the services it provides.
TTI National, Inc.	4	Will Not Provide Data	From Website: for state-to-state, in-state long distance, local toll (limited availability) and international calls to existing customers. In addition Toll-Free service and Calling Cards are also available.
UCN	4	Will Not Provide Data	Cannot identify this company or what services it provides.
Unison Communications, Inc.	2	Will Not Provide Data	Business only reseller. Quote: We interconnect with major carriers.
UNITED STATES CELLULAR CORPORATION	3	Will Not Provide Data	Not located in NY.
US LEC	3	Will Not Provide Data	Merged with PAETEC, was a "Will Provide" for previous rounds but no data provided R4.
Valstar, Inc.	3	Will Not Provide Data	Cannot identify this company or services it provides.
Vanco Direct	3	Will Not Provide Data	Cannot identify this company, aka Global Capacity Direct.
Velocity Networks Inc	2	Will Not Provide Data	Business only reseller.
Verio	3	Will Not Provide Data	Verio offer web hosting among other things, NTT is global reseller.
Verizon Avenue Corp.	3	Will Not Provide Data	no longer active.
Verizon Business Global LLC	3	Will Not Provide Data	Email indicates they cannot provide in 7-10 days
Verizon Network Integration Corp.	3	Will Not Provide Data	
Verizon New York	3	Will Not Provide Data	
Verizon Online	3	Will Not Provide Data	
Verizon Select Services, Inc.	3	Will Not Provide Data	formerly GTE Comm. Corp., focus on long-distance service.
Verizon Wireless	3	Will Not Provide Data	Provides data as Verizon Wireless
Verizon Wireless	4	Will Not Provide Data	Verizon Wireless services are now reported under Cellco Partnership dba Verizon Wireless.
Verizon Wireless	3	Will Not Provide Data	tower management company for Verizon Wireless
V-Global Communications	4	Will Not Provide Data	Voice and VoIP services.
VIA ONE TECHNOLOGIES INC.	4	Will Not Provide Data	Cannot identify this company or services they provide.

Vocal IP Networx Ltd	4	Will Not Provide Data	Voice and telephony services only.
Voda Networks, Inc.	2	Will Not Provide Data	Reseller. from website: Partnered with industry leading providers.
VoIPnet Technologies	4	Will Not Provide Data	Voice only.
VoIPStreet, Inc.	4	Will Not Provide Data	VoIP services only.
Vonage	4	Will Not Provide Data	Provides phone services only.
VPN Systems	3	Will Not Provide Data	Discovered on WISPA list. Does not provide BB service.
Warp Drive Products	3	Will Not Provide Data	Discovered on WISPA list. Does not provide BB service.
Wave2Wave Communications Inc	2	Will Not Provide Data	Company is a reseller, low priority, no outreach for R4
WavHost	3	Will Not Provide Data	Discovered on WISPA list. Webpage does not open, cannot get good search results on company.
WCS Wireless License Subsidiary, LLC	4	Will Not Provide Data	Cannot verify any information on company.
WDT	2	Will Not Provide Data	Reseller- unsure of service to NY.
White Fence	3	Will Not Provide Data	Company connects customers with broadband providers.
Wholesale Carrier Services, Inc.	2	Will Not Provide Data	Reseller- low priority for R4 outreach
WilTel Communications, LLC.	3	Will Not Provide Data	Acquired by Level 3.
Winstar	3	Will Not Provide Data	Company was reseller but since has gone bankrupt.
Worldlink USA Inc.	4	Will Not Provide Data	Unsure of actual company- best search turns up maritime communications company.
Worldwide Marketing Solutions	4	Will Not Provide Data	Research indicates website hosting, many pending lawsuits and scam reports.
Xand Corporation	3	Will Not Provide Data	Network systems- not BB provider
XCHANGE TELECOM CORP.	4	Will Not Provide Data	Voice services only.
Xcyncroj	4	Will Not Provide Data	Cannot identify company or services. Number is out of service
XO Communications Services, Inc. (Affiliated Entity)	2	Will Not Provide Data	
Zayo Group	3	Will Not Provide Data	Reseller, no NY customers
Zone Telecom, Inc.	4	Will Not Provide Data	Voice services, VoIP, etc.

OFFICIAL OCTOBER 2012 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE STATE OF OHIO

CONNECT OHIO®

October 1, 2012

TABLE OF CONTENTS

October 1, 2012

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

Please accept this submission from Connected Nation on behalf of the state of Ohio's State Broadband Initiative (SBI) Grant Program, known as Connect Ohio.

The Connect Ohio program and its collective stakeholder community continue to be faithful and energized contributors to the National Telecommunications and Information Administration's (NTIA) SBI program. Now more than ever, the significance of complete and validated data as compiled through the Federal Communications Commission's (FCC) National Broadband Map is instrumental in forging the innovation economy of the 21st century. As the Commission relies upon this unique resource to distribute monies under the Connect America Fund, through the Universal Service Fund reform, the Connect Ohio program equally values this data in informing meaningful program interventions relating to broadband access, adoption, and use initiatives. Truly, this coordination embodies the spirit of the SBI and demonstrates the joint effort of the NTIA, FCC, state governments, industry, and non-profits like Connected Nation as it continues to serve as a key tool for the American public and policymakers. We are proud of the role that Connect Ohio has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit broadband providers, consumers, and businesses nationwide.

The artifacts that comprise this submission should be found to be compliant with the October 1, 2012, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connect Ohio: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in

			Census Blocks of No Greater Than Two Square Miles in Area
Appendix A:	1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles
Appendix A:	1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A:	3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A:	4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A:	4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)		n/a	Accuracy and Verification Report
n/a		DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a		n/a	List of Changes and Corrections to the Dataset
n/a		n/a	Non-Participating Provider (NPP) Narratives
n/a		n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the April 2012 SBI data submission for the Connect Ohio program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on August 9, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance
New to the semi-annual submission for October 2012 is a more robust version of the ReadMe text file. As per the template released on the Grantee Workspace on May 18, 2012, this file contains a high-level summary of the items contained within the submission, including the exact file deliverables, a description of the errors and warnings from the Check Submission report, and extraneous information of which the NTIA and other users of the dataset should be made aware.

> This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the April 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That practice continues in this submission as technology and speed combinations are reviewed and scrutinized; any questionable information supplied by providers is reviewed more in depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.
>
> Also in this submission are narratives describing the data and coverage estimation of non-participating providers. While Connect Ohio continues outreach to all providers prior to each submission period, the need to submit broadband service data for all providers regardless of their participation is evident as the SBI program continues into this sixth round of data submissions. The submission of this estimated broadband service area for providers that have not supplied data to Connect Ohio is essential in being able to portray a more accurate depiction of the current broadband landscape.

In addition to the requirements mentioned above, please find this methodology paper to be inclusive of the ongoing section pertaining to industry mergers and acquisitions – specifically this section details any and all mergers or acquisitions that have taken place in Ohio since the April 2012 submission. The intent of this updated section is to provide a better understanding of how the broadband provider landscape has changed since the last submission cycle.

This October 2012 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for approximately 92.19 percent of the Ohio provider community, or 118 of 128 total providers. There are 116 participating providers and 2 additional non-participating providers whose estimated coverage areas have been submitted. Of the 116 participating providers, 33 supplied an update to their network or coverage area(s), while 50 have reported no change. The remaining 33 represent providers who previously supplied data but were non-responsive in the October 2012 update effort; therefore their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact record is contained herein. Of the 10 providers that are not represented in the attached datasets, 8 have refused to participate in the voluntary program or were non-responsive to multiple contact attempts, and 2 providers are currently in some form of progress toward data submission but were not able to submit coverage areas at the time of this submission.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connect Ohio principals that all commercially reasonable efforts were made to account for 100 percent of the known Ohio broadband provider community, pursuant to this semi-annual data update submission.

Connect Ohio has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Ohio conducts field validation efforts. To date, 78(60.94 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connect Ohio website, (www.connectohio.org), continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connect Ohio website encountered 23,839 unique visits during this reporting period (148,849 total to date for the life of the grant awarded on December 20, 2009). Additionally, this pronounced Web activity netted 155 broadband inquiries over this same reporting period (1,666 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connect Ohio website and the Connect Ohio interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connect Ohio mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Ohio to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connect Ohio has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Outreach was conducted during this data update reporting period by Connect Ohio to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect Ohio website. During this reporting period Connect Ohio has developed a number of new relationships with statewide associations such as Ohio Hospitals Association and Ohio Department of Education to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. It became apparent that these relationships are beneficial to the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connect Ohio will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connect Ohio has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connect Ohio is also working hard to clarify CAI information associated with wireless broadband. NTIA has requested in-depth questioning of CAI listing a wireless broadband service as their sole form of connectivity. This follow-up allows us to better understand the reason for adopting the wireless broadband service.

From our work in Ohio, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connect Ohio efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connect Ohio program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Ohio, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,

Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

Data Acquisition: Ohio Community Anchor Institutions Methodology

In this sixth reporting period of the SBI, Connect Ohio, working in close coordination with the state of Ohio, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connect Ohio has continued to identify and process CAI data obtained through an ongoing statewide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connect Ohio through Esri ArcGIS software.

Connect Ohio continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connect Ohio website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the state as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the state client. Connect Ohio will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link:
http://www.surveymonkey.com/s/R3RLVNG

In addition to the survey, Connect Ohio has developed a number of new relationships with statewide associations such as Ohio Hospitals Association and Ohio Department of Education to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connect Ohio will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connect Ohio has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connect Ohio conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect Ohio continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect Ohio works with the Ohio Office for Information Technology to identify existing relationships that can support CAI outreach.

Connect Ohio has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Ohio project as well as self-awareness of their own CAI connectivity (specifically upload and download speeds). Connect Ohio will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the Ohio Office for Information Technology will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the state.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	9,204	9,204	9,026	3,484	2,497	2,457
Libraries	808	808	807	684	586	333
Healthcare	1,950	1,950	1,950	5	5	5
Public Safety	3,817	3,817	3,815	5	4	4
Higher Ed Institutions	958	958	953	17	12	11
Other Government	590	590	589	13	7	7
Other Non-Government	3,660	3,660	3,660	29	20	15
Total	20,987	20,987	20,800	4,237	3,131	2,832

As part of Connect Ohio's efforts to ensure compliance with Ohio's Every Community Online (ECO) facilities, a member of the engineering and technical services team from Connect Ohio has visited a number of sites to perform speed tests to obtain information. In addition, technology types were reviewed, and it was determined that facilities with a T1 line have a synchronous connection of upload and download speeds. Therefore, the upload speed was able to be determined based on the download speed.

During the coming months, CAI data collection will be supported by regular reporting to the Connect Ohio team. The CAI data is proving an invaluable resource to all components of the Connect Ohio effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on August 9, 2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.

Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the state of Ohio.

Inventory of Deliverables, Connect Ohio: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the state of Ohio have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Ohio as a polygon of the state boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development is underway at CN as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

Ohio Field Validation Methodology

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets and Trips;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and
- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff conducted on-site validation tests in Ohio on the following providers: 1 Touch Technology; Access Ohio Valley; Amplex Internet; Armstrong Utilities; AT&T Inc.; Avolve; Bascom Mutual Telephone (d.b.a. BrightNet Bascom); Benton Ridge Telephone (d.b.a.

W.A.T.C.H. TV); Blue Sky Wireless; Buckeye Cablevision Inc.; Buckland Telephone; Celerity Networks; CenturyLink; Champaign Telephone Company (d.b.a. CTC); Cincinnati Bell Telephone Company LLC; Cincinnati Communications; CityNet Fiber; City of Wadsworth; Clearwire Corporation; Comcast; Computers4U; ConnectLink; Country Connections LLC; Coyote Wireless; Dark Horse Wireless; Databit Solutions; Doylestown Communications; DuplexCom of Ohio LLC; Eagle Communications (d.b.a. Safe-T.net); FairPoint Communications (d.b.a. Germantown Independent Telephone, Columbus Grove Telephone, and Orwell Telephone); Falcon 1; Fort Jennings Telephone Company; Frontier Communications (d.b.a. Citizen's Communications); GMN Wireless; Hometown Cable Company (also d.b.a. g Wireless); Horizon Telecom; Hometown Cable Company (d.b.a. g Wireless Inc.); Imagine Networks; Intelliwave LLC; J-B Nets LLC; Jenco Wireless; KeyOn Communications Inc. (being acquired by New Knoxville Telephone); King Office Supply; Leap; Level 3 Communications; LightSpeed Technologies; MegaPath Inc.; MetaLINK; Middle Point Home Telephone Company; Mikulski Communications LLC; Mobilecomm (d.b.a. Heavenwire); Nelsonville Cable Television; New Era Broadband LLC; New Knoxville Telephone; NexGen Access; NorthWest Net Inc.; nTelos (d.b.a. Ohio Fibernet); OmniCity; One Communications Corporation; R.A.A. Services; Redbird Internet Services; Southern Ohio Communication Services Inc. (also formerly Scioto Wireless); Sprint Nextel; StratusWave; Suddenlink; Sycamore Telephone; Telephone Service Company; Time Warner Cable Access (d.b.a. Insight Communications of Central Ohio LLC); T-Mobile; UData Net; Vaughnsville Telephone Company; Verizon Communications; Wavelinc Communications; Wilkshire Wireless; Wireless Intranet; Windstream (f.k.a. PAETEC Communications. Inc., Cavalier Telephone, and Talk America, Inc.); Wireless Intranet; XO Communications LLC; and Zayo Group LLC.

In addition to the field verification tests that have been conducted, Connect Ohio has also conducted work in the field to collect information for the Non-Participating Providers, Wireless Intranet and GLW Broadband which, by nature of the methodology required for this collection, are also included in the above list.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 78 companies (out of a universe of 128 viable providers) totaling 60.94 percent within the state of Ohio. This percentage also considers the non-participating provider (NPP) records submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Provider" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on August 9, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

Amplex Internet
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

SPEED - Amplex Internet gives you reliable connections that surpass the competition. Our premium plans offer 3.5Mbps down with a 10MB Burst!*

AT&T Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 24 Mbps service; screenshot below.

Compare Internet Packages

	Pro	Elite	Max	Max Plus	Max Turbo
Standard Monthly Rate	$38*	$43*	$48*	$53*	$63*
Downstream Speed	Up to 3 Mbps	Up to 6 Mbps	Up to 12 Mbps	Up to 18 Mbps	Up to 24 Mbps

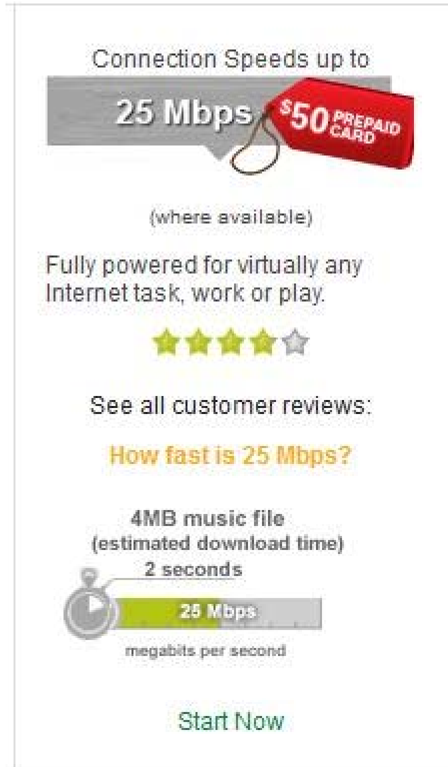
AT&T Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider confirmed tier 7 service is available.

Blu Sky Wireless
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

Residential

Basic: Up to 3Mbs Down / 128Kbs Up
Standard: Up to 5Mbs Down / 256Kbs
Turbo: Up to 8Mbs Down / 512Kbs
Turbo Plus: 12Mbs Down / 1Mbs

CenturyLink
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below.



Cequel Communications (Suddenlink)
Issue: Technology of transmission code 40 with maximum advertised download speed in tiers 5, 7, and 8, lower than expected value range for the technology.
Resolution: Provider representative confirmed that DOCSIS 3.0 is indeed in use, but speeds have not been turned up higher yet.

Conneaut Telephone Co
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 24 Mbps service; screenshot below.

SERVICE	PRICE
2.0MB/512k	$29.95
8MB/768k	$44.95
12MB/768k	$59.95
24MB/1MB	$74.95

Massillon Cable TV, Inc.
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 7, lower than expected value range for the technology.
Resolution: Provider website confirms use of DOCSIS 3.0 with the lower speeds.

- DOCSIS 3.0 High- Speed Data- Maximize your online experience with download speeds up to 10 Mbps, upload speeds up to 1.5 Mbps and 3 email addresses included for only $159.95/month.

MegaPath Inc.
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps and 45 Mbps service; screenshots below.

DSL service provides download speeds up to 20 Mbps over a nationwide, multi-redundant private network that optimizes performance and security. DSL is an ideal broadband solution for small and medium-sized businesses that download large files or use the Internet extensively.

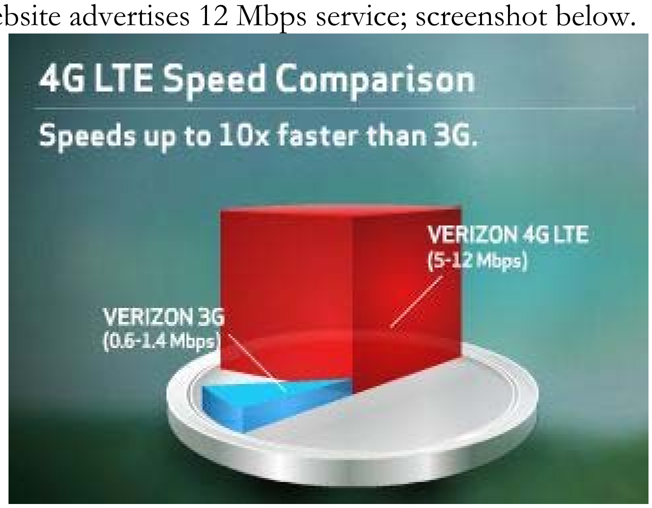
For maximum connectivity at a minimum cost, there's no greater value than MegaPath Business Ethernet. Choose the bandwidth—2 Mbps up to 45 Mbps—that best fits your business' needs.

T-Mobile USA, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website confirms that speeds greater than tier 6 are available; screenshot below.

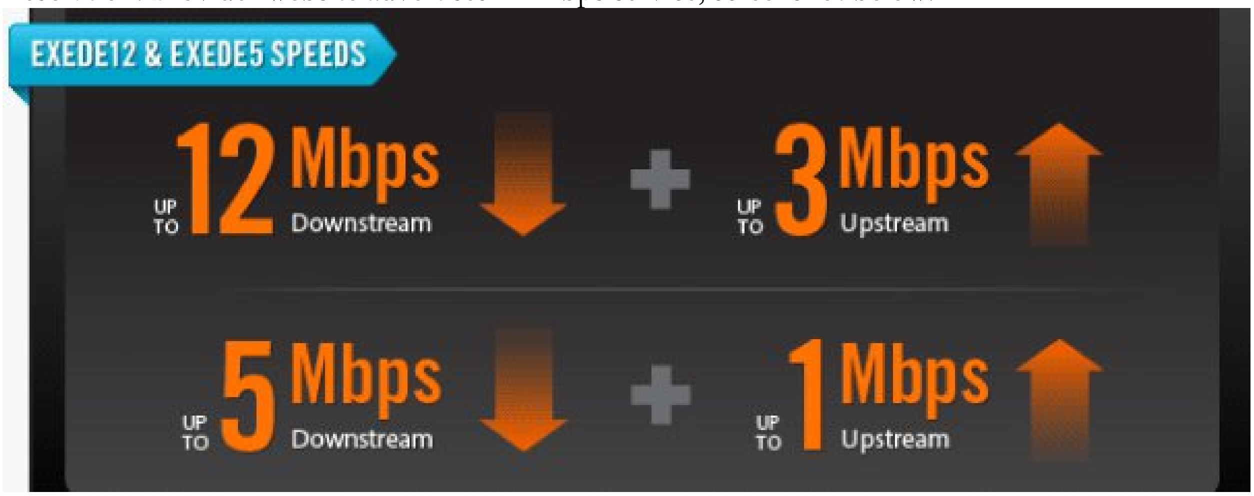
T-Mobile customers with 4G phones are already experiencing data speeds that are comparable to or faster than the speed of a home broadband network. And with recent improvements to our 4G network-doubling our theoretical download speeds-we're giving our customers enhanced 4G data speeds. We've seen average download speeds on our HSPA+ 42 Mbps-capable data stick approaching 10 Mbps with peak speeds of 27 Mbps, and download speeds approaching 8 Mbps with peak speeds of 20 Mbps on our upcoming HSPA+ 42 Mbps-capable smartphones.

TDS Telecommunications Corporation
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider website advertises 15 and 25 Mbps service; screenshot below.

Verizon Communications, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.



ViaSat, Inc.
Issue: Satellite platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.



Windstream Communications
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

See which of our speeds matches your online activities. Choose the right Internet speed (WATCH VIDEO)	3 Mbps (Basic Use)	6 Mbps (Most Popular)	12 Mbps (Fastest Option)

Data Submission and Coverage Estimation of Non-Participating Providers

As part of its ongoing broadband mapping efforts, CN has developed a series of processes with the goal of submitting coverage estimation mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of platform type (cable modem, DSL, fixed wireless, etc.). This state specific collection of coverage estimation methodology papers (see Appendix A) demonstrates the estimated broadband service territory for the providers in this state that have either been non-responsive or that have refused to participate in the SBI mapping initiative.

Accuracy and Verification: Provider Validation Methodology

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a statewide level, static maps of statewide and county-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Additionally, non-participating provider narratives that were submitted in previous mapping cycles are subjected to the same level of scrutiny. Occasionally, a provider may elect to voluntarily participate (thus eliminating the need for future data estimation activities in the field). However, more often than not, the NPP narrative is updated with a combination of data gleaned from the provider's website, data obtained through FCC research and/or data collected/verified in the field by a CN staff engineer.

Estimates derived from provider-validated data indicate that approximately 1.41 percent of Ohio households do not have terrestrial fixed broadband service available, and approximately 0.27 percent of Ohio households have neither mobile nor fixed broadband service available.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 2.81 percent of rural Ohio households do not have terrestrial fixed broadband service available, and approximately 0.53 percent of rural Ohio households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard. This research often proves to be exceptionally effective when estimating the coverage area of an NPP.
6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. omni-directional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).

15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).
23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hillshade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

BROADBAND INQUIRIES METHODOLOGY

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connect Ohio website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information requested by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at other such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,600 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connect Ohio project has received a total of 155 inquiries (1,666 grant inception to date). As more inquiries are submitted to Connect Ohio, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

MY CONNECTVIEW METHODOLOGY

My ConnectView is an online, interactive mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connect Ohio project launched My ConnectView on April 2, 2012, and received 2,788 visits this reporting period; to date the interactive mapping applications have received 13,193 visits.

Speed Test Methodology

The 1,945 speed tests that are represented in the Connect Ohio Speed Test Report during this reporting period (13,381 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Ohio speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connect Ohio project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connect Ohio with the information on where broadband services are available. Second, unlike theoretical speed information which was received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the state of Ohio.

Providers Deemed Non-Viable

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the October 2012 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	21Globe, Inc.	www.21globe.com/is/access/	General reseller of DSL and backhaul.
2	650Net	www.650net.net/	Dial-up only.

3	A 007 Access	www.a007.com/	General reseller of Quest DSL and mobile wireless; DSL does not qualify as the max advertised speed is 768 kbps x 128 kbps.
4	AAA Internet Service	n/a	URL no longer in service.
5	Aaccess Network Communications	www.aaccess.net/	Not a broadband provider; installs and maintains WiFi systems.
6	ACC-NET	www.acc-net.com/	This company is no longer an active provider or in business.
7	ACERX.NET	http://acerx.net/	General reseller but no contact information listed on website; requests for information were never returned.
8	Adelphia	n/a	No longer in business; assets liquidated.
9	Airespring, Inc.	www.airespring.com	General reseller of VOIP, long distance and data circuits (non-residential).
10	Airewaves Broadband, LLC	www.airewaves.com	URL no longer in service.
11	Airmail247.com	www.airmail247.com	Business mailing list search site; not a broadband provider.
12	Alphalink Technologies	www.alink.com/index.htm	This company is a nonfacilities-based reseller.
13	American Broadband & Telecommunications	www.ambt.net	This company is a nonfacilities-based reseller.
14	Antioch Wireless Broadband	www.antiochwirelessbroadband.com/	Resells DSL and cellular service in Antioch, IL only.
15	Arrowheadnet.com	www.arrowheadnet.com/	Domain registration and web hosting company.
16	bargainisp.net	www.bargainisp.net/	Generic web directory site; company does not offer broadband.
17	Beonline	www.beol.net	This company is a nonfacilities-based reseller.
18	Bonzai Pipeline, Inc.	www.bonzaipipeline.net	This company is no longer in business.
19	BreezeWave Broadband	www.breezewave.com	This company is no longer in business.
20	Bright Choice	www.brightchoice.com	Bright Choice was acquired by Omnicity.

21	Broadband National	www.broadbandnational.com	Nonfacilities-based general reseller of DSL and satellite for 36 companies (e.g., ACC Business, HughesNet, et al.).
22	Broadview Networks Holdings, Inc.	www.broadviewnet.com	Wholesale reseller of partners' communication products and services; company is nonfacilities-based.
23	BullsEye Telecom, Inc.	www.bullseyetelecom.com	Integrated suite of telecommunications services for businesses and general reseller of backhaul.
24	Byesville.Net	www.byesville.net	This company is no longer in business.
25	Cable One	n/a	Inactive; non-state provider.
26	CAC MediaNet, Inc.	n/a	No longer in business; acquired by First Step (Michigan general reseller of DSL).
27	Camino-Net Internet Services	www.camino-net.com	No longer in business; was dial-up only.
28	CanNet Internet Services	www.cannet.com	Offers dial-up and B2B services, webhosting, etc.
29	Canton Cable	n/a	Acquired by Comcast.
30	CCIS.net	www.ccis.net	Now owned by Beacon Technologies; offers dial-up and is general reseller of DSL in Pennsylvania.
31	Celito Communications	www.celito.net/	Offers dial-up and wireless in North Carolina.
32	CIMCO Communications, Inc.	www.cimco.net	This company is a nonfacilities-based reseller.
33	Clear Sky Communications	www.clearskycommunications.com/	This company is a general reseller of and an installation company for satellite services.
34	Cleartouch.Com	n/a	This company is no longer in business.
35	CloverNet	n/a	Script coding application company.
36	Coax-Net	www.coax.net	This company is a nonfacilities-based reseller.
37	Cobridge Communications, LLC	www.cobridge.net/communications	This company was acquired in Ohio by Time Warner.

38	Cognisurf	www.calling-plans.com	Dial-up internet provider.
39	Columbus Cable	n/a	Possibly acquired by Comcast; OSS service branch.
40	Combined Technologies Inc.	www.ctipack.com	This company is no longer in business.
41	Communication Options Inc.	www.coi.net	Provides B2B and residential dial-up.
42	config.com Internet	www.config.com	Nonfacilities-based reseller; provided limited data but not enough for creation of coverage area or identification of services.
43	CoreComm Wireless	n/a	This company is no longer in business.
44	Dacor Internet Services	www.dacor.net/	This company is a nonfacilities-based reseller.
45	Data-Tel of Illinois, Inc.	www.data-telinc.net/	This company is a nonfacilities-based reseller.
46	Davis Voice and Data	n/a	Cellular reseller only; does not operate a broadband network.
47	Dayton Digital Networks	www.daytondigital.net	No longer offers broadband services.
48	Deltaforce	www.deltaforce.net	Dial-up and webhosting services only.
49	deluxehost.com	deluxe-host.com	Offers web hosting only.
50	Devlin Express	www.devlinex.com	This company is a nonfacilities-based reseller.
51	DGUI	www.dgui.com/	No longer in business; domain name for sale.
52	DHB Networks, Ltd.	www.dhbnetworks.com	This company is no longer in business.
53	Dial National	www.dialnational.com/	Inactive URL; out of business.
54	Dialer.net	www.dialer.net/internet_access/United_States.html	Offers international dial-up services.
55	DigitalBridge Communications Corp.	n/a	Non-state provider; serves Idaho, Indiana, Montana, South Dakota, Virginia, and Wyoming.
56	DSL @ Interlync	www.interlync.com	General reseller of Covad and for this mapping cycle they have been non-responsive.

57	DTS-NET.COM	www.dts-net.com/	Provider of wholesale and retail telecommunications services.
58	Duvall Wireless	www.duvallwireless.net	This company is no longer in business.
59	East Allen High Speed Internet, LLC	n/a	Non-state provider; serves Allen County, Indiana.
60	East Palestine Internet, Inc.	www.epiinternet.com/	Company appears to have gone out of business; phone is disconnected and Inactive URL.
61	Enventis Telecom Inc.	n/a	Non-state general reseller.
62	Erielink LLC	www.erielink.com	No longer in business.
63	ETI - Connecting Your World	www.cyberenet.net/	General reseller of DSL services from infrastructure owned by Verizon, AT&T, and Covad.
64	EZnet Ohio	www.2.ezo.net/iserv.htm	Provides dial-up service.
65	FairPoint Broadband	www.fairpoint.com	Non-state provider.
66	Fast Dependable Access	www.fda.net	Inactive URL; company appears to have gone out of business.
67	g wireless, Inc.	http://www.g-wireless.net	Acquired by another company.
68	Galaxywave Internet	www.galaxywave.net/	Phone number was disconnected.
69	Global Crossing Telecommunications, Inc.	n/a	Acquired by another company.
70	GO Concepts	n/a	This company is a nonfacilities-based reseller.
71	Great American Broadband, Inc.	www.oibw.net	Non-state provider; serves Indiana.
72	Hubwest Protected Networks LLC	www.hubwest.com	Dial-up and web hosting only.
73	iDigi Wireless	www.digi.com	Inactive URL; no longer in business.
74	Imbris, Inc.	www.imbris.com	Provides fixed wireless in Idaho only.
75	IMGISP.NET	www.imgisp.net/	Search engine.
76	Incredible Networks	n/a	Inactive URL; out of business.
77	Inercom Communications Inc.	www.inercom.com	Inactive URL; out of business.

78	Interactiveinfo.com Inc.	www.rocketbroadband.com	Offers cable television services in NY only.
79	In-Touch Software	www.intouchsoftware.co.uk	Software development company.
80	iRadical	n/a	Inactive URL; out of business.
81	ISPartner.net	n/a	Inactive URL; out of business.
82	KAS Cable TV	www.kascable.com	This company is a nonfacilities-based reseller.
83	KeyOn Communications, Inc.	www.keyon.com	This company was acquired by New Knoxville Telephone Company.
84	LARIAT.NET	www.lariat.net/	Offers fixed wireless services in Wyoming only.
85	LCSisp.com	www.lcsisp.com/index.cfm	Offers national dial-up services only.
86	Lek.net Internet Services, Inc.	www.lek.net	General reseller of AT&T DLS and offers dial-up and computer repair.
87	LightEdge Solutions, Inc.	www.lightedge.com	IT consulting; LightEdge does not provide residential service in any state.
88	Lightyear Network Solutions, LLC	www.lightyear.net	Nonfacilities-based general reseller.
89	LinkAmerica.Net	www.linkamerica.net/	Inactive URL; out of business.
90	Magnum Cable	n/a	Inactive URL; out of business.
91	MainBoard	www.mainboard.cc/internet.htm	General reseller in Virginia.
92	Maine Cable and Wireless	www.mainecableandwireless.com	Inactive URL; out of business.
93	Marcin Company	n/a	Inactive URL; out of business.
94	Metropolitan Telecommunications Holding Company	n/a	MetTel provides facilities-based and resold services (certified CLEC in some states); the company provides a variety of voice, including wireless, and data services to commercial customers.
95	Millenicom Inc.	www.millenicom.com	General reseller of dial-up and mobile broadband (Sprint network).
96	Nanomega.Com	www.nanomega.com	Inactive URL; out of business.
97	NCO Wireless	www.ncowifi.com	Acquired by NexGen Access.
98	NetAccess, Inc.	www.nas.net/	Offers wireless B2B services only.
99	NetSpeed Online	www.netspeed-online.net	Inactive URL; out of business.

100	New Edge Network, Inc.	www.newedgenetworks.com	Acquired by EarthLink.
101	Northwest ISP	www.northwestisp.com/	Inactive URL; out of business.
102	nTelos, Inc.	n/a	Non-state provider; offers mobile wireless cards in West Virginia.
103	NuVox, Inc.	www.nuvox.com	Acquired by Windstream.
104	OffWorld1	n/a	Inactive URL; no longer in business.
105	ONEcom Wireless	n/a	Inactive URL; no longer in business.
106	Open Range Communications, Inc.	http://www.openrangecomm.com/	No longer in business.
107	Overarch Broadband	n/a	Offers services in Idaho only.
108	Pacific Internet Exchange	www.pie.us/	Inactive URL; company appears to have gone out of business.
109	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company.
110	Paknet Limited	n/a	Subsidiary of Pakistan Telephone Company; no services offered in the U.S.
111	Pattersonville Telephone Company	n/a	Does not offer broadband service.
112	Planet Online	www.planetonline.net/	Offers website hosting services.
113	Practical Support, Ltd.	http://www.practicalsupport.com/	Offers service, but below broadband threshold.
114	PremoWeb	www.premoweb.com/about_us/contact_us.html	Offers national dial-up services only.
115	Reliance Globalcom Services, Inc.	www.relianceglobalcom.com	California-based company; non-state provider.
116	Renaissance Networks	www.renaissancenetworks.com/	IT support company based in New Mexico.
117	Simply Dialup A Metrogeek Company	www.simplydialup.com/	Offers dial-up only.
118	Siscom Internet Service	www.siscom.net/index.html	This company is a nonfacilities-based reseller.
119	SkyLAN	n/a	This company is not a broadband provider.

120	Skymax Broadband, Inc.	http://www.skymaxbroadband.com/	No longer in business.
121	Sling Broadband	n/a	Non-state provider; WISP in Florida.
122	Supernova Systems, Inc.	home.onlyinternet.net/	Company acquired by Great American Broadband.
123	Surferz.Net	www.surferz.net/	Offers dial-up in upstate NY only.
124	T1 Shopper	www.t1shopper.com/	Search engine for general reseller.
125	TelNet Worldwide, Inc.	n/a	Does not offer broadband service.
126	The Iserv Company, LLC	www.iserv.net	This company is a nonfacilities-based reseller.
127	The T1 Company	www.t1company.com	Offers B2B services.
128	Total Access Networks, Inc	n/a	Does not offer broadband service.
129	TSISP.NET	www.tsisp.net	Inactive URL; out of business.
130	U.S. Wireless Online, Inc.	n/a	Non-state provider; acquired by Caviair and offers service in Florida only.
131	University Corporation for Advanced Internet Development	n/a	Currently ineligible under the parameters and guidance of the SBI grant program.
132	Untangled Technology, LLC	n/a	Company Acquired by Lightspeed Technologies.
133	UNUM Telecommunications, Inc.	www.utinet.net/	Inactive URL; out of business.
134	WCNet	www.wcnet.org/rates/hispeed/	This company is a nonfacilities-based reseller.
135	Wcoil	www.wcoil.com	Despite numerous outreach efforts, this company remains nonresponsive; accordingly, we are uncertain of the types of services offered.
136	WilTel Communications, LLC	www.level3.com	Acquired by Level 3.
137	WireFire Internet	www.wirefire.com	Acquired by FiberNet.
138	Wireless Roanoke, Inc.	www.wirelessroanoke.com/	Inactive URL; out of business.
139	wisbin	www.wisbin.com/	No longer in business.
140	www.AmericanAngel.us	www.americanangel.us/	Inactive URL; out of business.

141	YEYZOO.NET	www.yeyzoo.net/	Inactive URL; out of business.
142	YLISP (Your Local ISP)	www.itsyournet.com	Resells DSL and dial-up.
143	YourT1Wifi.com	yourt1wifi.com/	Offers wireless service in Idaho only.
144	Zito Media Communications, II, LLC	n/a	Zito Media does not yet offer broadband service in Ohio.
145	ZOOM Internet Services, LLC	n/a	Michigan-based dial-up provider and web hosting company.

APPENDIX A: ESTIMATION OF NON-PARTICIPATING PROVIDERS

GLW Broadband

Wireless Intranet

GLW BROADBAND

As part of its ongoing broadband mapping efforts, Connected Nation has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of whether the provider has chosen to support and participate in the SBI mapping initiative.

The following narrative provides detail regarding the recent, and ongoing, data collection and coverage estimation activities related to GLW Broadband (GLW) a cable television and cable modem Internet service provider, located in Grafton, Ohio with a service area around Grafton, LaGrange and Wellington, Ohio (and certain unincorporated of Lorain County). The narrative will include information regarding how and where CN obtained publicly available data and utilized on-the-ground validation and infrastructure verification techniques that support the underlying data.

Background

From March 1, 2010, through February 8, 2012, CN made 43 attempts to contact the provider (either by phone, e-mail, or in person). On two occasions (e-mail response from April 23, 2010 and conversation with a CSR on February 18, 2011) the provider refused to participate. On July 19, 2012, (after attempting to contact and persuade the provider 4 more times during this mapping cycle) a CN staff member decided that a field audit and coverage estimation document would be the only way that this provider would be represented on the National Broadband Map. On August 7, 2012, two CN staff members were dispatched into the field to gather data necessary for the creation of a coverage estimation document and map.

The Issue

GLW has predicated its refusal to participate in the Connect Ohio broadband mapping initiative.

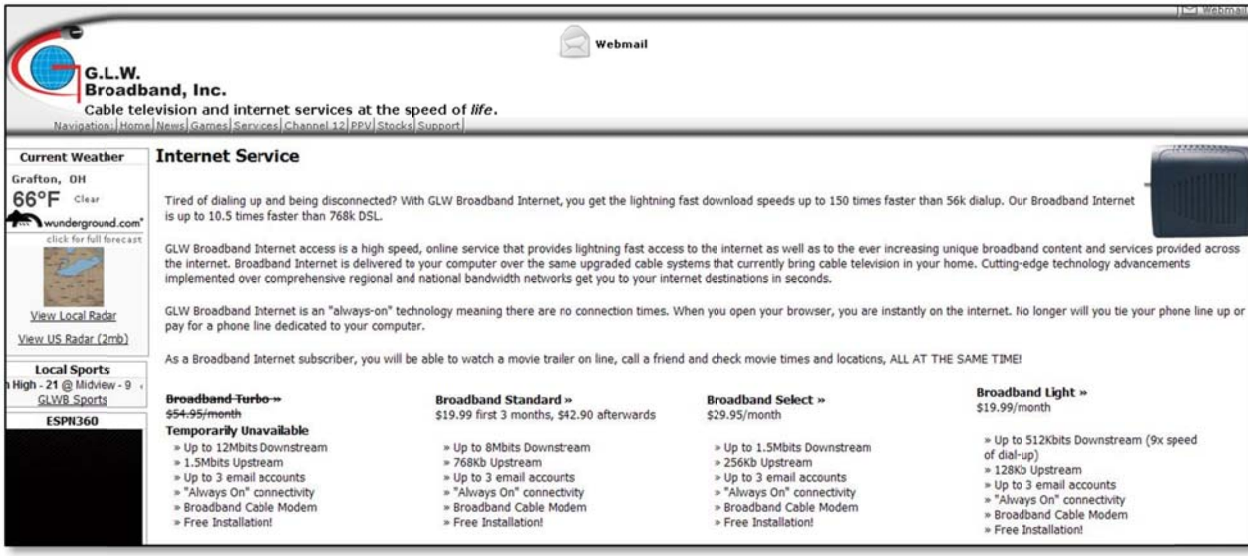
Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN has built a file based on research information and, as time progressed, enriched the file with information obtained through the public domain or through on-the-ground research and site verification. For example, CN reviewed the provider's website (www.glwb.net) to determine the residential service plans **(Exhibit A)** and reviewed the Ohio Department of Commerce, Video Service Authorization to determine the approximate service area **(Exhibit B)**.

A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) the system FRN #0004982286 **(Exhibit C)**. Also, to support field validation of access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any FCC authorizations that the provider may hold. This process yielded no license results.

.

Exhibit A: Service Plans



Webmail

G.L.W.
Broadband, Inc.
Cable television and internet services at the speed of *life*.

Navigation: | Home | News | Games | Services | Channel 12 | PPV | Stocks | Support |

Current Weather
Grafton, OH
66°F Clear
wunderground.com
click for full forecast
View Local Radar
View US Radar (2mb)

Local Sports
h High - 21 @ Midview - 9
GLWB Sports

ESPN360

Internet Service

Tired of dialing up and being disconnected? With GLW Broadband Internet, you get the lightning fast download speeds up to 150 times faster than 56k dialup. Our Broadband Internet is up to 10.5 times faster than 768k DSL.

GLW Broadband Internet access is a high speed, online service that provides lightning fast access to the internet as well as to the ever increasing unique broadband content and services provided across the internet. Broadband Internet is delivered to your computer over the same upgraded cable systems that currently bring cable television in your home. Cutting-edge technology advancements implemented over comprehensive regional and national bandwidth networks get you to your internet destinations in seconds.

GLW Broadband Internet is an "always-on" technology meaning there are no connection times. When you open your browser, you are instantly on the internet. No longer will you tie your phone line up or pay for a phone line dedicated to your computer.

As a Broadband Internet subscriber, you will be able to watch a movie trailer on line, call a friend and check movie times and locations, ALL AT THE SAME TIME!

~~Broadband Turbo »~~
~~$54.95/month~~
Temporarily Unavailable
» Up to 12Mbits Downstream
» 1.5Mbits Upstream
» Up to 3 email accounts
» "Always On" connectivity
» Broadband Cable Modem
» Free Installation!

Broadband Standard »
$19.99 first 3 months, $42.90 afterwards
» Up to 8Mbits Downstream
» 768Kb Upstream
» Up to 3 email accounts
» "Always On" connectivity
» Broadband Cable Modem
» Free Installation!

Broadband Select »
$29.95/month
» Up to 1.5Mbits Downstream
» 256Kb Upstream
» Up to 3 email accounts
» "Always On" connectivity
» Broadband Cable Modem
» Free Installation!

Broadband Light »
$19.99/month
» Up to 512Kbits Downstream (9x speed of dial-up)
» 128Kb Upstream
» Up to 3 email accounts
» "Always On" connectivity
» Broadband Cable Modem
» Free Installation!

Exhibit B: Service Area

Ohio Department of Commerce
Video Service Authorization

Video Service Provider: GLW Broadband, Inc.

VSA Number:	2010-VSA-0063	VSA Effective Date:	February 25, 2011
Application Date:	November 5, 2010	VSA Expiration Date:	February 25, 2021

IS HERBEBY GRANTED AN AUTHORIZATION TO PROVIDE VIDEO SERVICE IN THE VIDEO SERVICE AREA SPECIFIED BELOW IN ACCORDANCE WITH AND SUBJECT TO THE PROVISIONS OF 1332.21 THROUGH 1332.34 OF THE OHIO REVISED CODE AND THE TERMS AND CONDITIONS OF THIS AUTHORIZATION.

Terms and Conditions of the Authorization

A. Video Service Area

The video service provider is authorized to provide video service in the areas listed on the attached sheet.

GLW Broadband, Inc.
Service Areas
VSA Number: 2010-VSA-0063

Sub-Authorizations:

-47 LORAIN
Eaton Township
Grafton Township
Grafton Village
Lagrange Township
Lagrange Village
Litchfield Township

Exhibit C: Federal Registration Number

Registration Detail	
FRN:	0004982286
Registration Date:	08/20/2001 11:15:12 AM
Last Updated:	08/16/2004 08:28:24 AM
Business Name:	GLW Broadband , INC
Business Type:	Private Sector , Corporation
Contact Organization:	
Contact Position:	General Manager
Contact Name:	Steve C Fleming
Contact Address:	993 Commerce Drive P.O. Box 67 Grafton, OH 44044 United States
Contact Email:	
ContactPhone:	(440) 926-2794
ContactFax:	(440) 926-2889

<u>Preliminary Identification of Provider's Coverage Area</u>

Connected Nation determined the approximate parameters of the service area from the provider's website and from review of the Ohio Department of Commerce, Video Service Authorization for GLW. CN staff members travelled to Grafton, Ohio on August 7, 2012, to begin driving through the service territory and to begin their data collection process. The first stop along the way was in the Village of Grafton where the CN staff members requested a copy of the local franchise agreement (see excerpts in **Exhibit H)**; in this instance the franchise agreement specifies (Section 2.3 A, B & C) where and how the cable system's plant can be constructed on poles, easements, etc.

Next, the CN staff members drove throughout Lorain County systematically working towards LaGrange and then to Wellington **(Exhibit D)** as they confirmed the presence of cable plant. The CN staff members stopped and visited with representative from City Hall in both LaGrange (Village Administrator) and Wellington (Village Manager) and discussed the franchise agreements for those villages. While representatives from each location confirmed that the franchise agreement was substantially the same as Grafton, neither person had immediate access to the franchise agreement in time to make copies.

In all, the trip consisted of approximately 150 miles of "line driving" and/or visually confirming the location of offices, drop box locations, and aerial and underground plant **(Exhibit E)**. The concept being simple: where there is no cable, there can be no cable modem Internet service. While the coverage estimation submitted herein does not account for 100% of the service area of GLW, it does provide a robust general representation of their coverage area. This "line driving" allowed the CN engineers to create a GPS trail as illustrated in Exhibit D, use the data to create a Google Earth Image **(Exhibit F)** and then convert the image into a Connect Ohio coverage map for GLW **(Exhibit G).**

Exhibit D: Validation Points for Visual Infrastructure Confirmation

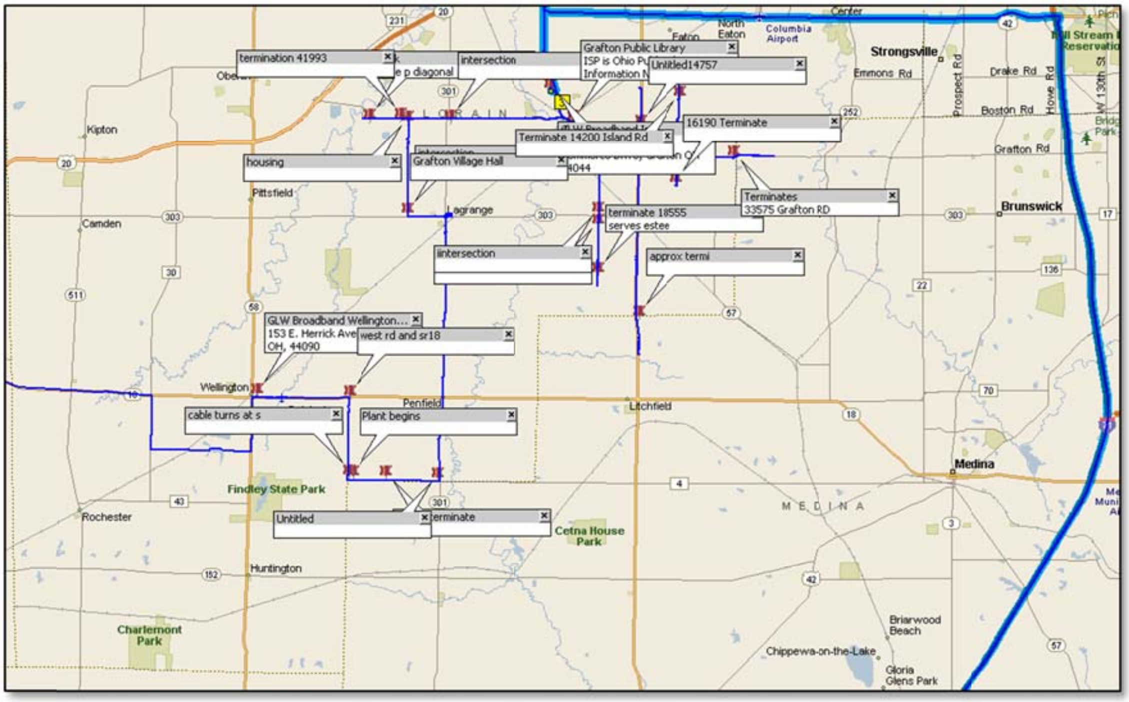


Exhibit E: Samples for Visual Confirmation of Office Locations and Infrastructure

Exhibit F: GLW Broadband Estimated Coverage

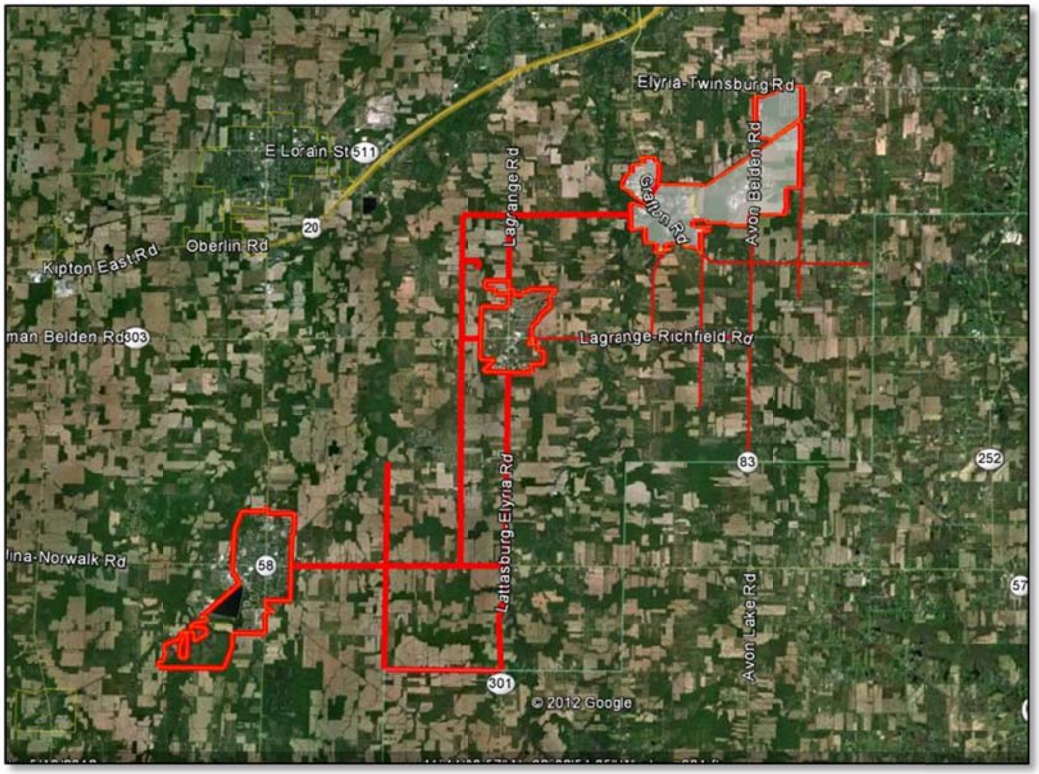
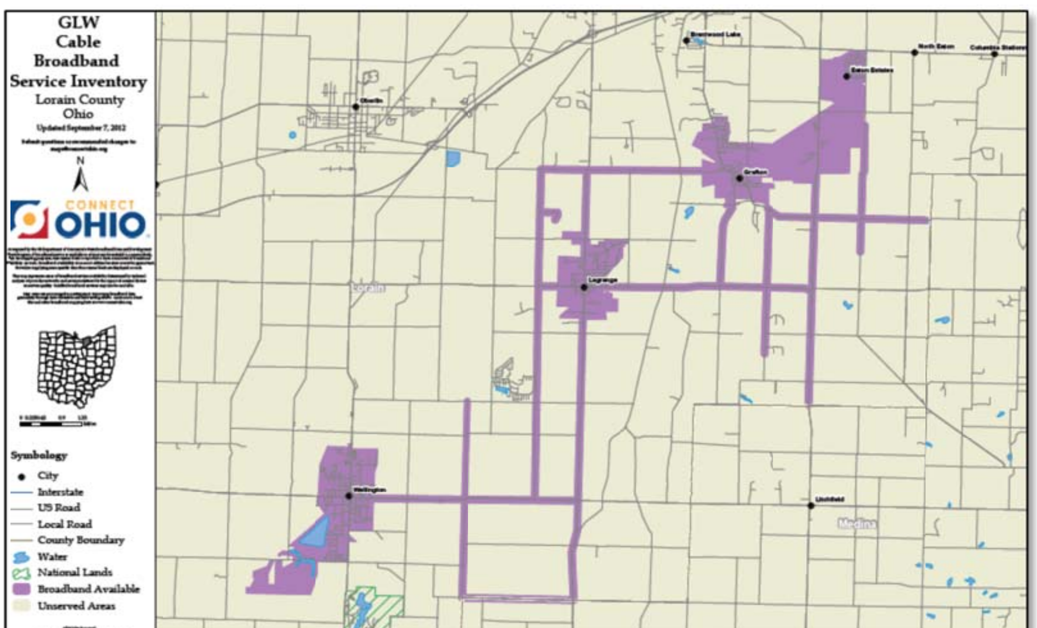


Exhibit G: GLW Broadband Estimated Coverage as Depicted by Connect Ohio



Q. "Standard Installation" means any residential installation that can be completed using a drop on one hundred fifty (150) feet or less.

R. "Street" means the surface of, and the space above and below, any public or private street, road, highway, freeway, lane, alley, path, court, sidewalk, parkway or drive, or any easement or right-of-way now or hereafter held by the Village.

S. "Subscriber" means any Person who lawfully receives Cable Television Service. In the case of multiple office buildings or multiple dwelling units, the "Subscriber" means the lessee, tenant or occupant.

T. "Unlawful" shall mean an act initiated by any person and will be considered a misdemeanor.

SECTION 2.

GRANT OF AUTHORITY AND GENERAL PROVISIONS

2.1) Franchise Required. It shall be unlawful for any person to construct, operate or maintain a Cable Communications System in the Village unless such person or the person for whom such action is being taken shall have first obtained and shall currently hold a valid Franchise granted pursuant to this Ordinance. It shall also be unlawful for any person to provide Cable Television Service in the Village unless such person shall have first obtained shall currently hold a valid Franchise granted pursuant to the provisions of this Ordinance. All Franchises granted by the Village pursuant to this Ordinance shall contain the same substantive terms and conditions.

2.2) Grant of Franchise. This Franchise is granted pursuant to the terms and conditions contained herein. Such terms and conditions shall be subordinate to all applicable provisions of state and federal laws, rules and regulations.

2.3) Grant of Nonexclusive Authority. The Grantee shall have the right and privilege to construct, erect, operate and maintain, in, upon, along, across, above, over and under the Streets, alleys, public ways and public places now laid out or dedicated and all extensions thereof, and additions thereto in the Village, poles, wires, cables, underground conduits, manholes and other television conductors and fixtures necessary for the maintenance and operation in the Village of a Cable Communications System as herein defined. The Cable Communications System constructed and maintained by Grantee or its agents shall not interfere with other uses of streets. Grantee shall make use of existing poles and other facilities available to Grantee to the extent it is technically and economically feasible to do so.

A. Notwithstanding the above grant to use Streets, no Street shall be used by Grantee if the Village in its sole opinion determines that such use is inconsistent with the terms, conditions or provisions by which such Street was created or dedicated, or with the present use of the Street. The Village shall be notified by the grantee of any proposed and or scheduled underground additions to Grantee's system.

B. This Franchise shall be nonexclusive, and the Village reserves the right to grant a similar use of said Streets, alleys, public ways and places, to any Person at any time during the period of this Franchise, provided, however, that any additional Franchise grants shall be under the same substantive terms and conditions as this Franchise.

C. Grantee shall have the authority to use the Village easements, public rights-of-way, Streets and other conduits for the distribution of Grantee's System. The Village may require all developers of future subdivisions to allow and accommodate the construction of the System as part of any provisions for utilities to serve such subdivisions.

2.4) Franchise Term. This Franchise shall be in effect for a period twelve (12) years from the date of acceptance by Grantee, unless renewed, revoked or terminated sooner as herein provided.

2.5) Previous Franchises. Upon acceptance by Grantee as required by Section 13 herein, this Franchise shall supersede and replace any previous Ordinance or Agreement granting a Franchise to Grantee to own, operate and maintain a Cable Television System within the Village. The Ordinance 80-995 is hereby expressly repealed.

2.6) Compliance with Applicable Laws, Resolutions and Ordinances. The Grantee shall at all times during the life of this Franchise be subject to all lawful exercise of the police power and the right of eminent domain by the Village. This Franchise shall comply with the Ohio franchise standards contained in the Ohio Revised Code.

2.7) Rules of Grantee. The Grantee shall have the authority to promulgate such rules, regulations, terms and conditions governing the conduct of its businesses as shall be reasonably necessary to enable said Grantee to exercise its rights and perform its obligation under this Franchise and to assure uninterrupted service to each and all of its Subscribers; provided that such rules, regulations, terms and conditions shall not be in conflict with provisions hereto, the rules of the FCC, the laws of the State of Ohio, the Village or any other body having lawful jurisdiction thereof and except upon occurrence of acts beyond the reasonable control of Grantee or acts of God.

2.8) Territorial Area Involved. This Franchise is granted for the corporate boundaries of the Village, as it exists from time to time. In the event of annexation by the Village, or as development occurs, any new territory shall become part of the area covered, provided, however, that Grantee shall not be required to extend service beyond its present System boundaries unless there is a minimum of thirty (30) homes

WIRELESS INTRANET INC.

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) program.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to Wireless Intranet, Inc., an Ohio wireless Internet service provider (WISP), with service areas in and around Delaware, Morrow, Marion and Union counties. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation and site verification techniques that support the underlying data.

Background

From March 10, 2010, through the April 2012 NTIA mapping submission, CN staff members conducted multiple outreach sessions to attempt to obtain the participation of the provider with 19 instances of communication (telephone and e-mail). However, since the requests were never acknowledged, the provider record was flagged for an on-the-ground data collection exercise at the end of the April 2012 submission cycle. Two additional attempts were made during this mapping cycle (May 4, 2012 and June 8, 2012) prior to dispatching CN staff members into the field. On June 13, 2012 two members of the CN engineering and technical services team drove through the provider's coverage area to independently gather the data.

The Issue

Wireless Intranet, Inc., by its lack of responsiveness since March 10, 2010, has predicated its unwillingness to participate in the Connect Ohio broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain, prior to conducting in-field spectrum testing. Despite the fact that Wireless Intranet, Inc. displays its coverage area on its website **(Exhibit A)**, the provider refused to offer any data that could be used for the construction of a complete dataset for submission to NTIA. All publically available, such as maximum advertised speeds, **(Exhibit B)** or searches for federal registration numbers **(Exhibit C)** were combined with the data gathered in the field in order to develop and present this coverage estimation document to the NTIA.

A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded a "no match" (Exhibit C) response. Additionally, the FCC Universal Licensing System (ULS) was searched to determine if the provider was the authorization holder of any spectrum, including but not limited to FCC Radio Service "NN" for 3650 MHz authorizations; this search also yielded "no match" **(Exhibit D)**.

Exhibit A: Service Area as Depicted June 11, 2012

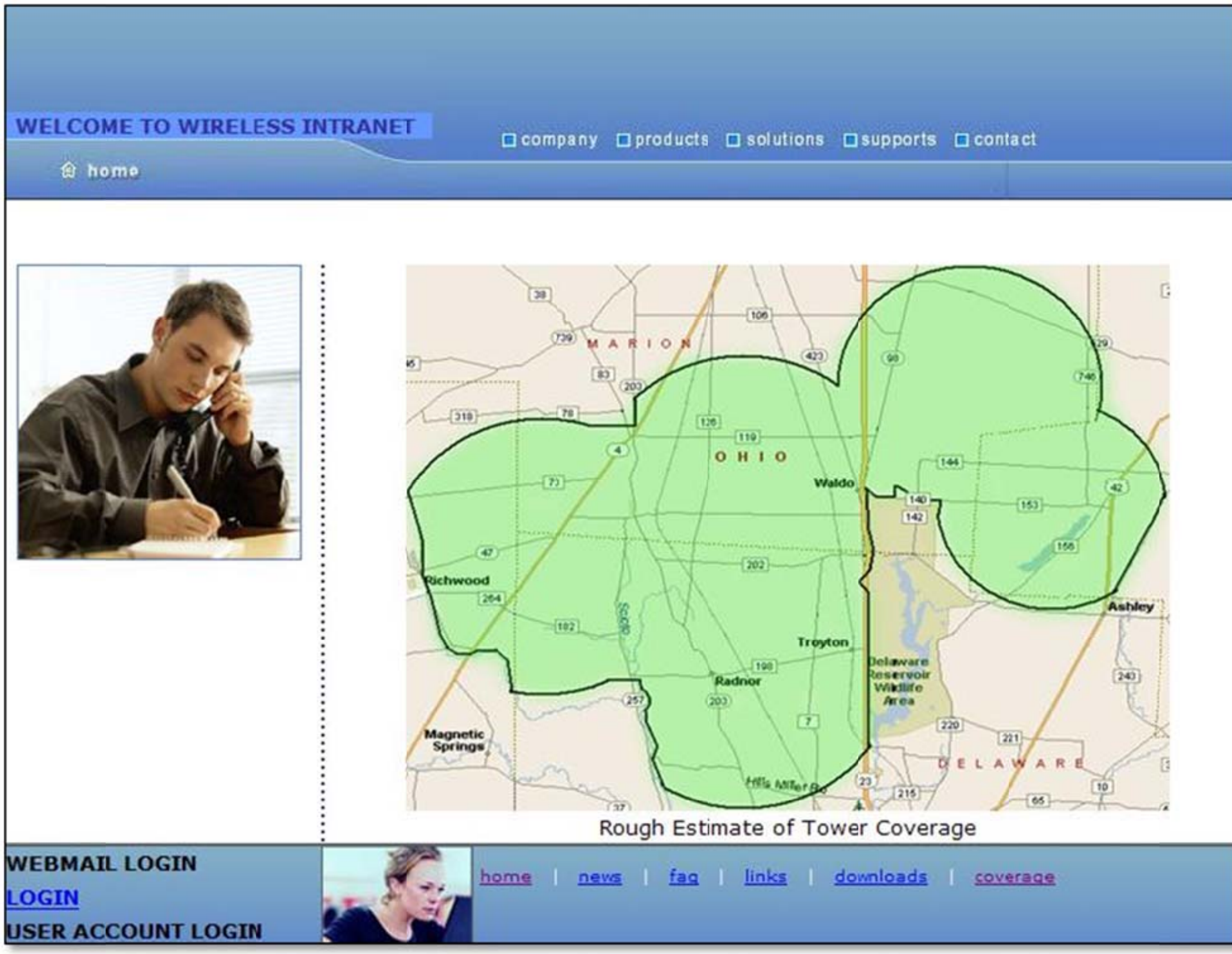
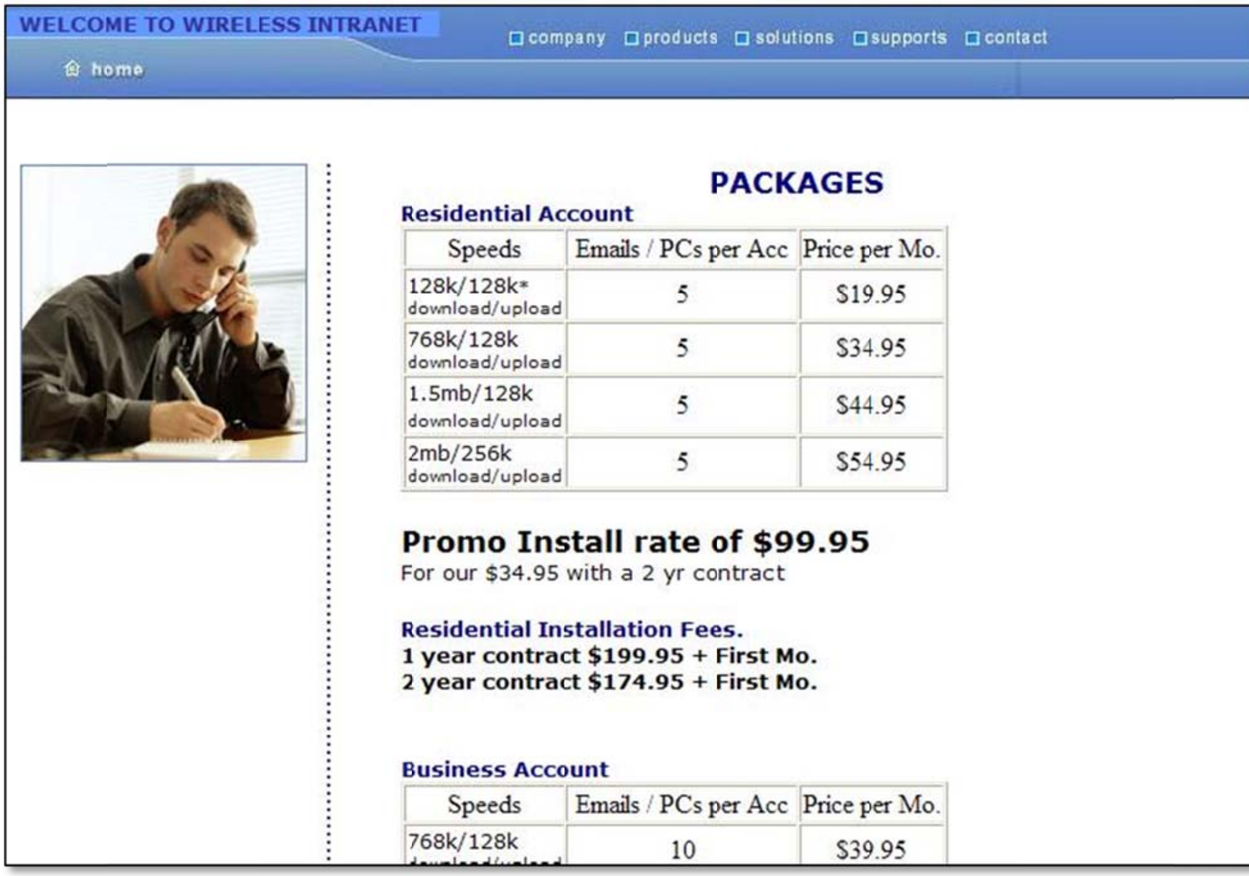


Exhibit B: Public Data Sources


WELCOME TO WIRELESS INTRANET

company | products | solutions | supports | contact

home

PACKAGES

Residential Account

Speeds	Emails / PCs per Acc	Price per Mo.
128k/128k* download/upload	5	$19.95
768k/128k download/upload	5	$34.95
1.5mb/128k download/upload	5	$44.95
2mb/256k download/upload	5	$54.95

Promo Install rate of $99.95

For our $34.95 with a 2 yr contract

Residential Installation Fees.

1 year contract $199.95 + First Mo.

2 year contract $174.95 + First Mo.

Business Account

Speeds	Emails / PCs per Acc	Price per Mo.
768k/128k	10	$39.95

Exhibit C: Federal Registration Number


FCC Federal Communications Commission

FCC Home | Search | Updates | E-Filing | Initiatives | For Consumers | Find People

AMERICA THE BEAUTIFUL

FCC Registration

FCC > FCC Registration

FCC Site Map

Search Public Information

Return to FCC Registration Home

No matches were found!

Try refining your search by adding a wildcard character (*).

Also see Advanced Search Tips and Tricks.

REFINE SEARCH

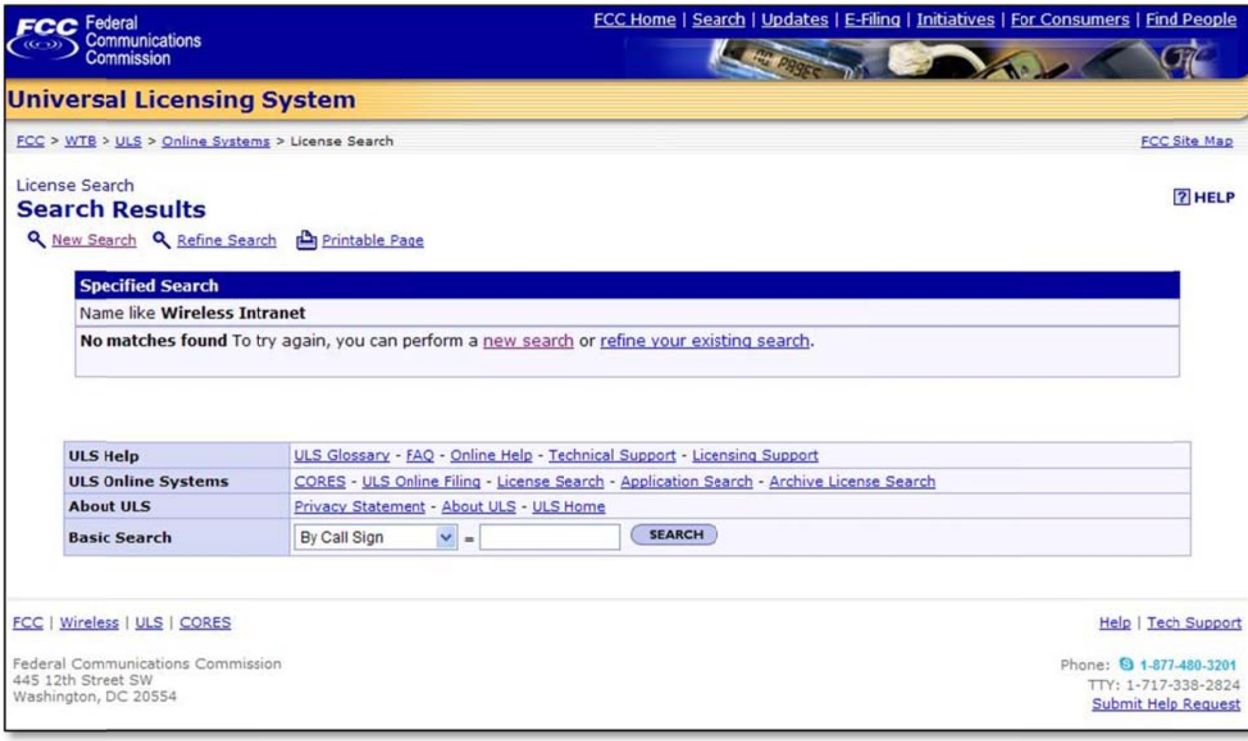
Customer Service

Frequently Asked Questions | Forms Requiring an FRN | Privacy Statement | FCC Home Page

FRN Help Line: 877-480-3201 (Mon.-Fri. 8 a.m.-6 p.m. ET)

The FRN Help desk has a dedicated staff of customer service representatives standing by to answer your questions or concerns. You can also email the FRN Help desk with your questions and concerns.

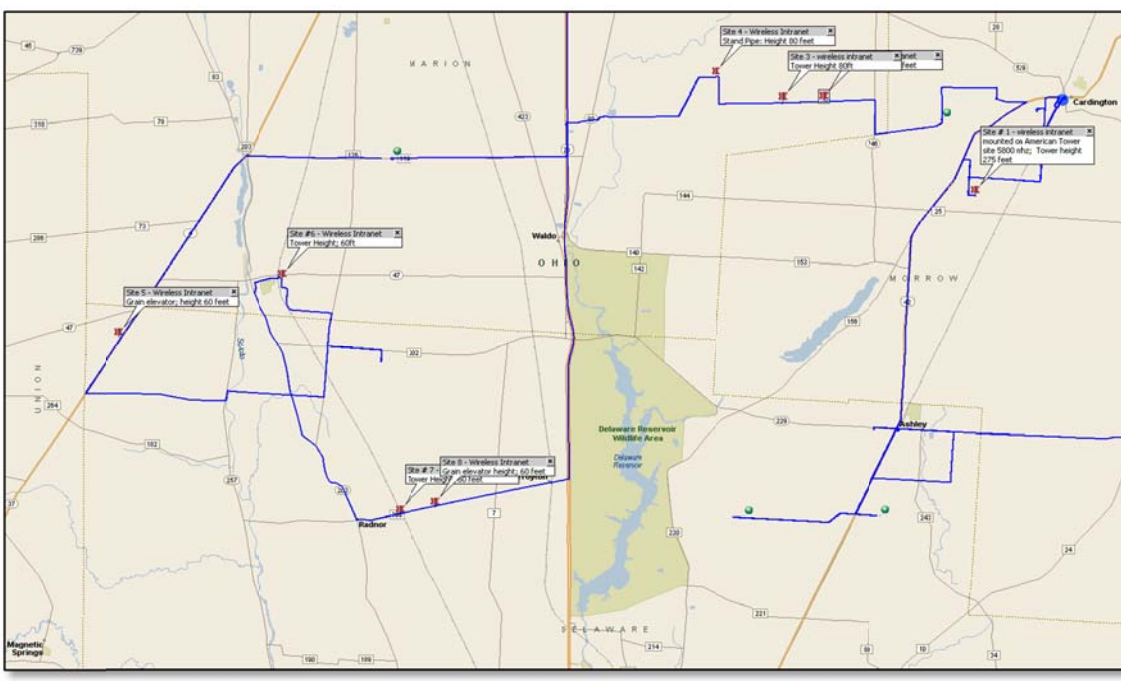
Exhibit D: License Reference



Preliminary Identification of Provider's Coverage Area

Eight transmit site locations were identified during the course of the field research and these locations were captured in a GPS route using Microsoft *Streets & Trips* **(Exhibit E).**

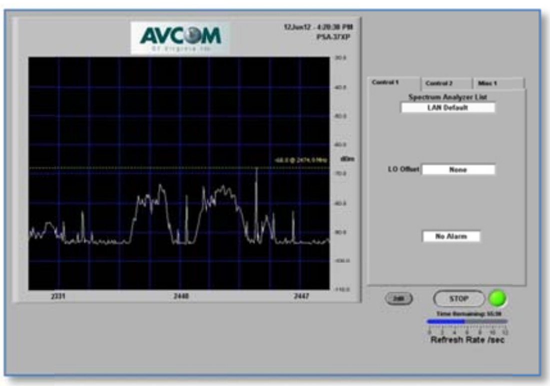
Exhibit E: Validation Points for AP Structures

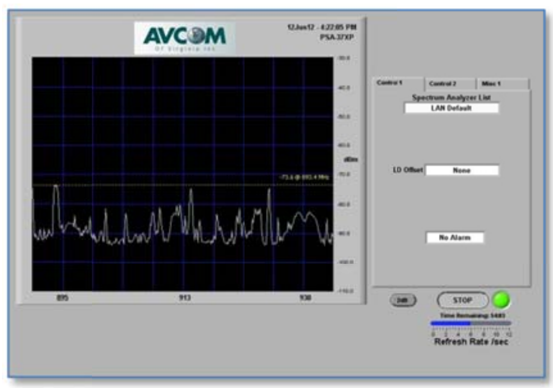


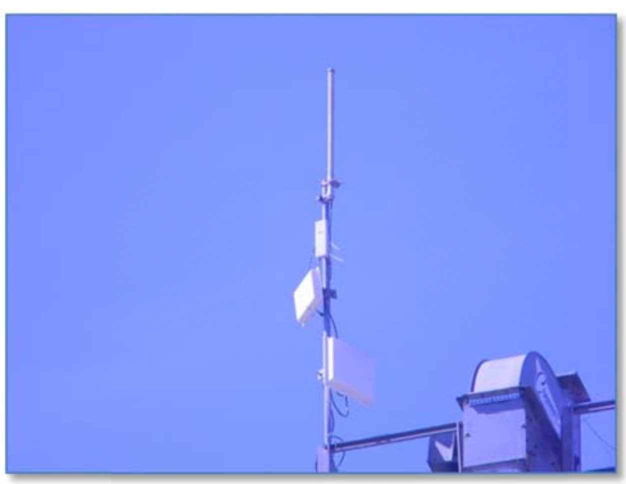
Testing Techniques

CN staff developed a data collection and site validation route based on information as outlined above primarily using the provider's coverage area (as depicted on the website) and attempting to identify centerline coordinates for each transmit location. CN staff members then used the "estimated" centerline coordinates to review satellite images from Google Earth in an attempt to isolate vertical structure that could be the transmit locations (water tanks, grain elevators, rooftops and/or towers). To ensure accuracy of the coverage estimates, the CN engineer also included wireless transmit sites of neighboring WISPs to eliminate confusion when a transmit site was located. For example, known transmit sites, from WISPs that have voluntarily submitted data, were also geocoded and "eliminated" during the on-the-ground search to ensure that erroneous signal testing was mitigated. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit F)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored) and photographs were taken of the access points.

Exhibit F: Field Data Samples for Wireless Intranet Tower Locations







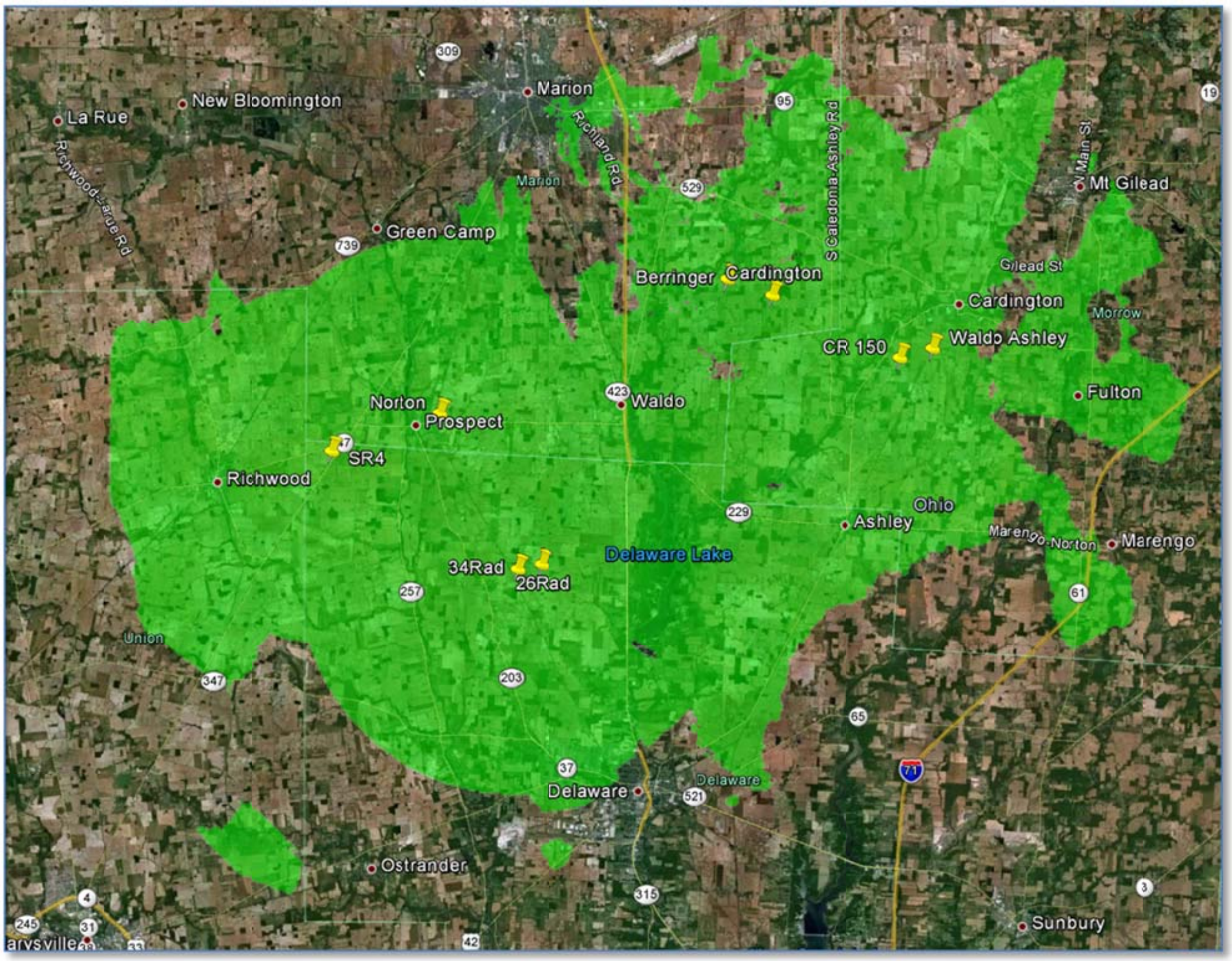
<u>Results and Submission for October 2012</u>

Through the analysis of the combined 8 estimated locations, 8 access points were ultimately identified and relative information was logged into the Wireless Intranet field validation notes file **(Exhibit G)**. The CN engineer then used the datum for each tower site to create a composite propagation study **(Exhibit H)**.

Exhibit G: Field Validation Notes

		Provider	Test Site Info	ordinates NAD 83 REQUIR		Test Data		Signal Verification/Spectrum Analyzer			
Site #	Date	Provider	Physical Address	(N) Lat Decimal	(-)(W) Long Decimal	Type	Pass or Fail?	Peak Freq	Peak Sig Strength	Spectrum Analyzer	Time
1	6/13/12	Wireless Intranet	3158 County RD 150	40.47335	-82.92735	Signal Verificatio	Pass	5730MHz	-70	Avcom PSA-37XP	2:25pm
2	6/13/12	Wireless Intranet	4680 Neibauer RD	40.49938	-82.98192	Signal Verificatio	Pass	2462MHz	-52	Avcom PSA-37XP	2:54pm
3	6/13/12	Wireless Intranet	4916 Newmans-Cardington Rd	40.49920	-82.99677	Signal Verificatio	Pass	2432MHz	-70	Avcom PSA-37XP	3:01pm
4	6/13/12	Wireless Intranet	3801 Berringer Rd	40.50612	-83.02097	Signal Verificatio	Pass	2382MHz	-43	Avcom PSA-37XP	3:09pm
5	6/13/12	Wireless Intranet	6948 SR 4	40.43443	-83.23658	Signal Verificatio	Pass	2474MHz	-68	Avcom PSA-37XP	4:20pm
6	6/13/12	Wireless Intranet	266 Prospect-Norton Rd	40.45031	-83.17746	Signal Verificatio	Pass	2440MHz	-36	Avcom PSA-37XP	4:49pm
7	6/13/12	Wireless Intranet	3434 Radnor Rd	40.38561	-83.13529	Signal Verificatio	Pass	907MHz	-47	Avcom PSA-37XP	5:11pm
8	6/13/12	Wireless Intranet	2658 Radnor Rd	40.38765	-83.12236	Signal Verificatio	Pass	2439MHz	-64	Avcom PSA-37XP	5:17pm

Exhibit H: Composite Propagation Study



APPENDIX B: BROADBAND PROVIDER LOG

Broadband Provider Log

Complete	169
Non-Responsive/Refused	9
In Progress	4
Count of Datasets by Status	**182**
Total Unique Providers Represented	**128**

Provider Name	Platform	Status	NDA Execution Date	Notes
JB-Nets, LLC	Fixed Wireless	Approval for Update Not Received - Data Still Submitted	4/5/2010	[AUG-30-12 Jess Cary] Change: Provider added new towers and expanded coverage area.
MetaLINK Technologies, Inc.	Fixed Wireless	Approval for Update Not Received - Data Still Submitted	3/22/2010	[SEP-10-12 Jess Cary] Change: Provider subtracted and added towers.
Amplex Internet	Fixed Wireless	Data Added to Statewide Inventory	3/26/2010	[AUG-21-12 Amanda Bentley] Change: Provider expanded service area; new towers sites were added.
AT&T Inc.	DSL	Data Added to Statewide Inventory	12/16/2009	[AUG-24-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
AT&T Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[AUG-20-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Bascom Mutual Telephone Company	Fiber	Data Added to Statewide Inventory	3/22/2010	[JUL-13-12 Amanda Bentley] Change: Provider expanded service area; upgrading cable broadband network over to fiber.
Bascom Mutual Telephone Company	Cable	Data Added to Statewide Inventory	3/22/2010	[JUL-13-12 Amanda Bentley] Change: Provider reduced cable broadband service area due to upgrading network to fiber.
Blu Sky Wireless	Fixed Wireless	Data Added to Statewide Inventory	2/24/2010	[AUG-20-12 Amanda Bentley] Change: Provider expanded service area; new towers sites were added.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[AUG-10-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Clearwire Corporation	Mobile Wireless	Data Added to Statewide Inventory	3/3/2010	[JUL-09-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Comcast Cable Communications, LLC	Cable	Data Added to Statewide Inventory	12/7/2009	[AUG-10-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Country Connections LLC	Fixed Wireless	Data Added to Statewide Inventory	2/15/2010	[AUG-02-12 Amanda Bentley] Change: Provider decommissioned some previous towers but added additional tower sites and expanded coverage.
CoxCom Inc.	Cable	Data Added to Statewide Inventory	1/29/2010	[AUG-03-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Frontier Communications Corporation	DSL	Data Added to Statewide Inventory	1/22/2010	[AUG-08-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Imagine Networks, LLC	Fixed Wireless	Data Added to Statewide Inventory	7/13/2011	[JUL-13-12 Amanda Bentley] Change: Provider expanded service area; new tower site and 2 new sectors to existing towers were added.
Intelliwave, LLC	Fixed Wireless	Data Added to Statewide Inventory		[AUG-10-12 Amanda Bentley] Change: New tower sites were added and others decommissioned. Intelliwave no longer operates networks in Vinton, Jackson, Gallia, and Lawrence Counties.
Jefferson County Cable TV, Inc.	Cable	Data Added to Statewide Inventory	2/1/2010	[JUL-10-12 Amanda Bentley] Change: Provider expanded service area.
Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/6/2010	[AUG-03-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.

Massillon Cable TV, Inc.	Cable	Data Added to Statewide Inventory	2/9/2010	[JUL-16-12 Amanda Bentley] Change and Correction: Provider expanded coverage area; also removed incorrect coverage from one road.
MegaPath Inc.	DSL	Data Added to Statewide Inventory	2/15/2010	[AUG-30-12 Jess Cary] Correction: Submitting data for the first time, but service was offered previously.
Mobilcomm	Fixed Wireless	Data Added to Statewide Inventory	2/16/2012	[SEP-5-12 Jess Cary] Change: Provider added new towers and expanded coverage area.
New Era Broadband, LLC	Fixed Wireless	Data Added to Statewide Inventory	7/12/2010	[JUL-10-12 Amanda Bentley] Change: Provider expanded service area; new towers sites were added.
New Knoxville Telephone Company	Fixed Wireless	Data Added to Statewide Inventory	3/12/2010	[SEP-5 Jess Cary] Change: Provider added new towers and expanded coverage area.
Spacenet Inc.	Satellite	Data Added to Statewide Inventory		[SEP-6-12 Jess Cary] Correction: Initial submission of provider's coverage, but they were in service previously.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[JUL-13-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[AUG-08-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
TDS Telecommunications Corporation	DSL	Data Added to Statewide Inventory	1/27/2010	[AUG-10-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Time Warner Cable LLC	Cable	Data Added to Statewide Inventory	12/21/2009	[AUG-16-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Verizon Communications, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[AUG-03-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
ViaSat, Inc.	Satellite	Data Added to Statewide Inventory	1/8/2010	[AUG-08-12 Amanda Bentley] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Wavelinc Communications	Fixed Wireless	Data Added to Statewide Inventory		[SEP-6-12 Jess Cary] Change: Provider added additional towers.
Your Digital Partner	Fixed Wireless	Data Added to Statewide Inventory	6/28/2010	[SEP-5-12 Jess Cary] Change: Provider's initial submission; service now meets broadband speeds.
Bascom Mutual Telephone Company	Backhaul	Backhaul Provider Only Processing Complete	3/22/2010	
Com Net, Inc.	Backhaul	Backhaul Provider Only Processing Complete		
First Communications, LLC	Backhaul	Backhaul Provider Only Processing Complete	8/13/2012	
Sprint Nextel Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/14/2010	
T-Mobile USA, Inc.	Backhaul	Backhaul Provider Only Processing Complete	1/8/2010	
TDS Telecommunications Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/27/2010	
Arthur Mutual Telephone Company	DSL	Speed Only Update; Data Processing Complete	12/22/2009	[AUG-16-12 Amanda Bentley] Change: Provider upgraded infrastructure and can now offer tier 3 upload speeds previously reported as tier 2; download speeds remain tier 5.
GLW Broadband	Cable	Estimated Coverage Submitted for Non-Participating Provider		[AUG-7-12 Jess Cary] Correction: Coverage estimated and submitted for non-participating provider.
Wireless Intranet	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[AUG-28-12 Jess Cary] Correction: Coverage estimated and submitted for non-participating provider.
CUE Band	Fixed Wireless	Partial Data Received		
1 Touch Technology Solutions, LLC	Fixed Wireless	No Update to Provide		
Armstrong Utilities, Inc.	Cable	No Update to Provide	3/11/2010	
AT&T Inc.	Backhaul	No Update to Provide	12/16/2009	
Ayersville Telephone Company	DSL	No Update to Provide	3/22/2010	
Bascom Mutual Telephone Company	Fixed Wireless	No Update to Provide	3/22/2010	
Benton Ridge Telephone Company	DSL	No Update to Provide	4/13/2010	
Block Communications, Inc.	Cable	No Update to Provide	2/8/2010	
Buckland Telephone Co.	Fiber	No Update to Provide	4/10/2010	
Cable Co-op, Inc.	Cable	No Update to Provide	4/9/2010	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Champaign Telephone Company	DSL	No Update to Provide		
Champaign Telephone Company	Fiber	No Update to Provide		
Champaign Telephone Company	Fixed Wireless	No Update to Provide		
Cincinnati Bell Telephone Company LLC	Cable	No Update to Provide	3/16/2010	
Cincinnati Bell Telephone Company LLC	DSL	No Update to Provide	3/16/2010	
Cincinnati Bell Telephone Company LLC	Fiber	No Update to Provide	3/16/2010	
Cincinnati Bell Telephone Company LLC	Mobile Wireless	No Update to Provide	3/16/2010	

Cincinnati Communications, LLC	Backhaul	No Update to Provide	1/6/2011	
Cincinnati Communications, LLC	BPL	No Update to Provide	1/6/2011	
Cincinnati Communications, LLC	Fiber	No Update to Provide	1/6/2011	
City of Wadsworth	Cable	No Update to Provide	7/19/2010	
Citynet, LLC	Backhaul	No Update to Provide	4/5/2010	
Clearwire Corporation	Fixed Wireless	No Update to Provide	3/3/2010	
Conneaut Telephone Company	Cable	No Update to Provide	12/22/2009	
Conneaut Telephone Company	DSL	No Update to Provide	12/22/2009	
CoxCom Inc.	Backhaul	No Update to Provide	1/29/2010	
Coyote Wireless Broadband LLC	Fixed Wireless	No Update to Provide	4/19/2010	
DataBit Solutions Corp	Fixed Wireless	No Update to Provide		
Eagle Communications, LLC	Fixed Wireless	No Update to Provide		
Erie County Cablevision, Inc.	Cable	No Update to Provide	2/8/2010	
FairPoint Communications	Cable	No Update to Provide	12/22/2009	
FairPoint Communications	DSL	No Update to Provide	12/22/2009	
Frontier Communications Corporation	Backhaul	No Update to Provide	1/22/2010	
Gateway Telecom LLC	Fixed Wireless	No Update to Provide	3/22/2010	
Glandorf Telephone Company, Inc.	Cable	No Update to Provide	3/9/2010	
Glandorf Telephone Company, Inc.	DSL	No Update to Provide	3/9/2010	
Hometown Cable Company	Fiber	No Update to Provide	4/15/2010	
Hometown Cable Company	Fixed Wireless	No Update to Provide	4/15/2010	
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
Jenco Speed Web	Fixed Wireless	No Update to Provide	4/28/2010	
Kalida Telephone Company, Inc.	DSL	No Update to Provide	3/8/2010	
Mango Bay Internet	Fixed Wireless	No Update to Provide	2/23/2010	
McClure Telephone Company	DSL	No Update to Provide	4/5/2010	
McClure Telephone Company	Fiber	No Update to Provide	4/5/2010	
Mediacom Indiana LLC	Cable	No Update to Provide	1/12/2010	
MegaPath Inc.	Backhaul	No Update to Provide	2/15/2010	
Middle Point Home Telephone Company	DSL	No Update to Provide	1/19/2010	
Mikulski Communications LLC	Fixed Wireless	No Update to Provide	4/13/2010	
Minford Telephone Company	DSL	No Update to Provide	3/3/2010	
Nelsonville TV Cable, Inc.	Cable	No Update to Provide	4/7/2010	
New Knoxville Telephone Company	Backhaul	No Update to Provide	3/12/2010	
New Knoxville Telephone Company	Cable	No Update to Provide	3/12/2010	
New Knoxville Telephone Company	DSL	No Update to Provide	3/12/2010	
New Knoxville Telephone Company	Fiber	No Update to Provide	3/12/2010	
North Coast Wireless Communications	Fixed Wireless	No Update to Provide	4/14/2010	
North West Net, Inc.	Fixed Wireless	No Update to Provide	4/6/2010	
OneCommunity	Backhaul	No Update to Provide	4/14/2010	
OneCommunity	Fixed Wireless	No Update to Provide	4/14/2010	
Ottoville Mutual Telephone Company	Backhaul	No Update to Provide	12/22/2009	
Ottoville Mutual Telephone Company	DSL	No Update to Provide	12/22/2009	
Ottoville Mutual Telephone Company	Fiber	No Update to Provide	12/22/2009	
Redbird Internet Services	Fixed Wireless	No Update to Provide	3/22/2010	
Ridgeville Telephone Company	DSL	No Update to Provide	3/12/2010	
S. Bryer Cable TV Corp.	Cable	No Update to Provide	11/8/2011	
SAA bright.net, Inc.	Fixed Wireless	No Update to Provide	3/23/2010	
Sherwood Mutual Telephone Association	DSL	No Update to Provide	3/25/2010	
Sycamore Telephone Company	Backhaul	No Update to Provide	12/22/2009	
Sycamore Telephone Company	DSL	No Update to Provide	12/22/2009	
tw telecom of ohio, llc	Backhaul	No Update to Provide	4/21/2010	
UDATAnet	Fixed Wireless	No Update to Provide		
US Signal Company, LLC	Backhaul	No Update to Provide	6/17/2010	
Vaughnsville Telephone Company, Inc	DSL	No Update to Provide	12/22/2009	
Verizon Communications, Inc.	Backhaul	No Update to Provide	12/14/2009	
Wabash Mutual Telephone Company	DSL	No Update to Provide	3/30/2010	
Wabash Mutual Telephone Company	Fixed Wireless	No Update to Provide	3/30/2010	
Waldron Communication Company	Backhaul	No Update to Provide	3/19/2010	
Waldron Communication Company	Fixed Wireless	No Update to Provide	3/19/2010	
WideOpenWest Finance, LLC	Cable	No Update to Provide		
Wilkshire Communications, Inc.	Fixed Wireless	No Update to Provide	3/16/2010	
XO Communications, LLC	Backhaul	No Update to Provide	2/12/2010	
Avolve, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	2/17/2011	
Benton Ridge Telephone Company	Fixed Wireless	No Update Provided - Use Last Submission Data	4/13/2010	
Bryan Municipal Utilities	Cable	No Update Provided - Use Last Submission Data		
Bryan Municipal Utilities	Fiber	No Update Provided - Use Last Submission Data		
Cequel Communications	Cable	No Update Provided - Use Last Submission Data	12/15/2009	
Cogent Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data		
ConnectLink, Inc.	Backhaul	No Update Provided - Use Last Submission Data	3/15/2010	
D&P Communications, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
Dark Horse Networks, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data	3/15/2010	
Doylestown Telephone Company	Cable	No Update Provided - Use Last Submission Data	4/14/2010	
Doylestown Telephone Company	DSL	No Update Provided - Use Last Submission Data	4/14/2010	
Doylestown Telephone Company	Fiber	No Update Provided - Use Last Submission Data	4/14/2010	

DuplexCom of Ohio, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data		
East Cleveland Cable TV and Communications, LLC	Cable	No Update Provided - Use Last Submission Data	4/13/2010	
Farmers Mutual Telephone Company	DSL	No Update Provided - Use Last Submission Data	12/22/2009	
Farmers Mutual Telephone Company	Fixed Wireless	No Update Provided - Use Last Submission Data	12/22/2009	
Fort Jennings Telephone Company	DSL	No Update Provided - Use Last Submission Data	4/2/2010	
Fort Jennings Telephone Company	Fiber	No Update Provided - Use Last Submission Data	4/2/2010	
Freund Enterprises Inc.	Backhaul	No Update Provided - Use Last Submission Data	3/2/2010	
Freund Enterprises Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	3/2/2010	
GMN Wireless Broadband	Fixed Wireless	No Update Provided - Use Last Submission Data	3/15/2010	
Horizon Telcom, Inc.	DSL	No Update Provided - Use Last Submission Data	3/27/2010	
Horizon Telcom, Inc.	Fiber	No Update Provided - Use Last Submission Data	3/27/2010	
KeyOn Communications, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	10/15/2009	[SEP-07-12 Mark Messer] Informed by New Knoxville Telephone they have acquired the asetts of KeyOn but have not submitted the mergers & acquisitions document.
King Office Service, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	4/9/2010	
Level 3 Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
LightSpeed Technologies	Fixed Wireless	No Update Provided - Use Last Submission Data	2/9/2010	
Mechcom Dot Net	Fixed Wireless	No Update Provided - Use Last Submission Data	4/22/2010	
NexGenAccess Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	4/16/2010	
Nova Telephone Company	DSL	No Update Provided - Use Last Submission Data	4/5/2010	
nTelos, Inc.	DSL	No Update Provided - Use Last Submission Data		
Omnicity, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
RAA Services	Fixed Wireless	No Update Provided - Use Last Submission Data	3/12/2010	
RTEC Communications, Inc.	Cable	No Update Provided - Use Last Submission Data	4/13/2010	
RTEC Communications, Inc.	Fiber	No Update Provided - Use Last Submission Data	4/13/2010	
Slane Telecom	Fixed Wireless	No Update Provided - Use Last Submission Data	4/9/2010	
Southern Ohio Communication Services, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	4/20/2010	
Telephone Service Company	Cable	No Update Provided - Use Last Submission Data	4/6/2010	
Telephone Service Company	DSL	No Update Provided - Use Last Submission Data	4/6/2010	
Telephone Service Company	Fiber	No Update Provided - Use Last Submission Data	4/6/2010	
The City of Dover	Backhaul	No Update Provided - Use Last Submission Data	4/9/2010	
Wabash Mutual Telephone Company	Fiber	No Update Provided - Use Last Submission Data	3/30/2010	
Windstream Communications	Backhaul	No Update Provided - Use Last Submission Data	1/28/2010	
Windstream Communications	DSL	No Update Provided - Use Last Submission Data	1/28/2010	
Windstream Communications	DSL	No Update Provided - Use Last Submission Data	1/28/2010	
YES Learning and Computer Center Inc	Backhaul	No Update Provided - Use Last Submission Data	4/24/2010	
Zayo Group, LLC	Backhaul	No Update Provided - Use Last Submission Data		
Windstream Communications	Backhaul	Solicited Initial Data	1/28/2010	
Windstream Communications	DSL	Solicited Initial Data	1/28/2010	
EarthLink Business	Backhaul	Other		[AUG-08-12 Wes Kerr] A company representative noted that they do not currently have what is necessary to accurately report this data.
Reliance Globalcom Services, Inc.	Backhaul	Refused to Participate		[JUN-08-12 Wes Kerr] a company representative responded "no thank you" when asked if they would be participating this round.
Advanced Computer Connections	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 contact attempts were made this period.
FiberTower Corporation	Backhaul	Non-Responsive to Multiple Attempts		4 contact attempts were made this period between May 2, 2012 and August 7, 2012.

Hocking Internet Technologies, Ltd	Fixed Wireless	Non-Responsive to Multiple Attempts	8/12/2010	In addition to numerous contact attempts made during past mapping submission periods, 4 contact attempts were made this period.
Linked Communications, LLC	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 contact attempts were made this period.
New Albany Net	Fiber	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 contact attempts were made this period.
Bellaire Television Cable Co. Inc.	Cable	Slated Field Audit for Estimated Coverage Analysis		
Firewire Internet	Fixed Wireless	Slated Field Audit for Estimated Coverage Analysis		
Firewire Internet	DSL	Slated Field Audit for Estimated Coverage Analysis		

Oklahoma Broadband Mapping

Data Submission Methodology Report

October 1, 2012

Sanborn
1935 Jamboree Drive
Suite 100
Colorado Springs, CO 80920

Data Submission Report (October 1, 2012)

Table of Contents

1 Introduction

This report is submitted along with the sixth data submission for the Oklahoma Broadband Mapping Project. This submission includes all data collected so far per the requirements of the National Telecommunications and Information Administration (NTIA) State Broadband Data and Development Grant Program (Docket No. 0660-ZA29) Notice of Funds Availability (NOFA) and formal and informal clarifications to it. Specifically, it includes broadband data collected from broadband providers and community anchor institutions data compiled from various sources for the State of OK. The State of OK has retained a mapping contractor, The Sanborn Map Company to perform the work related to the Mapping Grant for this project. Data from the previous submission is now publicly accessible via the OK Broadband Program (http://broadbandmapping.ok.gov/).

This document is a supplement to the five previous reports submitted with previous data submissions on May 1, 2010, October 1, 2010, April 1, 2011, October 1, 2011, and April 1, 2012 respectively. Therefore, it builds on the documents provided with those submissions. Rather than repeat the contents of the previous report, this document makes incremental updates on various topics where changes have been made in the methodology or reiterates the methodology used. Please refer to the previous documents for further details.

2 Overall Project Status

2.1 DATA COLLECTION

This section details data collection related to NTIA deliverables which include broadband data and community anchor institution data.

2.1.1 Broadband Data

For this submission, Sanborn started data collection efforts on July 5th, 2012 by sending out data update requests and technical data specifications. These were sent to a large list of companies which were compiled from multiple lists (FCC 477 list (dated June 30, 2011), Wireless Internet Service Providers Association (WISPA)) and from any providers that were identified through other sources such as web research, planning meetings, State outreach, etc. Sanborn also uploaded the final data for each provider in NTIA format from the previous submission on the Sanborn Provider Portal. The providers were encouraged to use the provider portal and update their information on it.

We followed the same contact and follow-up protocols as the previous submissions. In brief, this involved following up with already participating providers after sending them a letter requesting data updates. For newly identified providers, we contacted them three additional times and offered any/all support to make this as easy as possible. We provided a due date for submission but worked with providers who needed more time. If providers did not submit updated data and did not respond to our efforts to contact them, we reused their existing data.

The following are some of the important changes or no changes:

1. We continued to request all providers to provide us their speed information in mbps rather than as a speed tier. We did this in order to better validate the data, analyze served/underserved, and identify the breakdowns in speeds within a given tier. For this submission, 47% of the participating providers in OK have given us their speed in mbps rather than speed tier.

2. Like the previous submission, we also requested fixed wireless providers to provide us appropriate information to do propagation analysis. We had more success with this in the current submission. For those WISP providers that provided us the data to accomplish propagation, we used Radio Mobile to do propagation analysis and iterated with the providers until the parameters were suitably selected to get appropriate output. Propagation analysis results were provided to the providers for review through our provider portal and google kmz file formats to ensure validation. In OK, we were able conduct propagation analysis for six providers (AirLink, Cowboy.net, Omega 1 Wireless, PTCI, Plainsnet, and ProValue.Net) and collect propagation results from Link Technology for

one provider (HTS Wireless). Two providers submitted propagation results conduct themselves (Ruralinet, and Valnet).

3. We continue to not collect data from resellers.

4. Due to our NDA restrictions, last mile infrastructure points, if submitted by providers, are not being submitted to NTIA.

5. We continue to submit data for satellites in this submission based on NTIA clarifications. Four satellite providers have been identified in Oklahoma which are; Hughes, Starband, Wildblue, and Stratos. We have received data from all the companies listed above except for Stratos. We also were able to add an additional satellite provider, identified by NTIA (Skycaster) in this submission as well.

6. Due to NDA restrictions, address points are not included in this submission to NTIA for any commercial provider.

7. Some providers did not submit middle mile elevation or backhaul capacity, particularly when they asked us to reuse previous submission data. Wherever possible, we went back to providers to obtain that information, but it is not available for every record. In this submission, we also improved the elevation of middle mile data substantially. Some providers were providing elevation above sea level – we were able to work with the largest of these providers to resolve the issues and will continue to work on improving this over the next submission.

8. If a cable based wireline provider provides both DOCSIS 2.0 and DOCSIS 3.0 service to the same area, the block or road was listed only once with a technology code of 40.

9. Providers were only willing to indicate on a general level if they served business, residential or both, so we did not get any providers that broke down the type of service by block. Only if the provider stated they only serve business to business customers did we fill in the "category of end user" with a code of 2, otherwise this field was left blank. There are three providers in OK who are identified as serving business customers only. These are:

    1) Cogent Communications, Inc.
    2) TW Telecom of Oklahoma LLC
    3) XO Communications, LLC

10. This submission is being made based on the NTIA data model as of 08/09/12 provided by NTIA on the SBDD site.

    We have added nine new providers in this submission:

1) Cowboy.Net (fixed wireless)
2) Cross Valliant Cellular (mobile wireless)
3) Cross Wireless (mobile wireless)
4) Diamond Net (fiber)
5) HTS Wireless (fixed wireless)
6) Omega 1 Wireless (fixed wireless)
7) ProValue (fixed wireless)
8) Skycasters (satellite)
9) Wavelinx (fixed wireless)

In this submission:

1) We have contacted a total of 193 providers in OK, of which 55 providers were contacted for the first time.
2) We have identified 104 potential providers, of which 90 are participating in this map to date and 14 have refused to participate. In addition, 24 providers have not responded to our efforts to contact them and we are not sure whether any of these providers are actual providers or not. A list of the non-responders, resellers and non-providers is provided at the end of the document and all of these potential broadband providers were contacted. Even if some providers were identified as non-providers or resellers in previous submissions, we continue sending out data request letters to these providers in case their status has changed in any way.
3) 44% of the providers submitted new or updated data whereas for the remaining providers, we reused data from their previous submissions. This is in contrast to 49% providers submitting new or updated data during the previous submission.
4) We do not report areas of service for providers that have refused to participate or have not responded to our requests for data. In some cases program office staff are aware of approximate service areas for non-participating providers, but to date we have reported only areas that meet our validation criteria. If estimated service areas are desired we would collaborate with other states and NTIA to develop and disclose a workable methodology.

During this submission period, we had the following changes in providers:

1) Oklahoma Telephone and Telegraph changed its name to Oklatel Communications, Inc.
2) Wildblue changed its name to Viasat
3) Community Cablevision Company changed its name to Community Cable & Broadband

2.1.2 Community Anchor Institutions Data

The community anchor institutions data continues to be crowd-sourced through the online data gathering application created by the Sanborn Team. Following discussions with NTIA on ways to improve the CAI IDs via email and guidance on what datasets to use for IDs, we have incorporated IDs for libraries and schools where possible. The numbers of community anchor institutions that have responded so far is provided below:

Category	Name	Total in Submission 6	Total with Broadband Information in Submission 6
1	School - K through 12	1966	375
2	Library	211	175
3	Medical/healthcare	459	162
4	Public Safety	1794	316
5	University, college, other post-secondary	79	22
6	Other community support - government	507	91
7	Other community support - nongovernmental	16	2

2.2 DATA PROCESSING

We started with the following base data:

Census Blocks:

For this submission, Census 2010 data was utilized. The data was set up as follows:

- Block size (AREA) is calculated combining the 2010 land area (ALAND) and water area (AWATER)
- AREA is converted from square meters to square miles to calculate square mileage (SMI).
- If the SMI of a block is less than or equal to 2, then the less than or equal to 2 square mile indicator (LE2SMI) is set to true.

Road Segments:

2010 Tiger Line IDs (TLID) were used for data processing for this submission. The data was set up as follows:

- The GT2SMI (Greater Than 2 Square Mile) indicator is set to True when:
  - The 2010 road segment <u>is completely within</u> a block that is NOT less than 2 square miles
- Only minimum and maximum address ranges and a single zip code for each road segment is maintained.

All data received went through the following processing steps:

1. **Triage:** All new data were quickly reviewed to understand what was received, and in what format. We also made sure we had all the required components for NTIA's data model, such as their FRN and advertised speed information. We also screened for any known issues that we might have seen before (such as Excel 2003 spreadsheets that cut off at 32k row).
2. **Ingest:** At this time the data is actually brought into our systems. Each provider is set up with a unique file geodatabase to store their information. Record counts of what was received are logged so that we can validate that we did not drop anything in processing.
3. **Data Processing:** In this step, the data goes through a number of ETL routines to convert the raw proprietary information into a format similar to the NTIA format. The exact routine utilized depends on how the data is received.
   1) When a wireline provider submits a service boundary, we select all the blocks and roads inside that shape.

2) If a wireline provider submits a customer address list, the points are geocoded, and then the appropriate block or road segment is selected.
3) If a wireline provider submits block and road information using Census data, we just make sure everything is formatted to the appropriate specifications.
4) If the wireline provider submits any type of road or line data that does not directly correlate to the TIGER data set, we convert the lines to TIGER by selecting the road centroid and spatially selecting the closest segment in our data set. If the road is in a block less than 2 square miles, then the block is selected. Some manual cleanup is also applied to make sure we do not accidentally drop any road segments that should have been processed.
5) Wireless provider data is formatted to ensure that there are no overlapping polygons with the technology type and spectrum. In addition the data is cropped to the state boundary.
6) After each round of processing, we make sure that we only keep unique records. A unique record is defined as having a unique combination of FRN, Block/Road ID, and technology type. If there are multiple records with different speeds, but all else is equal, than we select the maximum of the advertised speeds.

4. **QC Review:** All data are then sent to a different analyst to perform a thorough quality control review on the processed data set. Record counts are compared to what was submitted. The QC staff also makes sure the ETL scripts and routines populated all of the right fields.
5. **QA Review:** Data is then sent to another team for Quality Assurance Review. In this step the data is not only double checked against what was originally submitted, but it is also brought up inside standardized ArcMap templates that allow us to make sure our results make sense. This often involves comparing the new data set with prior submissions, as well as looking for any possible technology or speed anomalies and verifying against third-party datasets (as discussed in more details in the next section).
6. **Provider Review:** Processed data is all posted to a customized web-mapping tool we commonly refer to as the Provider Portal. All providers were notified once their data was available on the site, and were given five business days to review the data and respond. In this site, providers can log on and visually see their processed data in a map format. It also allows them to overlay their raw data to help them validate that we did indeed process things correctly. The provider portal also has a suite of markup tools that will allow the providers to edit their data, including adding or removing service areas, and making changes to the data attributes.
7. **Comment Processing:** All comments and feedback received from the provider portal is then reviewed and applied to the processed data set. This updated data set goes back through our QA and QC processes, and if time allows, back out to the Provider Portal, for the provider to review and sign off.

8. **Data Append:** After all of the individual data sets are processed and approved, we run an append process which merges all of the individual provider data sets into one geodatabase. This is also the point where our team will do any final transformations to get our working data model into the latest NTIA publishing format.

9. **Submission Comparison Check:** Starting with this submission an additional check was added to our quality review process. An application was written that compares the individual provider's unique data that is stored in their unique file to that which is stored in our final appended file and the NTIA submission data. Any variation in each of these data files in thoroughly investigated and resolved. This was done to assure no data loss or data transformation issues. We also compare the submission 5 dataset to the submission 6 dataset, review any variations and assure that the changes found can be documented as being requested by the provider.
10. **Final QA/QC:** A series of quality checks are run on the final appended data sets to ensure it is ready for submission to NTIA. We also run the latest version of the NTIA receipt tool at this time. If any issues are flagged as failing they are reviewed and corrected. All warnings are also reviewed and either corrected or documented in the attached document which explains that we have validated this data and any last issues are corrected.
11. **Submission to NTIA.**

2.2.1 Submission 6: NTIA Submission Data Model Schema Changes

The latest data model released was released on August 8, 2012 was very similar to the previous data model. No substantive changes were noted and changes related to allowable speed and technology of transmission combinations. Most of these combinations have exceptions to them and hence were not being completely disallowed by NTIA.

2.3 DATA VALIDATION

Sanborn has continued to perform the same validation on the data as the previous four submissions (details in previous reports and a summarized version provided below). Some minor updates to the validation process are discussed below.

1) QC of the data at various steps – this includes when data is received (triage), when it is processed through the various processing steps discussed above, etc.

2) Spatial checks against public and commercial datasets
    a. For OK, we continued to use the following datasets for validation:
        i. Exchange Boundaries: for DSL boundaries
        ii. MediaPrints: for Cable and Fiber boundaries
    b. We did not use speedtest.net speed data that we used previously for validation as we had our own speed test data that was more current and pertinent.
3) Speedtest data and other data collection for verification
    a. We continue to use speedtest data collected through our interactive map and community anchor data crowd-sourced for validation purposes.
    b. For this submission, we added an additional dataset to check against – FCC speed test data. We geocoded the data, used the IP to reverse engineer the provider name and used it to check speeds where possible.
    c. We also incorporated any feedback we received through the interactive map – this included feedback such as incorrect speeds, incorrect boundaries, missing provider or areas of no service, etc.
4) Verification by providers – processed data are uploaded on our Provider Portal for providers to review both the outcome of data processing and any issues that we found in the third-party and crowd-sourced validation. Issues pertaining to a particular provider are highlighted and shown in the portal for those providers only. Issues that are global and cannot be assigned to a particular provider are shown to all providers (e.g. there are no providers in this area, or we tried to get service here and heard x from A provider, y from B provider, etc.). Previously, we were highlighting these issues through a letter but in this submission, we have integrated the feedback through the Provided Portal. We make additional calls to providers who have issues.
5) Planning workshops and local validation –
    a. During this submission, local validation was undertaken by an independent group, the Center for Spatial Analysis at the University of Oklahoma (OU). OU performed an independent survey gathering data points from CAI's and the GIS community for the State of Oklahoma. Within Sanborn's validation process, OU's points were compared against provider's data. Those data points found in question were taken back to the providers for correction. Also, during this submission, Sanborn created an efficient way to make sure the CAI data that OU had gathered from phone calls or public gatherings was entered straight into the database without duplicating efforts for either team by designing a CAI data entry interface. This allows OU to increase their efforts to gather more data points by streamlining the process and provides current data to Sanborn to use for each submission and report to NTIA.

b. We have reviewed any issues that the State Planning team has identified and brought to our attention.

2.4 UNIVERSE OF CONTACTED PROVIDERS/NON-PROVIDERS

We have identified 104 potential providers, of which 90 are participating in this map to date and 14 have refused to participate. In addition, 24 providers have not responded to our efforts to contact them and we are not sure whether any of these providers are actual providers or not. A list of the non-responders, resellers and non-providers is provided at the end of the document and all of these potential broadband providers were contacted. Even if some providers were identified as non-providers or resellers in previous submissions, we continue sending out data request letters to these providers in case their status has changed in any way.

2.4.1 Non-providers

4D Networks Corp.
Atlas Telephone Company
Charter Communications
Comcast Cable Communications, Inc.
Cyber Rover
Fulltel
IO-2 Services
KoehlerPro Wireless
LightEdge Solutions Inc.
Magic Wireless Internet Service Providers LLC
McLeodUSA Telecom Services Inc. / PaeTec Corp
OKC Broadband (Ideal Advertising Inc.)
Oklahoma 5 Licensee Co., LLC
PCS Internet Services
Qwest Communications Company, LLC
Reach Broadband
Stouffer Communications / Granby Telephone
Telovations, Inc.
Texhoma Wireless
The Internet Shop
Tulsa MetroNet
United Wireless Communications, Inc.
University Corporation for Advanced Internet
UnplugUSA
Verizon Business Global LLC dba Verizon Business
Zayo Enterprise Networks, LLC

2.4.2 Resellers

Broadview Networks Holding Inc.
BullsEye Telecom, Inc.
Earthlink
Enventis Telecom Inc. / Hickory Tech Corp

Global Crossing Telecommunications Inc.
Logix Communications, LP
Metropolitan Telecommunications of Oklahoma, Inc.
New Edge Network, Inc.
Reallinx, Inc.
Telefonica USA, Inc.
TulsaConnect
Westel, Inc

2.4.3 Non-Responders/Difficulty Contacting

Airosurf Communications
Alliance Comm Network
Cable West
Coalgate Internet
CSWEB.NET
DataFlys
Datz
eConnect
Flash-Link Internet Service
Greenfly Networks, Inc.
HDR Internet Services/ OnALot.com
INETmax
KPowerNet, LLC/KAMO
Lakeview Cable
MEDIACOM LLC
ms bit
OneLink Wireless
Onlineok.com
ruralOK
The Junction
upperspace.net
Utopian Wireless Corporation
VectorLink
Wireless Broadband of Oklahoma

2.4.4 Not-Participating

Atlas Broadband
BartNET
EasyTEL Communications
eVolve Business Solutions LLC/Cincinnati Bell Inc.
horizon net
LRC Group
Meriplex Communications, Ltd.
OneNet
PriceNET Wireless
Rhino Communications
Stratos Offshore Services Company
Summit Digital, Inc.
Vroom Wireless, LLC

WEHCO Video, Inc.

Oregon Broadband Mapping Project Methodology

Contact Name Manager:	Bryan Conway
Contact Phone Number:	503-378-6200
Contact E-mail:	**bryan.conway@state.or.us**

Submitted By:	Philip Woods
Contact E-mail:	**Philip.Woods@state.or.us**

Product Specification:	Fall 2012 NTIA Data Model
Product/Process:	NTIA—Oct 1, 2012 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Oregon Broadband Mapping Project's October 1, 2012 data submission. To support varying levels of technical and program knowledge, both a **process summary** and a **process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Provider Participation Statistics Summary

Summary	Count
Total Providers Researched/Contacted	449
Total Valid Broadband Providers	108
Non-Responsive Providers	13
Non-Cooperative Providers	08
Number of Providers - Supplied Updates for this Submission	55
Number of Providers - Confirmed No Updates	31
Will Provide Data	1

- New Providers since Last Data Submission (5)
  - Blue Mountain Cable
  - PrineTIME Internet Solutions
  - Safelink Internet Services
  - Silver Star
  - Wallowa Valley Networks

- Existing Providers – No Updates (31)
    - Ashland Fiber Network
    - BendBroadband
    - Cableone
    - Cal – Ore Communications Inc.
    - Cascade Networks, Inc.
    - Coltontel
    - Helixtel.com
    - Integra Telecom
    - J & N Cable Systems, Inc.
    - Molalla Communications Company
    - Monitor Cooperative Telephone Company
    - Nehalem Telecommunications Inc.
    - North-State Telephone Co.
    - Oregon-Idaho Utilities, Inc.
    - PEAK Internet
    - Molalla Communications Company
    - Webformix Company
    - St Paul Telephone
    - PocketiNet Communications Inc
    - QualityLife Intergovernmental Agency
    - Reliance Connects
    - Skycasters
    - St Paul Telephone.
    - Stephouse Networks
    - U.S. Cellular
    - UnwiredWest LLC
    - Upward Access
    - Wave Broadband
    - Webformix Company
    - Whiz To Coho, Inc.
    - XO Communications Services, Inc

- Providers Included (listed by Provider and Holding Company name) by DBA

Air Speed LLC	Gervais Telephone Company	Quantum Communications
Alyrica	Gorge Networks	Reliance Connects
Ashland Fiber Network	Helixtel.com	Rio Networks
AT&T Corp, Inc.	HughesNet	Roome Telecommunications Inc.
AT&T Mobility LLC	Hunter Communications, INC	Rural Technology Group
Axxis Communications	Integra Telecom	Safelink Internet Services
Beaver Creek Telephone Company	J & N Cable Systems, Inc.	SandyNet
BendBroadband	Level 3 Communications, LLC	SawNet
BendTel	LS Networks	SCIO Mutual Telephone
Blue Mountain Cable	MegaPath Corporation	SCS Communications
Cableone	Meritel Group, Inc	Silver Star Telecom
Cal-Ore Communications Inc.	MINet	Skycasters
Canby Telcom	Molalla Communications Company	Sprint
Cascade Networks, Inc.	Monitor Cooperative Telephone Company	St Paul Telephone
CenturyLink	Monroe Telephone	StarBand Communications
CHARTER COMMUNICATIONS INC.	Mount Angel Telephone Company	Stayton Cooperative Telephone Company
City of Cascade-Locks	Rural Network services Inc.	Stephouse Networks
Clear Creek Mutual Telephone Company	Nehalem Telecommunications Inc.	TDS Telecom
Clearwire	NextGen Internet Systems, Inc.	T-Mobile
CoastCom, Inc	Nextnet Ventures, LLC	Tnet Broadband
Cogent Communications Group	North-State Telephone Co.	TW Telecom of Oregon LLC
Coinet	OnlineNW	U.S. Cellular
Coltontel	ORBITCOM	UnwiredWest LLC
Comcast	ORCA Communications	Upward Access
Communications Access Cooperative Holding Enterprise	Oregon Telephone Corporation	Verizon Wireless
Comspan Communications, Inc.	OregonFAST.net	Vertex SSX Corporation
Country Vision Cable	Oregon-Idaho Utilities, Inc.	ViaSat, Inc.
Crestview Cable Communications	PEAK Internet	Wallowa Valley Networks
Cricket Communications, Inc.	Pendleton Fiber Company	WarmSprings Telecommunications Co.
Douglas Fast Net	People's Telephone Company	Wave Broadband
Eagle Telephone System, INC	Pine Telephone Systems, Inc.	Webformix Company
EarthLink Business	Pioneer Telephone Cooperative	Whiz To Coho, Inc.
Eastern Oregon Telecom	PocketiNet Communications Inc	WTech Link
EONI.com	Preferred Connections Inc. NW	X5 PDX, LLC
Freewire Broadband LLC	PrineTIME Internet Solutions	XO Communications Services, Inc. (Affiliated Entity)
Frontier Communications Northwest Inc.	Qnect.net	Yellowknife Wireless Company, LLC
Frontier Communications of Oregon	QualityLife Intergovernmental Agency	Zayo Group LLC

- Non-Responsive Providers (13)
  - Air Speed LLC
  - City of Cascade - Locks
  - Crestview Cable Communications
  - EarthLink Buisness
  - Freewire Broadband LLC
  - HughesNet
  - Level 3 Communications, LLC
  - OregonFAST.net
  - Qnect.net
  - Quantum Communications
  - Rio Networks
  - SawNet
  - Yellowknife Wireless Company, LLC

- Non-Cooperative Providers (8)
  - BendTel
  - Cogent Communications Group
  - Meritel Group, Inc.
  - NextGen Internet Systems, Inc
  - X5 PDX, LLC
  - Next Ventures, LLC
  - Vertex Ventures
  - StarBand Communications

- Other Provider Changes

Name Changes

Covad Communications Company - now identified as MegaPath Corporation
New Edge Networks - now identified as EarthLink Business
WildBlue Communications, Inc. - now identified as ViaSat Communications

Acquisitions and merges

AboveNet Communications Inc. acquired by Zayo Group LLC
Chambers Cable acquired by BendBroadband

Additional providers identified as non-broadband this round

Orbitcom
Coinet
Preferred Connections Inc. NW

- Providers researched and identified as non-broadband providers can be viewed within the table at the end of this document.

COVERAGE AREA CHANGES

- Coverage Footprint Reductions/Map Refinement –
    - Alyrica (TT-10)
    - Canby Telcom (TT-50)
    - Charter Communications Inc. (TT-41)
    - Cricket Communications, Inc. (TT-80)
    - Eastern Oregon Telecom (TT-10)
    - Eastern Oregon Telecom (TT-70)
    - New Edge (TT-30)
    - TDS Telecom (TT-10)
    - T-Mobile (TT-80)
    - Verizon Wireless (TT-80)

- Technology Changes/Additions –
    - BendBroadband. – New TT-41 coverage
    - Eagle Telephone Systems, INC. – New TT - 50 coverage
    - Eagle Telephone Systems, INC. – New TT - 10 coverage
    - EONI – New TT-70 coverage
    - EONI – New TT-71 coverage
    - ORCA – New TT-10 coverage
    - WarmSprings Telecommunications Co. – New TT-70 coverage

- Coverage Footprint Expansion –
    - Charter Communications, Inc (TT-40)
    - CoastCom, Inc (TT-50)
    - Douglas Fast Net (TT-10)
    - Douglas Fast Net (TT-50)
    - Eastern Oregon Telecom (TT-50)
    - Frontier Communications Northwest Inc. (TT-10)
    - George Networks (TT-70)
    - Gervais Telephone Company (TT-50)
    - LS Network (TT-30)
    - LS Network (TT-50)
    - OnlineNW (TT-71)
    - ORCA Communications (TT-50)
    - Pendleton Fiber Company (TT-50)
    - Rural Technology Group (TT-70)
    - TW Telecom of Oregon LLC (TT-30)

COMMUNITY ANCHOR INSTITUTION (CAI) DETIALS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	Broadband Subscriber (1 or 2)	Trans Tech	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	1615	361	351	317	317
Category 2 - Library	189	185	185	177	177
Category 3 - Medical/Healthcare	323	22	10	10	9
Category 4 - Public Safety	1136	239	115	66	66
Category 5 - Universities/Colleges	69	38	37	34	34
Category 6 - Other: Government	227	37	219	28	28
Category 7 - Other: Non-Government	19	3	2	1	1
Total	**3578**	**885**	**919**	**633**	**632**

Total CAI records: 3,578

Broadband Service - Yes	885	24%
Broadband Service - Unknown	2,693	75%

Broadband Service - Yes

Unknown Technology Type	154	17%
Unknown Speed	225	8%
Download Speed = Upload Speed	630	71%

Public Wi-Fi Unknown	97%
CAI with CAIID	31%
Libraries with No CAIID	3%

CAI CHANGES

- Library CAI IDs have been updated with Oregon specific identifiers.
- Medical and Health Care facilities have been cleaned up. Removing duplicate data and adding new facilities.

PROCESS REVIEW

1. **Provider Outreach and Data Collection**

   Data is collected from identified broadband ISPs via a process of e-mail notifications and telephone interactions designed to achieve the maximum number of positive responses. ISPs can supply data and/or updates in a number formats via the following communication channels: mail, e-mail, and web applications (provider portal and file upload tool).

2. **Data Ingestion and Processing**

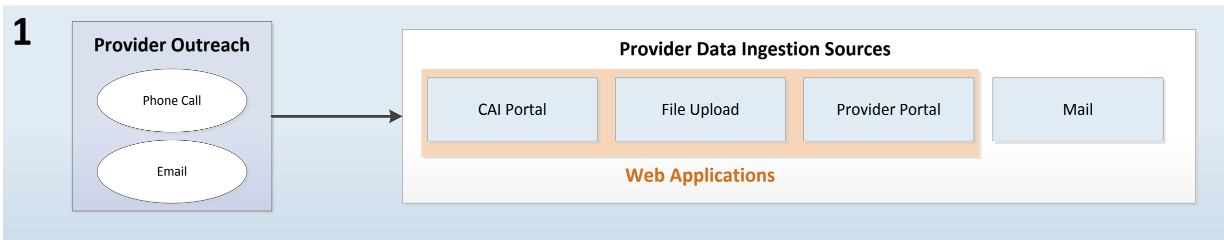
   Acquired data enter a recursive multi-stage editing, validation and verification process until all parties are satisfied that the data is a good representation of both the ISP service area and level of service. Automated scripts run nightly that capture updates posted by an ISP and publish completed updates to the provider portal web application for further provider review.

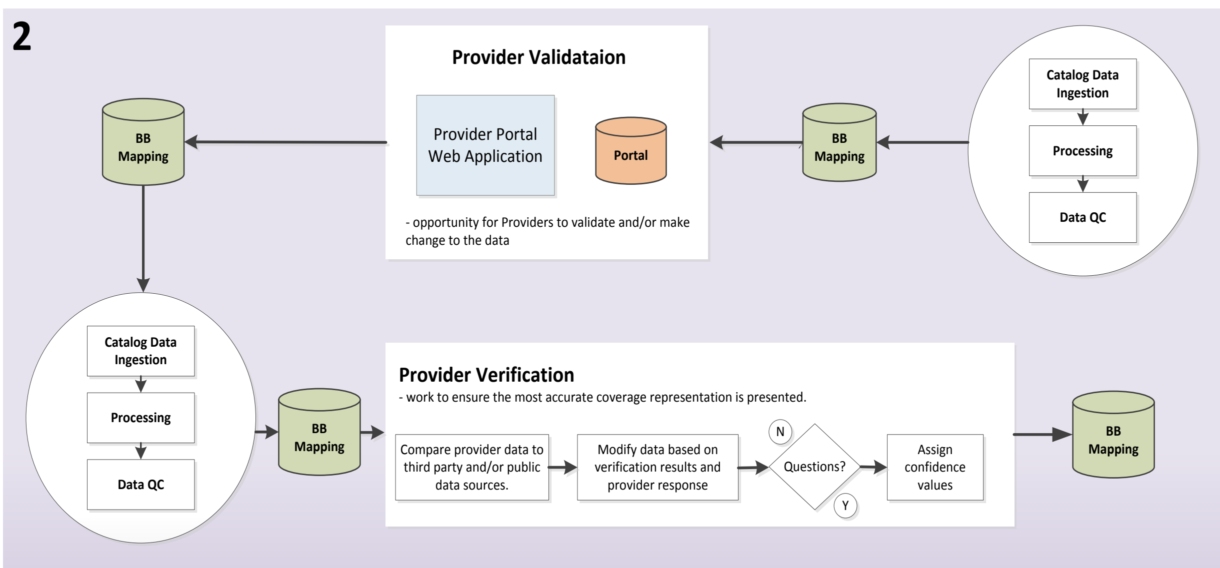
3. **Reporting**

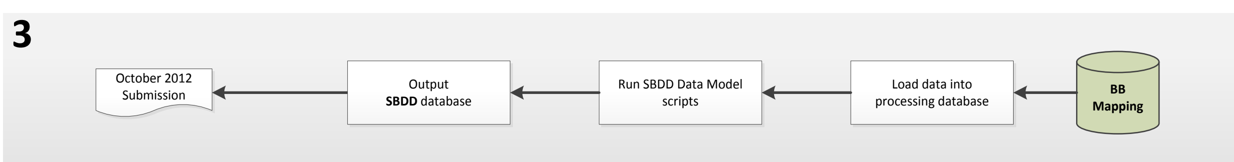
   At the close of each data collection period all ISP and CAI data is passed through a set of automated processes that parse the geospatial data into the format required for NTIA submission, flag potential data errors and generate associate tabular reports. The final outputs are combined into a single archive file for submission via the Broadband State Data Management Tool hosted by the FCC.

* Process Review Diagram, sections reference below numbered diagram (pg.10)

* Process Review Diagram, sections reference above numbered paragraphs (pg.9):







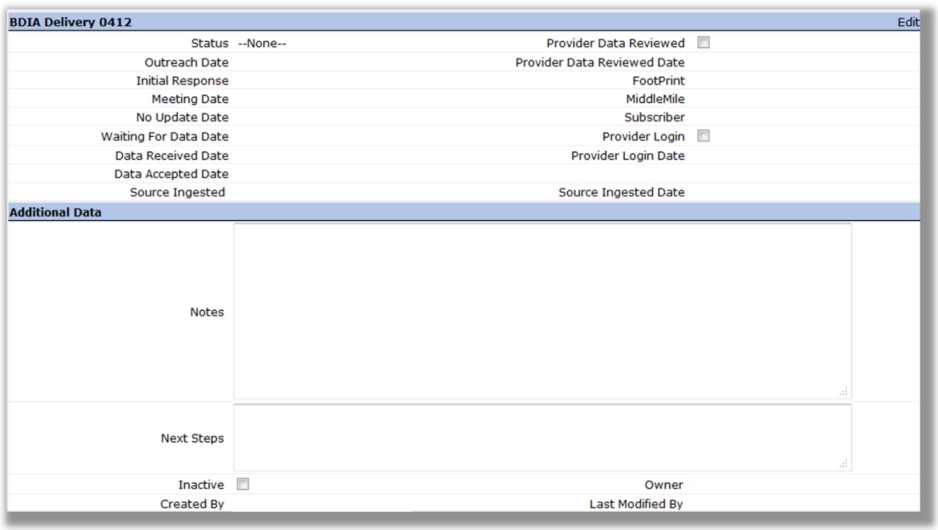
PROCESS SUMMARY

DATA GATHERING

BROADBAND SERVICE AREAS, MIDDLE MILE AGGREGATION POINTS AND BROADBAND SERVICE OVERVIEW

The collection of Broadband Service Areas, Middle Mile Aggregation Points and Broadband Service Overview information is handled through the following Provider Outreach Process:

- Build and maintain an inventory of Broadband providers through currently known providers and research.
- The inventory and everyday interaction with providers is tracked using the Provider Catalog (PCat). Below are some examples of the web application.

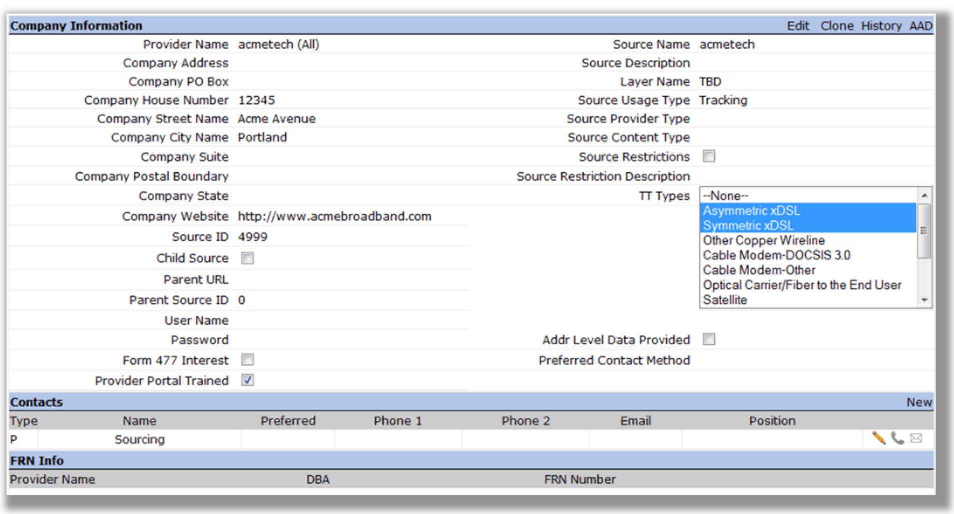


BDIA Delivery 0412 Edit

Status	--None--	Provider Data Reviewed	☐
Outreach Date		Provider Data Reviewed Date	
Initial Response		FootPrint	
Meeting Date		MiddleMile	
No Update Date		Subscriber	
Waiting For Data Date		Provider Login	☐
Data Received Date		Provider Login Date	
Data Accepted Date			
Source Ingested		Source Ingested Date	

Additional Data

Notes			
Next Steps			
Inactive	☐	Owner	
Created By		Last Modified By	



Company Information Edit Clone History AAD

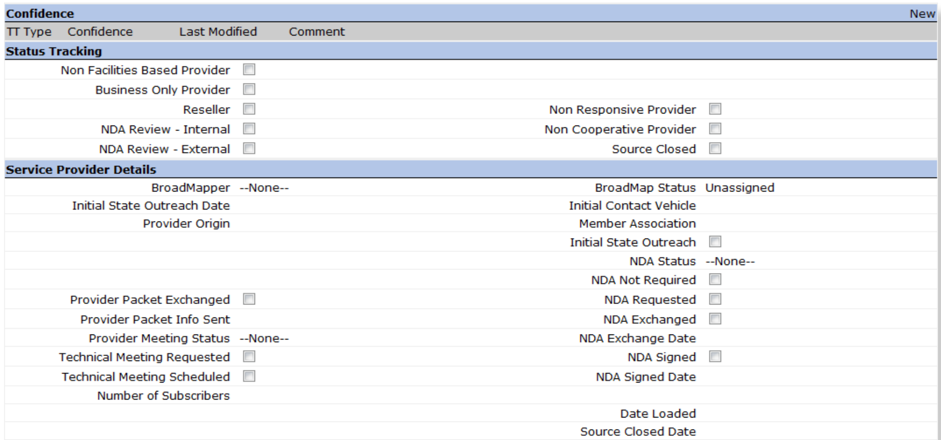
Provider Name	acmetech (All)	Source Name	acmetech
Company Address		Source Description	
Company PO Box		Layer Name	TBD
Company House Number	12345	Source Usage Type	Tracking
Company Street Name	Acme Avenue	Source Provider Type	
Company City Name	Portland	Source Content Type	
Company Suite		Source Restrictions	☐
Company Postal Boundary		Source Restriction Description	
Company State		TT Types	--None-- Asymmetric xDSL Symmetric xDSL Other Copper Wireline Cable Modem-DOCSIS 3.0 Cable Modem-Other Optical Carrier/Fiber to the End User Satellite
Company Website	http://www.acmebroadband.com		
Source ID	4999		
Child Source	☐		
Parent URL			
Parent Source ID	0		
User Name			
Password		Addr Level Data Provided	☐
Form 477 Interest	☐	Preferred Contact Method	
Provider Portal Trained	☑		

Contacts New

Type	Name	Preferred	Phone 1	Phone 2	Email	Position
P	Sourcing					

FRN Info

Provider Name	DBA	FRN Number



Confidence			New
TT Type Confidence Last Modified Comment			
Status Tracking			
Non Facilities Based Provider	☐		
Business Only Provider	☐		
Reseller	☐	Non Responsive Provider	☐
NDA Review - Internal	☐	Non Cooperative Provider	☐
NDA Review - External	☐	Source Closed	☐
Service Provider Details			
BroadMapper	--None--	BroadMap Status	Unassigned
Initial State Outreach Date		Initial Contact Vehicle	
Provider Origin		Member Association	
		Initial State Outreach	☐
		NDA Status	--None--
		NDA Not Required	☐
Provider Packet Exchanged	☐	NDA Requested	☐
Provider Packet Info Sent		NDA Exchanged	☐
Provider Meeting Status	--None--	NDA Exchange Date	
Technical Meeting Requested	☐	NDA Signed	☐
Technical Meeting Scheduled	☐	NDA Signed Date	
Number of Subscribers			
		Date Loaded	
		Source Closed Date	

- Update provider material that describes the data requirements and logistics for data transfer.
- Update Non-Disclosure Agreement (NDA) for use in the project, where applicable.
- Maintain multiple protocols for the provider to submit data, including Secure File Upload Protocol when desired.
- Conduct one-on-one informational discussions with each provider to communicate the following:
  - Requirements of this project;
  - Broadband data required to support the product data model;
  - Submission protocols available;
  - Capability to validate how the supplied data is aggregated.
- Download/receive provider data.
- Establish a repeatable process with provider. Maintain provider communication, transaction and data handling records throughout the project (dates contacted, data received, etc.).

COMMUNITY ANCHOR INSTITUTION (CAI)

The collection of CAI information is handled through the following CAI Collection Process:

- Collect and maintain inventory of CAIs through currently known CAIs, data mining, and research.
- Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.
- Upload web-based data to Core Database for standardization.
- Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.
- Geocode CAI locations.
- Translate Core Database data to deliverable-ready format.
- Continue engagement with non-responsive institutions.
- Communicate with Oregon State departments to acquire CAI data.

DATA INTEGRATION PROCESS

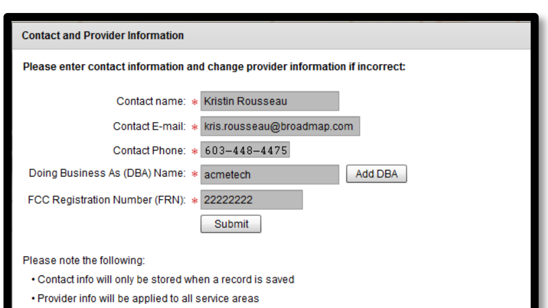
The data integration and processing mechanisms currently used allow for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type category (addresses, block lists, paper maps, etc.).
- Standardize input based on data type within BB Mapping Database.
- Create Compact Polygons (CP)—(internal methodology for generating area-based feature for coverage in BB Mapping Database).
- Apply broadband attribution to CP; apply metadata to CP.
- Perform quality analysis of the CP against the source supplied to identify any completeness or accuracy issues.
- Post data to the provider portal web application for provider review and validation.
- Request additional information from the provider if elements of coverage are missing or contain discrepancies. This is a second manual quality check to ensure data is complete.
    - Process coverage area to build the required NTIA data model layers.

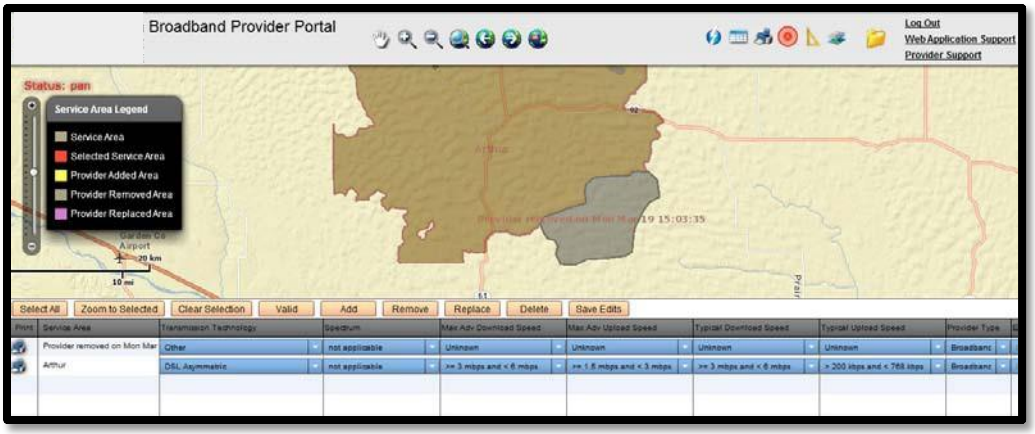
With the deployment of the Provider Portal, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it supplies them with more visibility into how their data is being represented and gives them knowledge and ownership of their coverage representation. Below are some bullet points and supporting screen shots on how the portal is used.

- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration

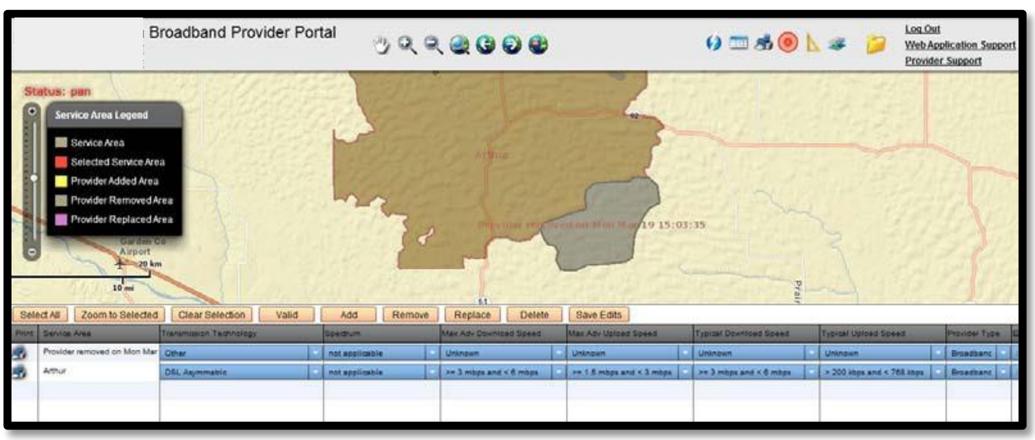
- Collection and confirmation of contact, as well as the company's DBA Name and FRN accuracy



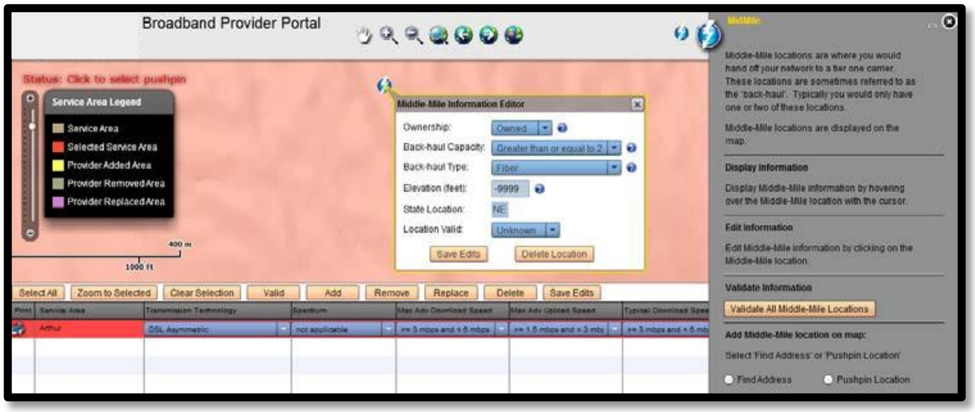
- Capability to review and request changes to the coverage footprint

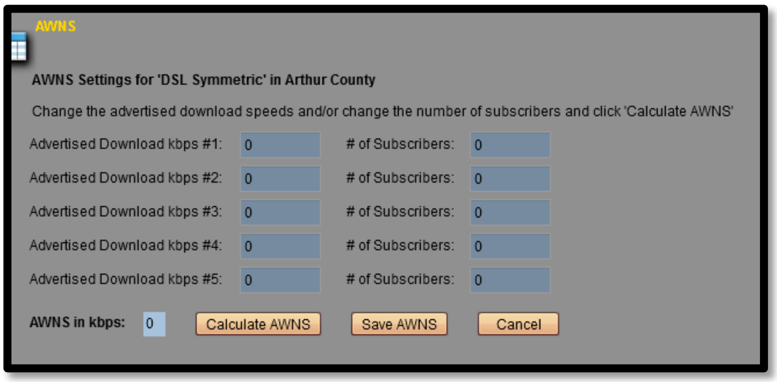


- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

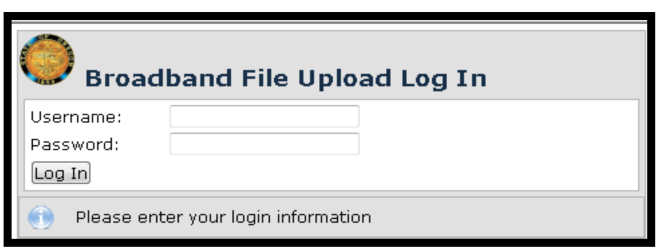


- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





- File upload functionality to support providers that would prefer a shape file, spreadsheet, PDF, KMZ/KML file be used to reflect changes for the data round



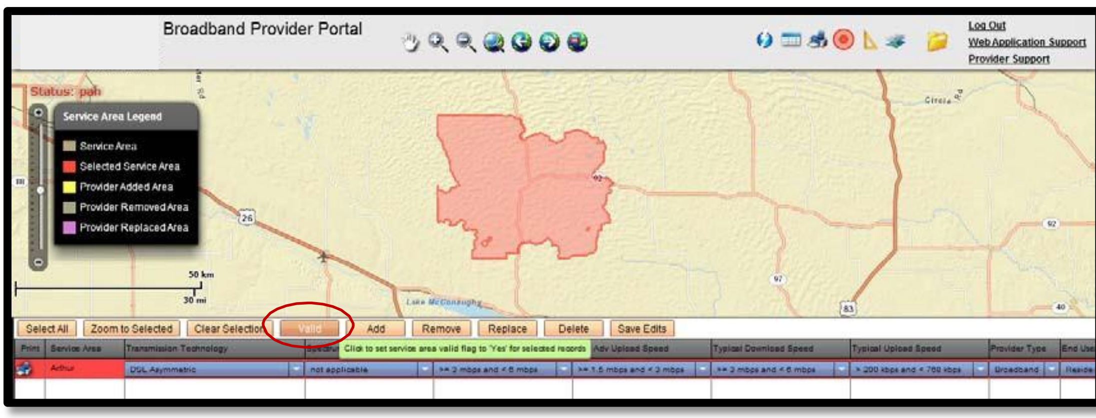
- Once the provider has reviewed and/or completed changes to their coverage, middle mile and AWNS, they may validate by selecting the validate field for each feature.

DATA VALIDATION AND VERIFICATION

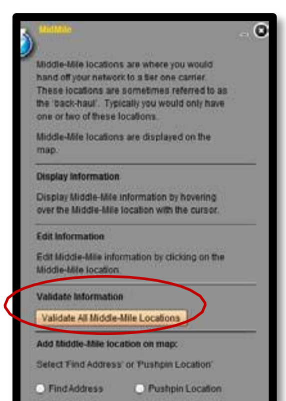
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage areas and serviceability claims, additional reviews are performed using the methods described in the subsections below in order of action (**Broadband Provider Validation**, **Third-Party Data Verification**, **Public Verification, and Confidence Values**).

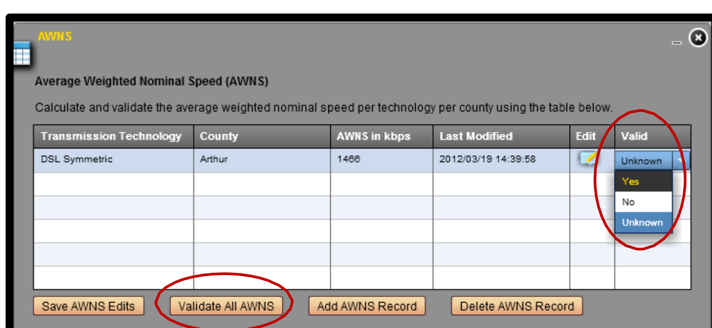
Validation examples are as follows:

- Coverage validation can be done on one record/footprint at a time or by selecting multiple footprints and selecting the 'Valid' button.



- Middle Mile & AWNS Validation





All validation results are tracked internally through the Validation Table, which is used to improve the overall **Confidence Value** of each provider.

THIRD-PARTY DATA VERIFICATION

The coverage is visually and programmatically compared against third-party data as new or updated coverage area information is received and ingested from providers. All anomalies identified during this analysis are reviewed with the providers.

3rd Party Source Name	Source Type	Verification Type
Pitney Bowes (PBBI)	Exchange Info Plus (Central Office Locations)	Exchange datasets are used to verify the following Transmission Technologies (TT): Asymmetric xDSL (10), Symmetric xDSL (20), Other Copper Wireline (30), and Optical Carrier/Fiber to the End User (50).
Media Prints	Cable Boundaries	Used to verify the following TT: Cable Modem—DOCSIS 3.0 (40) and Cable Modem—Other (41)
American Roamer	Wireless Coverage Patterns (EVDO, GPRS, WISP, HSPA)	Used to verify the following TT: Terrestrial Fixed Wireless—Unlicensed (70), Terrestrial Fixed Wireless—Licensed (71) and Terrestrial Mobile Wireless (80)
Comsearch	Wireless Spectrum Holdings and Tower Data	Used to verify the following TT: Terrestrial Fixed Wireless—Unlicensed (70), Terrestrial Fixed Wireless—Licensed (71) and Terrestrial Mobile Wireless (80)

PUBLIC VERIFICATION – CROWD SOURCING

Oregon Broadband Map

Public Feedback and speed test data

Since last data submission, we have improved the public website - interactive map to collect more detailed feedback on the represented broadband coverage areas. The feedback is also displayed on the map itself, which we're currently using as discussion points with providers during the outreach phases of each data submission. The data collected can be seen at the following path:

Hyperlink: **http://broadband.oregon.gov/StateMap/index.html**

FCC Speed test data:

Speed test results for Oregon submitted by individuals via the FCC browser and mobile based tools have been included in the verification process for this submission for supporting provider service area claims and bandwidth benchmarking.

CONFIDENCE VALUES

All verification, validation and manual quality review results are tracked by provider/technology type and stored and maintained within a **Validation table**. A confidence value is assigned, based on internal assessments of the collected information, to highlight the provider coverage areas and/or attributions that would benefit from further investigation and/or enhancements.

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention. This is an ongoing initiative, we are working to improve and gain acceptance for from providers included in the program.

QUALITY CONTROL

Following collection, processing and analysis of the provider and CAI data, the product is checked manually and algorithmically against the NTIA data model. Some of the items included within these checks are:

- Format correctness;
- Table and field structure;
- Valid values, including default values, where applicable;
- Geographic extent and topology errors.

Prior to data submission, another quality control script supplied by NTIA is run. This script, SBDD_CheckSubmission.py, creates a text output form that is required to be submitted along with the final deliverable. All data must pass submission check unless otherwise specified by NTIA.

PROVIDERS RESEARCHED

1-800-RECONEX INC	GCI COMMUNICATION CORP	OPERATOR SERVICE CO
800 RESPONSE INFORMATION SERVICES LLC	GLOBAL CAPACITY GROUP INC	OPEX COMMUNICATIONS INC
ACCESS ONE INC	Global Connection Inc. of America	ORBITCOM INC
ACCESS POINT INC	GLOBAL CROSSING LOCAL SERVICES INC	OREGON GOVWORKS
Access2Go	GLOBAL CROSSING NORTH AMERICAN NETWORKS INC	OREGON HEALTH NETWORK
ACCESSLINE COMMUNICATIONS		OREGON MUNICIPAL ISP COALITION
CORPORATION	GLOBAL CROSSING TELECOMMUNICATIONS INC	OREGON TELECOM INC
ACN COMMUNICATION SERVICES INC	GLOBAL CROSSING TELEMANAGEMENT INC	Outdoor DAS - American Tower Corp
ADVANCED TEL INC	GLOBAL TEL*LINK CORP	Pac-West Telecomm, Inc.
ADVANCED TELCOM INC	GLOBALCOM INC	PACIFIC-SOUTH TELECOM INC

ADVANTAGE TELECOMMUNICATIONS CORP	GLOBALSTAR USA LLC	PACIFIC NORTHWEST TELCO, INC.
AFFINITY NETWORK INC	GO SOLO TECHNOLOGIES INC	Pacific West
AFFORDABLE VOICE COMMUNICATIONS INC	GOLD LINE TELEMANAGEMENT INC	PAETEC Communications, Inc.
AFN, Inc.	Granite Telecommunications	Peerless Network of Oregon, LLC
AGM TELECOM CORPORATION	GROUP SIX COMMUNICATIONS LLC	PELZER COMMUNICATIONS
AIRESPRING INC	GTC TELECOM CORP	CORPORATION
AIRNEX COMMUNICATIONS INC	HARBOR COMMUNICATIONS LLC	PIC Professional Services
ALLIANCE GLOBAL NETWORKS LLC	HickoryTech/Eventis Telecom	PNG TELECOMMUNICATIONS INC
ALLIANCE GROUP SERVICES INC	HORIZON TELECOM INC	PORTLAND STATE UNIVERSITY
AMERICA NET LLC	HUGHES COMMUNICATIONS INC / HNS LICENSE	Preferred Connections Inc. NW
AMERICAN PHONE SERVICES CORP	LLC	
American Telecommunications Systems, Inc.	HYPERCUBE TELECOM LLC	PREFERRED LONG DISTANCE INC
AMERICOM TECHNOLOGIES INC	iBasis	PRIME TIME VENTURES LLC
AMERIVISION COMMUNICATIONS INC	IBASIS RETAIL INC	PRIMUS TELECOMMUNICATIONS INC
ANDIAMO TELECOM LLC	IBFA ACQUISITION COMPANY LLC	Priority ONE Telecommunication, Inc.
Applegate Broadband LLC	IDT AMERICA CORP	PRIORITYONE TELECOMMUNICATIONS INC
APPLEWOOD COMMUNICATIONS CORPORATION	INDIGENOUS TELEPHONE INC	
	INETWORKS GROUP INC	PUBLIC COMMUNICATIONS SERVICES INC
ASSOCIATED COOPERATIVE	INFOTELECOM LLC	
TELECOMMUNICATIONS INC	INLAND DEVELOPMENT CORPORATION	PULSE TELECOM LLC
ASSOCIATED NETWORK PARTNERS INC	INMARK INC	QUANTUMSHIFT COMMUNICATIONS
ATC OUTDOOR DAS LLC	Inmate Calling Solutions, LLC	INC
ATL COMMUNICATIONS INC	INMATE COMMUNICATIONS CORP	QUASAR COMMUNICATIONS
ATX LICENSING INC	INTEGRATED SERVICES INC A NEVADA CORPORATION	CORPORATION
BANDWIDTH.COM CLEC LLC		Radix Networks
BCN TELECOM INC	INTELEPOINT LLC	REDUCED RATE LONG DISTANCE LLC

BELLSOUTH LONG DISTANCE INC	INTELLETRACE INC	RELIANT COMMUNICATIONS INC
BETTERWORLD TELECOM LLC	INTELLICALL OPERATOR SERVICES INC	RIDLEY TELEPHONE CO LLC
BG ENTERPRISES INC	INTELLIGENT COMMUNITY SERVICES INC	RRV ENTERPRISES INC
BIGREDWIRE.COM INC	Intlepoint, LLC	Rural Services Company; dba Ulatilla
BLUEBIRD WIRELESS BROADBAND SERVICES	INTRADO COMMUNICATIONS INC	Electric Cooperative
LLC	IPC NETWORK SERVICES INC	Sage Telecom, Inc.
BROADBAND DYNAMICS LLC	J IRWIN COMMUNITY INFORMATICS CONSULTING	Salem Hospital Regiona Health
BROADCORE	KANSAS INDEPENDENT TELECOMMUNICATIONS	Center
BROADVIEW NETWORKS INC	LLC	SBC LONG DISTANCE LLC
BROADWING COMMUNICATIONS LLC	KDDI AMERICA INC	SHARED COMMUNICATIONS INC
BT COMMUNICATIONS SALES LLC	KRUSE - MERCANTILE PROFESSIONAL SUITES	SILV COMMUNICATION INC
BUDGET CALL LONG DISTANCE INC	Lane Telecommunications Services, Inc.	SMARTRAK INCORPORATED
BUDGET PREPAY INC	LCR TELECOMMUNICATIONS LLC	SNAKE RIVER PCS
BUEHNER FRY INC	LDMI TELECOMMUNICATIONS INC	SNET AMERICA INC
BULLSEYE TELECOM INC	LEGACY LONG DISTANCE INTERNATIONAL INC	SNIP LINK LLC
BUSINESS DISCOUNT PLAN INC	LEGENT COMMUNICATIONS CORP	Spacenet, Inc.
BUSINESS NETWORK LONG DISTANCE INC	LEWIS & CLARK COLLEGE	Sprinfield Utility Board
BUSINESS TELECOM INC	LIGHTYEAR NETWORK SOLUTIONS LLC	STARTEC GLOBAL OPERATING COMPANY
CALIFORNIA OREGON BROADCASTING INC	Lincoln County	
CALL PLAN USA INC	LONG DISTANCE CHARGES INC	STELERA WIRELESS
Cause Based Commerce Inc., - dba The Sienna	LONG DISTANCE CONSOLIDATED BILLING CO	Sterling Communications
Group	LOTEL INC	STI PREPAID LLC
CBEYOND COMMUNICATIONS LLC	LSSI DATA CORPORATION	SUNGARD NETWORK SOLUTIONS INC
CCI NETWORK SERVICES LLC	MAIN STREET TELEPHONE CO	TALK AMERICA INC
CENTEL COMMUNICATIONS INC	MALHEUR HOME TELEPHONE CO	TCAST COMMUNICATIONS INC

CENTRAL TELECOM LONG DISTANCE INC	Master Call Communications	TCG JOINT VENTURE HOLDINGS INC
CENTRAL TELEPHONE INC	MATRIX TELECOM INC	TECHNOLOGY SERVICES INC
CIMCO COMMUNICATIONS INC	MCGRAW COMMUNICATIONS INC	TEL WEST COMMUNICATIONS LLC
CINCINNATI BELL ANY DISTANCE INC	MCI COMMUNICATIONS SERVICES INC	TELCO PARTNERS INC
CITY OF EUGENE	MCIMETRO ACCESS TRANSMISSION SERVICES LLC	Telecare, Inc.
CITY OF KLAMATH FALLS	MCLEODUSA TELECOMMUNICATIONS SERVICES	Telecom Management - dba Pioneer
CITY OF PORTLAND	INC	LD
Clear World Communication Corporation	MD Communications	TELECONNECT LONG DISTANCE
CLOSECALL AMERICA INC	Metropolitan Telecommunications of Oregon - dba MetTel	SERVICES & SYSTEMS CO
COAST INTERNATIONAL INC		TELENATIONAL COMMUNICATIONS
Coinet	NORTHSTAR TELECOM INC	INC
	NORTHWEST OPEN ACCESS	TELEQUALITY COMMUNICATIONS INC
COMCAST BUSINESS COMMUNICATIONS LLC	NETWORK	TELMEX USA LLC
COMCAST PHONE OF OREGON LLC	NOS COMMUNICATIONS INC	TELRITE CORPORATION
ForesTel,LLC	NOSVA LIMITED PARTNERSHIP	
France Telecom Corporate Solutions, LLC	OLS INC	
FREEDOMSTARR COMMUNICATIONS INC	ONESUITE CORP	
FRONTIER TELENET	ONLINE NORTHWEST	

DATA DEVELOPMENT & VALIDATION METHODOLOGIES WHITE PAPER

Commonwealth of Pennsylvania
State Broadband Initiative (SBI)
Broadband Mapping Project

NTIA Data Submittal
September 28, 2012

Table of Contents

Introduction

The following sections of this document provide an overview of the process used for the SBI Broadband Mapping data development for the Commonwealth of Pennsylvania. The following narrative is depicted in Appendix A, Commonwealth of Pennsylvania SBI Process Workflow, and Appendix B, State Broadband Data Validation Workflow, included at the end of this document.

Broadband Provider Outreach Results

As a result of the outreach to broadband providers and investigating whether a internet service provider (ISP) fits the definition of a broadband provider as per the NOFA, the following is a summary of our findings:

- 294 Total Investigated ISPs
- 121 Total Confirmed Broadband Service Providers (unique Provider/DBAs combinations)
- 96 Broadband Service Providers who Supplied Data (unique Provider/DBAs combinations)
- 37 Total Confirmed Broadband Service Resellers
- 2 Broadband Service Resellers who Supplied Data

Attachment C, Master Outreach List, contains additional provider information.

Broadband Provider Outreach Procedure

The following outreach procedure provides the framework for communicating with Broadband Service Providers (providers). The primary goals of the outreach approach documented herein are to:

- Promote provider understanding and acceptance of the Broadband Mapping process, results, and benefits
- Clarify NTIA Broadband Mapping requirements
- Facilitate data confidentiality agreements as required
- Minimize the submittal of invalid data
- Enhance provider understanding of the semi-annual update process
- Work with providers to evaluate submittal options to facilitate data submittals

Data Submission Guidelines

Guidelines for the providers' submission of Broadband Mapping Data are documented in the "Data Submission Guidelines". These Guidelines define technical requirements, submission specifications, and coordination and documentation activities.

Pennsylvania Broadband Providers Website

A URL was deployed (http://www.bakergis.com/PABroadbandProvider/) to communicate and distribute NTIA NOFA requirements to providers along with outreach and data submittal materials including:

- NTIA NOFA and subsequent clarification
- Outreach letters to providers
- Draft Non-Disclosure/Data Sharing Agreement

- Quick Start Guides
- Data Submission Guidelines
- Data Transmittal Letter
- Broadband Data Submittal Templates
- Census TIGER Data
- Data Submittal Assistance Contact Information

Outreach Delivery Vehicles

- A State Broadband Mapping Initiative Call for Data letter from the Commonwealth of Pennsylvania Department of Community and Economic Development (DCED) was emailed to all providers in the Commonwealth. This initial provider contact letter described the program and the role of Michael Baker Jr., Inc. (Baker) acting on behalf of the DCED for Broadband Data Collection and Mapping.
- Baker distributed a follow-up letter to all providers describing the data submittal requirements and material and help available to aid with the data submittals.
- Submittal assistance was provided to providers that needed help with data submittals.
- Presentations were conducted with various broadband provider associations to present the data submittal requirements and answer questions.
- Email communication and electronic transfer of data was encouraged to facilitate a faster delivery of data and information.
- A URL was deployed and promoted to distribute outreach material and information concerning the Broadband Mapping Project.
- A secure FTP URL was provided for submittal of broadband data by providers.
- A secure Broadband Provider Data Update Webportal was deployed for providers to redline/update their service coverage, rather than supply their updated coverage for the semi-annual data updates.

Inclusion of Resellers

With the request for data current as of December 31, 2011, resellers are being included in all of the outreach, data collection, data aggregation, and verification tasks. The following reseller outreach form has been developed to secure the proper information and to minimize the resource commitment required by the reseller.

Reseller Information

R4-07/25

Reseller Name:
D/B/A Name (If applicable) :
FCC Registration Number ("FRN") (If applicable) :
Web Site Address:
Reselling Broadband Service for the following Organization(s): (List all carriers you represent)
Do you resell services for the entire area of each carrier above? ☐ Yes ☐ No
If no, indicate what area(s) you resell broadband services (List counties or Cities):
Technology of Transmission (Check all that apply):
☐ Assymmetric xDSL (ADSL) ☐ Symmetric xDSL (SDSL)
☐ Cable Modem – DOCSIS 3.0 ☐ Other Copper Wire
☐ Cable Modem - Other ☐ Optical Carrier/Fiber to End User
☐ Terrestrial Fixed Wireless – Unlicensed ☐ Satellite
☐ Terrestrial Fixed Wireless - Licensed ☐ Terrestrial Mobile Wireless
☐ Electric Power Line ☐ Other
Speed Tiers (See info on next page) : What is the fastest Broadband service plan ("Max") you offer, and what service plan ("Typical") do customers normally buy each month. To see the speed categories, turn to page 2 of this form.
Max Adv Down: ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10 ☐11
Max Adv Up: ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10 ☐11
Typical Adv Down: ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10 ☐11
Typical Adv Up: ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10 ☐11
Middle Mile Equipment (for each Carrier): ☐ Owned ☐ Leased Does your company own or lease any equipment related to the Broadband service for the Carriers you sell?
Latitude/Longitude or Location Address:
Facility Type: ☐Fiber ☐Copper ☐Hybrid Fiber Coax ☐ Wireless
Facility Capacity (see page 2 of this form): ☐1 ☐2 ☐3 ☐4 ☐5 ☐6
Elevation: ____ Feet above or below grade (nearest foot)

Speed Tier Codes:

Upload Speed Tier Code	Download Speed Tier Code	Description
1	--	Less than or equal to 200 kbps
2	--	Greater than 200 kbps and less than 768 kbps
3	3	Greater than 768 kbps and less than 1.5 mbps
4	4	Greater than 1.5 mbps and less than 3 mbps
5	5	Greater than 3 mbps and less than 6 mbps
6	6	Greater than 6 mbps and less than 10mbps
7	7	Greater than 10 mbps and less than 25 mbps
8	8	Greater than 25 mbps and less than 50 mbps
9	9	Greater than 50 mbps and less than 100 mbps
10	10	Greater than 100 mbps and less than 1 gbps
11	11	Greater than or equal to 1gbps

Middle Mile Serving Facility Codes:

Data Rates Code	Interconnection Point Data Rate
1	Multiple T1s and less than 40 mbps
2	Greater than 40 mbps and less than 150 mbps
3	Greater than 150 kbps and less than 600 mbps
4	Greater than 600 mbps and less than 2.4 gbps
5	Greater than 2.4 gbps and less than 10 gbps
6	Greater than or equal to 10 gbps

Figure 1 Reseller Outreach/Interview Form

Secure Broadband Provider Data Update Webportal

A secure web-based application for broadband service providers has been deployed to simplify and automate the semi-annual process for collecting and verifying data. The webportal provides an easy-to-use map redlining tool for updating a provider broadband service area and attributes. It is expected that the simplification and automation of the data collection process will increase participation and improve the timeliness of provider response, data accuracy and consistency. Providers are being encouraged to utilize this tool but data is still being accepted through other means and formats.

Figure 2 Provider Data Update Webportal Entry Page

The View/Edit Coverage Map functions via secure login/password and secured map services limit broadband providers to see and edit only their own data. Picklists of valid database attributes eliminates entry errors and create consistency. It also contains a workflow from initial provider input, saving of a provider's work-in-progress, provider formally submitting edits, aggregation into the master geodatabase, soliciting provider approval of aggregated data, and final approval of the edit.

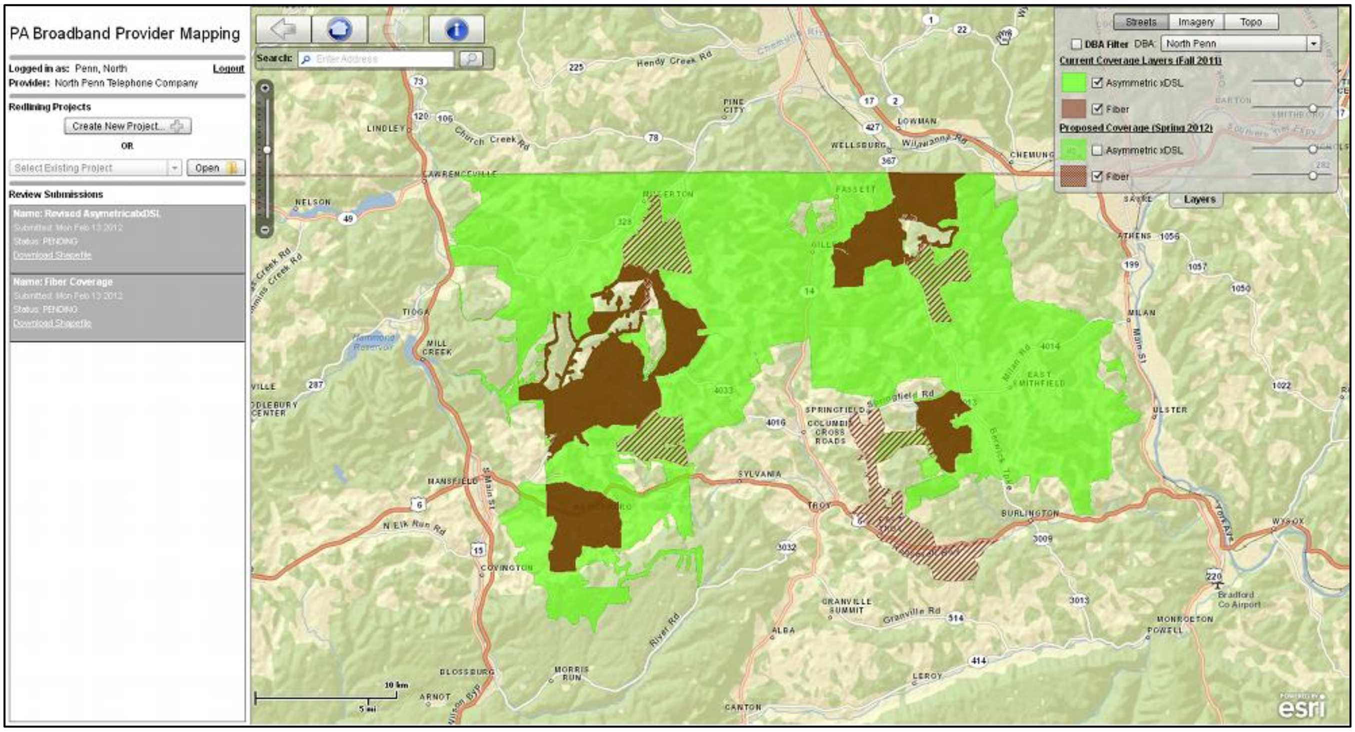


Figure 3 Provider Data Update Webportal –View/Edit Coverage Map Environment

Broadband Outreach Tracker Application

The Tracker application is utilized to collect all correspondence with providers and feedback on the effectiveness of the outreach activities by tracking items such as:

- The number and content of incoming e-mails and letters submitted from the providers
- The number and source of comments, questions, and suggestions made by providers
- The number and source of comments, questions, and suggestions made by attendees at provider meetings and conference calls
- Provider contact information and data submittal status.

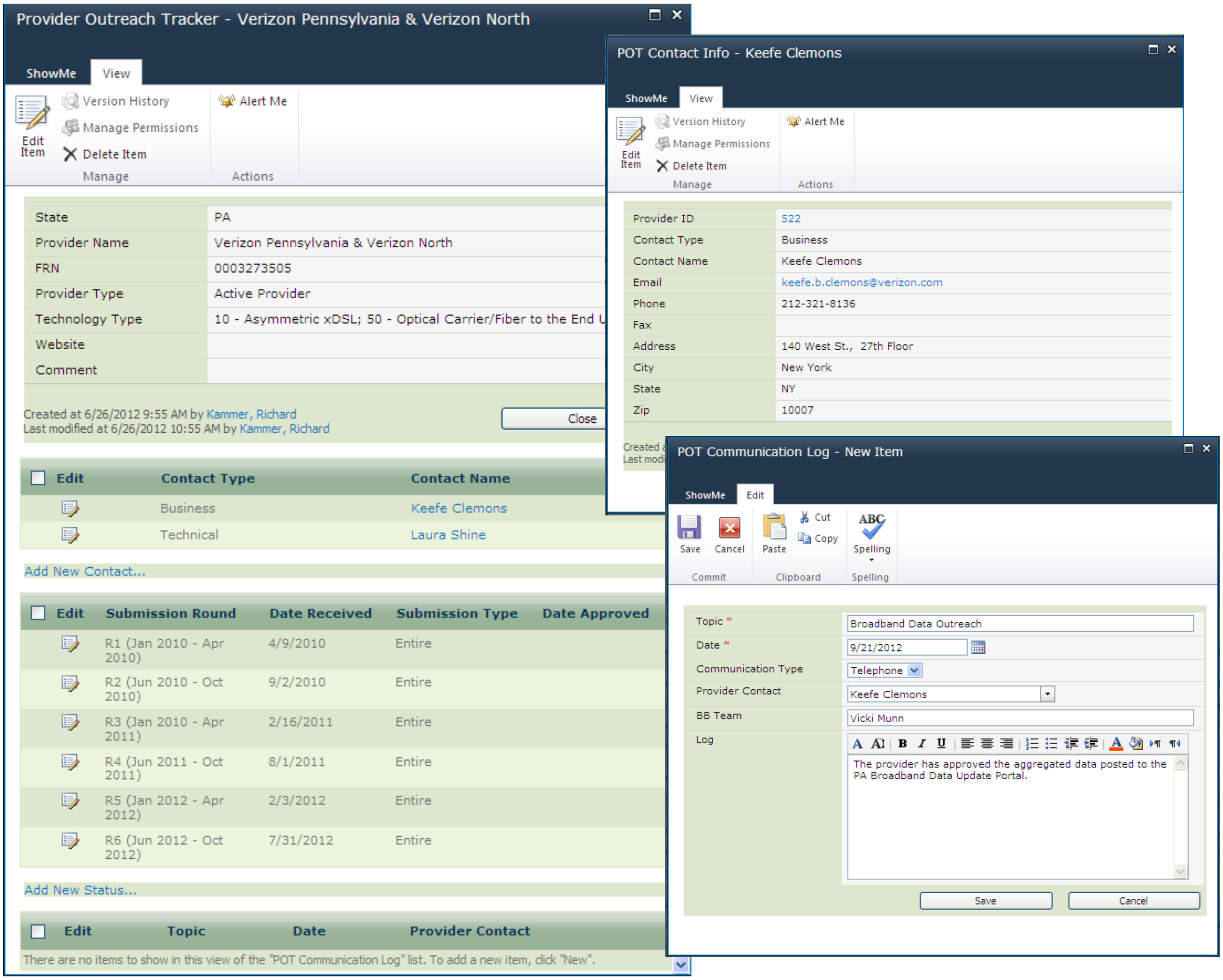


Figure 4 Broadband Outreach Tracker

Provider Submittal Validation

When a data submittal is received from a broadband service provider, it is updated in the Broadband Outreach Tracker and run through an initial validation process to assure that it meets the submittal guidelines.

Validation Checklist

The following items are part of this initial data validation process:

- Verify provider's transmittal letter requested in Data Submission Guideline with is complete and matches submitted data
- Verify the file naming conventions
- Verify each file is machine readable
- Verify data is in the correct GIS or Tabular format/file type
- Verify each field is populated and no empty or NULL values are present for mandatory fields
- Verify all ID (record number points) are unique within the submittal

- Verify all attribute data is formatted according to the submittal guidelines
- Verify topology for all geospatial submissions
- Verify Metadata for all submissions
- Verify the required contact information is included
- Verify adherence to Data Submittal Guidelines (see http://www.bakergis.com/PABroadbandProvider/ to access Data Submittal Guidelines)

  Broadband Service Availability (at least one)
  - Individual Street Addresses (Sec 3.1 & 4.1)
  - Census Blocks < 2 sq mi (Sec 3.3 & 4.3)
  - Street Segments for Census Blocks > 2 sq mi (Sec 3.2 & 4.2)
  - Service Overview (Sec 3.4 & 4.4)
  - Polygonal Boundary Area(s) (Sec 3.8 & 4.8)

  Middle-mile Points (Sec 3.5 & 4.5)
  Community Anchor Institutions (Sec 3.7 & 4.7)
  Last Mile Connection Points (Sec 3.6 & 4.6)
  WISP Antennas (Sec 4.9)

Data Usability Determination

The validation results are evaluated by the outreach and aggregation persons to determine the usability of the data. If the data meets the submission specifications, it is forwarded on for data aggregation. If it is determined to be unusable, it is returned to the provider for resolution. If the data can be manipulated to get it into a usable format, it is manipulated as required, and then forwarded on for data aggregation.

SBI Data Development

Data from the providers may be submitted in various formats as defined in the Data Submittal Guidelines, or in some cases unspecified formats may be accepted to help facilitate provider participation. Depending on the format of the submitted data, it is processed through one of the following processes to upgrade it to the NTIA SBI data standards.

Spatial Data

After validation and any required manipulation of any spatial data submitted by the providers, it is georeferenced and simply loaded into the appropriate NTIA geodatabase feature class.

Address Data Geocoding

If not already in the standard address point template, the provider tabular address data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. ArcGIS geocoding tools are then utilized geospatially locate the address points for the tabular records. Interactive address rematching is performed against two additional street centerline datasets as needed to increase geocoding matching results. The NTIA deliverable is the geocoded address point geodatabase table. The geocoded address points are also subsequently aggregated to the census block or road segment feature class for public web map display.

Census Block Aggregation

If not already in the standard census block template, the provider tabular census block data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The provider tabular census block records are then joined to the geodatabase 2010 U.S. Census Block. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination. The NTIA deliverable is the census block geodatabase table.

If the list of census blocks contains blocks > 2 sq. miles then these blocks are used to select all the 2010 U.S. Census TIGER centerlines that intersect those blocks. The Census Block record data is aggregated to each Road Segment within the Census Block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Census Block combination.

Road Segment Aggregation

If not already in the standard road segment template, the provider road segment data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. If the provider submittal included graphic centerline segments, these are migrated into the delivery geodatabase along with the linked attribute records. If the provider submittal was tabular road segment records only, they are then joined to the geodatabase 2010 U.S. Census TIGER centerline feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

If the provider road segment data lie within census blocks <= 2 sq. miles then the road segment data is aggregated to the census block. This process is performed as many times as necessary for multiple Trans Tech values for each Provider/Road Segment combination. The NTIA deliverable is the road segment geodatabase table.

Overview Data Aggregation

Provider Service Availability Areas submitted for entire county areas are loaded into the NTIA geodatabase Overview table. If not already in the standard template, the provider data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The provider overview records are then joined to the geodatabase 2010 U.S. Census County feature class. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination.

Polygonal Boundary Aggregation/Integration

Providers submitting polygonal service area data are handled in two ways. Wireline Provider data is aggregated to the census block feature class for areas where census blocks <= 2 sq. mi., or road segment feature class for areas where census blocks > 2 sq. mi. Wireless Provider Service Availability Areas submitted by polygonal area are simply loaded into the NTIA geodatabase Poly_Bndry feature class.

Wireline Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Depending on the area, census blocks < or => 2 sq. mi., a selection set of either census blocks or road segments that intersect the polygon boundary is created. The attributed polygon boundary is then joined with census blocks or road segments table to attribute accordingly. This join is performed as many times as necessary for multiple Trans Tech values for each Provider/County Area combination. The NTIA deliverable is the census block or road segment geodatabase table.

Wireless Provider

The polygonal data is georeferenced and loaded into the Poly_Bndry feature class. The polygon is then attributed, manually if necessary. Multiple Poly_Bndry records are created for multiple Trans Tech values for each provider. The NTIA deliverable is the polygon boundary geodatabase table.

Middle/Last Mile Data Integration

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. The NTIA deliverable is the middle or last mile geodatabase table.

Community Anchor Institution Integration

Providers supplied some Community Anchor Institution (CAI) data with the data submittals. But the majority of the data was collected from existing GIS Layers maintained by the Commonwealth of Pennsylvania, outreaching to CAIs through state agencies and their contacts, and having CAIs complete an online survey at http://www.bakerbb.com/pa_institution_survey/.

Provider CAIs

If not already in the standard template, the data is first loaded into that template. The data is then exported to a geodatabase table using the ArcGIS Conversion Tools. The point features are geo-located utilizing the lat/long information provided. Address data is used to geocode locations only when lat/long data is not provided.

Commonwealth CAIs

CAI shapefiles were provided through the Commonwealth's other geospatial efforts. The shapefiles were then exported to the NTIA geodatabase CAI feature class. Various sources for obtaining broadband information for the CAIs were utilized. Various state agencies provided some of the information, i.e. Pennsylvania Department of Education (PDE) provided tabular broadband information for schools, PDE provided tabular broadband information for libraries, and Pennsylvania State Police provided tabular broadband information for their facilities. A CAI data survey website was also deployed and the URL distributed by various state agencies to the CAI contacts. Data from all of these sources were then aggregated into the CAI geodatabase table for the NTIA deliverable.

Typical Speeds from Other Sources

Because not all providers are submitting the typical speed attribution with their data, a method to fill in the missing information has been developed using other sources. The method utilizes speed test data supplied through the FCC speed test information as well as from other speed test data that we are independently collecting. Business rules have been established so quality and realistic typical speeds are produced. In addition, the calculated typical speeds are compared against the Centris average speed verification data to be certain that the calculated typical speeds are within reason. The end result is a more complete data submittal to NTIA.

Propagation Modeling

Fixed wireless broadband transmission is a diverse technology. Service may be transmitted over licensed and unlicensed spectrum, and delivered by larger corporate or smaller LLC business entities, many of which serve rural areas of the State. This diversity has resulted in varying levels of SBI participation including Providers that have:

- participated,
- refused to participate,
- wished to participate but lack adequate capabilities and/or tools, or
- supplied data of marginal accuracy

The NTIA's supplemental grant funding has provided the means to generate propagation models to supplement and validate the above scenarios. In addition, the NTIA has identified fixed wireless service coverages with unusual shapes for state grantee analysis.

To facilitate development of propagation mapping, additional tower/antenna information is being requested from fixed wireless broadband providers. For those providers not responding to requests for required tower/antenna information, an attempt is made to gather the information through 3rd party sources and field investigation. The Provider, 3rd party and/or field data is processed using Terrain Analysis Package (TAP) software to develop propagation models. Maps of the resultant propagation study are sent to the fixed wireless providers for their feedback on the propagation model produced for their company.

Data Verification Summary

Pennsylvania's broadband mapping project employs a multi-prong approach to ensure the provider data is accurate and complete.

In summary, the project employs the following validation methodologies and resources:

- Provider Validation
- Data Validation via Market Intelligence Sources
- Data Validation Using State Supplied Data Points
- Field Validation
- Wireless Coverage Analysis
- Topology Validation
- Automated Validation Processing
- Confidence Level/Statistical Modeling
- SBDD Check Submission
- Stakeholder Validation

The remainder of this verification section describes the various methods in greater detail.

Provider Validation

After data development, service availability maps are generated and submitted to the providers to validate their mapping results. This provides a "sign off" on the interpretation of the submitted data and extends the outreach efforts by providing a visual representation of the data to be delivered to the State and the NTIA.

Types of Provider Maps

Provider maps generally consist of the following types.

Outreach Maps

Often, providers will send data which does not contain all the information needed for a NTIA compliant dataset. In such cases, as an aid to the outreach communication, it may be necessary to produce a map to help the provider locate their service area or verify data they have provided. These maps may take many forms, but generally are of two types:

- General Location Maps – these maps are often produced when the provider does not have a list of address or other standard submittal data and needs help defining their service area. A typical map will show counties, major roads, and towns of the general area the provider has stated as their service area. The intent of the map is to give the provider a way to markup or delineate their service area. If a provider has not provided required attribute information such as Technology of Transmission, Speed Data, etc. then it may be necessary to add a visual clue to this data like an information stamp on the map that they can easily fill out. If the provider sends the map back with a service area boundary, this can then be digitized and sent back to the provider for verification.
- Verification of Provider Supplied Boundaries – these maps are produced when the provider has sent service area boundary information which is confusing or otherwise unclear. Often these are produced when providers send CAD maps, hand drawn maps that need digitization, or lists of zip codes or counties served. A typical map will place the interpreted boundary over a location map so the provider can verify the service area. As with the General Location Map, information stamps or other visual clues may be placed on the map.

Initial Verification Maps

Once the provider data has been processed and the census block and road segment feature classes created, an Initial Verification Map (Figure 5) is produced to give the provider a visual representation of their service area by census block. These maps enable the provider to verify their service area and make changes if necessary. Initial Verification Maps are produced using a set of standards and produced at the highest resolution necessary to convey the map information to the provider. Initial Verification Maps are also produced for Wireless Polygon areas.

Detailed Verification Maps

Providers who have questions about their service areas may request additional information to help clarify issues. In these cases, it may be necessary to create a Detailed Verification Map to highlight the areas in question.

Detailed Verification Maps provide the same information as Initial Verification Maps only at a higher resolution. Several maps may be needed to accurately portray an area in question.

Revised Maps

Revised maps take two forms:

Initial or Detailed Verification Maps which have been annotated or marked-up by the provider
Outreach produced Initial or Detailed Verification Maps incorporating provider changes

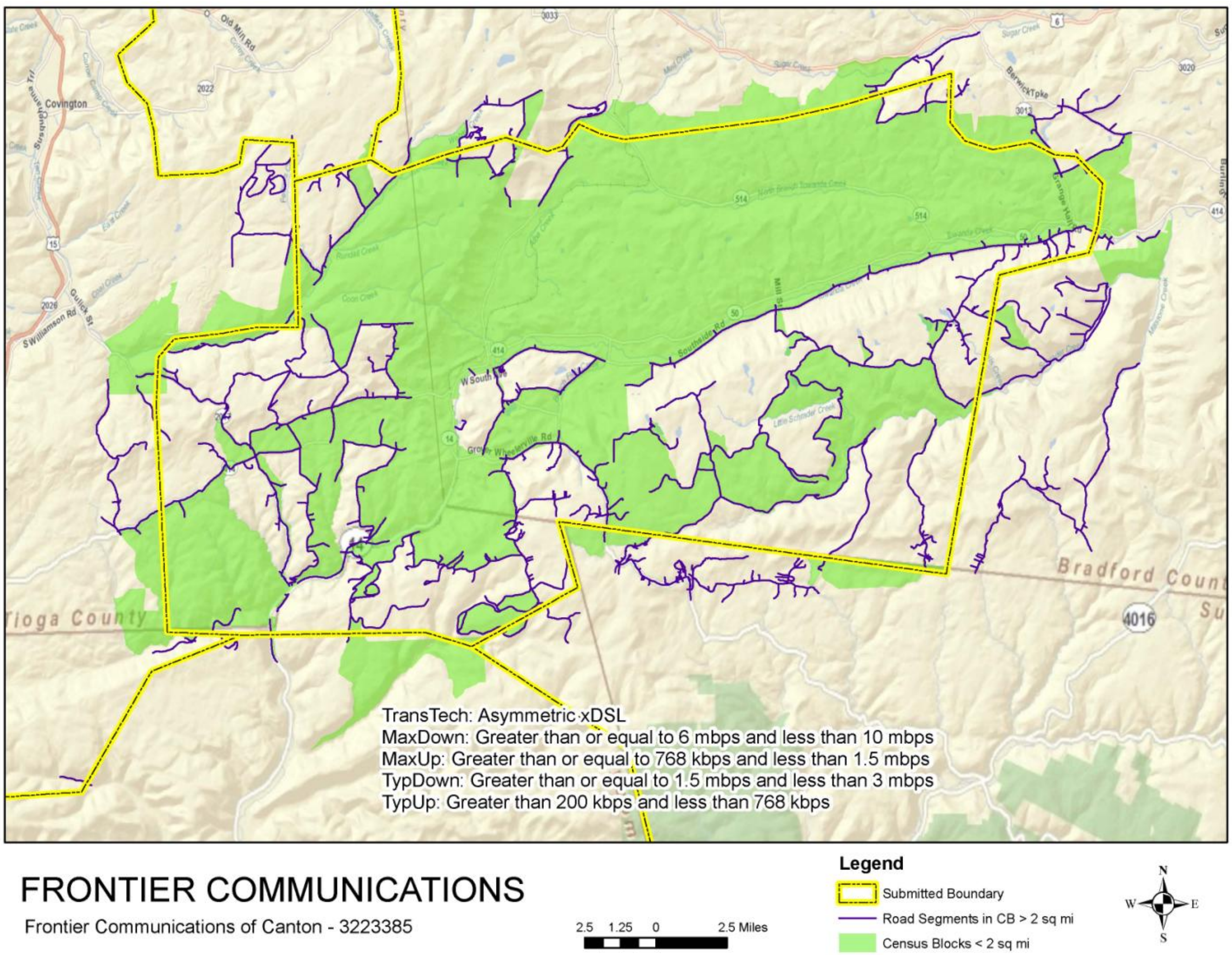


Figure 5 Provider Map

Data Validation

A critical component of the project is the validation of the data submitted by the broadband service providers. Data from various sources, as described in more detail in the following sections, is utilized to develop a level of confidence in the data received from the broadband providers.

Validation Data Set Collection and Development

This validation process employs data sets developed or acquired from different sources as described in the following sections.

Provider Feedback Loop: Maps of completed provider service areas and data are furnished back to the providers for confirmation of the processed/aggregated information. Feedback is integrated into the each provider's dataset.

Telogical Systems Wireline Market Intelligence Data: This commercially available dataset was developed using a methodology that incorporates deep web crawling and additional means, including direct mail harvesting and advertising collaterals (including door to door) to gather cable and telecommunication provider information. This dataset is used as a validation source for wireline provider service area coverage, Technology of Transmission, and Speed.

American Roamer Wireless Market Intelligence Data: This commercially available dataset is used as an independent source to verify information submitted by providers of wireless broadband service. This dataset is used as a validation source for wireless provider service area coverage.

Prior Commonwealth Broadband Mapping Dataset: Under the requirements of the Commonwealth's Act 183 of 2004 legislation, broadband coverage data was previously collected by the Commonwealth. These datasets are used as a validation source for provider service area coverage and Technology of Transmission.

FCC Speed Test: The FCC speed test data includes the IP addresses for each specific speed test conducted. This IP address is queried against a web search engine to determine the provider assigned to that address and is used as a validation source for the provider service coverage and typical speeds.

Fixed Wireless Line of Sight Analysis: Utilizing the existing PAMAP LiDAR for topography generation and determining tower/antennae heights, line of sight analysis is performed to determine areas of reported fixed wireless broadband coverage that is questionable.

Field Data Acquisition: Broadband technicians visited a sampling of census block locations to gather broadband data to be used for validation. The following criteria were taken into account when developing the census block sampling dataset:

urban vs. rural census block characteristic
censes block grouping
land vs. water census block characteristic

The overarching mission of the Federal broadband stimulus program is to expand Broadband service to areas that are currently unserved and underserved. Also, the market intelligence validation sources typically represent some rural, but more urban areas. Thus, our field data collection efforts were targeted more towards the rural areas; split 90% rural, 10% urban.

Additionally, a study by Penn State University (Glasmeier 2002) notes that a large number of census block groups typically fit within any given cable or telephone company service areas. Therefore, our field sample was also based on selection of one census block per block group and a land mass greater than 50% to avoid field visiting areas covered mostly by water. There are a total of 10,387 block groups in PA. Using a statistical sample size calculator based upon the number of block groups in the state and +/- 4% margin of error at a 95% confidence level, the sample size is 568 census block locations statewide. The procedure for selecting the calculated field verification census blocks is provided below.

Select one census block per census block group
Convert the census block groups polygon to label points.
Select the census block polygon by doing a spatial selection using census block groups label points.
Select from the current selection where the census block land mass is 50% or greater and the block is rural.
Export the selected blocks to a new shapefile. This reset the FID for the next step.
Select every 2nd, 3rd, 4th, or so on to get the desired number of blocks. Query used to select: MOD("FID",2) = 0. This will select every other record.

The planned census block field locations are shown in Figure 6.

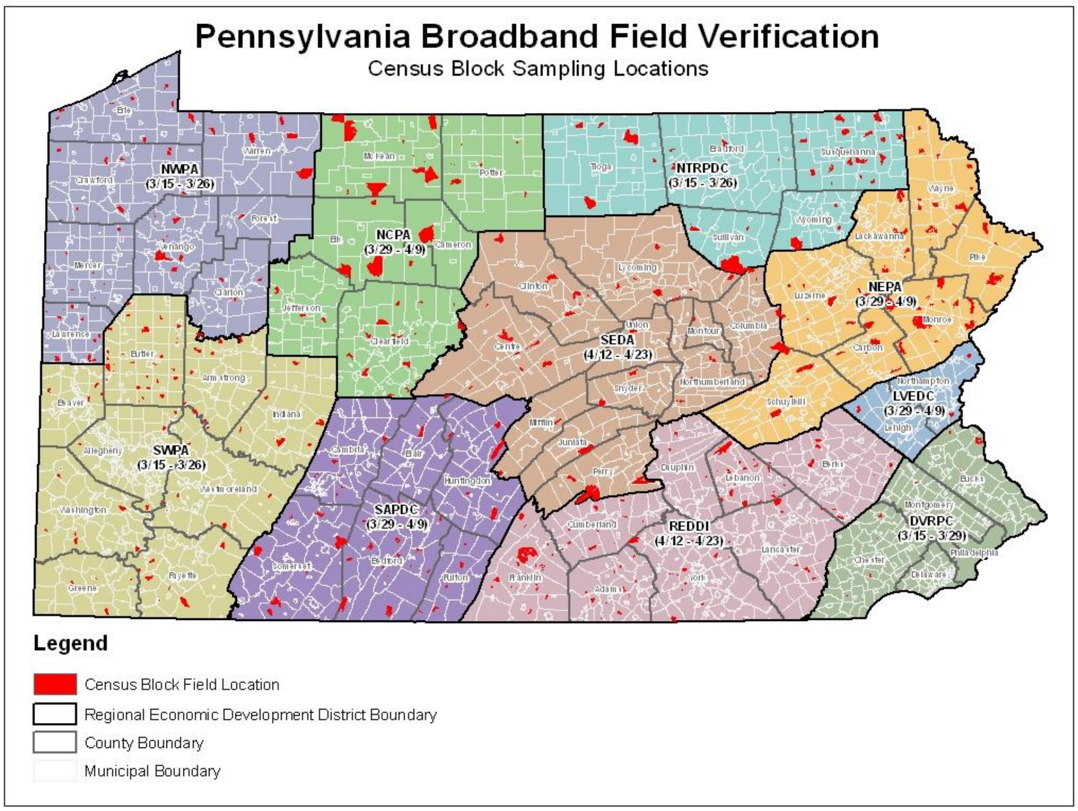


Figure 6 Planned Field Verification Census Block Locations

For each census block in the sample set, broadband technicians collected data using Panasonic Toughbook computers, loaded with MapPoint mapping software, and a customized Microsoft Access data collection form with the ability to automatically import GPS coordinates. The sample census blocks were pre-loaded and directly accessible from MapPoint. Two types of data collection were conducted (infrastructure observation and wireless speed testing) and the results were recorded and linked to the corresponding field location coordinates within the designated sample census block. The information collected by the field broadband technicians includes:

Wireline:

GPS coordinates
circuit infrastructure feeding the area (copper, fiber, cable)
local distribution hut equipment inspection, where allowed/possible
witness access circuit speed tests, where allowed/possible
facility elevation (measurement relative to grade), where allowed/possible
distance from DSLAM measurement where applicable and determine access speed capability with an accuracy within 500ft using mapping software
collect site pictures

Wireless:

GPS coordinates
internet speed test

The map in Figure 7 shows the locations (blue points) of the census block field surveys that were performed.

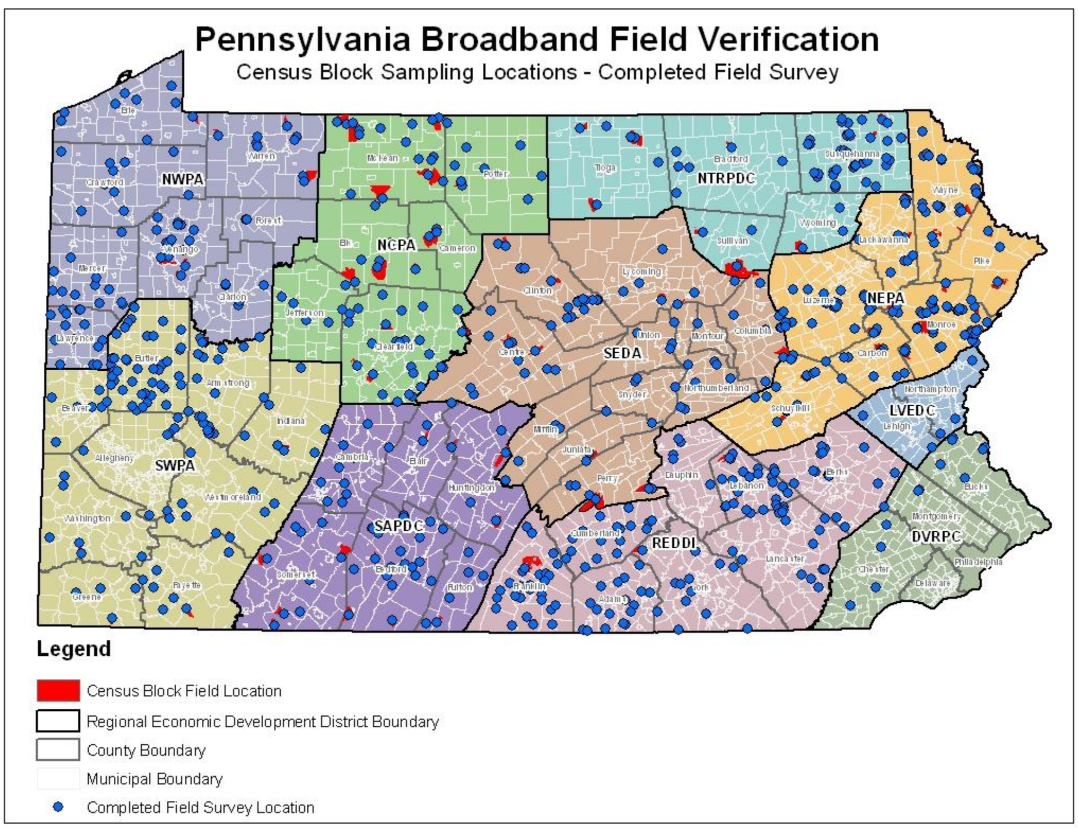


Figure 7 Completed Field Verification Locations

For the 568 census blocks that were visited, 2821 individual wired/wireless data elements were recorded and 3666 pictures were taken at those locations. This field collected dataset is used as a validation source primarily for wireline and wireless technology of transmission, middle mile, and wireless speed.

Provider Data Validation Process

Provider Feedback Loop: Feedback received from the providers is visually inspected and integrated directly in the mapping GIS database.

Service Area Validation Data: The Telogical wireline service area data is tabular and contains a separate record for each provider/technology of transmission combination with an associated census block or TIGER road segment, depending on the whether the size of the census block area (=/< or > 2 sq. mi.). This data is exported into an ArcGIS data format. The American Roamer wireless service area data is already in and ArcGIS data format. The validation data is then joined to the provider service area data by census block or TIGER road segment ID. Any database records in the provider or validation tables that cannot be joined are output to a separate layer that indicates the areas of discrepancy between the two datasets. The joined tables are then queried to detect any speed discrepancies which are also output to a separate discrepancy layer.

Field Validation Data: The field data are also collected in tabular database format, and represent a specific lat/long spatial location for each record. This data is also exported into an ArcGIS data format, joined to the provider data, queried to validate pertinent attribution. Again, records not joined and/or with detected attribution discrepancies are output to separate GIS layers.

Topology: The ArcGIS Validate Topology Tool is used to flag any topology issues in the broadband data. Flagged issues are reviewed to identify false positives and update true errors as required.

SBI Check Submission: The NTIA-provided SBI Check Submission tool is utilized to validate that the deliverable broadband data is consistent with the business logic rules set forth by the NTIA and a passing receipt is provided with the data submittal to NTIA.

Stakeholder Feedback: The state broadband mapping website includes a feedback function. Comments received from stakeholders such as the regional Economic Development Districts and the public are reviewed and used to validate the provider data submissions.

Validation and Confidence Level Reporting

To facilitate validation and confidence level reporting, Baker deployed a validation application called Statistical Evaluation and Assessment System (SEAS) which automatically compares the multiple independent validation datasets against the broadband service providers' supplied information. The SEAS application uses statistical methodologies to report the confidence level in the spatial and attribute accuracy of the information. Appendix B shows the validation workflow.

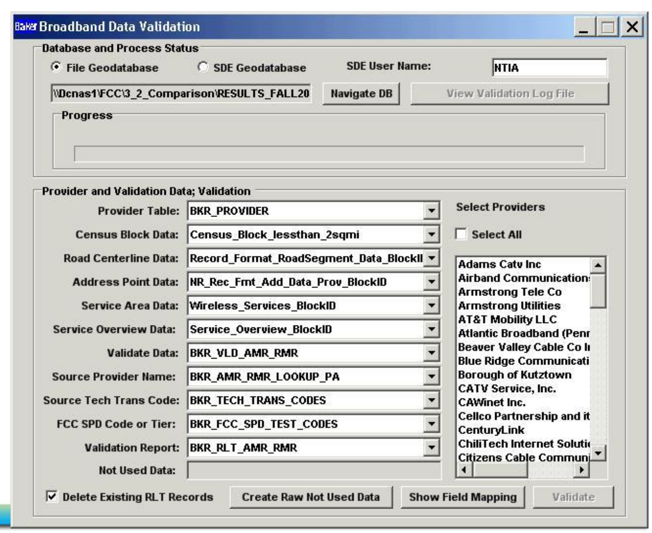


Figure 8 SEAS

The SEAS comparison is a three-part validation process:

Comparison of the collected validation source against the aggregated broadband provider data.
Match percentage calculation for each provider reported in the DataPackage.xls, “Provider Table” tab, “Comments” column.
Confidence score calculation displayed on the state broadband website.

After completing all validation data source collections, SEAS is used to automatically compare the multiple validation datasets against the aggregated broadband data which came from the providers. Through the SEAS accumulation table, it produces a match percentage per broadband service record based upon the number of matches that record has against each validation source. The matched percentage for each record is the result of the total count of the matched validations for the record divided by the total validation source being compared against the record. Validation confidence rating/score is assigned on a scale of 1 to 5 based upon the percentage of validation source matches as per the following score results:

1 Star   = 0% - 19% Match
2 Stars = 20% - 39% Match
3 Stars = 40% - 59% Match
4 Stars = 60% = 79% Match
5 Stars = 80% - 100% Match
“No Analytics” = No validation source available for that provider

The Commonwealth’s public broadband mapping website (www.broadbandinpa.com) is updated with the confidence level results at the record level based upon the queried geographic location and the following shows an example of this representation.

Provider Name	Transmission Technology	Max Download Speed	Max Upload Speed	Confidence Score
AT&T Mobility	Mobile Wireless	Greater than or e…	Greater than or e…	
Verizon	Asymmetric xDSL	Greater than or e…	Greater than or e…	NO ANALYTICS
Comcast	Cable Modem – Other	Greater than or e…	Greater than or e…	

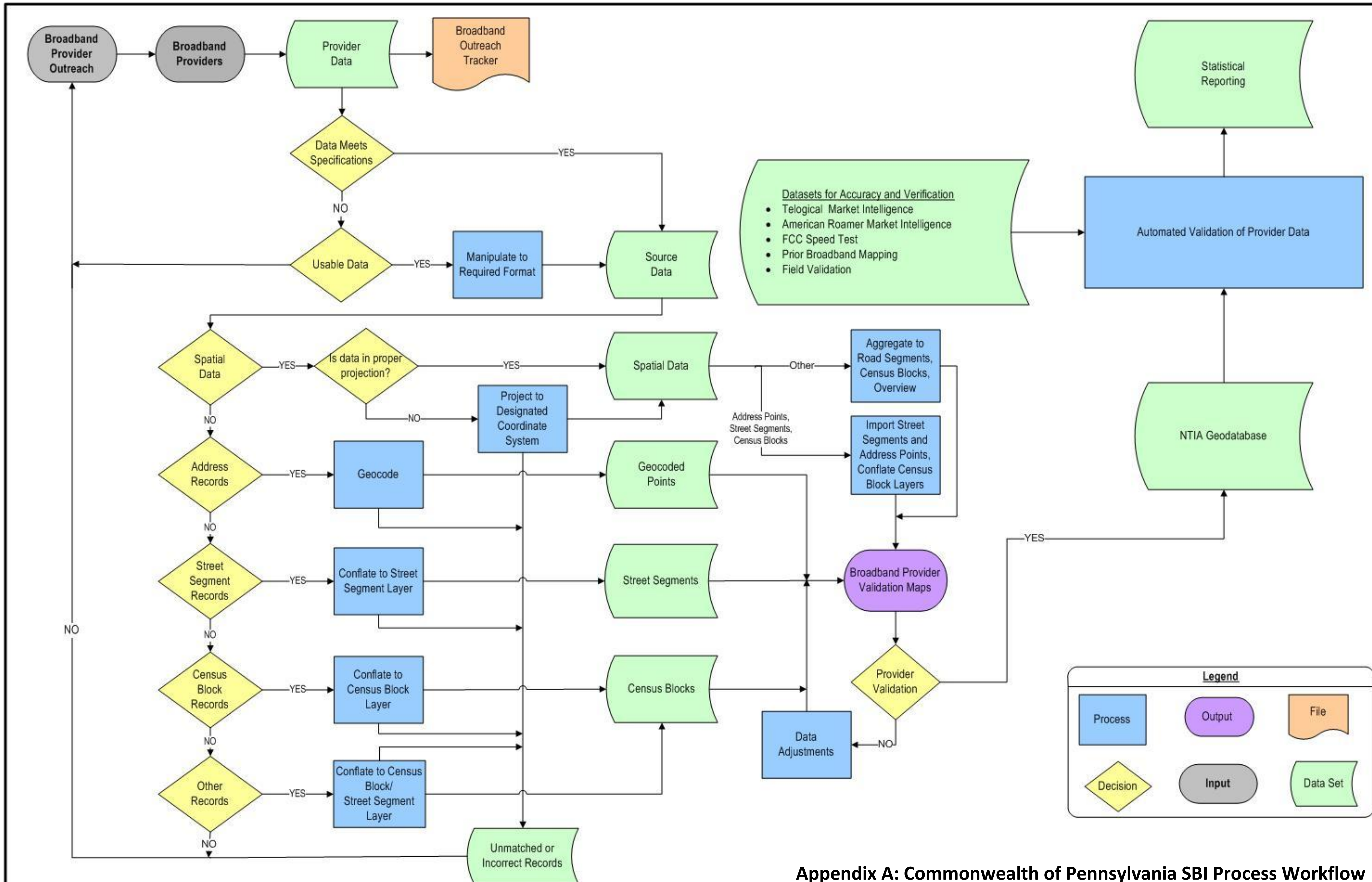
The matched percentage for the records for each provider are summarized and then divided by the total count of the records to create the final matched percentage for the specific provider. These percentages are included in DataPackage.xls on the Provider Table tab in the Comments column.

Low Confidence Provider Feedback

Provider data which is assigned a low confidence (1 or 2 stars) through the SEAS process is communicated back to the provider through a feedback loop. Generally, the low confidence feedback and reconciliation is a continuous refinement process and usually occurs between update cycles. The goal is to provide this feedback through the Provider Data Update Webportal via a web connection that is available and rolled out to providers in January 2012.

Changes and Corrections Documentation

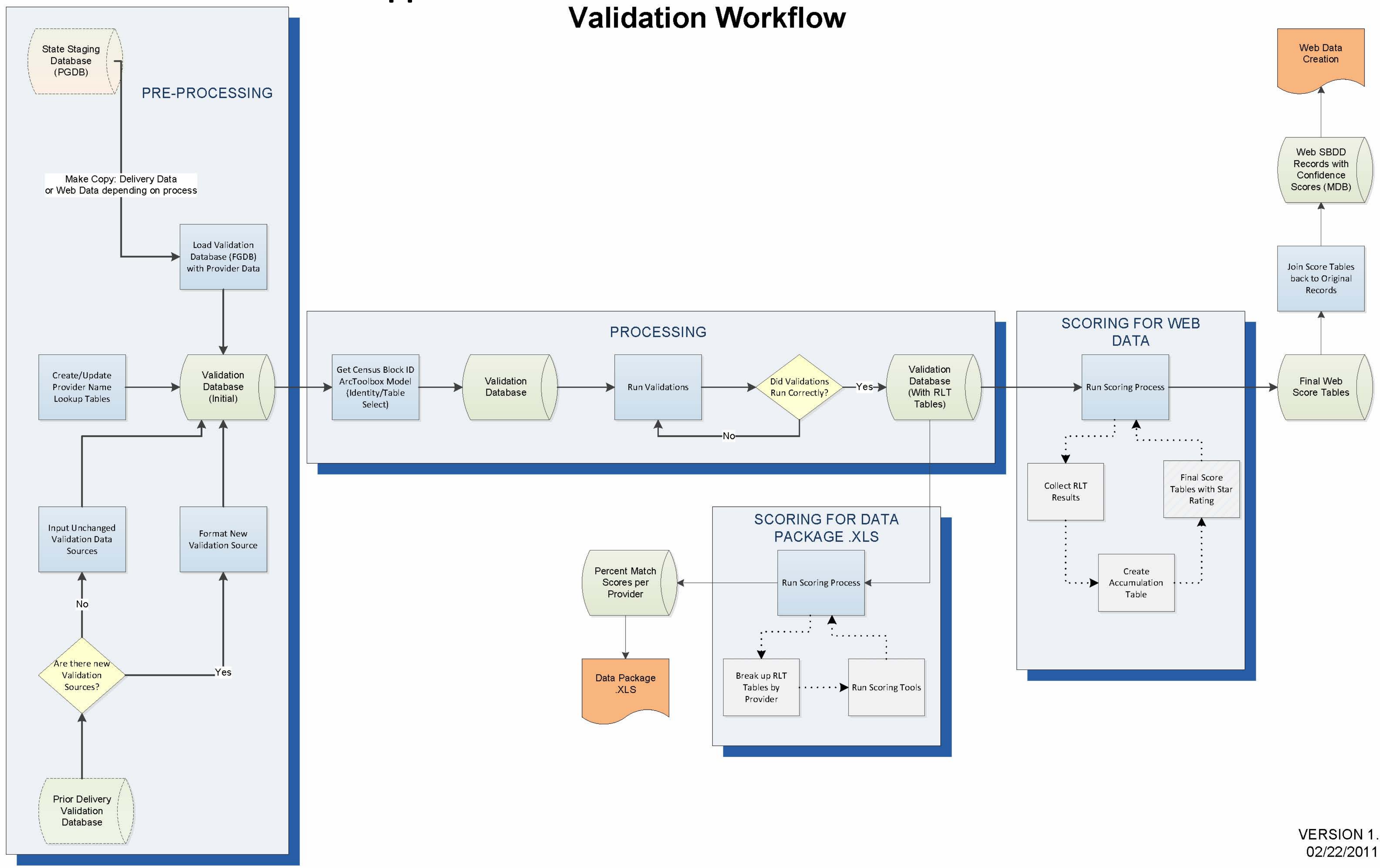
With each semi-annual NTIA data submittal, changes and corrections documentation is provided. Significant changes in a provider's status or data, corrections to previously supplied data, providers supplying data for the first time, etc. are specified by Provider name in the Changes and Corrections document.



Appendix A: Commonwealth of Pennsylvania SBI Process Workflow

October 1, 2010

Appendix B: State Broadband Data Validation Workflow



VERSION 1.1
02/22/2011

Appendix C: Master Outreach List

Filing Company DBA	Filing Company Name	Status
21st Century Resoration & SLS		Not a Broadband Provider or Reseller
2s Graphic Design Inc.		Not a Broadband Provider or Reseller
A P Wireless		Not a Broadband Provider or Reseller
AboveNet		Not a Broadband Provider or Reseller
Access Northeast		Not a Broadband Provider or Reseller
Al's Satellite		Not a Broadband Provider or Reseller
Alteva Communications		Not a Broadband Provider or Reseller
Altius Broadband		Not a Broadband Provider or Reseller
Antietam Cable		Not a Broadband Provider or Reseller
bedford.net		Not a Broadband Provider or Reseller
BurstNET		Not a Broadband Provider or Reseller
Buytelco, Inc.		Not a Broadband Provider or Reseller
Charter Internet		Not a Broadband Provider or Reseller
CIMCO Communications, Inc.		Not a Broadband Provider or Reseller
Cincinnati Bell Inc.		Not a Broadband Provider or Reseller
Citynet Holdings, LLC		Not a Broadband Provider or Reseller
Clearview Partners		Not a Broadband Provider or Reseller
Community TV Systems Inc		Not a Broadband Provider or Reseller
Computer Central		Not a Broadband Provider or Reseller
Cpudirect Networks, LLC		Not a Broadband Provider or Reseller
Detwiler Communications Inc (Detwiler Golden Rule Communications, Inc.)		Not a Broadband Provider or Reseller
A P Wireless		Not a Broadband Provider or Reseller
Access Northeast		Not a Broadband Provider or Reseller
Airespring, Inc.		Not a Broadband Provider or Reseller
American Digital Online Services, Inc. (ADOS)		Not a Broadband Provider or Reseller
Budget Prepay, Inc. D/B/A Budget Phone, Inc.		Not a Broadband Provider or Reseller
Cablesat		Not a Broadband Provider or Reseller
Charter Internet		Not a Broadband Provider or Reseller
Cyberonic Internet Communications, Inc.		Not a Broadband Provider or Reseller
Digital Connections, Inc.		Not a Broadband Provider or Reseller
DISH		Not a Broadband Provider or Reseller
DSLBroker.com		Not a Broadband Provider or Reseller

Filing Company DBA	Filing Company Name	Status
Dubois Communications Inc		Not a Broadband Provider or Reseller
Ducom, Inc.		Not a Broadband Provider or Reseller
EA Media		Not a Broadband Provider or Reseller
East Palestine Internet		Not a Broadband Provider or Reseller
Easton Telecom Services		Not a Broadband Provider or Reseller
Eduro Networks, LLC		Not a Broadband Provider or Reseller
Entelegent Solutions, Inc.		Not a Broadband Provider or Reseller
EZLinx (NEPAdata.com Ventures, LLC)		Not a Broadband Provider or Reseller
Farber Technology		Not a Broadband Provider or Reseller
Global Crossing North America, Inc		Not a Broadband Provider or Reseller
Graybar Utility		Not a Broadband Provider or Reseller
Ground Control		Not a Broadband Provider or Reseller
Herr Cable		Not a Broadband Provider or Reseller
Hotwire Communications, Ltd.		Not a Broadband Provider or Reseller
International Broadband Electric Communications, Inc. (IBEC, Inc)		Not a Broadband Provider or Reseller
Internet Communications Inc.		Not a Broadband Provider or Reseller
ISP 1		Not a Broadband Provider or Reseller
JB Cable		Not a Broadband Provider or Reseller
Keystone Wireless, LLC d.b.a. Immix Wireless		Not a Broadband Provider or Reseller
Leading Edge Computer Services, Inc.		Not a Broadband Provider or Reseller
Leap Wireless International, Inc.		Not a Broadband Provider or Reseller
Lebanon MobileFone		Not a Broadband Provider or Reseller
LightEdge Solutions, Inc.		Not a Broadband Provider or Reseller
Line Systems, Inc.		Not a Broadband Provider or Reseller
Losch Internet Services		Not a Broadband Provider or Reseller
Meriplex Communciations, Ltd		Not a Broadband Provider or Reseller
Metropolitan Telecommunications Holding Co / Netlogic, Inc.		Not a Broadband Provider or Reseller
Milestone Communications Inc		Not a Broadband Provider or Reseller
Millheim TV Transmission Company		Not a Broadband Provider or Reseller
MTT First (A/K/A MountainTop Technologies, Inc.)		Not a Broadband Provider or Reseller
Nauticom		Not a Broadband Provider or Reseller
Netrepid		Not a Broadband Provider or Reseller

Filing Company DBA	Filing Company Name	Status
OpenRange Communications		Not a Broadband Provider or Reseller
Optical Telecommunications Inc.		Not a Broadband Provider or Reseller
Optical Telecommunications Inc.		Not a Broadband Provider or Reseller
PAOnline Netrepid		Not a Broadband Provider or Reseller
PenTeleData Limited Partnership I		Not a Broadband Provider or Reseller
Philadelphia Cable TV Internet Phone		Not a Broadband Provider or Reseller
Phoenix Cable Incorporated		Not a Broadband Provider or Reseller
Pitcairn Community Cable		Not a Broadband Provider or Reseller
Presque Isle Technology Solutions		Not a Broadband Provider or Reseller
Presque Isle Technology Solutions		Not a Broadband Provider or Reseller
PulseAIR		Not a Broadband Provider or Reseller
Qualcomm (DBA MediaFLO)		Not a Broadband Provider or Reseller
Qwest Communications International dba Qwest Communications Company, LLC		Not a Broadband Provider or Reseller
Reliance Globalcom Services, Inc. (Yipes Communications Group, Inc.)		Not a Broadband Provider or Reseller
Retel TV Cable		Not a Broadband Provider or Reseller
Satellite Internet Broadband		Not a Broadband Provider or Reseller
SCR Online		Not a Broadband Provider or Reseller
Self Service America, discount ISP		Not a Broadband Provider or Reseller
Snip Link LLC		Not a Broadband Provider or Reseller
Southside TV (Southside Television Association)		Not a Broadband Provider or Reseller
Stage 2 Networks, LLC		Not a Broadband Provider or Reseller
Sunset Net		Not a Broadband Provider or Reseller
Telovations, Inc.		Not a Broadband Provider or Reseller
tw telecom inc.		Not a Broadband Provider or Reseller
UHP Wireless Networks		Not a Broadband Provider or Reseller
USA Digital Communications		Not a Broadband Provider or Reseller
Valley Cable Systems		Not a Broadband Provider or Reseller
Ward Communications		Not a Broadband Provider or Reseller
Wavecrazy		Not a Broadband Provider or Reseller
Westfield Community Antenna Assoc.		Not a Broadband Provider or Reseller
Whitefence		Not a Broadband Provider or Reseller
WinBeam (Northwest Infonet)		Not a Broadband Provider or Reseller

Filing Company DBA	Filing Company Name	Status
Your Internet Services		Not a Broadband Provider or Reseller
Zampelli Electronics		Not a Broadband Provider or Reseller
ACC Business	AT&T	Other
CLEAR	Affiliate of Clearwire	Other
Fisk Internet Services, LLC	Getwireless.net, Inc.	Other
Jefferson County Cable	Blue Devil Cable TV, Inc.	Other
Pencor Services, Inc. (PenTeleData)	Blue Ridge Communications	Other
Susquehanna Communications	Comcast Cable Communications, LLC	Other
American Telecharge, Inc.		Potential
BackWoods Wireless		Potential
BCN Telecom, Inc.		Potential
BetterWorld Telecom, LLC		Potential
Broadband Dynamics, LLC D/B/A Diversified		Potential
Broadstar, LLC		Potential
Broadvox		Potential
Business Automation Technologies, Inc. d/b/a Data Network Solutions		Potential
Cellular One of NEPA (Northeast Pennsylvania)		Potential
Cooperative Communications, Inc.		Potential
Country Cable TV		Potential
Covista Communications, Inc.		Potential
CS Technologies Plus		Potential
cyberMIND		Potential
DSCI Corporation		Potential
DSLOPTIONS		Potential
DynaLink Communications, Inc.		Potential
Easton Telecom Services		Potential
EasyStreet Online Services		Potential
Ernest Communications, Inc.		Potential
FSN Broadband LP		Potential
ICDC Wireless Inc.		Potential
Interglobe Communications, Inc.		Potential
Interlync Internet Services, Inc.		Potential
LaunchNet		Potential
Layer Four Solutions, LLC		Potential

Filing Company DBA	Filing Company Name	Status
LocalNet Corp		Potential
Master Vision Cable		Potential
Pennsylvania Cable Network		Potential
Prescient Worldwide		Potential
Purecom		Potential
SureWire Internet		Potential
Surf Erie Internet Services		Potential
Adams Cable Service	Adams Catv Inc	Provider
Airband Communications, Inc.	Airband Communications, Inc.	Provider
Armstrong Telephone - North (Duke Center)	Armstrong Tele Co	Provider
Armstrong Telephone- PA (Clinton Area)	Armstrong Tele Co	Provider
Armstrong Utilities	Armstrong Utilities	Provider
AT&T Corp, Inc.	AT&T Corp, Inc.	Provider
AT&T Mobility LLC	AT&T Mobility LLC	Provider
Atlantic Broadband	Atlantic Broadband (Penn), LLC	Provider
Beaver Valley Cable	Beaver Valley Cable Co Inc.	Provider
Bentleyville Communications Corporation	FairPoint Communications	Provider
Blue Devil Cable	Blue Devil Cable TV, Inc.	Provider
Blue Ridge Communications	Blue Ridge Communications	Provider
Broadview Networks Holdings, Inc.		Provider
Brockway Tv Inc		Provider
CABLEVISION	CSC HOLDINGS, INC	Provider
CATV Service	CATV Service, Inc.	Provider
CAWinet	CAWinet, Inc.	Provider
CenturyLink	CenturyTel, Inc.	Provider
ChiliTech Internet Solutions, Inc.	ChiliTech Internet Solutions, Inc.	Provider
Citizens Cable Communications	Citizens Cable Communications	Provider
Citizens of Kecksburg	Citizens of Kecksburg	Provider
Clarity Connect, Inc.	Clarity Connect, Inc.	Provider
Clear.com	Clearwire Corporation	Provider
Coaxial Cable Tv Corp	Coaxial Cable Tv Corp	Provider

Filing Company DBA	Filing Company Name	Status
Cogent Communications, Inc.	Cogent Communications, Inc.	Provider
Comcast	Comcast Cable Communications, LLC.	Provider
Consolidated Communications	Consolidated Communications	Provider
Conterra Ultra Broadband, LLC	Conterra Ultra Broadband Holdings, Inc.	Provider
CONXX	CONXX	Provider
Covad Communications Company	DIECA Communications, Inc.	Provider
Cricket Communications, Inc.	Leap Wireless International, Inc.	Provider
DBSi		Provider
Deposit Telephone Company, Inc.	TDS TELECOM	Provider
DirecTV		Provider
EagleZip.com	EagleZipCom LLC	Provider
Evenlink		Provider
Fibertech	Fiber Technologies Networks, L.L.C.	Provider
Frontier Communications	Frontier Communications	Provider
Frontier Communications of Breezewood	Frontier Communications	Provider
Frontier Communications of Canton	Frontier Communications	Provider
Frontier Communications of Oswayo	Frontier Communications	Provider
Full Service Computing Corp		Provider
Gap CableTV	Gap CableTV	Provider
Getwireless.net, Inc.	Getwireless.net, Inc.	Provider
Hancock Telephone Co	Hancock Telephone Co	Provider
Hickory Telephone Company	Hickory Telephone Company	Provider
Hometown Utili-com	Borough of Kutztown	Provider
HughesNet	Hughes Communications, Inc.	Provider
Hydrosoft Internet		Provider
ICON Technologies Inc.		Provider
Innernet, Inc.		Provider
Ironton Telephone Co	Ironton Telephone Co	Provider
KCnet	Keystone Community Network, Inc.	Provider

Filing Company DBA	Filing Company Name	Status
Kuhn Communications	Kuhn Communications	Provider
Lackawaxen Telephone Co	Lackawaxen Telephone Co	Provider
Lantek	Lantek	Provider
Laurel Highland Telephone Company	Laurel Highland Telephone Company	Provider
Level 3 Communications, LLC	Level 3 Communications, LLC	Provider
Lumos Networks (Formerly Ntelos Media)		Provider
Mahanoy & Mahantango Telephone Company	TDS TELECOM	Provider
Marianna and Scenery Hill Telephone Company	FairPoint Communications	Provider
MetroCast Communications	Gans Communications, LP	Provider
Navpoint Internet		Provider
Netcarrier Telecom, Inc.	Netcarrier Telecom, Inc.	Provider
Netconex		Provider
Nitel, Inc.		Provider
Nittany Media, Inc.		Provider
Noroc Broadband	Noroc Broadband LLC	Provider
North Penn	North Penn	Provider
Northeastern Telephone	Northeastern Telephone	Provider
One Communications	One Communications	Provider
PaCLEC Corporation		Provider
PAETEC Communications, Inc.	PAETEC Communications, Inc.	Provider
Palmerton Telephone Co	Palmerton Telephone Co	Provider
Pennsylvania Telephone Co	Pennsylvania Telephone Co	Provider
PulseNet		Provider
Pymatuning Indep. Tel. Company	Pymatuning Indep. Tel. Company	Provider
QCOL, Inc	QCOL, Inc	Provider
Raystown Wireless		Provider
RCN Telecom Services of Philadelphia, Inc.	RCN and RCN Business Services	Provider
RCN Telecom Services, Inc.	RCN and RCN Business Services	Provider

Filing Company DBA	Filing Company Name	Status
Service Electric Cable TV, Inc.	Service Electric Cable TV, Inc.	Provider
Service Electric Cablevision, Inc.	Service Electric Cablevision, Inc.	Provider
Shen-Heights TV Associates, Inc.	Shen-Heights TV Associates, Inc.	Provider
Sidera Networks	Sidera Networks, LLC	Provider
Skycasters	Skycasters, LLC	Provider
SkywayUSA	Skyway	Not a Broadband Provider or Reseller
Smoothstone IP Communications		Provider
South Canaan Telephone Company	South Canaan Telephone Company	Provider
Sprint	Sprint Nextel Corporation	Provider
StarBand Communications Inc.	StarBand Communications Inc.	Provider
StarLinX	StarLinX	Provider
StarTec Global Communications		Provider
Sti Wireless		Provider
Sting Communications	Sting Communications	Provider
Sugar Valley Telephone Company	TDS TELECOM	Provider
Tele-Media	Tele-Media Company of Zion, LLC	Provider
Telnes Broadband		Provider
TIME WARNER CABLE	TIME WARNER CABLE LLC	Provider
T-Mobile	T-Mobile USA, Inc.	Provider
Towerstream Corporation		Provider
Transbeam Inc.		Provider
U.S. Cellular		Provider
Usa Choice Internet Services Company, Llc	Usa Choice Internet Services Company, Llc	Provider
Venus Telephone Corporation	Venus Telephone Corp.	Provider
Verizon Pennsylvania Inc.	Verizon Pennsylvania Inc.	Provider
Verizon Wireless	Cellco Partnership and its Affiliated Entities	Provider
ViaSat, Inc. (formerly WildBlue Communications, Inc.)	ViaSat, Inc.	Provider
Wave2Wave Communications	Wave2Wave Communications, Inc.	Provider

Filing Company DBA	Filing Company Name	Status
West Side Telecommunications	West Side Telephone Company	Provider
Western PA Internet Access		Provider
WestPAnet	WestPAnet	Provider
Windstream	Windstream Pennsylvania, Inc	Provider
Wire Tele-View Corp.	Wire Tele-View Corp.	Provider
Wireless PA Internet Access		Provider
WorldConnX, Inc.		Provider
XO Communications Services, Inc. (Affiliated Entity)	XO Communications, LLC	Provider
Yukon Waltz Telephone Company	Yukon Waltz Telephone Company	Provider
Zito Media	Zito Media, L.P.	Provider
1USA.COM		Reseller
Advanced Mobile Group		Reseller
AL's Satellite		Reseller
American Telephone Company LLC		Reseller
Bandwidth.com		Reseller
Beacon Technologies		Reseller
Broad Sky Networks		Reseller
Broadband Dynamics, LLC D/B/A Diversified		Reseller
Broadband National		Reseller
Broadband.com		Reseller
BullsEye Telecom, Inc.		Reseller
Computer Solutions, Inc.		Reseller
Csolutions, Inc.		Reseller
DCT Telecom Group, Inc.		Reseller
Delmarva T1		Reseller
Diehl Michael J Cable Television D/B/A Somerfield Cable TV		Reseller
Double Dog	Double Dog	Reseller
Drizzle		Reseller
DSL Extreme		Reseller
Earthlink (D/B/A New Edge Network, Inc.)		Reseller
Hans Cedardale Satellite Inc.		Reseller

Filing Company DBA	Filing Company Name	Status
In the Stix Broadband, LCC		Reseller
IPNS		Reseller
Juno Online Services, Inc.		Reseller
Matrix Business Tech		Reseller
NetZero, Inc.		Reseller
New Edge Holding Company dba New Edge Network, Inc.		Reseller
North Central Internet		Reseller
One-Stop Communications	One-Stop Communications	Reseller
Philadelphia High Speed Wireless Internet		Reseller
RealLinx		Reseller
Steel City Broadband		Reseller
Telefonica Data Corp SA dba Telefonica USA, Inc.		Reseller
TOAST.net Internet Service		Reseller
Tracon Telecom		Reseller
USA Digital Communications		Reseller
Virtuallycheap Internet Services		Reseller
Zayo Bandwidth Northeast, LLC		Reseller

OFFICIAL OCTOBER 2012 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE COMMONWEALTH OF PUERTO RICO

CONNECT PUERTO RICO®

October 1, 2012

TABLE OF CONTENTS

October 1, 2012

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

Connected Nation is pleased to present this submission on behalf of the Designated Entity, the Puerto Rico Office of the Chief Information Officer, and the Commonwealth of Puerto Rico's State Broadband Initiative (SBI) Grant Program, known as Connect Puerto Rico.

The Connect Puerto Rico program and its collective stakeholder community continue to be faithful and energized contributors to the National Telecommunications and Information Administration's (NTIA) SBI program. Now more than ever, the significance of complete and validated data as compiled through the Federal Communications Commission's (FCC) National Broadband Map is instrumental in forging the innovation economy of the 21st century. As the Commission relies upon this unique resource to distribute monies under the Connect America Fund, through the Universal Service Fund reform, the Connect Puerto Rico program equally values this data in informing meaningful program interventions relating to broadband access, adoption, and use initiatives. Truly, this coordination embodies the spirit of the SBI and demonstrates the joint effort of the NTIA, FCC, state governments, industry, and non-profits like Connected Nation as it continues to serve as a key tool for the American public and policymakers. We are proud of the role that Connect Puerto Rico has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit broadband providers, consumers, and businesses nationwide.

The artifacts that comprise this submission should be found to be compliant with the October 1, 2012, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connect Puerto Rico: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in

			Census Blocks of No Greater Than Two Square Miles in Area
Appendix A:	1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles
Appendix A:	1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A:	3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A:	4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A:	4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)		n/a	Accuracy and Verification Report
n/a		DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a		n/a	List of Changes and Corrections to the Dataset
n/a		n/a	Non-Participating Provider (NPP) Narratives
n/a		n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the April 2012 SBI data submission for the Connect Puerto Rico program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on August 9, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance
New to the semi-annual submission for October 2012 is a more robust version of the ReadMe text file. As per the template released on the Grantee Workspace on May 18, 2012, this file contains a high-level summary of the items contained within the submission, including the exact file deliverables, a description of the errors and warnings from the Check

Submission report, and extraneous information of which the NTIA and other users of the dataset should be made aware.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the April 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That practice continues in this submission as technology and speed combinations are reviewed and scrutinized; any questionable information supplied by providers is reviewed more in depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

Also in this submission is a narrative describing the data and coverage estimation of non-participating providers. While Connect Puerto Rico continues outreach to all providers prior to each submission period, the need to submit broadband service data for all providers regardless of their participation is evident as the SBI program continues into this sixth round of data submissions. The submission of this estimated broadband service area for providers that have not supplied data to Connect Puerto Rico is essential in being able to portray a more accurate depiction of the current broadband landscape.

In addition to the requirements mentioned above, please find this methodology paper to be inclusive of the ongoing section pertaining to industry mergers and acquisitions – specifically this section details any and all mergers or acquisitions that have taken place in Puerto Rico since the April 2012 submission. The intent of this updated section is to provide a better understanding of how the broadband provider landscape has changed since the last submission cycle.

This October 2012 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for 95 percent of the Puerto Rico provider community, or 19 of 20 total providers. There are 18 participating providers and one additional non-participating provider whose estimated coverage areas have been submitted. Of the 18 participating providers, 9 supplied an update to their network or coverage area(s), while 9 have reported no change. A complete roster by provider depicting participation status and contact record is contained herein. The provider that is not represented in the attached datasets is currently in some form of progress toward data submission but was not able to submit coverage areas at the time of this submission.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connect Puerto Rico principals that all commercially reasonable efforts were made to account for 100 percent of the known Puerto Rico broadband provider community, pursuant to this semi-annual data update submission.

Connect Puerto Rico has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Puerto Rico conducts field validation efforts. To date, 13(65 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connect Puerto Rico website, (www.connectpr.org), continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connect Puerto Rico website encountered 3,210 unique visits during this reporting period (16,144 total to date for the life of the grant awarded on December 20, 2009). Additionally, this pronounced Web activity netted 6 broadband inquiries over this same reporting period (77 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connect Puerto Rico website and the Connect Puerto Rico interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connect Puerto Rico mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Puerto Rico to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connect Puerto Rico has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

In conjunction with the Office of the Chief Information Officer, outreach was conducted during this data update reporting period by Connect Puerto Rico to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the commonwealth through multiple methods including a customized online survey available on the Connect Puerto Rico website. During this reporting period Connect Puerto Rico continued to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. It became apparent that these relationships are beneficial to the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connect Puerto Rico will continue to build upon these existing relationships over the coming months and utilize its contacts throughout the commonwealth to collect data and raise awareness of this project.

In addition to fostering and building relationships with commonwealth agencies, associations, and organizations, Connect Puerto Rico has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connect Puerto Rico is also working hard to clarify CAI information associated with wireless broadband. NTIA has requested in-depth questioning of CAI listing a wireless broadband service as their sole form of connectivity. This follow-up allows us to better understand the reason for adopting the wireless broadband service.

From our work in Puerto Rico, as well as other states, we recognize the great value of this data to future collaboration efforts within the commonwealth as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connect Puerto Rico efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connect Puerto Rico program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great Commonwealth of Puerto Rico, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,

Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

DATA ACQUISITION: PUERTO RICO COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this sixth reporting period of the SBI, Connect Puerto Rico, working in close coordination with the Commonwealth of Puerto Rico, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connect Puerto Rico has continued to identify and process CAI data obtained through an ongoing island-wide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connect Puerto Rico through Esri ArcGIS software.

Connect Puerto Rico continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connect Puerto Rico website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the commonwealth as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the client. Connect Puerto Rico will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link:
http://www.surveymonkey.com/s/RGLRB9D

In addition to the survey, Connect Puerto Rico continued to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connect Puerto Rico will continue to build upon these new relationships over the coming months and utilize its contacts throughout the commonwealth to collect data and raise awareness of this project.

In addition to fostering and building relationships with territory agencies, associations, and organizations, Connect Puerto Rico has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connect Puerto Rico conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect Puerto Rico continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect Puerto Rico works with the Office of the Chief Information Officer to identify existing relationships that can support CAI outreach.

Connect Puerto Rico has an ongoing mission to educate CAI throughout the island on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Puerto Rico project as well as self-awareness of their own CAI connectivity (specifically upload and download speeds). Connect Puerto Rico will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the Office of the Chief Information Officer will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the commonwealth.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	2,024	2,021	1,724	1,544	1,506	1,505
Libraries	157	156	153	2	1	1
Healthcare	624	623	139	4	4	4
Public Safety	302	301	274	21	15	11
Higher Ed Institutions	601	601	143	25	19	19
Other Government	129	129	122	0	59	45
Other Non-Government	1,591	1,530	979	8	5	5
Total	5,428	5,361	3,534	1,604	1,609	1,590

During the coming months, CAI data collection will be supported by regular reporting to the Connect Puerto Rico team. The CAI data is proving an invaluable resource to all components of the Connect Puerto Rico effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on August 9, 2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the commonwealth, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.

Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the Commonwealth of Puerto Rico.

Inventory of Deliverables, Connect Puerto Rico: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the Commonwealth of Puerto Rico have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Puerto Rico as a polygon of the island boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development is underway at CN as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

PUERTO RICO FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the territory using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the territory using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets and Trips;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and
- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff conducted on-site validation tests in Puerto Rico on the following providers: Aeronet Wireless; AT&T; Critical Hub Networks; Choice Communications; Data@ccess; Liberty Cablevision of Puerto Rico; Neptuno Media; PR Wireless Inc.; San Juan Cable LLC (d.b.a. OneLink); Puerto Rico Telephone Company; Sprint; T-Mobile; and Worldnet.

In addition to the field verification tests that have been conducted, Connected Nation had previously conducted work in the field to collect information for the non-participating provider, San

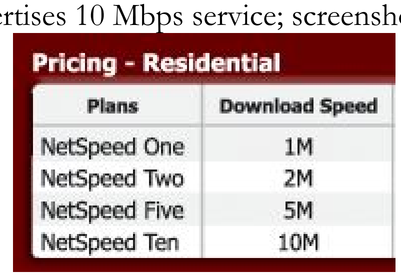
Juan Cable LLC (d.b.a. OneLink) which, by nature of the methodology required for this collection, is also included in the above list. On June 26, 2012, the Denver Business Journal reported that Liberty Global will be "acquiring the parent San Juan Cable LLC (d.b.a. OneLink)." As such, the number of viable providers should result in a net of -1 prior to year end.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 13 companies (out of a universe of 20 viable providers) totaling 65 percent within the Commonwealth of Puerto Rico. This percentage also considers the non-participating provider (NPP) records submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Provider" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on August 9, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

AT&T Mobility LLC
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider confirmed that tier 7 service is available.

Critical Hub Networks
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.



Pricing - Residential

Plans	Download Speed
NetSpeed One	1M
NetSpeed Two	2M
NetSpeed Five	5M
NetSpeed Ten	10M

Liberty Global, Inc.
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider website advertises 30 Mbps service; screenshot below.

Our Internet service sets the bar for high speed web access in Puerto Rico. If you're looking for speed and reliability, you got it. We offer you the highest speeds at the lowest prices, guaranteed. The stats prove it! You don't need to install a phone line you don't use. The equipment cost is included. Plus, if you bundle it up with our TV and phone services, it costs even less!

3 Mbps	Triple Pack Individual $29.99 - $39.99 Monthly	Up to 5 times faster than most, plus, you get aditional features for FREE!	Show me more Details
5 Mbps	Triple Pack Individual $34.99 - $44.99 Monthly	Increase your speed and save an average of $40 compared to the competition.	Show me more Details
10 Mbps	Triple Pack Individual $44.99 - $64.99 Monthly	Rev it up! The only place where you can get this much speed without breaking the bank.	Show me more Details
20 Mbps	Triple Pack Individual $54.99 - $74.99 Monthly	Do evething you love to do online all at once and faster than ever.	Show me more Details
30 Mbps	Triple Pack Individual $64.99 - $84.99 Monthly	All your household divices connected and at full speed.	Show me more Details

PR Wireless Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

• Internet móvil hasta **12 Mbps** de velocidad

Puerto Rico Telephone Company, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 16 Mbps service; screenshot below.

Planes de Internet 16 Mega

T-Mobile USA, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website indicates speeds greater than tier 6 are available; screenshot below.

T-Mobile customers with 4G phones are already experiencing data speeds that are comparable to or faster than the speed of a home broadband network. And with recent improvements to our 4G network-doubling our theoretical download speeds-we're giving our customers enhanced 4G data speeds. We've seen average download speeds on our HSPA+ 42 Mbps-capable data stick approaching 10 Mbps with peak speeds of 27 Mbps, and download speeds approaching 8 Mbps with peak speeds of 20 Mbps on our upcoming HSPA+ 42 Mbps-capable smartphones.

Data Submission and Coverage Estimation of Non-Participating Provider

As part of its ongoing broadband mapping efforts, CN has developed a series of processes with the goal of submitting coverage estimation mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of platform type (cable modem, DSL, fixed wireless, etc.). This specific collection of coverage estimation methodology papers (see Appendix A) demonstrates the estimated broadband service territory for the providers in Puerto Rico that have either been non-responsive or that have refused to participate in the SBI mapping initiative.

Accuracy and Verification: Provider Validation Methodology

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at an island-wide level, static maps of island-wide and municipality-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Additionally, non-participating provider narratives that were submitted in previous mapping cycles are subjected to the same level of scrutiny. Occasionally, a provider may elect to voluntarily participate (thus eliminating the need for future data estimation activities in the field). However, more often than not, the NPP narrative is updated with a combination of data gleaned from the provider's website, data obtained through FCC research and/or data collected/verified in the field by a CN staff engineer.

Estimates derived from provider-validated data indicate that approximately 14.25 percent of Puerto Rico households do not have terrestrial fixed broadband service available, and approximately 0.17 percent of Puerto Rico households have neither mobile nor fixed broadband service available.

Within rural areas of the island, results derived from provider-validated data indicate that approximately 22.91 percent of rural Puerto Rico households do not have terrestrial fixed broadband service available, and approximately 0.20 percent of rural Puerto Rico households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard. This research often proves to be exceptionally effective when estimating the coverage area of an NPP.
6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. omni-directional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).

15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).
23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hillshade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

BROADBAND INQUIRIES METHODOLOGY

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the island, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connect Puerto Rico website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the territory maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information requested by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at other such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,600 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connect Puerto Rico project has received a total of 6 inquiries (77 grant inception to date). As more inquiries are submitted to Connect Puerto Rico, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

MY CONNECTVIEW METHODOLOGY

My ConnectView is an online, interactive mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connect Puerto Rico project launched My ConnectView on April 2, 2012, and received 878 visits this reporting period; to date the interactive mapping applications have received 2,811 visits.

SPEED TEST METHODOLOGY

The 238 speed tests that are represented in the Connect Puerto Rico Speed Test Report during this reporting period (1,428 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Puerto Rico speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for municipality-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connect Puerto Rico project, speed test information is collected throughout the commonwealth. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connect Puerto Rico with the information on where broadband services are available. Second, unlike theoretical speed information which was received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the Commonwealth of Puerto Rico.

PROVIDERS DEEMED NON-VIABLE

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the October 2012 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	Adelphia	n/a	Acquired by another company; no longer in business.
2	Advance IP Applications, Inc.	www.advanceipapplications.com/	Data integrator and management company.
3	Advance Wireless Communications, Inc.	www.advancedwireless.com/	General distributor of radio equipment.
4	Affinity Mobile, LLC	www.affinitymobile.com	Inactive URL; out of business.
5	American Telephone Communication	www.americantel.com	General distributor of telephones and equipment.
6	Arroyo Calling Services	n/a	Prepaid phone services and pay phone distributor.
7	Atenas Internet	www.atenas.com/	General reseller of backhaul and dial-up; also offers B2B wireless services.
8	Broadband Internet Via Air	www.bivapr.net	BIVA assets acquired by Sprint and Clearwire; Inactive URL; no longer in business.
9	Centennial Communications Corporation	n/a	General reseller; acquired by AT&T.
10	Centennial de Puerto Rico	n/a	Acquired by AT&T.
11	Centennial Puerto Rico License Corp.	n/a	Acquired by AT&T.
12	Centro Beeper	n/a	Paging company.
13	Comunicaciones Tony Plaza, Inc.	n/a	Pay phone and prepaid services.
14	Cortelco Systems Puerto Rico, Inc.	n/a	Distributor of communications and billing systems.
15	Custom Teleconnect, Inc.	www.customteleconnect.com	US provider of operator support, domestic and international direct dial service, international callback and debit card services; also an independent pay phone provider (IPP) for the hospitality and tourism industries.

16	Datavos Corporation	www.datavos.com	Inactive URL; out of business.
17	DG-TEC Puerto Rico, LLC	n/a	Dominican-based VOIP and GSM provider; may now be out of business.
18	Ernesto L. González Morales	n/a	Not a provider of broadband services.
19	Empire Payphones, Inc.	n/a	Prepaid phone services and pay phone distributor.
20	Fibercrossing Corp.	www.fibercrossing.net	Went out of business in December of 2009.
21	Globalstar Caribbean, Ltd.	www.globalstarusa.com	Provider of satellite phones and SMS service.
22	Hibridos Telecommunications, Inc. (HIB)	n/a	Puerto Rico-based CLEC; refused to participate.
23	Humacao Payphone	n/a	Prepaid phone services and pay phone distributor.
24	IDT Puerto Rico Co.	www.idt.net	Resells local and long distance phone services.
25	Intellicall Operator Services, Inc.	www.intellicalloperatorservices.com	Outsourced service solutions and U.S. call center facilities.
26	Level 3 Communications, LLC	http://www.level3.com/	No broadband services offered on the island.
27	Lightyear Alliance of Puerto Rico, LLC	www.lightyear.net	Nonfacilities-based general reseller.
28	MCI Communications Services, Inc.	n/a	Acquired by Verizon.
29	MCI International, Inc.	n/a	Acquired by Verizon.
30	MEG COMMUNICATION	n/a	No longer in business.
31	Metro Beeper, Inc.	www.metrobeeper.com	Paging company.
32	MG Communications	n/a	Prepaid phone services and pay phone distributor.
33	Moises Sierra Fernandez	n/a	Not a provider of broadband services.
34	Network Communications International Corp.	www.ncic.com	Inmate telephone services, pay phone services, and directory assistance and reseller of prepaid

			minutes.
35	Network Operator Services, Inc.	www.centrisinfo.com	U.S. provider of operator support, domestic and international direct dial service, international callback and debit card services; also an independent pay phone provider (IPP) for the hospitality and tourism industries.
36	Neutral Tandem-Puerto Rico, LLC	www.neutraltandem.com	Provides tandem services for wholesale long distance, local transit, and international long distance.
37	Next G Network of NY, Inc.	n/a	System integrator.
38	North Sight Communications, Inc.	www.northsite.com	Was an iDEN provider in Puerto Rico; URL no longer works; may have been acquired by Proxtel Wireless.
39	Optivon Telecommunications Services, Inc.	www.optivonpr.com	Nonfacilities-based general reseller.
40	Orizon Wireless Corp.	n/a	No longer in business, contacts and website decommissioned, all licensed point-to-point authorizations now terminated by the FCC.
41	Pan American Telephone Co., PR, LLC	n/a	Hispanic-owned political consulting, public affairs, communications and business development firm on Long Island.
42	Payphone Telecom	n/a	Prepaid phone services and pay phone distributor.
43	Phoneworks, Inc.	n/a	Pay phone services and distributor.
44	PR Pronto Telecommunications Corp.	n/a	An international word-of-mouth marketing agency.
45	PR Wireless, Inc.	www.openmobilepr.com	General reseller of prepaid mobile (long distance and broadband).

46	Primus Telecommunications Group, Inc.	www.ptgi.com//docs/factscaribbean.html	Nonfacilities-based general reseller and CLEC.
47	Qwest Communications Company, LLC	n/a	Acquired by CenturyLink.
48	San Juan Gas Acquisition Corporation, (SAC)	n/a	Gas and propane company with offshore communications.
49	STSJ Overseas Telephone Company, Inc.	n/a	Facilities-based long distance carrier; offers direct dial, toll-free long distance, calling and debit cards, international toll-free service and 24-hour bilingual operator services; does not offer broadband.
50	Tatiana C. Velázquez Roza	n/a	Not a provider of broadband services.
51	T-Mobile Puerto Rico, LLC	n/a	Holding company for T-Mobile; registered with JRT.
52	Tricom USA, Inc.	www.tricomusa.net	Specializes in the installation of any voice, data, and fiber cabling, from new construction to additions.
53	Value Added Communications, Inc.	n/a	Inmate telephone services, pay phone services and directory assistance.
54	Verizon Wireless	n/a	Out-of-state provider.
55	VoiceLan Group, Corp.	www.voicelangroup.com	Inactive URL; out of business.
56	VPNet, Inc.	www.vox-tel.com	Inactive URL; out of business.
57	WorldNet Telecommunications	n/a	CLEC and holding company for Worldnet.

APPENDIX A: ESTIMATION OF NON-PARTICIPATING PROVIDER: SAN JUAN CABLE, LLC (D.B.A ONELINK)

SAN JUAN CABLE, LLC (D.B.A. ONELINK)

As part of its ongoing broadband mapping efforts, Connected Nation has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the SBI mapping initiative.

The following narrative will discuss the recent data collection activities related to San Juan Cable, LLC (d.b.a. OneLink), a cable television and cable modem provider in the San Juan, Puerto Rico area, explaining how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

Background

Since the April 2012 mapping submission, CN staff members have attempted to contact OneLink with 6 additional telephonic or e-mail outreach efforts. Prior to the April 2012 mapping submission, CN staff members attended meetings in Puerto Rico from September 21-25, 2009, for a series of one-on-one provider meetings, which had been scheduled by Maria Pou, Special Assistant to the OCIO, to discuss the SBI grant program. OneLink was scheduled to attend a meeting on September 24 at 10 a.m.; however, no one from the organization arrived (nor did they notify Maria of their intent to cancel). Outreach efforts conducted from September 2009 through July 2011 have failed to motivate OneLink into either responding or participating in the mapping initiative. On June 26, 2012, the Wall Street Journal reported that "Liberty Global Inc. (LBTYA, LBTYB), along with investment funds tied to Searchlight Capital Partners LP, Tuesday agreed to acquire OneLink Communications, in a roughly $585 million deal expected to form Puerto Rico's largest cable operator." (see Exhibit M). Subsequently, on August 1, 2012, newsisnybusiness.com reported that the local telephone company (Puerto Rico Telephone) filed additional comments on the proposed transaction (see Exhibit N).

CN staff members have continued to monitor the OneLink website for additional information but have not discovered any changes to either the coverage area of OneLink or the maximum advertised speeds offered by this company. Accordingly, the coverage polygon for OneLink is hereby being submitted with a "No Update" status to NTIA in regards to coverage and/or maximum advertised speeds.

The Issue

OneLink, by its lack of actions, indicated its unwillingness to participate in the island-wide mapping initiative. This surfaced as a problem during the first two stages of mapping; the lack of data for this provider will continue to threaten to skew future research and planning activities under the direction of the OCIO.

Identification of Provider's Legal Name, d.b.a., and FRN

CN began building a file based on anecdotal information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN received information from the Junta Reglamentadora de Telecomunicaciones de Puerto Rico (JRT) indicating that territory once operated by Adelphia was the same territory now operated by OneLink. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system did not yield results. It was later discovered that the entity of record with the JRT was, in fact, San Juan Cable, LLC. A new search on the FCC CORES site yielded an FRN of 0013778857**(Exhibit A)** and additional contact data. This was later confirmed when NTIA provided CN with a submission summary comparison against FCC Form 477 filers **(Exhibit B)**.

Exhibit A: FRN

Registration Detail	
FRN:	0013778857
Registration Date:	07/19/2005 11:31:36 PM
Last Updated:	10/22/2009 10:22:28 AM
Business Name:	San Juan Cable LLC
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	San Juan Cable LLC
Contact Position:	Inventory Accountat
Contact Name:	Edward Hernandez
Contact Address:	P.O. Box 192296 San Juan, PR 00919 United States
Contact Email:	edward.hernandez@onelinkpr.com
ContactPhone:	(787) 766-0909 4404
ContactFax:	(787) 641-0009

Exhibit B: SBI Form 477 Reference

Puerto Rico

Service Providers Submitted *

* Based on data from Census Block <2 Sq. Miles, Address-Level, Street Segment, Residential Overview Files, Wireless Shape Files

State Broadband Data Submission				FCC Form 477 (June 2009)		
FRN	Company Name	Doing Business As	#	FRN	Company Name	Doing Business As
4979233	AT&T Mobility LLC	AT&T Mobility LLC	1	0003766532	AT&T Inc.	New Cingular Wireless Services, Inc.
001731470	America Movil	Puerto Rico Telephone Company, Inc.	2	0004496774	AT&T Inc.	AT&T Corp.
0017434911	Hughes Network Systems, LLC	Hughes Network Systems, LLC	3	0001731470	Am¿rica M¿vil	Puerto Rico Telephone Company, Inc.
0010593408	Liberty Global, Inc.	Liberty Cablevision of Puerto Rico Ltd.	4	0012216933	Am¿rica M¿vil	Telecomunicaciones de Puerto Rico, Inc.
0003774593	Sprint Nextel Corporation	Sprint	5	0009631136	Centennial Communications Corpor	Centennial Communications Corp.
			6	0018483073	Hughes Communications, Inc.	HNS License Sub, LLC
			7	0010593408	Liberty Global, Inc.	Liberty Cablevision of Puerto Rico Ltd.
			8	0012841458	Neptuno Media, Inc.	Neptuno Media
			9	0003605953	Qwest Communications Internation	Qwest Communications Company, LLC
			10	0013778857	San Juan Cable Holding, LLC	San Juan Cable LLC
			11	0003774593	Sprint Nextel Corporation	Sprint Nextel Corporation
			12	0005087457	StarBand Communications Inc.	StarBand Communications Inc.
			13	0018547828	Telefonica Data Corp SA	Telefonica USA, Inc.
			14	0018547885	Telefonica International Holding, BV	Telefonica Larga Distancia de Puerto Rico, In
			15	0018591826	Worldnet Telecommunications, Inc.	WORLDNET TELECOMMUNICATIONS

Identification of Provider's Coverage Area

Connected Nation extracted the municipality boundaries from OneLink's publicly available website **(Exhibit C)** and used the company's published boundaries to create a GIS shapefile **(Exhibit D)** of the greatest advertised extent of OneLink's service area.

Exhibit C: Municipal Boundaries

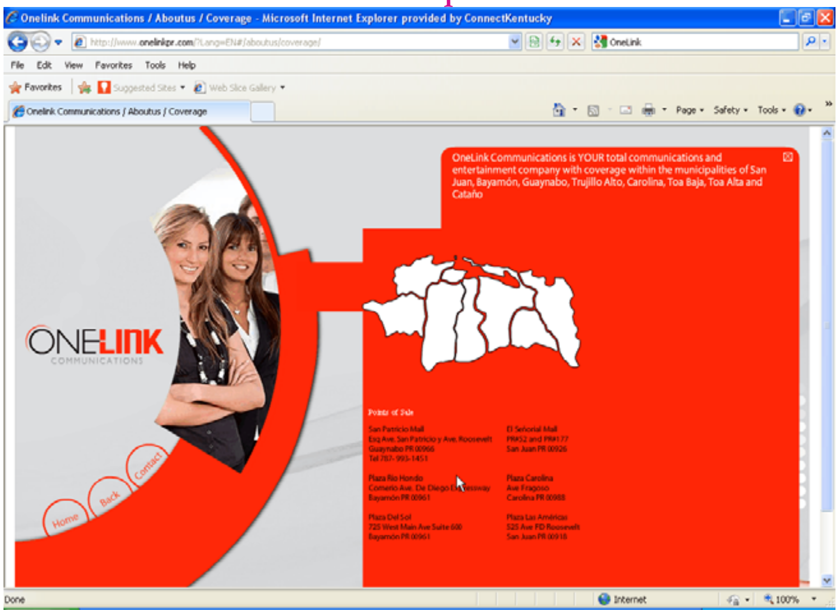
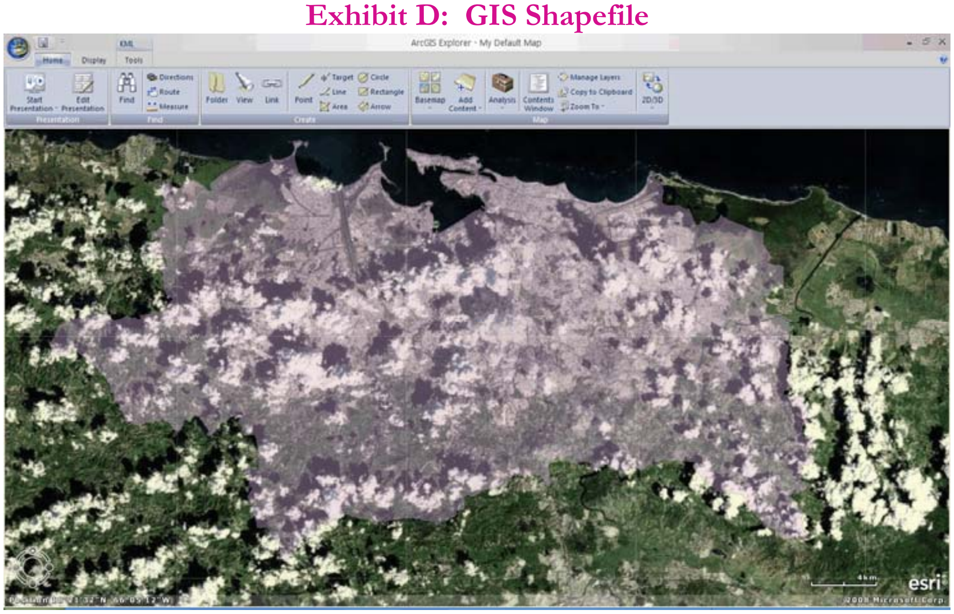
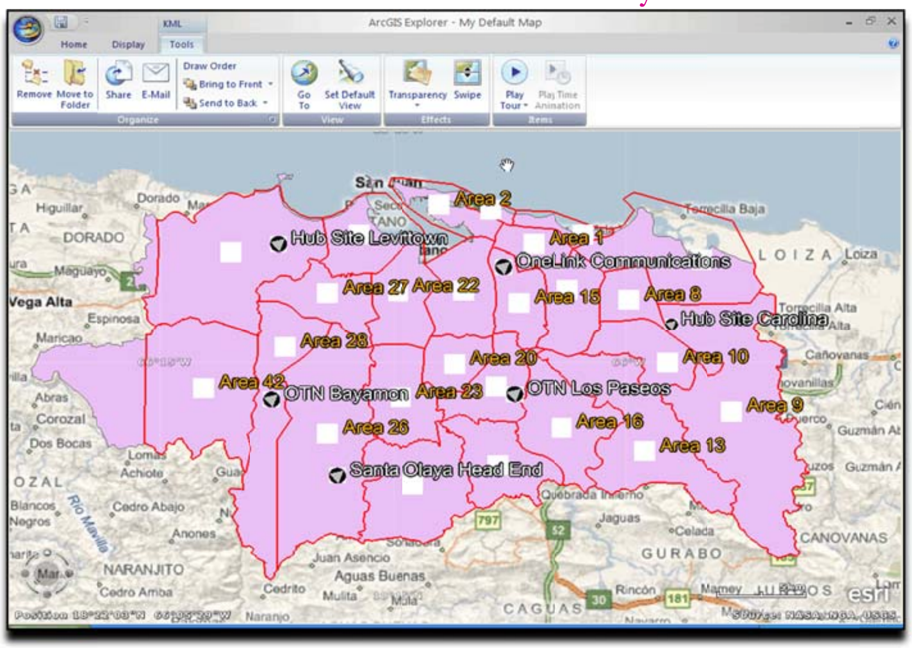


Exhibit D: GIS Shapefile



These polygons were then compared against *the only* data supplied by OneLink during the course of attempted communication **(Exhibit E)**. The purple-shaded area was the CN coverage polygon extracted from OneLink's website, and the red outlines illustrate the franchisee boundaries submitted by OneLink.

Exhibit E: OneLink Franchise Boundary Submission

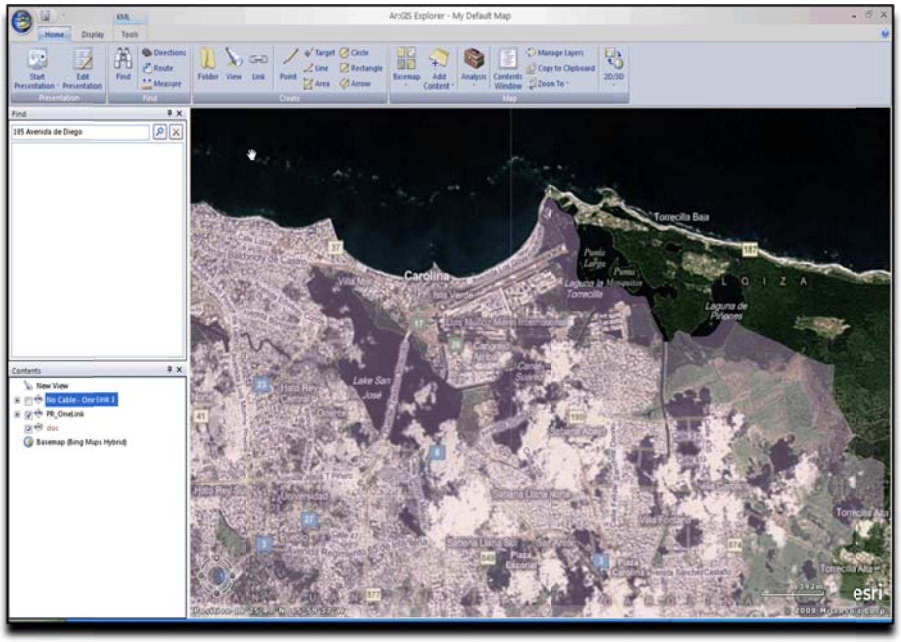


Using this combined coverage polygon as the basis for further investigation, Connected Nation set out on an exploratory "drive test" to determine where cable plant existed and estimate where cable modem likely existed in the greater San Juan area. During the period of February 7-11, 2011, Connected Nation deployed five staff members (all highly trained, former telecommunications operators) to conduct a thorough analysis of OneLink's alleged coverage area.

Testing Techniques

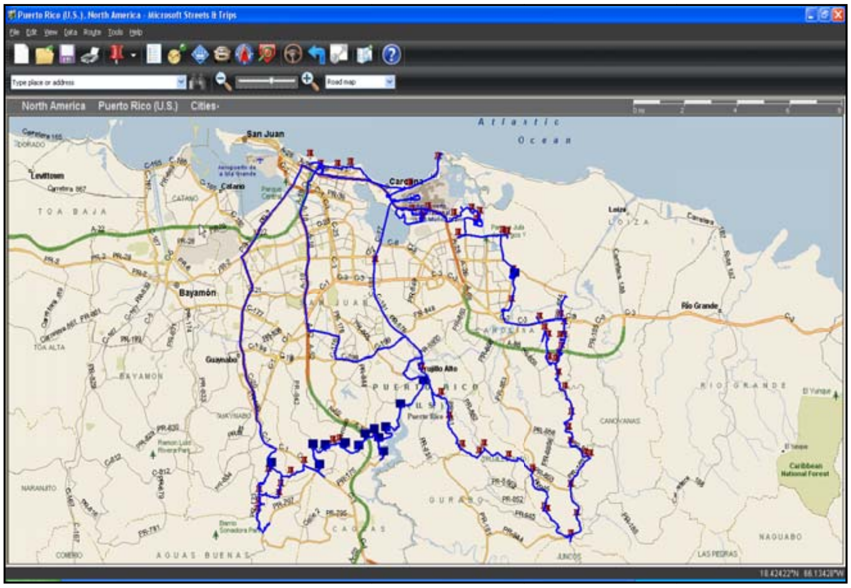
Specific quadrants **(Exhibit F)** were assigned to each of the validation teams on a daily basis. The goal was to drive through each of the areas and determine the existence (or lack thereof) of CATV plant – whether fiber or coaxial.

Exhibit F: Sample Quadrant



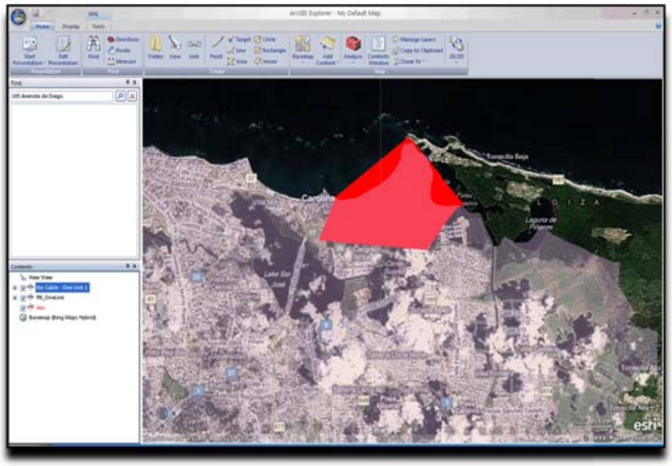
Test points were pre-selected and entered into Microsoft *Streets & Trips* software **(Exhibit G)**, which also created a GPS-enabled "trace route" of each day's drive testing activities. As cable plant was identified, markers were placed within *Streets & Trips*, pinpointing the areas where service was likely to exist. Connected Nation staff members then proceeded to stop at points along the way and conducted random interviews with residents within the area querying the actual availability of cable modem service.

Exhibit G: Test Point Locations



Based on the lack of visible or traceable cable plant, polygons were created in ArcGIS Explorer to specify the population areas where the Connected Nation staff believed coverage gaps existed. The illustration below **(Exhibit H)** represents one such gap area identified during the drive test.

Exhibit H: Coverage Gap Polygon



Visual identification of physical CATV plant **(Exhibit I)** was relatively easy and straightforward. The Connected Nation team members, many of whom were former CATV operators, found very little difficulty in identifying aerial (above ground) CATV plant or in locating plant that traveled below the earth's surface (underground plant) based simply on looking for specific cable routes.

Exhibit I: OneLink Service Truck

The images below demonstrates that the Connected Nation team could, in fact, locate aerial plant **(Exhibit J)** and identify CATV plant moving from a pole to an area where underground vaults or above-ground pedestals **(Exhibit K)** were easily traced and identified.

Exhibit J: Aerial Plant

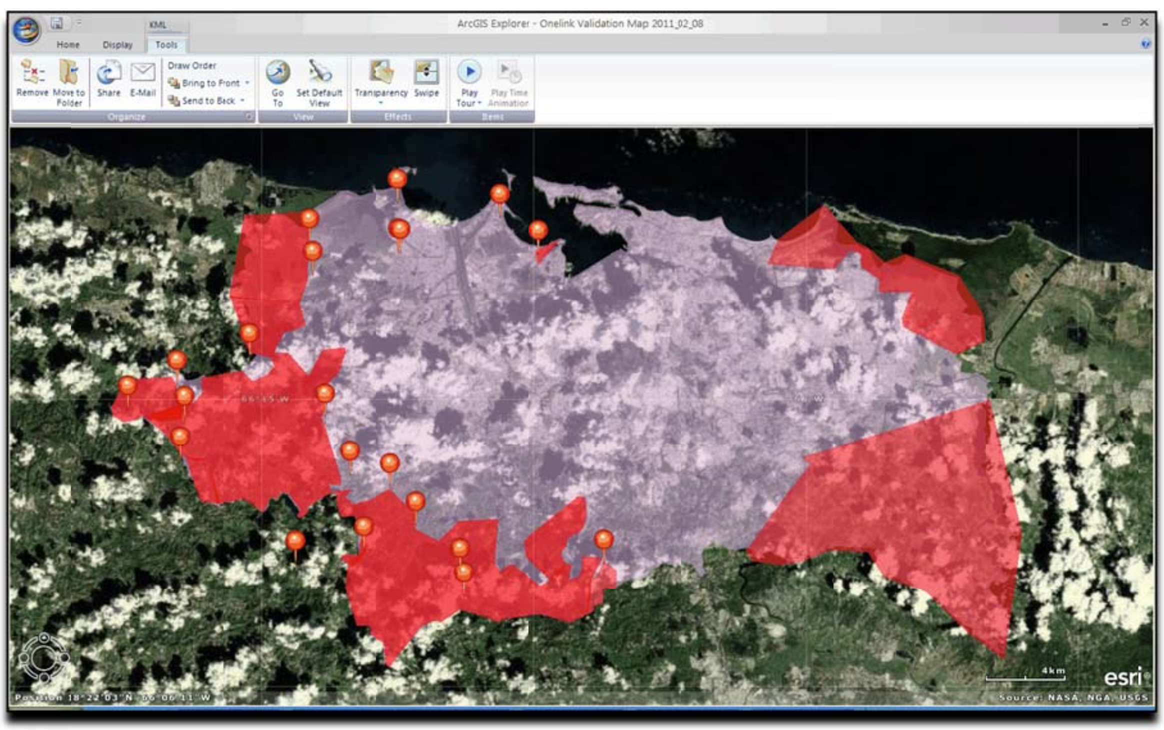
Exhibit K: Above Ground Pedestal

At the conclusion of this week-long exercise, Connected Nation had driven through several hundred miles of the OneLink franchise area, located above-ground and underground plant, visited with and surveyed numerous local residents, obtained collateral material from OneLink's local offices (to determine maximum advertised connection speeds), and created a polygon that illustrates the identified and likely coverage area of OneLink.

Results and Submission for April 2012

As a result of the collection of publicly available information and the on-the-ground validation efforts, Connected Nation is submitting on behalf of the Commonwealth of Puerto Rico, the cable modem broadband service area of OneLink. Without provider participation and support of the SBI mapping initiative, CN has proceeded with developing a relevant and feasible methodology for collecting and validating the service area of a currently non-participating broadband provider. The image below **(Exhibit L**) shows the exact results of the validation efforts in terms of the revisions made to the advertised cable broadband availability in the San Juan area. Polygons in red demonstrate areas where the CN staff reasonably believes "gaps" exist in the franchise area. The remaining purple-shaded areas are included, along with full attributes, in the Puerto Rico broadband data submission for the October 1, 2011, deliverable to NTIA for the SBI grant program.

Exhibit L: Validation Results



Sample OneLink Cable Modem Collateral Material

Exhibit M: *Wall Street Journal* Article

by William Launder and Kristin Jones
June 26, 2012

Liberty Global Inc. (LBTYA, LBTYB), along with investment funds tied to Searchlight Capital Partners LP, Tuesday agreed to acquire OneLink Communications, in a roughly $585 million deal expected to form Puerto Rico's largest cable operator.

Liberty Global, which is controlled by media entrepreneur John Malone, has in recent years sought out growth opportunities primarily in Europe, where it has purchased two of Germany's largest cable operators. In the Americas, Liberty already owns other businesses in Puerto Rico and in Chile.
OneLink, the parent of San Juan Cable LLC, will be merged with Liberty's existing operations in Puerto Rico.

As of the end of March, OneLink Communications served around 262,500 revenue-generating units in Puerto Rico. Combined, the companies have around 480,000 revenue-generating units, generating nearly $300 million in 2011 adjusted revenue, said Liberty Global Chief Executive Mike Fries.

Exhibit N: newsismybusiness.com Article

by Michelle Kantrow
August 1, 2012

Claro has filed a motion expressing its concerns about the Liberty-OneLink merger. (Credit: © Mauricio Pascual)

Puerto Rico Telephone, which does business as Claro Puerto Rico, has drawn the line in the sand with regards to Liberty Puerto Rico's proposed acquisition of OneLink Communications, asking the Telecommunications Regulatory Board for transparency in the process.

In a motion filed at the agency, Claro Puerto Rico asked the board to give it and the general public access to the application Liberty filed last week requesting the approval of the $585 million transaction announced about a month ago.

"As of today, the Board has not made the document public, even when that's essential to understanding, evaluating and making comments about the transaction," the company said in a statement sent to reporters Tuesday.

The carrier also asked the agency to address the fact that, "contrary to what Liberty has presented to the media" if the transaction is approved OneLink would be the surviving entity and would continue providing cable service in Puerto Rico.

"Although both the Board and Liberty have sold this transaction as one that would result in Liberty controlling OneLink's operations in Puerto Rico, OneLink and Liberty filed several documents with the FCC stating that as a result of the transaction Liberty will cease to exist as a corporate entity and OneLink would survive the transaction and would continue providing cable service in Puerto Rico in Liberty's and OneLink's territories," PRT said in its statement.

"That fact that OneLink would survive as a result of the transaction raises serious issues that the Board must address and require public and binding commitments by OneLink and Liberty before any application is approved," the carrier further stated.

When the transaction was announced, Liberty Global — the local company's parent — explained that upon completion it would own 60 percent of the company and investment fund company Searchlight Capital Partners L.P would own the remaining 40 percent. The company would continue doing business in Puerto Rico as Liberty, it said.

"Today, PRT/Claro sent a press statement in which they claim that the entity that would survive the purchase transaction between Liberty Cablevision of Puerto Rico and OneLink Communications would be OneLink and that the latter would be the one that would continue providing cable TV services," said Naji Khoury, General Manager of Liberty Cablevision of Puerto Rico. "This statement is completely false."

"Regardless of which corporate entity registered in Puerto Rico survives the transaction, be it San Juan Cable, LLC [OneLink], or Liberty Cablevision of Puerto Rico, the resulting company's assets will be managed by Liberty as the majority partner and Searchlight Capital Partners, L.P. as the minority partner, and myself as general manager of the newly formed company; just as it was reported from the beginning in press releases disseminated in Puerto Rico and the United States," he said. "In addition, the resulting brand will also be Liberty's."

APPENDIX B: BROADBAND PROVIDER LOG

Broadband Provider Log

Complete	24
Non-Responsive/Refused	0
In Progress	2
Count of Datasets by Status	**26**
Total Unique Providers Represented	**20**

Provider Name	Platform	Status	NDA Execution Date	Notes
Liberty Global, Inc.	Cable	Approval for Update Not Received - Data Still Submitted	10/19/2009	[AUG-27-12 Jess Cary] Change: Provider expanded coverage area.
PR Wireless, Inc.	Mobile Wireless	Approval for Update Not Received - Data Still Submitted		[AUG-27-12 Jess Cary] Correction: Initial submission of provider's coverage, but they were in service previously.
AT&T Mobility LLC	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[AUG-27-12 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Critical Hub Networks	Fiber	Data Added to Statewide Inventory	9/30/2010	[AUG-27-12 Jess Cary] Change: Provider added initial fiber coverage.
Spacenet Inc.	Satellite	Data Added to Statewide Inventory		[SEP-6-12 Jess Cary] Correction: Initial submission of provider's coverage, but they were in service previously.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[AUG-27-12 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[AUG-27-12 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
XAirNet Corp.	Fixed Wireless	Data Added to Statewide Inventory		[AUG-27-12 Jess Cary] Correction: Initial submission of provider's coverage, but they were in service previously.
Aeronet Wireless Broadband Corp.	Backhaul	Backhaul Provider Only Processing Complete		
Sprint Nextel Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/14/2010	
T-Mobile USA, Inc.	Backhaul	Backhaul Provider Only Processing Complete	1/8/2010	
San Juan Cable Holding, LLC, OneLink Communi	Cable	No Update-Estimated Coverage Submitted for Non-Participating Provider		
Ayustar Corporation	Fixed Wireless	No Update to Provide	7/12/2010	
Critical Hub Networks	Backhaul	No Update to Provide	9/30/2010	
Critical Hub Networks	Fixed Wireless	No Update to Provide	9/30/2010	
Data@ccess Communications	Backhaul	No Update to Provide	9/29/2009	
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
INTECO	Backhaul	No Update to Provide	1/30/2012	
Neptuno Media, Inc.	Backhaul	No Update to Provide	4/29/2010	
PREPA Networks LLC	Backhaul	No Update to Provide	4/21/2010	
Puerto Rico Cable Acquisition Company, Inc.	Cable	No Update to Provide	9/27/2010	
Puerto Rico Telephone Company Inc.	DSL	No Update to Provide	4/23/2010	
Worldnet Telecommunications Inc.	Backhaul	No Update to Provide	4/19/2010	
Puerto Rico Telephone Company Inc.	Mobile Wireless	No Update Provided - Use Last Submission Data	4/23/2010	
Aeronet Wireless Broadband Corp.	Fixed Wireless	Solicited Initial Data		
Telefonica International Holding, BV	Backhaul	Solicited Initial Data		

Rhode Island
Broadband Mapping Project
September 2012 Data Submission - Summary and Processes

Prepared By:
Stuart Freiman
Broadband Program Director
Rhode Island Economic Development Corp.
315 Iron Horse Way. Suite 101
Providence, RI 02908
401-278-9100
sfreiman@riedc.com

Section A: The Broadband Rhode Island Mapping Team Overview

In support of the national broadband initiatives undertaken by President Obama and the Federal Government through the American Recovery & Reinvestment Act of 2009 (Recovery Act), Public Law No. 111-5, and the Broadband Data Improvement Act (BDIA), title I of Public Law No. 110-385, 122 Stat. 4096, the Rhode Island Economic Development Corporation (RIEDC), as the entity assigned by former Governor Donald Carcieri, has been awarded grant funds from the United States Department of Commerce – National Telecommunications and Information Administration (NTIA) State Broadband Data and Development Grant Program.

Project Description

EA Engineering, Science, and Technology, Inc. (EA), has been selected by RIEDC, through their Broadband Initiative for Rhode Island (BBRI) to provide a data management and retrieval system for RIEDC. RIEDC and EA entered into a contractual agreement on January 15, 2010 for a base period of 2 (two) years with 3 (three) optional years. The work assignment consists of negotiating non disclosure agreements (NDA) with the State's broadband providers, collecting provider broadband data, verifying data submitted, combining and updating data collected, developing and implementing a broadband website with mapping application, and reporting findings to RIEDC and the NTIA.

This program has created a statewide broadband map which will be maintained for five (5) years, that assesses broadband infrastructure in Rhode Island and distinguishes between served, underserved, and un-served communities as per the definition specified by NTIA. The data has been made available to the public, with certain restrictions to account for confidentiality of supplier information, through a state website and is linked to a Federal Department of Commerce webpage. The goal of this project is to meet the RIEDC's broadband mapping needs and in doing so provide maps and information that will be used to lend guidance and assistance in the planning of future broadband infrastructure development, as well as provide numerous broadband options to the end users.

The BBRI is a comprehensive effort aimed at producing a high level of detailed inventory of broadband services provided to residential, government and business consumers within the State of Rhode Island. The project is not only a Geographical Information Systems (GIS) mission but a project that needs expertise in GIS, contracting and legal issues, Quality Assurance/Quality Control (QAQC), and project management. In order to acquire, collect, process, analyze and display the data that represents these services it was necessary to combine the resources of several professional firms. Each team member provides unique set of strengths and capabilities needed to create the system that is in place. The team is made up of Rhode Island Economic Development Corporation (RIEDC), EA Engineering (EA), University of Rhode Island (URI), Adler Pollock & Sheehan P.C. (AP&S), Eastern Shore Regional GIS Cooperative (ESRGC), and Mapping

& Planning Services (M&PS). The following paragraphs provide information on each team member and their role the project.

The RIEDC is leading the project efforts for the State of Rhode Island (RI). Led by Mr. Stuart Freiman, they oversee all facets of the project and teams involved. The RIEDC coordinates schedules, communicates directly with the National Telecommunications Information Agency (NTIA), reviews and approves all project deliverables, and ensure all project deadlines are met. With their high visibility in the RI business community they are instrumental in arranging meetings between broadband providers and BBRI Team members. The relationship and communication RIEDC has with the State's providers was and continues to be instrumental in making the process of collecting and verifying information from the providers as effortless as possible.

EA is the prime contractor selected to lead the State's data collection, verification, reporting, and mapping efforts. EA has been providing scientific and engineering technical solutions to a wide range of government and industrial clients since 1973. Serving IT and GIS solutions via the web has become a standard business solution for EA's clients. As the prime contractor EA works closely with the RIEDC on all phase of the BBRI project. Included in the work EA has done to date, is the creation of the State's broadband website and mapping application (Digital Atlas). The website provides information on the project, links to related sites, custom mapping capabilities, and user speed test and feedback forms. The site can be viewed at the following address; http://broadband.ri.gov/.

M&PS has been providing GIS consulting services in RI for over 20 years. For the RI Broadband Mapping project, M&PS assisted in the development of a verification and analysis process which is used to perform the QA/QC of the data prior to submitting to the NTIA. Prior to each bi-annual NTIA submittal M&PS uses this process to review and check the data. During this process MP&S checks for positional and attribute accuracy of the data by using a random sampling methodology. The service MP&S provides insures data going to the NTIA is of the highest accuracy and precision. Additional M&PS provides data analysis and static maps displaying the data status at each delivery date.

The GIS laboratory in the URI's Department of Natural Resources is the center of technical expertise in the GIS field for the State of RI. On this project URI manages all GIS data report by EA to the RIEDC. They also serve as an additional tier of QA/QC on the data that is collected and submitted to the NTIA. URI provides technical input to the data processes and the types of maps and data to be displayed on the website. Additionally, several data layers including Community Anchor Institute locations and base map layers being used on the Digital Atlas are provided by URI.

The Eastern Shore Regional GIS Cooperative (ESRGC) is an organization that provides technical support, training, and GIS services to local governments on the Eastern Shore of Maryland. In addition to supporting the BBRI project, ESRGC is leading the broadband mapping efforts for the state of Maryland. For the BBRI project, the ESRGC's provides the project team technical advisor support. They provide guidance on the project's technical approach and peer review support based on knowledge gained from their work in Maryland. ESRGC provided assistance in defining requirements for the QA/QC process, database design, and data verification tasks. The ESRGC provides the Team with a "lessons learned" from the Maryland Broadband project which guided the BBRI Team around common mistakes made on broadband mapping projects.

AP&S is a local RI law firm providing legal advice and representation and has been servicing RI residents and firms for 50 years. The role AP&S plays on this project is providing the necessary legal advice and contracting that is necessary between the RIEDC and the broadband providers. To date, AP&S has brokered the Non-Disclosure Agreements (NDA's) between the RIEDC and 16 broadband providers. These agreements were imperative and had to be in place before any data was submitted by the broadband providers. All provider broadband information that is made public is based on what the NDAs state. AP&S became the State's expert as to what information was legal for the team to make available to the public and modeled the NDAs off of the guidance provided in the NOFA.

Project Contacts

Contact	Project Role	Phone	Email
Rhode Island Economic Development Corp (RIEDC)			
Stuart Freiman	**Broadband Program Director**	401-278-9168	sfreiman@riedc.com
Shane White	State GIS Coordinator	401-222-6483	swhite@doa.ri.gov
University of Rhode Island	***URI***		
Greg Bonynge	URI-EDC Director/BBRI Project Liaison	401-874-2180	greg@edc.uri.edu
EA Engineering, Science and Technology (EA)			
Lou Garcia, PMP	**Project Manager**	410-771-7950	lgarcia@eaest.com
Jason Samus	Senior Technical Review	410-771-7950	jsamus@eaest.com
Brian Lesinski	Senior Technical Advisor	401-736-3440	blesinsk@eaest.com
Joe DeLuca, GISP	Technical Lead	410-771-7950	jdeluca@eaest.com

Adler Pollock & Sheehan (APS)			
Alan Shoer, Esq.	Legal Team	401-274-7200	ashoer@apslaw.com
Kristen Sherman, Esq.	Legal Team	401-274-7200	KSherman@apslaw.com
Mapping & Planning Services (M&PS)			
Mary Hutchinson., GISP	Verification Analyst	401-423-3841	mhutch@mappingplanning.com
Eastern Shore Regional GIS Cooperative (ESRGC)			
Michael Scott, Ph.D., GISP	Senior Technical Advisor	410-543-6083	msscott@salisbury.edu

BROADBAND PROVIDER DATA VERIFICATION REPORT
RHODE ISLAND DATA SUBMITTAL #5
SEPTEMBER 28, 2012

General Findings:

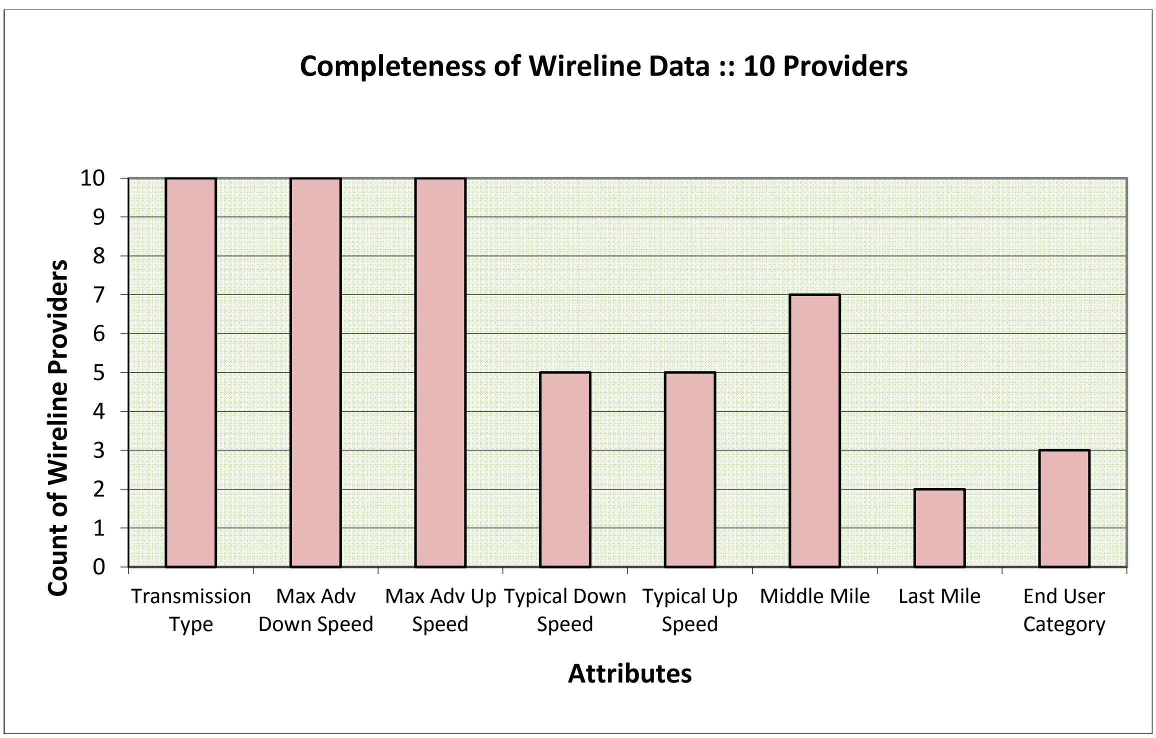
- Rhode Island has extensive broadband coverage from 18 providers. These 18 providers combine to offer broadband coverage for the entire state of Rhode Island.

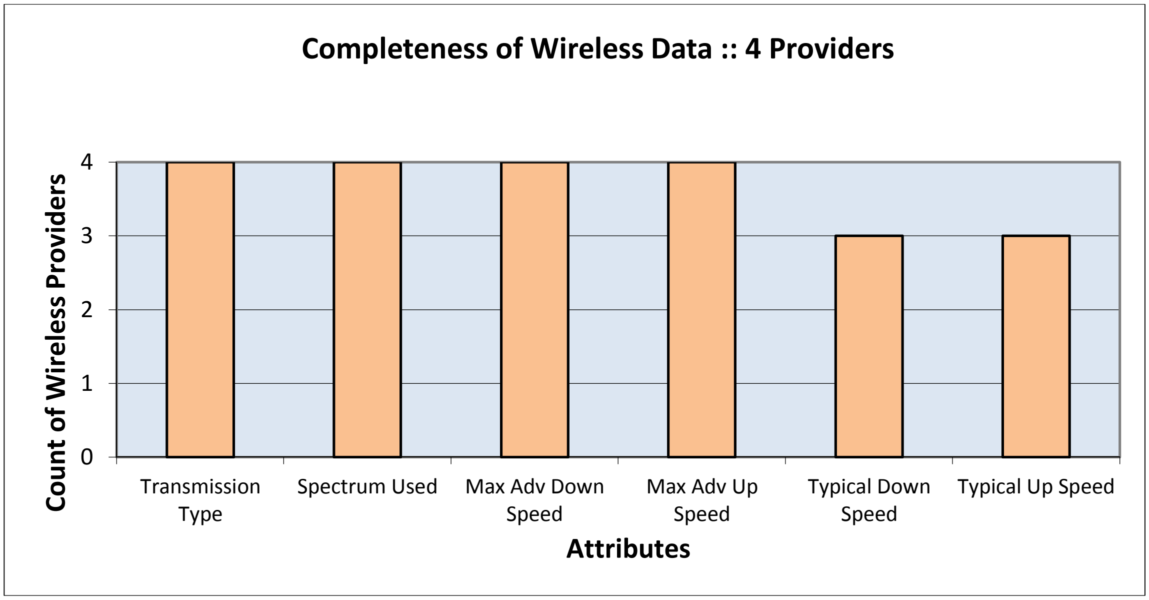
- Broadband availability on a census block basis is summarized in the Figure below:

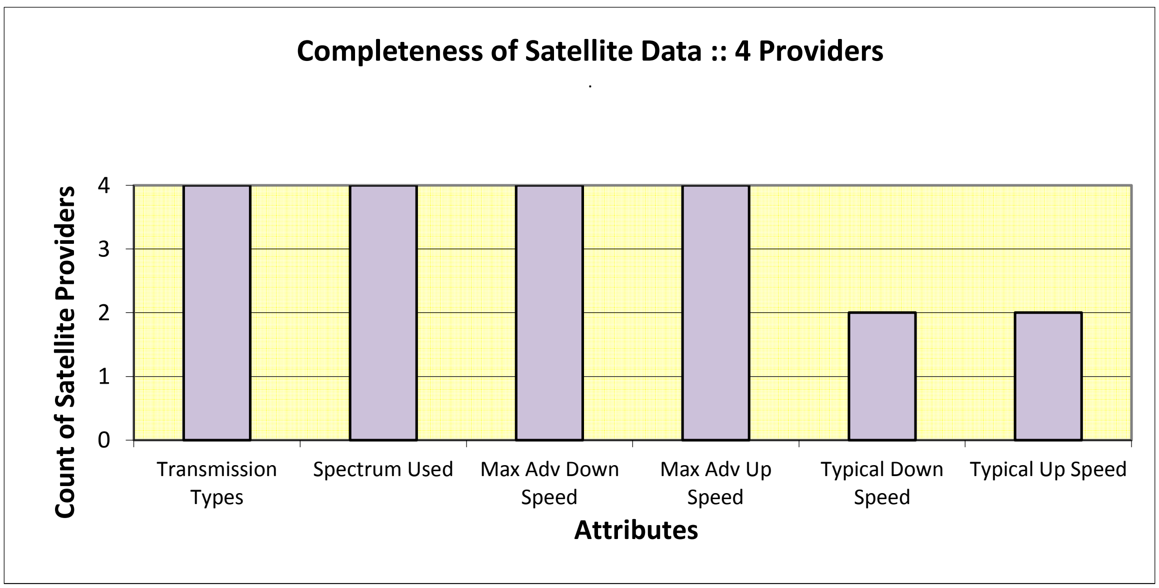
Broadband Availability	Census Blocks	% of Total
Unserved: Census block no access to broadband	0	0
Underserved: One to four broadband providers	0	0
Competitive: Five to Eight broadband providers	1,044	4
Nine to Twelve broadband providers	24,124	96
Thirteen to Fifteen broadband providers	13	<1
Total	**25,181**	**100**

Note: Broadband is defined as being wireline, wireless and satellite service for this table.

- A total of 18 providers submitted data; 10 wireline, 4 wireless, and 4 satellite. The completeness of the attributes in the 18 providers' datasets is summarized in the Figures below.







- Middle Mile data was provided by 7 broadband providers. There were a total of 23 facilities (13 owned and 10 leased).

- Last Mile data was provided by 2 broadband providers, Cogent Communication and AboveNet Communications. Both of the last mile facilities reported are owned by the provider that submitted the data.

- A total of 983 Community Anchor Institutions (CAIs) are identified. These were verified with available Rhode Island Geographic Information System (RIGIS) datasets and 204 RIEDC and FCC speed tests.

- The RIEDC collected 1,183 speed tests in 378 (1.5%) of the census blocks within the State. These tests are for the period 7/15/2011 to 8/1/2012.

- A total of 2,341 wireline speed tests from FCC were used for the verification. These tests are for the period 3/11/2010 to 5/31/2012 and cover 1,096 (4.4%) of the census blocks within the State. Tests were collected by OOKLA and MLAB.

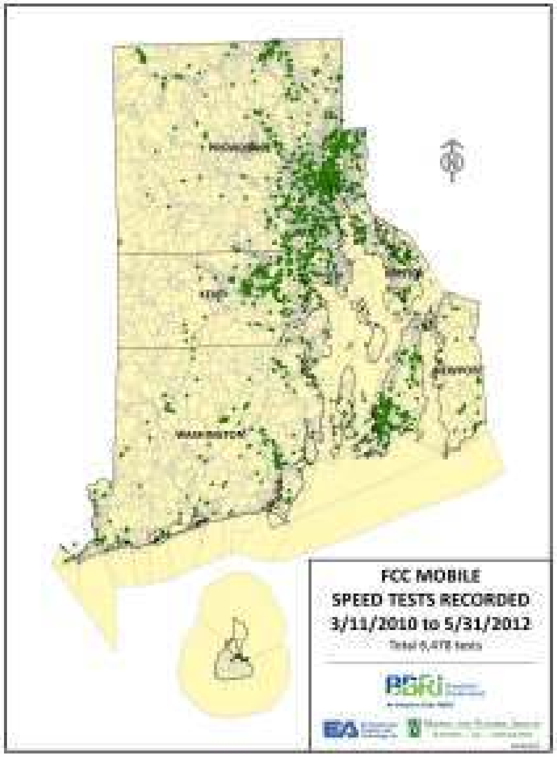
- FCC tests for Mobile Applications (accessing Cellular, WiFi, Edge & UTMS) are also used for the verification. These 6,478 speed tests are recorded for the period 3/11/2010 to 5/31/2012 and cover 1,362 (5.4%) of the census blocks within the State. These tests were collected by OOKLA.

- A total of 10,002 speed tests (RIEDC, FCC, and FCC Mobile Applications) were used for verification purposes. These were distributed within 2,548 (10%) of the 2010 US Census Bureau's 25,181 census blocks in the state. The distribution of each of these sources/types of tests is similar and follows population and household patterns across the State. The distribution of the speed tests are shown in the Figures on the following page.

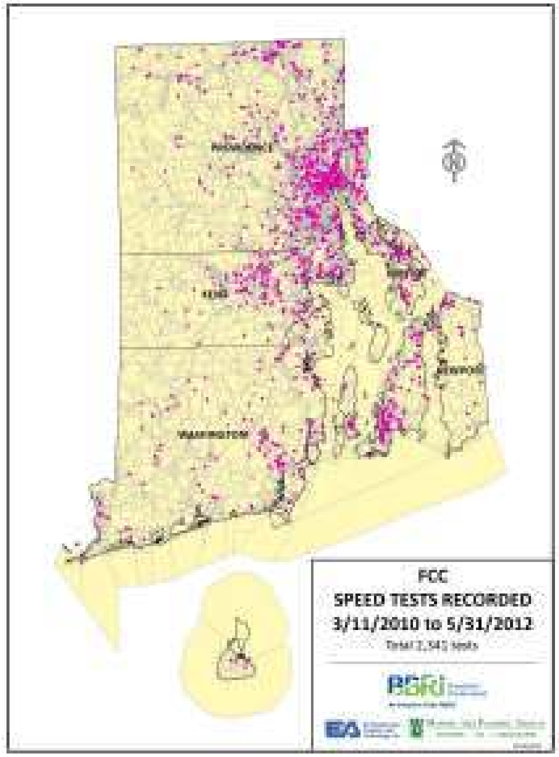
- A total of 56 census blocks are greater than 2 sq. miles, with 28 over land and 28 over open water areas. Road Segment data was provided by 1 provider. Service Address data was provided by 1 provider. All land-based census blocks greater than 2 sq. miles had road segment or service address data.

The Figures below show the distribution of speed tests used for verification purposes.

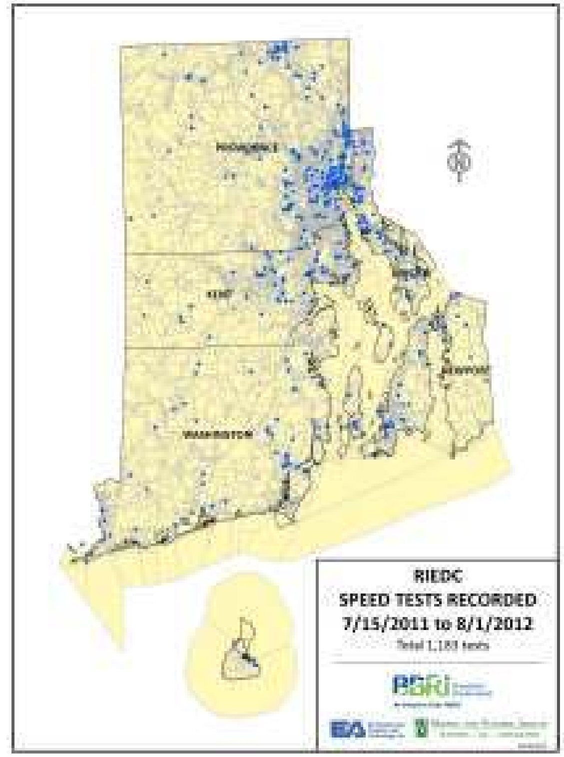
FCC Collected Speed Test - Mobile



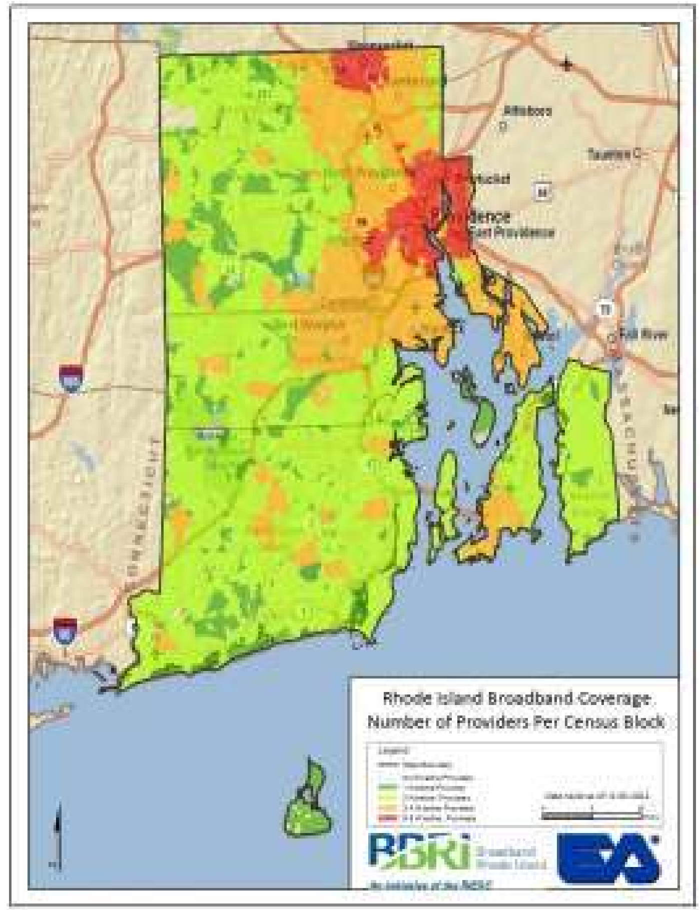
FCC Collected Speed Test - Wireline



RIEDC Collected Speed Test



The Figures below display the wireline and wireless coverage areas reported in Rhode Island and the number of providers available per census block.



Rhode Island Broadband Coverage Map

Number of Providers Available Per Census Block

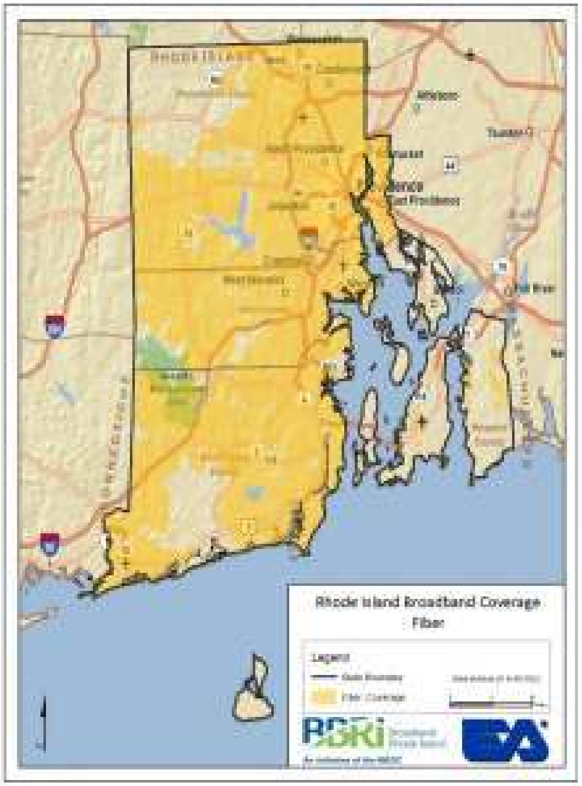
The Figures below display the availability of each technology types offered in Rhode Island.

Satellite Coverage

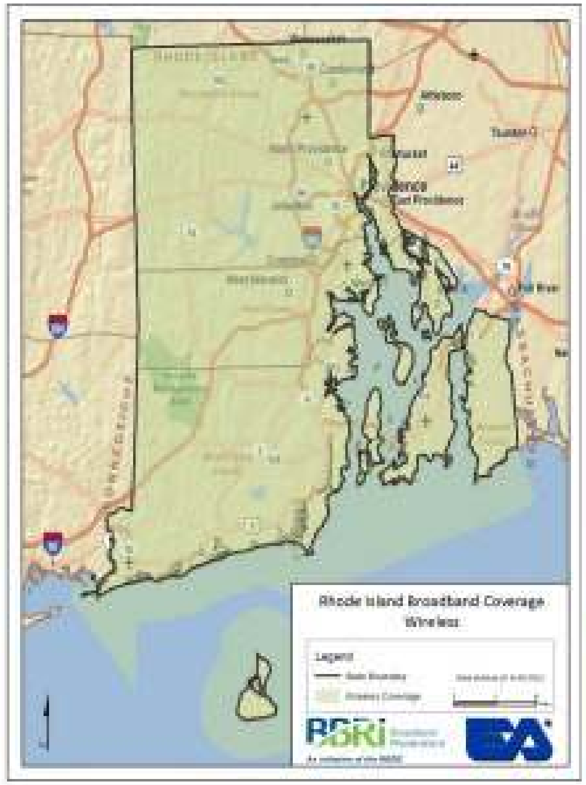
Copper Wireline Coverage

Cable Coverage

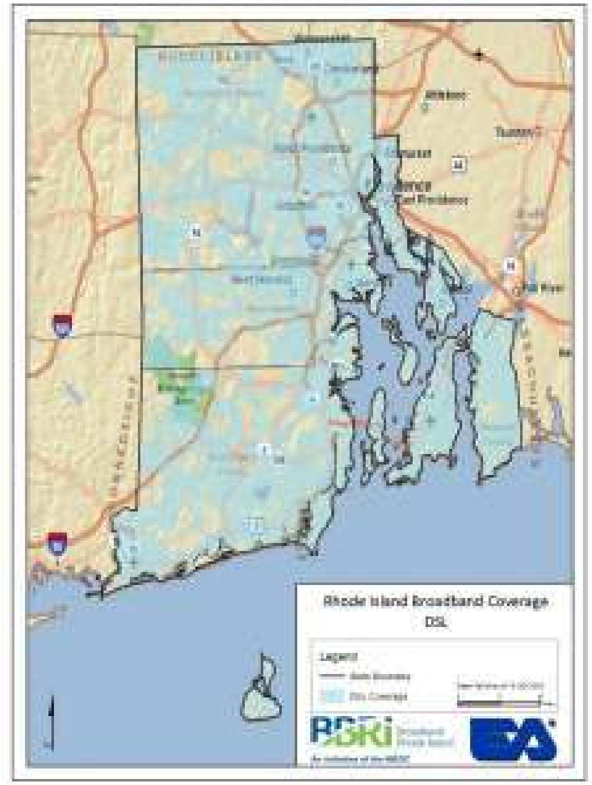
The Figures below display the availability of each technology types offered in Rhode Island.



Fiber Optic Coverage



Wireless Coverage



DSL Coverage

Provider Name: Above Net Communications Inc.
DBA: AboveNet

Data Characteristics

FRN:	0000820598
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	2
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	YES
Provided Last Mile:	YES
Provided End User Category:	YES

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
11	11

Typical down/upload speeds reported by provider: Not provided

Number of technology transmission types reported by provider: 1

Count and Capacity of Middle Mile Facilities: 1, 6

Count and Capacity of Last Mile Facilities: 1, 9

End user Category: 2

Data Verification:

Counties served by provider and number of census blocks with service. A total of 2 census blocks are served.

County	Census Block per County
Bristol	0
Kent	0
Newport	0
Providence	2
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Application [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0

Count of FCC [2] speed tests: 0
Count of FCC Mobile Application [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: 0

Middle Mile facilities outside of reported service area: Facility is located within the reported service area.

Last Mile facilities outside of reported service area: Facility is located within the reported service area.

%/# of census blocks verified by RIEDC & FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	2
% of served census blocks confirmed by speed test	0

Footnotes:

1 RIEDC Date Range: 7/15/2011 to 8/1/2012
2 FCC Date Range: 3/11/2010 to 5/31/2012
3 FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Provider Name: AT&T Mobility LLC
DBA: AT&T Mobility LLC

Data Characteristics

FRN:	0004979233
Type of Data Submitted:	Wireless
Census Block Count (unique):	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	NO
Provided Last Mile:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
7	5

Typical down/upload speeds reported by provider: Not provided

Number of technology of transmission types and spectrums reported by provider: 1, with 2 spectrums

Data Verification:

Counties served by provider and number of census blocks with service. A total of 25,181 census blocks are served.

County	Census Blocks per County
Bristol	1,092
Kent	4,183
Newport	2,452
Providence	13,157
Washington	4,297

Greatest down/upload speed from RIEDC [1] speed tests: 9,8
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [3] Mobile Application speed tests: 4,4

Count of RIEDC speed tests: 1
Count of FCC speed tests: 0
Count of FCC Mobile Application speed tests: 73

Speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census blocks served	27
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	25,181
% of served census blocks confirmed by speed test	<1%

Middle mile facilities outside of reported service area: No middle mile facilities.

Footnotes:

1 RIEDC Date Range: 7/15/2011 to 8/1/2012
2 FCC Date Range: 3/11/2010 to 5/31/2012
3 FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Provider Name: Broadview Networks, Inc.
DBA: Broadview Networks, Inc.

Data Characteristics

FRN:	0003775285
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	9,924
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	YES
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq miles:	NO
Provided Address Points for census block greater than 2 sq miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Technology	Max Download Category	Max Upload Category
10	5	5
20	5	5
30	10	10
50	11	11

Typical down/upload speeds reported by provider: No speeds were provided

Number of technology transmission types reported by provider: 4

Count of Middle Mile Facilities: 8

End user Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 9,924 census blocks are served.

County	Census Block per County
Bristol	4
Kent	1,110
Newport	935
Providence	7,868
Washington	7

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: 4, 4
Greatest down/upload speed from FCC Mobile Application [3] speed tests: 4, 3

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 2
Count of FCC Mobile Application [3] speed tests: 1

RIEDC and FCC speed tests outside of reported service area: 0

Middle mile facilities outside of reported service area: All are centrally located within the reported census blocks.

%/# of census blocks verified by RIEDC & FCC speed tests:

Confirmation of census block served	3
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	9,924
% of served census blocks confirmed by speed test	<1%

Footnotes:

1 RIEDC Date Range: 7/15/2011 to 8/1/2012
2 FCC Date Range: 3/11/2010 to 5/31/2012
3 FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Provider Name: CellCo Partnership
DBA: Verizon Wireless

Data Characteristics

FRN:	0003290673
Type of Data Submitted:	Wireless
Census Block Count:	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Middle Mile:	NO
Provided Last Mile:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
7	5

Typical down/upload speeds reported by provider: 6, 5

Number of technology of transmission types and spectrums reported by provider: 1, with 4 spectrums

Data Verification:

Counties served by provider and number of census blocks with service. A total of 24,986 census blocks are served.

County	Census Blocks per County
Bristol	1,088
Kent	4,163
Newport	2,346
Providence	13,149
Washington	4,240

Greatest down/upload speed from RIEDC [1] speed tests: none taken
Greatest down/upload speed from FCC [2] speed tests: 4, 2
Greatest down/upload speed from FCC Mobile Application [3] speed tests: 7, 4

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 14
Count of FCC Mobile Applications [3] speed tests: 449

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census blocks served	109
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	24,986
% of served census blocks confirmed by speed test	<1%

Footnotes:

1 RIEDC Date Range: 7/15/2011 to 8/1/2012
2 FCC Date Range: 3/11/2010 to 5/31/2012
3 FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Provider Name: Cogent Communication, Inc.
DBA: Cogent Communication

Data Characteristics

FRN:	0004654042
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	2
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	YES
Provided Last Mile:	YES
Provided Road Segments for census blocks greater than 2 sq miles:	NO
Provided Address Points for census block greater than 2 sq miles:	NO
Provided End User Category:	YES

Maximum down/upload speeds reported by provider:

Max Download Category	Max Upload Category
11	11

Typical down/upload speeds reported by provider: Not Provided

Number of technology of transmission types reported by provider: 1

Count and Capacity of Middle Mile Facilities: 1, 6

Count and Capacity of Last Mile Facilities: 1, 4

End User Category: 2

Data Verification:

Counties served by provider and number of census blocks with service. A total of 2 census blocks are served.

County	Census Blocks per County
Bristol	0
Kent	0
Newport	0
Providence	2
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: No speed tests were taken

Count of RIEDC [1] Speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Applications [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: No speed tests were taken

Middle mile facilities outside of reported service area: Facility is within the reported census blocks.

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	2
% of served census blocks confirmed by speed test	0%

Footnotes:
1. RIEDC Date Range: 7/15/2011 to 8/1/2012
2. FCC Date Range: 3/11/2010 to 5/31/2012
3. FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Provider Name: CoxCom Inc.
DBA: Cox Communications

Data Characteristics

FRN:	0001524461
Type of Data Submitted:	Census Blocks, Address Points
Census Block Count (unique):	24,407
Service Address Point Count (unique):	2,267
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	YES
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq miles:	NO
Provided Address Points for census block greater than 2 sq miles:	YES
Provided End user Category:	NO

Maximum advertised down/upload speeds reported by provider:

Data Type	Max Download Category	Max Upload Category
Census Blocks	9	5
Service Address Points	9	5

Typical down/upload speeds reported by provider: Not provided

Number of technology of transmission types reported by provider: 1

Count and Capacity of Middle Mile Facilities: 1, 6

End User Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 24,430 census blocks are served (24,407 by census block data and 23 by service address data).

County	Census Blocks per County
Bristol	1,083
Kent	4,116
Newport	2,286
Providence	12,888
Washington	4,057

Greatest down/upload speed from RIEDC [1] **speed tests**: 9, 9
Greatest down/upload speed from FCC [2] **speed tests:** 10, 6
Greatest down/upload speed from FCC Mobile Applications [3] **speed tests:** 8, 7

Count of RIEDC [1] **speed tests**: 796
Count of FCC [2] **speed tests:** 1,187
Count of FCC Mobile Applications [3] **speed tests:** 1,994

RIEDC and FCC speed tests outside of reported service area: 6 of 3,977 speed tests were recorded outside of the coverage area reported by provider.

Middle mile facilities outside of reported service area: All are located within the reported census blocks.

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	1,340
Census blocks served, not reported by provider	4
Total number of served census blocks reported by provider	24,430
% of served census blocks confirmed by speed test	5%

Footnotes:

1 RIEDC Date Range: 7/15/2011 to 8/1/2012
2 FCC Date Range: 3/11/2010 to 5/31/2012
3 FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Provider Name: Fiber Technologies Networks, LLC.
DBA: Fibertech

Data Characteristics

FRN:	0006797849
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	15
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES, INCOMPLETE (9 of 15)
Provided Typical Upload Speed:	YES, INCOMPLETE (9 of 15)
Provided Middle Mile:	NO
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq miles:	NO
Provided Address Points for census block greater than 2 sq miles:	NO
Provided End User Category:	YES

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
11	11

Typical down/upload speeds reported by provider: 10, 10

Number of technology of transmission types reported by provider: 1

Count of Middle Mile Facilities: 0

End User Category: 2

Data Verification:

Counties served by provider and number of census blocks with service. A total of 15 census blocks are served.

County	Census Blocks per County
Bristol	0
Kent	2
Newport	0
Providence	13
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Applications [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	15
% of served census blocks confirmed by speed test	0%

Footnotes:
1 RIEDC Date Range: 7/15/2011 to 8/1/2012
2 FCC Date Range: 3/11/2010 to 5/31/2012
3 FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Provider Name: Full Channel TV, Inc.
DBA: Full Channel

Data Characteristics

FRN:	0004973731
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	1,084
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Middle Mile:	YES
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq miles:	NO
Provided Address Points for census block greater than 2 sq miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
6	4

Typical down/upload speeds reported by provider: 6, 4

Number of technology of transmission types reported by provider: 1

Count and Capacity of Middle Mile Facilities: 1, 3

End User Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 1,084 census blocks are served.

County	Census Blocks per County
Bristol	1,084
Kent	0
Newport	0
Providence	0
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: 6, 4
Greatest down/upload speed from FCC [2] speed tests: 7, 5
Greatest down/upload speed from FCC [3] Mobile Applications speed tests: 6, 4

Count of RIEDC [1] **speed tests**: 6
Count of FCC [2] **speed tests:** 14
Count of FCC Mobile Applications [3] **speed tests:** 25

RIEDC and FCC speed tests outside of reported service area: 1 (This mobile speed test was within 340' of serviced area).

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	25
Census blocks served, not reported by provider	1
Total number of served census blocks reported by provider	1,084
% of served census blocks confirmed by speed test	2%

Footnotes:

1 RIEDC Date Range: 7/15/2012 to 8/1/2012
2 FCC Date Range: 3/11/2010 to 5/31/2012
3 FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Provider Name: Hughes Network Systems, LLC
DBA: Hughes

Data Characteristics

FRN:	0009559881
Type of Data Submitted:	Satellite
Census Block Count (unique):	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
5	2

Typical down/upload speeds reported by provider: 5, 1

Number of technology of transmission types reported by provider: 1, with 1 spectrum

Data Verification:

Counties served by provider and number of census blocks with service. A total of 25,181 census blocks are served.

County	Census Blocks per County
Bristol	1,092
Kent	4,183
Newport	2,452
Providence	13,157
Washington	4,297

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Application [3] speed tests: 3, 2

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Applications [3] speed tests: 3

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	3
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	25,181
% of served census blocks confirmed by speed test	<1%

Footnotes:

1 RIEDC Date Range: 7/15/2011 to 8/1/2012
2 FCC Date Range: 3/11/2010 to 5/31/2012
3 FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Provider Name: Level 3 Communications, LLC
DBA: Broadwing

Data Characteristics

FRN:	0003723822
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	6
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Middle Mile:	YES
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq miles:	NO
Provided Address Points for census block greater than 2 sq miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
11	11

Typical down/upload speeds reported by provider: 11, 11

Number of technology of transmission types reported by provider: 1

Count and Capacity of Middle Mile Facilities: 8, 6

End User Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 6 census blocks are served.

County	Census Blocks per County
Bristol	0
Kent	0
Newport	0
Providence	6
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: 7, 5
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 1
Count of FCC Mobile Applications [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: 1 of 1 speed tests were recorded outside the coverage area reported by provider (within the Town of North Kingstown).

Middle mile facilities outside of reported service area: None of the 8 facilities reported are located within the reported service area.

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census blocks served	0
Census blocks served, not reported by provider	1
Total number of served census blocks reported by provider	6
% of served census blocks confirmed by speed test	0%

Footnotes:
1 RIEDC Date Range: 7/15/2011 to 8/1/2012
2 FCC Date Range: 3/11/2010 to 5/31/2012
3 FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Provider Name: Lightower Fiber Networks
DBA: Lightower Fiber Networks

Data Characteristics

FRN:	00017625567
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	8,402
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Middle Mile:	NO
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq miles:	NO
Provided Address Points for census block greater than 2 sq miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
11	11

Typical down/upload speeds reported by provider: 11, 11

Number of technology of transmission types reported by provider: 1

Count and Capacity of Middle Mile Facilities: 0, 0

End User Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 8,402 census blocks are served.

County	Census Blocks per County
Bristol	0
Kent	4
Newport	0
Providence	8,398
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Application [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: No speed tests were taken

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	8,402
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 7/15/2011 to 8/1/2012
2 FCC Date Range: 3/11/2010 to 5/31/2012
3 FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Provider Name: MegaPath Corporation
DBA: MegaPath Corporation

Data Characteristics

FRN:	0003753753
Type of Data Submitted:	Census Blocks
Census Block Count (unique):	12,253
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Middle Mile:	NO
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq miles:	NO
Provided Address Points for census block greater than 2 sq miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Technology	Max Download Category	Max Upload Category
10	6	3
20	8	8
30	5	5

Typical down/upload speeds reported by provider:

Technology	Typical Download Category	Typical Upload Category	Count
10	3	2	3,758
20	4	4	2,298
30	5	5	6,781

Number of technology of transmission types reported by provider: 1

Count and Capacity of Middle Mile Facilities: 0, 0

End User Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 12,253 census blocks are served.

County	Census Blocks per County
Bristol	3
Kent	2,924
Newport	0
Providence	9,326
Washington	0

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: 4, 4

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Application [3] speed tests: 9

RIEDC and FCC speed tests outside of reported service area: One speed test was outside the reported provider area

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	8,402
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 7/15/2011 to 8/1/2012
2 FCC Date Range: 3/11/2010 to 5/31/2012
3 FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Provider Name: Skycasters
DBA: Skycasters

Data Characteristics

FRN:	0018756155
Type of Data Submitted:	Satellite
Census Block Count (unique):	N/A
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
6	4

Typical down/upload speeds reported by provider: 5, 2

Number of technology of transmission types reported by provider: 1, and 1 spectrum

Data Verification:

Counties served by provider and number of census blocks with service. A total of 25,181 census blocks are served.

County	Census Blocks per County
Bristol	1,092
Kent	4,183
Newport	2,452
Providence	13,157
Washington	4,297

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Application [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: No speed tests were taken

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	25,181
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 7/15/2011 to 8/1/2012
2 FCC Date Range: 3/11/2010 to 5/31/2012
3 FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Provider Name: Sprint Nextel Corporation
DBA: Sprint

Data Characteristics

FRN:	0003774593
Type of Data Submitted:	Wireless
Census Block Count (unique):	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Middle Mile:	NO
Provided Last Mile:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
5	3

Typical down/upload speeds reported by provider: 5, 3

Number of technology of transmission types reported by provider: 1, with 2 spectrums

Data Verification:

Counties served by provider and number of census blocks with service. A total of 25,181 census blocks are served.

County	Census Blocks per County
Bristol	1,092
Kent	4,183
Newport	2,452
Providence	13,157
Washington	4,297

Greatest down/upload speed from RIEDC [1] speed tests: 3, 1
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: 8, 5

Count of RIEDC [1] speed tests: 1
Count of FCC [2] speed tests: 0
Count of FCC Mobile Applications [3] speed tests: 1,250

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census blocks served	95
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	25,181
% of served census blocks confirmed by speed test	<1%

Footnotes:

1 RIEDC Date Range: 7/15/2011 to 8/1/2012
2 FCC Date Range: 3/11/2010 to 5/31/2012
3 FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Provider Name: StarBand Communications, Inc.
DBA: StarBand Communications, Inc.

Data Characteristics

FRN:	0005087457
Type of Data Submitted:	Satellite
Census Block Count:	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
3	2

Typical down/upload speeds reported by provider: Not reported

Number of technology of transmission types reported by provider: 1, with 1 spectrum

Data Verification:

Counties served by provider and number of census blocks with service. A total of 25,181 census blocks are served:

County	Census Block per County
Bristol	1,092
Kent	4,183
Newport	2,452
Providence	13,157
Washington	4,297

Greatest down/upload speed from RIEDC [1] speed test: No speed tests were taken
Greatest down/upload speed from FCC [2] speed test: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed test: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Applications [3] speed test: 0

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	25,181
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 7/15/2012 to 8/1/2012
2 FCC Date Range: 3/11/2010 to 5/31/2012
3 FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Provider Name: T-Mobile USA, Inc.
DBA: T-Mobile

Data Characteristics

FRN:	0006945950
Type of Data Submitted:	Wireless
Census Block Count (unique):	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	YES
Provided Typical Upload Speed:	YES
Provided Middle Mile:	YES
Provided Last Mile:	NO

Maximum advertised down/upload speeds reported by provider:

Technology	Max Download Category	Max Upload Category
80	7	4

Typical down/upload speeds reported by provider: 6, 3

Number of technology of transmission types reported by provider: 1, with 1 spectrum

Count and Capacity of Middle Mile facilities: 3, 6

Data Verification:

Counties served by provider and number of census blocks with service. A total of 24,162 census blocks are served.

County	Census Blocks per County
Bristol	1,088
Kent	3,932
Newport	2,321
Providence	12,763
Washington	4,058

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: 6, 4

Count of RIEDC 2010 [2] speed tests: 0
Count of FCC 2010 [3] speed tests: 0
Count of FCC 2010 Mobile Applications [4] speed tests: 103

RIEDC and FCC speed tests outside of reported service area: 0

Middle mile facilities outside of reported service area: The three facilities are within the reported service area.

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census blocks served	37
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	24,162
% of served census blocks confirmed by speed test	<1%

Footnotes:

1 RIEDC Date Range: 7/15/2011 to 8/1/2012
2 FCC Date Range: 3/11/2010 to 5/31/2012
3 FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Provider Name: Verizon New England Inc.
DBA: Verizon

Data Characteristics

FRN:	0003628971
Type of Data Submitted:	Census Blocks, Road Segments
Census Block Count (unique):	18,532
Road Segment Count (unique):	686
Provided Technology of Transmission:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO
Provided Middle Mile:	NO
Provided Last Mile:	NO
Provided Road Segments for census blocks greater than 2 sq miles:	YES
Provided Address Points for census blocks greater than 2 sq miles:	NO
Provided End User Category:	NO

Maximum advertised down/upload speeds reported by provider:

Technology	Max Download Category	Max Upload Category
10	6	3
50	9	7

Typical down/upload speeds reported by provider: Not provided

Number of technology of transmission types reported by provider: 2

Total count of Middle Mile facilities: Not provided

End user Category: Not provided

Data Verification:

Counties served by provider and number of census blocks with service. A total of 18,560 census blocks are served (18,532 by census block data and 28 by road segment service data).

County	Census Blocks per County
Bristol	894
Kent	3,241
Newport	1,640
Providence	10,231
Washington	2,554

Greatest down/upload speed from RIEDC 2010 [1] speed tests: 11, 7
Greatest down/upload speed from FCC 2010 [2] speed tests: 8, 4
Greatest down/upload speed from FCC 2010 [3] Mobile Application speed tests: 8, 8

Count of RIEDC [1] speed tests: 228
Count of FCC [2] speed tests: 531
Count of FCC Mobile Application [4] speed tests: 1,152

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	631
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	18,560
% of served census blocks confirmed by speed test	3%

Footnotes:
1 RIEDC Date Range: 7/15/2011 to 8/1/2012
2 FCC Date Range: 3/11/2010 to 5/31/2012
3 FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Provider Name: ViaSat
DBA: ViaSat

Data Characteristics

FRN:	0017588898
Type of Data Submitted:	Satellite
Census Block Count (unique):	N/A
Provided Technology of Transmission:	YES
Provided Spectrum Used:	YES
Provided Max Advertised Download Speed:	YES
Provided Max Advertised Upload Speed:	YES
Provided Typical Download Speed:	NO
Provided Typical Upload Speed:	NO

Maximum advertised down/upload speeds reported by provider:

Max Download Category	Max Upload Category
7	7

Typical down/upload speeds reported by provider: Not provided

Number of technology of transmission types reported by provider: 1, and 1 spectrum

Data Verification:

Counties served by provider and number of census blocks with service. A total of 24,434 census blocks are served.

County	Census Blocks per County
Bristol	1,002
Kent	3,834
Newport	2,379
Providence	12,970
Washington	4,249

Greatest down/upload speed from RIEDC [1] speed tests: No speed tests were taken
Greatest down/upload speed from FCC [2] speed tests: No speed tests were taken
Greatest down/upload speed from FCC Mobile Application [3] speed tests: No speed tests were taken

Count of RIEDC [1] speed tests: 0
Count of FCC [2] speed tests: 0
Count of FCC Mobile Application [3] speed tests: 0

RIEDC and FCC speed tests outside of reported service area: 0

%/# of census blocks verified by RIEDC and FCC speed tests:

Confirmation of census block served	0
Census blocks served, not reported by provider	0
Total number of served census blocks reported by provider	24,434
% of served census blocks confirmed by speed test	0%

Footnotes:

1 RIEDC Date Range: 7/15/2011 to 8/1/2012
2 FCC Date Range: 3/11/2010 to 5/31/2012
3 FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Community Anchor Institutions: All categories

Data Characteristics

Type of Data Submitted: Point
Feature Count: 983
Provided Technology of Transmission: YES, INCOMPLETE (338 of 983)
Provided Subscribe Downstream Speed: YES, INCOMPLETE (363 of 983)
Provided Subscribe Upstream Speed: YES, INCOMPLETE (810 of 983)
Provided Street Address: YES, COMPLETE
Provide Public Wifi: YES, INCOMPLETE (767 of 983)
Provided URL: YES, INCOMPLETE (637 of 983)
Provided CAIID: YES, INCOMPLETE (579 of 983)

Count of Community Anchor Institutions by category:

CAI Category	Count of Features
1 – School K through Grade 12	518
2 - Library	91
3 – Medical/healthcare	56
4 – Public safety	242
5 – Univ., college, other post-secondary	24
6 – Other govt support - govt	48
7 – Other govt support - non-govt	4

Maximum Subscribe down/upstream speeds reported by institutions:

CAI Category	Max Downstream Category	Max Upstream Category	Count
1	10	10	1
2	10	10	1
3	11	11	3
4	10	10	3
5	11	11	2
6	11	11	1
7	7	6	1

Number of technology of transmission types reported by provider: 9

Data Verification:
Greatest down/upload speed from RIEDC [1] speed test: 10, 8
Greatest down/upload speed from FCC [2] speed test: 9, 6
Greatest down/upload speed from FCC Mobile Applications [3] speed tests: 7, 7

Count of RIEDC speed tests: 115
Count of FCC speed tests: 66
Count of FCC Mobile Applications speed tests: 92

Footnotes:

1 RIEDC Date Range: 7/15/2011 to 8/1/2012
2 FCC Date Range: 3/11/2010 to 5/31/2012
3 FCC Mobile Application Date Range: 3/11/2010 to 5/31/2012

Section C: Data Processes and Submission Overview

Submission Summary

The Broadband Rhode Island Mapping (BBRI) Team, led by EA Engineering, Science & Technology, Inc. (EA), in its role as primary technical lead for the BBRI project, contacted 24 potential facilities-based broadband service providers (BSPs) and received data from 18 providers for this round of data collection. An overall summary of the data submission is described below:

- 24 potential facilities-based broadband service providers were contacted for this round of data collection
- 2 BSPs responded but did not provide data
- 4 BSPs were identified as resellers of data
- 18 BSPs responded and provided data

Of those that provided data:

- 8 provided only census block information
- 1 provided census blocks and addresses
- 1 provided census blocks and road segments
- 8 provided wireless coverage areas

In addition, 7 of the 18 responsive BSPs provided middle mile infrastructure points and 2 of 18 responsive BSPs provided last mile infrastructure points.

Besides the 24 providers contacted during the current round of broadband data collection, the BBRI team has previously reached out to an additional 122 potential broadband providers. These 122 broadband providers did not provide data because they were either broadband resellers, their data was being collected under a different provider's dataset, they were non-responsive, they chose not to participate, or they did not offer service in Rhode Island. The 122 providers previously researched and contacted are listed below:

1. 360 networks (USA) Inc.
2. A.R.C. Networks, Inc. / ATX Licensing, Inc. /
3. Access Point, Inc.
4. ACN Communication Services, Inc.
5. Ad-Base Systems Inc. (DBA GlobalPOPS)
6. Airespring, Inc.
7. AmeriVision Communications d/b/a Affinity 4
8. Apogee Telecom
9. ATC Outdoor DAS, LLC
10. Bandwidth.com CLEC, LLC
11. BBN Communications

12. BCN Telecom, Inc.
13. Bell South Long Distance, Inc.
14. Bellsouth.Net
15. BLC Management, LLC d/b/a Angles Communications Solutions
16. Broadview Networks, Inc.
17. Broadvox-CLEC, LLC
18. Budget PrePay, Inc. d/b/a Budget Phone
19. BullsEye Telecom, Inc.
20. CCG Communications, LLC d/b/a Veroxity Technical Partners, Inc.
21. CERFnet
22. Charter Communications
23. Cleartel Telecommunications, Inc. (acquired by Birch)
24. CloseCall America, Inc.
25. Comcast Business Communications
26. Comcast Cable
27. CommPartners, LLC
28. Commrail (Access Northeast)
29. Computer Sciences Corporation
30. ComTech21, LLC
31. Comtel Telcom Assets LP d/b/a Clear Choice Communication
32. Conversent Communications (d/b/a Earthlink Business III)
33. Covista, Inc.
34. Cricket Communications
35. CTC Communications (d/b/a One Communications)
36. DSCI Corporation
37. DSL.net
38. EasyNet
39. Entelegent Solutions, Inc.
40. Ernest Communications, Inc.
41. Evercom Systems, Inc.
42. ExteNet Systems, Inc.
43. FAIRPOINT COMMUNICATIONS
44. Global Capacity Group, Inc.
45. Global Crossing Telecommunications, Inc.
46. Global NAPS, Inc.
47. Granite Telecommunications, LLC
48. Hickory Tech. Corp. / Enventis Telecom, Inc.
49. Hosttech Communications, LLC
50. IDT America, Corp.
51. inContact, Inc. (f/k/a UCN, Inc.)
52. Intap, LLC (dba Big Dog Technologies, Inc.)
53. Internap Network Services
54. International Telecom, Ltd.

55. Internet & Telephone, LLC
56. Intrado Communications, Inc.
57. ISP Alliance (ZCorum)
58. Key3Media Events (Media Live International)
59. LexMark International
60. Lightyear Network Solutions, LLC
61. Link Technologies
62. Macross Information Systems
63. Magellan Hill Technologies, LLC
64. Masergy Communications
65. Matrix Telecom, Inc.
66. Meganet Communications
67. Melita PLC (fka Melita Cable Cable plc)
68. MetroCast Cablevision
69. Metropolitan Telecommunications of Rhode Island
70. Mitel NetSolutions, Inc.
71. Mobile Beacon
72. Mobilitie Investments, LLC
73. MTS Allstream
74. Mzima Networks
75. NationalNet
76. Navigator Telecommunications, LLC
77. "NEON Connect, Inc. / RCN New York Communications, LLC
78. Neutral Tandem – Rhode Island, LLC
79. New Edge Networks
80. New Horizons Communications Corp.
81. Nextel Communications
82. NextG Networks of NY
83. Nextira One, LLC d/b/a Black Box Network Services
84. Nextlink Wireless, Inc.
85. nFrame
86. Nortel Networks
87. North Atlantic Networks, LLC
88. Norwood Light Broadband
89. Pac-West Telecomm, Inc.
90. PAETEC
91. Pipeline Wireless LLC
92. Primus Telecommunications, Inc.
93. ProvDotNet LLC
94. Qwest Communications Company, LLC / Qwest Communications of Delaware
95. RCN Corporation
96. REON Broadband Corporation
97. RNK, Inc.

98. SAVVIS Communications Corporation
99. SBA Communications Corp. (acquired National Grid Communications)
100. SBC Internet Services
101. Secured Network Services
102. Serbia Broadband-Srpske Kablovske mreze dcc
103. SpeakEasy
104. Spectrotel, Inc.
105. STSN GENERAL HOLDINGS
106. TDS TELECOM
107. Telrite Corporation
108. Thames Valley Communications
109. The Internet Connection
110. Total Communications Inc.
111. Towerstream Inc.
112. Trans National Communications International
113. United Systems Access Telecom, Inc. d/b/a/ USA Telephone
114. Virgin Media
115. Wayport
116. Wholesale Carrier Services, Inc.
117. WilTel Communications Group, LLC
118. Wireless Data Service Provider
119. XO Communications Services, Inc.
120. Ymax Communications Corp.
121. Zone Four
122. Zone Telecom, Inc.

Rhode Island Broadband Mapping Data Processes

Data Received From Providers – The process begins by receiving data from each provider that offers service in the State of Rhode Island (RI). Broadband data is currently received from 18 broadband facility based service providers within the State who have signed Non-Disclosure Agreements with RIEDC. Once all of the available data is received from a provider it is reviewed and archived in its native format. While the same data is requested from each provider the information often comes in different formats and with missing attribute and or spatial data. If attributes are missing from the dataset the provider is contacted to see if the missing information is available.

Data Evaluated & Processed – The EA project team gives the data spatial attributes through geocoding to the RI E911 data or by joining the data to the 2010 census block data. The attribute data is then formatted so that the database can easily be entered in the Broadband Rhode Island geodatabase. Speeds reported below broadband levels are removed from the dataset and archived. Data that is located in census blocks great than 2 square miles are loaded into either the address or street segment feature classes. All remaining data is loaded into the census block feature class. The data is loaded using Esri tools and software. The Broadband

Rhode Island, or our data analysis geodatabase, stores the most recent broadband information. Data is extracted from this geodatabase and formatted as needed to be used for the State's web map and our biannual NTIA submittals. Data is pulled from this analysis database, formatted to meet the web and NTIA formatting requirements, and loaded into either the NTIA transfer database or the web mapping database using custom built data extraction and loading tools.

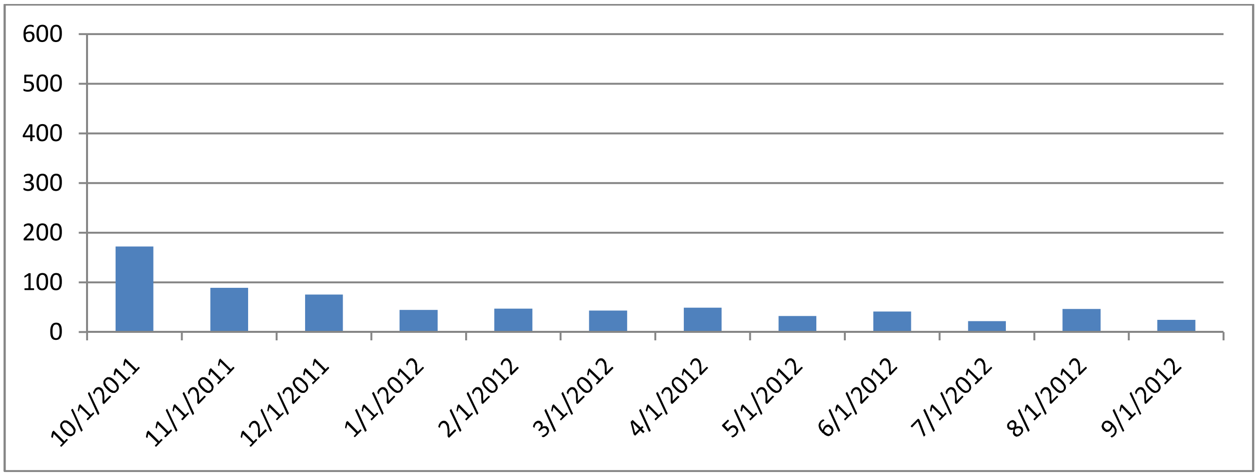
- Community Anchor Institute (CAI) Data: The initial list of CAIs were received from the University of Rhode Island and populated into the BBRI database. This data was then compared to and updated using 3rd party datasets in order to create the most comprehensive CAI list available for RI. In order to collect the broadband data for the CAIs, the BBRI Team utilized a top down approach. The agencies that oversaw a large number of CAIs such as RINET and OSHEAN were contacted regarding the data collection. CAIs that still had missing attribute data after contacting these agencies were contact directly via phone and email. Once contacted, the CAIs were directed to an online survey. The online survey walked the user through a short questionnaire that collected the required CAI broadband data. At the end of the survey the user was directed to take a speed test in order to help with the data collection and verification process.

Data Verification – Once the data is loaded into the geodatabase the verification process can begin. This process is comprised of several steps to ensure that the actual facilities and services provided to the public match the provider's data being reported. The steps are listed below, followed by a detailed description of each step.

1. Compared to Available Datasets
   a. Speed test
   b. User feedback
   c. 3rd party dataset analysis
2. Spatial Analysis of Coverage Area
3. Physical Infrastructure Survey
4. Provider Meetings
5. 3rd Party Verification

- Compared to Available Datasets -
  - Speed test – Using Ookla's speed test application, EA has been collecting speed test data for RI since March 2010. A breakdown of speed tests collected over the past year by EA, displayed by month, can be found in the table below. EA uses both the FCC speed tests collected for RI and the speed tests collected on the RI broadband website to get a better view of the actual speeds and coverage area providers are offering the public. The speed tests are geocoded and mapped by provider. (FCC speed test providers are identified by the speed test's IP address) Each provider's speed test data is compared to their stated coverage area.

Discrepancies are noted and reported back to the provider. The provider either gives a reason for the discrepancy or instructs us to modify their coverage area to match the speed test data.



- User feedback - user feedback information is captured by both the FCC and RI's broadband mapping website. This information is reviewed on a case by case basis. Changes are made as needed to the data and reported to the provider, similar to the speed test data update process.

- Best practices for final data quality checks include the review and comparison to 3rd party datasets (such as the FCC's 477 data) with the information received from the providers. The FCC's data is used to check for previously unknown providers, perform spatial analysis and comparisons on the data, and to give a better understanding of our confidence in the data. Since FCC data is broken out by census tract the provider's data must be converted to the tract level in order to perform a full data comparison.

- Spatial Analysis of Coverage Area– Spatial Analysis is performed on each provider's data set. The analysis checks for small areas in populated sections of the state that are surrounded by coverage areas but do not show coverage. These "donut holes" in the data are reviewed and reported to the provider if we feel they have a high probability of actually being covered by the providers' broadband services.

- Physical Infrastructure Survey - As part of the expanding need to verify broadband coverage within RI, a physical infrastructure survey pilot project was performed for the Town of Foster. The physical infrastructure survey verified the physical broadband facilities present within the Town. EA performed the survey utilizing GPS equipment and industry knowledge to capture the actual location of strategic infrastructure facilities throughout Foster. The data was then mapped and analyzed to determine where wireline broadband service is theoretically available within the town. Structures outside of the identified theoretical service area were mailed surveys to determine if broadband was actually available at their location as well as collect additional broadband usage information from the residents.

- Provider Meetings - The BBRI Team held conference calls with broadband providers that had significant changes in their current data submittals or had identified issues that required a review. These conference calls were used as working sessions to review reasoning behind changes being made, discuss findings, address questions, and review edits being made to the provider's submitted dataset. Following the meetings, edits to the data were made final based on the information agreed upon. The reason for making each edit to the data was documented in case issues or questions arose in the future.

- 3rd Party Verification – A 3rd party, Mapping & Planning Services (M&PS), is used to do provide an independent review and a report on the status of each provider's data. These reports summarize the data collected and provide a second review of the verification steps listed above.

Data Analysis – In addition to the data verification steps, a complete summary of each provider's data and static broadband coverage maps are created for RIEDC. These maps are used to analyze existing data availability and plan for future broadband development and outreach projects.

Geodatabase Checks– Once the data is processed and verified the database is checked prior to submittal to the NTIA. This process is comprised of several steps to ensure that the information in the geodatabase is as accurate and complete and possible.

- Visual Checks - These visual checks inspect the data to ensure completeness, accuracy, and engineering logic. The visual inspection process employs random sampling techniques to validate feature placement and attribution. The random sampling is performed in accordance with ANSI standards for attribute inspection.

- Automated Checks – These checks are performed on 100% of the data. ESRI's Production Line Tool Set (PLTS) and the NTIA's QC toolbox are utilized for the automated check of the data. PLTS check for both schema and logical errors in the data. The following checks are performed on the data.

  - Geodatabase Format - Verify that the geodatabase's name and feature classes are correct per the corresponding RIEDC data model and NOFA requirements.
  - Coordinate System Errors - Check for proper projection definition.
  - Validity Checks - Verify the attribution fields in the tables and field values fall within the domain specified in the geodatabase.
  - Duplicate Item Values - Verify the uniqueness of attribute values within a user-specified item (such as Feature IDs).

- Invalid Item Values - Checks for invalid codes using discrete values and ranges defined in the appropriate domain tables.
- Spatial Logic Checks - Checks the geodatabase to validate minimum size polygons, minimum length lines, and dangles in line feature classes.

- If the geodatabase has passed all tests listed above, and has met the acceptance criteria, the dataset is considered passed and can be processed for delivery to RIEDC and the NTIA. If the geodatabase fails any test and does not meet acceptance criteria, the data is considered failed and will be returned with error reports to the data processing team for correction. Additional follow-up with the providers may be necessary to correct the issue(s). Once edits are completed or exceptions are documented, the geodatabase will be returned to the QC team for an additional sequence of all QC procedures. This process will be repeated until all tests have received a passing status or exceptions have been documented.

OFFICIAL OCTOBER 2012 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE STATE OF SOUTH CAROLINA

CONNECT south carolina®

October 1, 2012

TABLE OF CONTENTS

October 1, 2012

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

As the State Broadband Designated Entity, Connected Nation, in cooperation with South Carolina's broadband provider community and state-based partners, is pleased to present this submittal of the state of South Carolina's State Broadband Initiative (SBI) Grant Program, known as Connect South Carolina.

The Connect South Carolina program and its collective stakeholder community continue to be faithful and energized contributors to the National Telecommunications and Information Administration's (NTIA) SBI program. Now more than ever, the significance of complete and validated data as compiled through the Federal Communications Commission's (FCC) National Broadband Map is instrumental in forging the innovation economy of the 21st century. As the Commission relies upon this unique resource to distribute monies under the Connect America Fund, through the Universal Service Fund reform, the Connect South Carolina program equally values this data in informing meaningful program interventions relating to broadband access, adoption, and use initiatives. Truly, this coordination embodies the spirit of the SBI and demonstrates the joint effort of the NTIA, FCC, state governments, industry, and non-profits like Connected Nation as it continues to serve as a key tool for the American public and policymakers. We are proud of the role that Connect South Carolina has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit broadband providers, consumers, and businesses nationwide.

The artifacts that comprise this submission should be found to be compliant with the October 1, 2012, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connect South Carolina: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in

			Census Blocks of No Greater Than Two Square Miles in Area
Appendix A:	1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles
Appendix A:	1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A:	3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A:	4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A:	4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)		n/a	Accuracy and Verification Report
n/a		DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a		n/a	List of Changes and Corrections to the Dataset
n/a		n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the April 2012 SBI data submission for the Connect South Carolina program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on August 9, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance
New to the semi-annual submission for October 2012 is a more robust version of the ReadMe text file. As per the template released on the Grantee Workspace on May 18, 2012, this file contains a high-level summary of the items contained within the submission, including the exact file deliverables, a description of the errors and warnings from the Check Submission report, and extraneous information of which the NTIA and other users of the dataset should be made aware.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the April 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That practice continues in this submission as technology and speed combinations are reviewed and scrutinized; any questionable information supplied by providers is reviewed more in depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

In addition to the requirements mentioned above, please find this methodology paper to be inclusive of the ongoing section pertaining to industry mergers and acquisitions – specifically this section details any and all mergers or acquisitions that have taken place in South Carolina since the April 2012 submission. The intent of this updated section is to provide a better understanding of how the broadband provider landscape has changed since the last submission cycle.

This October 2012 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for approximately 95.74 percent of the South Carolina provider community, or 45 of 47 total providers. Of the 45 participating providers, 24 supplied an update to their network or coverage area(s), while 14 have reported no change. The remaining 7 represent providers who previously supplied data but were non-responsive in the October 2012 update effort; therefore, their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact record is contained herein. The 2 providers that are not represented in the attached datasets have refused to participate in the voluntary program or were non-responsive to multiple contact attempts.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connect South Carolina principals that all commercially reasonable efforts were made to account for 100 percent of the known South Carolina broadband provider community, pursuant to this semi-annual data update submission.

Connect South Carolina has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect South Carolina conducts field validation efforts. To date, 33 (70.21percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connect South Carolina website, (www.connectsc.org), continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connect South Carolina website encountered 3,222 unique visits during this reporting period (16,590 total to date for the life of the grant awarded on December 20, 2009). Additionally, this pronounced Web activity netted 25 broadband inquiries over this same reporting period (138 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connect South Carolina website and the Connect South Carolina interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connect South Carolina mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect South Carolina to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connect South Carolina has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

In conjunction with the state of South Carolina outreach was conducted during this data update reporting period by Connect South Carolina to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect South Carolina website. During this reporting period Connect South Carolina has developed a number of new relationships with statewide associations such the South Carolina State Firefighters Association and the Office of State Fire Marshal to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. It became apparent that these relationships are beneficial to the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connect South Carolina will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connect South Carolina has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connect South Carolina is also working hard to clarify CAI information associated with wireless broadband. NTIA has requested in-depth questioning of CAI listing a wireless broadband service as their sole form of connectivity. This follow-up allows us to better understand the reason for adopting the wireless broadband service.

From our work in South Carolina, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connect South Carolina efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connect South Carolina program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of South Carolina, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,

Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

DATA ACQUISITION: SOUTH CAROLINA COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this sixth reporting period of the SBI, Connect South Carolina, working in close coordination with the state of South Carolina, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connect South Carolina has continued to identify and process CAI data obtained through an ongoing statewide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connect South Carolina through Esri ArcGIS software.

Connect South Carolina continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connect South Carolina website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the state as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the state client. Connect South Carolina will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link:
http://www.surveymonkey.com/s/RJH5DMW

In addition to the survey, Connect South Carolina has developed a number of new relationships with statewide associations such as South Carolina State Firefighters Association and the Office of the State Fire Marshal to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connect South Carolina will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connect South Carolina has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connect South Carolina conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect South Carolina continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect South Carolina works with the state of South Carolina to identify existing relationships that can support CAI outreach.

Connect South Carolina has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect South Carolina project as well as self-awareness of their own CAI connectivity (specifically upload and download speeds). Connect South Carolina will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the state of South Carolina will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the state.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	1,764	1,764	1,764	1,099	1,098	1,098
Libraries	284	284	284	184	183	183
Healthcare	295	295	295	198	199	199
Public Safety	821	821	821	320	317	316
Higher Ed Institutions	226	226	226	138	136	136
Other Government	903	903	903	825	825	825
Other Non-Government	94	94	94	83	83	83
Total	4,387	4,387	4,387	2,847	2,841	2,840

During the coming months, CAI data collection will be supported by regular reporting to the Connect South Carolina team. The CAI data is proving an invaluable resource to all components of the Connect South Carolina effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on August 9, 2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.

Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the state of South Carolina.

Inventory of Deliverables, Connect South Carolina: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the state of South Carolina have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to South Carolina as a polygon of the state boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development is underway at CN as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

DATASETS FOR IN-KIND MATCH

Connect South Carolina received an in-kind match contribution to assist with SBI mapping goals which has been beneficial to the program in the following ways:

Connect South Carolina received a Community Anchor Institution (CAI) connectivity information dataset for a variety of institution types including higher education, state and local governments, public safety, and more from the South Carolina Budget and Control Board - Department of State Information Technology as part of an in-kind match contribution to Connect South Carolina - $107,548.

Connect South Carolina received a CAI dataset for schools and libraries from the South Carolina Budget and Control Board - Department of State Information Technology as part of an in-kind match contribution to Connect South Carolina - $71,232.

SOUTH CAROLINA FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets and Trips;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and

- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff conducted on-site validation tests in South Carolina on the following providers: AT&T; Atlantic Broadband; CenturyLink; Charter Communications; Chester Telephone Company (d.b.a. Fairfield Communications); Clearwire Corporation; Comcast; Countrywide Wireless; Electronics Service Company of Hamlet LLC; Family View Cable; Farmers Telephone Cooperative Inc. (d.b.a. FTC Communications); Frontier Communications of the Carolinas; Harron Communications; Home Telephone Company Inc.; NTInet Inc.; Palmetto Rural Telephone (d.b.a. Low Country); Pee Dee Net; Pee Dee Online; PRT Communications; Rock Hill Telephone Company (d.b.a. Comporium Communications, PBT Communications, and Fort Mill Telephone Company); Sandhill Telephone Cooperative; SkyRunner; Southern Coastal Cable; Sprint; TDS Telecom; Time Warner Cable Inc.; T-Mobile; tw telecom; US Cellular; Verizon South Inc.; Wide Open West (formerly d.b.a. Knology); Windstream; and XO Communications.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 33 companies (out of a universe of 47 viable providers) totaling 70.21 percent within the state of South Carolina.

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on August 9, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

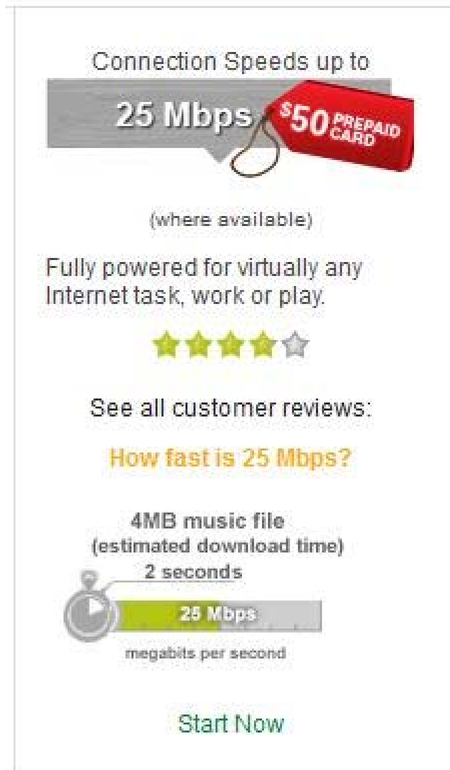
AT&T Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 24 Mbps service; screenshot below.

Compare Internet Packages

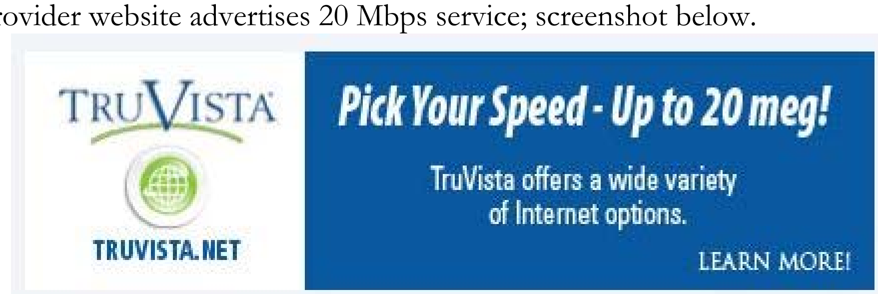
	Pro	Elite	Max	Max Plus	Max Turbo
Standard Monthly Rate	$38*	$43*	$48*	$53*	$63*
Downstream Speed	Up to 3 Mbps	Up to 6 Mbps	Up to 12 Mbps	Up to 18 Mbps	Up to 24 Mbps

AT&T Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider confirmed that tier 7 service is available.

CenturyLink
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below.



Chester Telephone Company
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps service; screenshot below.



Comcast Cable Communications, LLC
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 7, lower than expected value range for the technology.
Resolution: Confirmed use of DOCSIS 3.0 with speed tier 7. Speeds are currently kept lower to be backwards compatible.

Farmers Telephone Cooperative, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15.1 Mbps service; screenshot below.

Residential Services

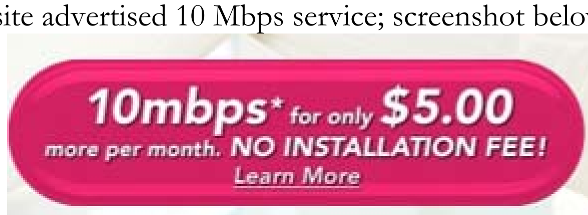
1.5 Mbps down / 512 Kbps up	4.0 Mbps down / 1.0 Mbps up	6.0 Mbps down / 1.0 Mbps up	15.1 Mbps down / 1.0 Mbps up
$19.95/mo.*	$39.95/mo.	$44.95/mo.	$54.95/mo.
5 Free E-mail Accounts	10 Free E-mail Account	10 Free E-mail Account	10 Free E-mail Account

Hargray Communications Group, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

Add Hargray High-Speed Internet service for the very best in fast, reliable connections to the World Wide Web.

Choose the Speed That's Right for You	
3Mbps	3Mbps downstream/Up to 1Mbps upstream
5Mbps	5Mbps downstream/Up to 1Mbps upstream
10Mbps	10Mbps downstream/Up to 1Mbps upstream

Home Telephone Company, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertised 10 Mbps service; screenshot below.



Horry Telephone Cooperative, Inc.
Issue: DSL platform with maximum advertised download speed in tier 9, higher than expected value range for the technology.
Resolution: Provider website advertises up to 50 Mbps service; screenshot below.

Promo Price 1st 6 months Available ONLY to Multiple Product Customers*	Up to Download Speed	Up to Upload Speed	Single Product Price	Multiple Product Price	Promotional Price*
LITE	1 Mbps	1 Mbps	$32.95	$24.95	$16.95
STANDARD	10 Mbps	1 Mbps	$49.95	$44.95	$28.95
PREMIUM	20 Mbps	2 Mbps	$59.95	$54.95	$38.95
ULTRA	30 Mbps	5 Mbps	$79.95	$69.95	$48.95
ELITE	50 Mbps	5 Mbps	$99.95	$89.95	$68.95
HTC Bluewave - Tier 1**	10 Mbps	10 Mbps	$49.95	$44.95	$28.95
HTC Bluewave - Tier 2**	20 Mbps	10 Mbps	$59.95	$54.95	$38.95
HTC Bluewave - Tier 3**	30 Mbps	10 Mbps	$79.95	$69.95	$48.95
HTC Bluewave - Tier 4**	50 Mbps	10 Mbps	$99.95	$89.95	$68.95

***Selected areas only.*

Palmetto Rural Telephone Cooperative, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

Name	Download Speeds Up To	Price
Basic	576k	19.95
Basic Plus	1.5mbps	25.95
Silver	3mbps	29.95
Gold	6mbps	49.95
Platinum	10mbps	69.95

Pee Dee Online Consulting
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative confirmed that 10 Mbps service is available and advertised locally, but not advertised on the website.

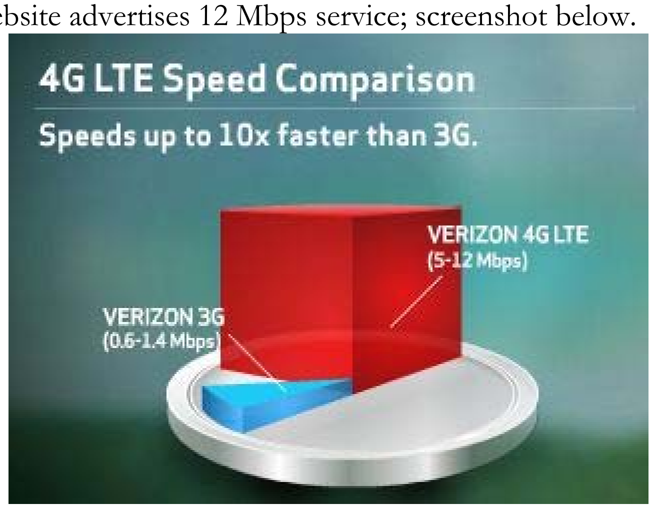
Piedmont Rural Telephone Cooperative, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps service; screenshot below.

T-Mobile USA, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises that download speeds greater than tier 6 are available; screenshot below.

T-Mobile customers with 4G phones are already experiencing data speeds that are comparable to or faster than the speed of a home broadband network. And with recent improvements to our 4G network-doubling our theoretical download speeds-we're giving our customers enhanced 4G data speeds. We've seen average download speeds on our HSPA+ 42 Mbps-capable data stick approaching 10 Mbps with peak speeds of 27 Mbps, and download speeds approaching 8 Mbps with peak speeds of 20 Mbps on our upcoming HSPA+ 42 Mbps-capable smartphones.

TDS Telecommunications Corporation
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider website advertises 15 and 25 Mbps service; screenshot below.

Verizon South Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.



West Carolina Rural Telephone Cooperative, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

DSL Only

12 MB*	$31.62 Per Month
6 MB*	$24.65 Per Month

Windstream Communications
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

See which of our speeds matches your online activities. Choose the right Internet speed (WATCH VIDEO)	3 Mbps (Basic Use)	6 Mbps (Most Popular)	12 Mbps (Fastest Option)

ACCURACY AND VERIFICATION: PROVIDER VALIDATION METHODOLOGY

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a statewide level, static maps of statewide and county-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Estimates derived from provider-validated data indicate that approximately 3.18 percent of South Carolina households do not have terrestrial fixed broadband service available, and approximately 0.16 percent of South Carolina households have neither mobile nor fixed broadband service available.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 4.04 percent of rural South Carolina households do not have terrestrial fixed broadband service available, and approximately 0.21 percent of rural South Carolina households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal

Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard.

6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. omni-directional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).
15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).
23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hillshade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

Broadband Inquiries Methodology

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connect South Carolina website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information requested by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at other such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,600 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connect South Carolina project has received a total of 25 inquiries (138 grant inception to date). As more inquiries are submitted to Connect South Carolina, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

My ConnectView Methodology

My ConnectView is an online, interactive mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connect South Carolina project launched My ConnectView on April 2, 2012, and received 881 visits this reporting period; to date the interactive mapping applications have received 7,262 visits.

SPEED TEST METHODOLOGY

The 90 speed tests that are represented in the Connect South Carolina Speed Test Report during this reporting period (505 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect South Carolina speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connect South Carolina project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connect South Carolina with the information on where broadband services are available. Second, unlike theoretical speed information which was received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the state of South Carolina.

Providers Deemed Non-Viable

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the October 2012 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	ACSinc.net	www.acsinc.net	This company does not provide residential Internet service.
2	Aerolina Wireless Networks	www.aerolina.com	This company provides commercial services only.
3	Airespring, Inc.	www.airespring.com	This company is a non-facilities-based reseller.
4	Beyond Communications	www.discoverbeyond.com	This provider offers service to select MDUs and HOAs, but not to public communities; non-responsive to multiple attempts.
5	Broadview Networks Holdings, Inc.	www.broadviewnet.com	Non-facilities-based reseller to businesses.
6	County of Oconee	www.oconeefocus.com	BIP recipient promotes the construction of a fiber optic broadband network in the county.
7	Genesis Telecommunications	www.genesistelcom.com	Dial-up services in Greenwood only.
8	Global Crossing Telecommunications, Inc.	http://www.globalcrossing.com	Acquired by another company.
9	Hickory Tech Corporation	www.enventis.com	B2B services.
10	Hotwire Communications	www.gethotwired.com	Offers residential service to one multi-dwelling unit.
11	LightEdge Solutions, Inc.	www.lightedge.com	Illinois provider; no service in SC.

12	Lightyear Network Solutions, LLC	www.lightyear.net	Non-facilities-based reseller.
13	Main Street Wireless	http://www.mainstreetsc.com	Provider may no longer be in business.
14	MegaPath Inc.	www.megapath.com	This company does not provide Internet services in the state.
15	Metropolitan Telecommunications Holding Company	www.mettel.net	Non-facilities-based reseller of business services.
16	Navacore.net	www.navacore.net	Dial-up only.
17	Net Doctors	www.netmds.com	This company does not offer high-speed Internet; dial-up only.
18	New Edge Network, Inc.	www.newedgenetworks.com	Acquired by Earthlink. Company does not offer residential service; resells backhaul.
19	NuVox, Inc.	n/a	Acquired by another company.
20	Open Range Communications, Inc.	http://www.openrangecomm.com	No longer in business.
21	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company.
22	Personally Complete	www.personallycomplete.com	This company does not provide Internet access.
23	Pine Tree Cablevision	www.ptc-me.net	This company is out of business.
24	PM Broadband	www.pmcol.com	This company is out of business.
25	Qwest Communications Company, LLC	www.qwest.net	Acquired by CenturyLink.
26	Shentel Converged Services, Inc.	www.shentel.com	This company is a private cable provider serving a few campuses and related MDUs, but not public residences.
27	Techcore Consultants II	www.almega.com	This company is no longer in business in South Carolina.
28	TeleSouth Wireless	www.telesouth1.com	The company appears to be out of business.
29	Telovations, Inc.	www.telovations.com	This company does not provide residential Internet services.

30	University Corporation for Advanced Internet Development	www.internet2.edu	This consortium is a BIP/BTOP recipient with no Internet network.
31	WilTel Communications, LLC.	n/a	Acquired by Level 3.
32	WP Media	www.wpmedia.com	This company is a consulting firm.

Appendix A: Broadband Provider Log

Broadband Provider Log

Complete	101
Non-Responsive/Refused	3
In Progress	1
Count of Datasets by Status	**105**
Total Unique Providers Represented	**47**

Provider Name	Platform	Status	NDA Execution Date	Notes
AT&T Inc.	DSL	Data Added to Statewide Inventory	12/16/2009	[AUG-28-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
AT&T Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[AUG-20-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[AUG-08-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Charter Communications, Inc.	Cable	Data Added to Statewide Inventory	12/15/2009	[AUG-20-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Clearwire Corporation	Mobile Wireless	Data Added to Statewide Inventory	3/17/2011	[JUL-19-12 Matthew Brunt] Change: Provider expanded mobile wireless coverage.
Comcast Cable Communications, LLC	Cable	Data Added to Statewide Inventory	12/7/2009	[AUG-28-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Countrywide Wireless	Fixed Wireless	Data Added to Statewide Inventory		[AUG-17-12 Matthew Brunt] Correction: Initial submission of provider's coverage, but they were in service previously.
Electronics Service Company of Hamlet, LLC	Fixed Wireless	Data Added to Statewide Inventory	3/24/2010	[AUG-17-12 Matthew Brunt] Change: Provider expanded fixed wireless coverage area.
Farmers Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	1/22/2010	[AUG-15-12 Matthew Brunt] Change: Provider expanded fiber coverage area.
Farmers Telephone Cooperative, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/22/2010	[AUG-15-12 Matthew Brunt] Change: Provider expanded mobile coverage area.
Frontier Communications Corporation	DSL	Data Added to Statewide Inventory	1/22/2010	[AUG-10-12 Matthew Brunt] Change: Provider added DSLAM locations.
Hargray Communications Group, Inc.	Cable	Data Added to Statewide Inventory	1/25/2010	[AUG-20-12 Matthew Brunt] Change: Provider expanded cable coverage area.
Hargray Communications Group, Inc.	Cable	Data Added to Statewide Inventory	1/25/2010	[AUG-20-12 Matthew Brunt] Change: Provider expanded cable coverage area.
Home Telephone Company, Inc.	DSL	Data Added to Statewide Inventory	1/22/2010	[AUG-03-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Home Telephone Company, Inc.	Fiber	Data Added to Statewide Inventory	1/22/2010	[AUG-03-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Home Telephone Company, Inc.	Fiber	Data Added to Statewide Inventory	1/22/2010	[AUG-03-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Home Telephone Company, Inc.	Cable	Data Added to Statewide Inventory	1/22/2010	[AUG-03-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Home Telephone Company, Inc.	Cable	Data Added to Statewide Inventory	1/22/2010	[AUG-03-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.

Horry Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	1/22/2010	[AUG-27-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Horry Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	1/22/2010	[AUG-27-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Horry Telephone Cooperative, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/22/2010	[AUG-27-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Horry Telephone Cooperative, Inc.	Cable	Data Added to Statewide Inventory	1/22/2010	[AUG-27-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/6/2010	[JUL-18-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Rock Hill Telephone Company	Mobile Wireless	Data Added to Statewide Inventory	1/25/2010	[AUG-15-12 Matthew Brunt] Change: Provider expanded mobile coverage area.
Spacenet Inc.	Satellite	Data Added to Statewide Inventory		[SEP-12-12 Matthew Brunt] Correction: Initial submission of provider's coverage, but they were in service previously.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[JUL-18-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[AUG-09-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
TDS Telecommunications Corporation	DSL	Data Added to Statewide Inventory	1/27/2010	[AUG-24-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Time Warner Cable LLC	Cable	Data Added to Statewide Inventory	12/21/2009	[AUG-20-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Verizon South Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[JUL-18-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
ViaSat, Inc.	Satellite	Data Added to Statewide Inventory	1/8/2010	[AUG-30-12 Matthew Brunt] Changes: Provider can now offer tier 7 download and tier 5 upload speeds to portions of their service area.
West Carolina Rural Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	1/22/2010	[AUG-15-12 Matthew Brunt] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Conterra Ultra Broadband Holdings	Backhaul	Backhaul Provider Only Processing Complete	11/8/2011	
Palmetto Rural Telephone Cooperative, Inc.	DSL	Speed Only Update; Data Processing Complete	1/22/2010	[AUG-03-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds and tier 5 upload speeds.
Palmetto Rural Telephone Cooperative, Inc.	DSL	Speed Only Update; Data Processing Complete	1/22/2010	[AUG-03-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds and tier 5 upload speeds.
Rock Hill Telephone Company	Cable	Speed Only Update; Data Processing Complete	1/25/2010	[AUG-15-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 9 download speeds.
Rock Hill Telephone Company	Cable	Speed Only Update; Data Processing Complete	1/25/2010	[AUG-15-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 9 download speeds and tier 4 upload speeds.
Rock Hill Telephone Company	Cable	Speed Only Update; Data Processing Complete	1/25/2010	[AUG-15-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 9 download speeds and tier 4 upload speeds.
Rock Hill Telephone Company	Fiber	Speed Only Update; Data Processing Complete	1/25/2010	[AUG-15-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 9 download speeds.
Rock Hill Telephone Company	Fiber	Speed Only Update; Data Processing Complete	1/25/2010	[AUG-15-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 9 download speeds.

Rock Hill Telephone Company	Fiber	Speed Only Update; Data Processing Complete	1/25/2010	[AUG-15-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 9 download speeds.
West Carolina Rural Telephone Cooperative, Inc.	DSL	Speed Only Update; Data Processing Complete	1/22/2010	[AUG-15-12 Matthew Brunt] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds and tier 5 upload speeds.
AT&T Inc.	Backhaul	No Update to Provide	12/16/2009	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Chesnee Telephone Company, Inc.	Cable	No Update to Provide	1/25/2010	
Chesnee Telephone Company, Inc.	DSL	No Update to Provide	1/25/2010	
Chester Telephone Company	Backhaul	No Update to Provide	1/25/2010	
Chester Telephone Company	Cable	No Update to Provide	1/25/2010	
Chester Telephone Company	DSL	No Update to Provide	1/25/2010	
Chester Telephone Company	Fiber	No Update to Provide	1/25/2010	
DeltaCom, Inc.	Backhaul	No Update to Provide	2/16/2010	
Family View CableVision	Cable	No Update to Provide		
Farmers Telephone Cooperative, Inc.	Backhaul	No Update to Provide	1/22/2010	
Farmers Telephone Cooperative, Inc.	Backhaul	No Update to Provide	1/22/2010	
Farmers Telephone Cooperative, Inc.	DSL	No Update to Provide	1/22/2010	
Farmers Telephone Cooperative, Inc.	DSL	No Update to Provide	1/22/2010	
Farmers Telephone Cooperative, Inc.	Fiber	No Update to Provide	1/22/2010	
Frontier Communications Corporation	Fiber	No Update to Provide	1/22/2010	
Hargray Communications Group, Inc.	Backhaul	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	Backhaul	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	Backhaul	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	DSL	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	DSL	No Update to Provide	1/25/2010	
Hargray Communications Group, Inc.	Fiber	No Update to Provide	1/25/2010	
Harron Communications LP	Cable	No Update to Provide		
Home Telephone Company, Inc.	Backhaul	No Update to Provide	1/22/2010	
Home Telephone Company, Inc.	Backhaul	No Update to Provide	1/22/2010	
Horry Telephone Cooperative, Inc.	Backhaul	No Update to Provide	1/22/2010	
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
NTInet, Inc	Fixed Wireless	No Update to Provide	2/9/2010	
Pee Dee Online Consulting	Fixed Wireless	No Update to Provide	2/24/2010	
Piedmont Rural Telephone Cooperative, Inc.	DSL	No Update to Provide	1/28/2010	
Piedmont Rural Telephone Cooperative, Inc.	Mobile Wireless	No Update to Provide	1/28/2010	
Rock Hill Telephone Company	Backhaul	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Backhaul	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Backhaul	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Cable	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	DSL	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	DSL	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	DSL	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	DSL	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Fiber	No Update to Provide	1/25/2010	
Rock Hill Telephone Company	Fixed Wireless	No Update to Provide	1/25/2010	
Sandhill Telephone Coop., Inc.	Backhaul	No Update to Provide	1/25/2010	
Sandhill Telephone Coop., Inc.	DSL	No Update to Provide	1/25/2010	
Skyrunner, Inc.	Fixed Wireless	No Update to Provide		
Southern Coastal Cable, LLC	Cable	No Update to Provide	6/30/2010	
Sprint Nextel Corporation	Backhaul	No Update to Provide	1/14/2010	
TDS Telecommunications Corporation	Backhaul	No Update to Provide	1/27/2010	
tw telecom of south carolina, llc	Backhaul	No Update to Provide	4/26/2010	
United States Cellular Corporation	Mobile Wireless	No Update to Provide	2/15/2011	
West Carolina Rural Telephone Cooperative, Inc.	Backhaul	No Update to Provide	1/22/2010	
ATG Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	1/14/2010	
Atlantic Broadband, LLC	Cable	No Update Provided - Use Last Submission Data	2/3/2010	
Charter Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data	12/15/2009	
Knology of South Carolina, Inc.	Cable	No Update Provided - Use Last Submission Data	7/13/2011	
Level 3 Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
Northland Communications Corp.	Cable	No Update Provided - Use Last Submission Data		
Pee Dee Net	Fixed Wireless	No Update Provided - Use Last Submission Data	2/23/2010	
Windstream Communications	Backhaul	No Update Provided - Use Last Submission Data	1/20/2010	
Windstream Communications	DSL	No Update Provided - Use Last Submission Data	1/20/2010	
Windstream Communications	Backhaul	Solicited Initial Data	1/20/2010	
Birch Communications, Inc.	Backhaul	Refused to Participate		[MAY-04-12 Daryl Coffey] A company representative sent an e-mail stating that the company declines to participate.
Atlantic Tele-Network, Inc.	Mobile Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during the last mapping submission period, 4 contact attempts were made this period.
Knology of South Carolina, Inc.	Backhaul	Non-Responsive to Multiple Attempts	7/13/2011	In addition to numerous contact attempts made during past mapping submission periods, 5 contact attempts were made this period.

South Dakota Broadband Mapping Project: Product Release White Paper

Contact Name Manager: Jim Edman
Contact Phone Number: 603-773-4861
Contact E-mail: Jim.Edman@state.sd.us

Submitted By: Kristin Rousseau
Contact E-mail: kristin.rousseau@broadmap.com

Product Specification: Fall 2012 NTIA Data Model
Product/Process: NTIA— October 1, 2012 Data Deliverable
Dataset Submission QC: NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's October 1st, 2012 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Provider Participation Statistics Summary

Summary	Count
Total Providers Researched/Contacted	98
Total Valid Broadband Providers	51
Non-Responsive Providers	4
Non-Cooperative Providers	1
Number of Providers - Supplied Updates for this Submission	38
Number of Providers - Confirmed No Updates	8

- New Providers Since Last Data Submission
    - No new providers added to the dataset for this submission.
    - Additional providers are currently under review to identify if they are valid broadband providers.

- Existing Providers – Confirmed No Updates
    - Cable One, Inc.
    - Hughes Network Systems
    - Knology, Inc.
    - MNW Wireless
    - Skycasters
    - StarBand Communications Inc.
    - Valley Telephone
    - Venture Communications

- Providers Included (listed by Provider and Holding Company name)

Alliance Communications Cooperative	MNW Wireless
AT&T Mobility	New Edge Network, Inc.
Beresford Municipal Telephone	Northern Valley Communications
Cable One, Inc.	Northern Wireless
CenturyLink (SD)	RC Communications
Cheyenne River Sioux Tribe	RC Technologies, Inc.
Consolidated Telecom	Roberts County Telephone Cooperative
Data Truck	Santel Communications
DigitalBridge Communications (BridgeMaxx)	SDN Communications
Faith	Sioux Valley Wireless
Fibercomm L.C.	Skycasters
Fort Randall	Sprint
Frontier Communications	StarBand Communications Inc.
Golden West Communications	Swiftel Communications
Hughes Network Systems	Triotel / McCook Cooperative
Interstate Telecommunications Cooperative	Valley Telecommunications Cooperative
Kennebec Telephone Company	Valley Telephone
KeyOn Communications Inc.	Venture Communications
Knology, Inc.	Verizon Wireless
Long Lines	West River Cooperative
Mediacom Communications Corporation	West River Telecommunications Cooperative
Midcontinent Communications	Western Telephone Company
Midstate Communications	WildBlue Communications Inc. (ViaSat)
Mitchell Telecom (Sancom, Inc. dba Mitchell Telecom)	Zayo

- Non-Responsive Providers/Non-Cooperative Providers
    - KeyOn Communications Inc.
    - New Edge Network, Inc.
    - Western Communications
    - Wirefree USA
    - Nate’s Net

- Providers researched and identified as non-broadband providers can be viewed within the table at the end of this document.

COVERAGE AREA CHANGES

- Coverage Footprint Reductions/Map Refinement –
  - CenturyLink (TT-10)
  - AT&T Mobility LLC (TT-80)
  - Cheyenne River Sioux Tribe Telephone Authority (TT-10)
  - Fort Randall Telephone Company (TT-10)
  - Golden West Cablevision Inc (TT-10)
  - Golden West Telecommunications (TT-10)
  - Interstate Telecommunications Cooperative, Inc. (TT-10)
  - James Valley Telecommunications (TT-10)
  - Mediacom LLC (TT-40)
  - Midcontinent Communications (TT-40)
  - NVC (TT-10)
  - Santel Communications Cooperative (TT-10)
  - SDN Communications (TT-50, TLIDS)
  - Splitrock (Middle Mile)
  - Swiftel Communications (TT-50)
  - TrioTel Communications, Inc. (TT-10)
  - Venture Communications Coop. (TT-10, FRN-0004338463)
  - West River Telecommunications (Middle Mile / Rename)
  - Zayo Group LLC (Middle Mile)

- Coverage Footprint Expansion –
  - Beresford Municipal Telephone (TT-10)
  - Cheyenne River Sioux Tribe Telephone Authority (TT-50)
  - Frontier Citizens Communications of Minnesota (TT-10)
  - Golden West Telecommunications (TT-50)
  - Interstate Telecommunications Cooperative, Inc. (TT-50)
  - Midcontinent Communications (TT-50)
  - Midstate Communications (TT-50)
  - RC Technologies, Inc. (TT-71)
  - Santel Communications Cooperative (TT-50)
  - SDN Communications (TT-50, Blocks)
  - SpeedConnect (TT-71)
  - SpeedConnect (TT-80)
  - Splitrock Properties (Middle Mile)
  - Swiftel Communications (TT-10)
  - TrioTel Communications, Inc. (TT-50)
  - Venture Communications Coop. (TT-50, Both FRNs)
  - ViaSat (TT-60)
  - West River Cooperative Telephone Company (TT-10)
  - West River Cooperative Telephone Company (TT-50)

- Provider Attribution or Name Changes –
  - West River Telecommunications Cooperative (Middle Mile Rename)
  - WildBlue Communications, Inc. (TT-60, Changed Name ViaSat)
  - New Edge Networks, Inc. (TT-20/TT-30 Removed / Non-Coop)
  - Venture Communications Coop. (TT-10 / FRN 0004338463 / Removed)

DATA CORRECTIONS

- Beresford Municipal Telephone
  - Beresford has a pipeline that supports a restricted amount of bandwidth. They offer their business customers a better overall package/level of service but since they have a limitation in their infrastructure, they are unable to support the same level of service for their residential customers.
    They were originally represented as two different footprints, one for residential with lower speeds and the other for business with higher speeds, to support the difference in services they support.

    NTIA requested that the residential footprint be removed and the remaining footprint updated to support both residential and business services for now. They stated that they will look into this mapping for a potential update to the data model in future data submissions, because there are many providers offering both services with different speeds.

COMMUNITY ANCHOR INSTITUTION (CAI) DETAILS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	CAIID Counts	Broadband Subscriber (Yes)	Trans Tech	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	447	208	386	252	230	231
Category 2 - Library	96	80	27	22	16	15
Category 3 - Medical/Healthcare	180	0	104	32	25	24
Category 4 - Public Safety	373	0	70	51	27	27
Category 5 - Universities/Colleges	36	24	35	22	23	22
Category 6 - Other: Government	353	0	353	353	353	353
Category 7 - Other: Non-Government	16	0	6	5	4	4
Total	**1501**	**312**	**981**	**737**	**678**	**676**

CAI CHANGES

- The State Information Technology Bureau, the Bureau of Information and Telecommunications, extracted broadband service details from their circuit inventory system regarding the broadband capabilities of the k-12 schools, universities, and state/county/local government offices to which it provides services.

- The CAI inventory was review again against the database mentioned below for the following categories: Category 1: K-12 Schools, Category 2: Libraries and Category 5: Colleges
These databases are as follows:

  - For K-12 institutions (CAI type 1) please add the NCES ID CCD ID value found here: **http://nces.ed.gov/ccd/bat/**

  - For Higher Education (CAI type 5) please add the NCES IPEDS ID value found here: **http://nces.ed.gov/ipeds/datacenter/**

  - For Libraries (CAI type 2) please. Combine (do not add) “FSCSKey” and “FSCs_SEQ” from the “puout08av2000” file and place them here: **http://harvester.census.gov/imls/data/pls/index.asp** (FYI the LIBID is your state’s unique ID for libraries)

SUBMISSION RECEIPT

SUBMISSION RECEIPT RESULTS

- Attached are the results from the NTIA data submission receipt quality script.

SD_2012_9_26.txt

- Error Report
  - The main items flagged within the submission receipt were the technology and speed matches, which were validated by the provider and/or are within the ranges communicated in the NTIA data model.

  - All items are included within the accompanying ReadMe file.

HIGH-LEVEL SUMMARY

DATA GATHERING

BROADBAND SERVICE AREAS, MIDDLE MILE AGGREGATION POINTS AND BROADBAND SERVICE OVERVIEW

The collection of Broadband Service Areas, Middle Mile Aggregation Points and Broadband Service Overview information is handled through the following Provider Outreach Process:

- Build and maintain an inventory of Broadband providers through currently known providers and research.
- The inventory and everyday interaction with providers is tracked using the Provider Catalog (PCat). Below are some examples of the web application, which has a shared access between our team and mapping partner (BroadMap).

Company Information			Edit Clone History AAD
Provider Name	acmetech (All)	Source Name	acmetech
Company Address		Source Description	
Company PO Box		Layer Name	TBD
Company House Number	12345	Source Usage Type	Tracking
Company Street Name	Acme Avenue	Source Provider Type	BroadMap
Company City Name	Portland	Source Content Type	
Company Suite		Source Restrictions	☐
Company Postal Boundary		Source Restriction Description	
Company State		TT Types	--None-- Asymmetric xDSL Symmetric xDSL Other Copper Wireline Cable Modem-DOCSIS 3.0 Cable Modem-Other Optical Carrier/Fiber to the End User Satellite
Company Website	http://www.acmebroadband.com		
Source ID	4999		
Child Source	☐		
Parent URL			
Parent Source ID	0		
User Name			
Password		Addr Level Data Provided	☐
Form 477 Interest	☐	Preferred Contact Method	
Provider Portal Trained	☑		

Contacts New

Type	Name	Preferred	Phone 1	Phone 2	Email	Position
P	Sourcing					

FRN Info

Provider Name	DBA	FRN Number

Confidence New

TT Type	Confidence	Last Modified	Comment

Status Tracking

Non Facilities Based Provider	☐		
Business Only Provider	☐		
Reseller	☐	Non Responsive Provider	☐
NDA Review - Internal	☐	Non Cooperative Provider	☐
NDA Review - External	☐	Source Closed	☐

Service Provider Details

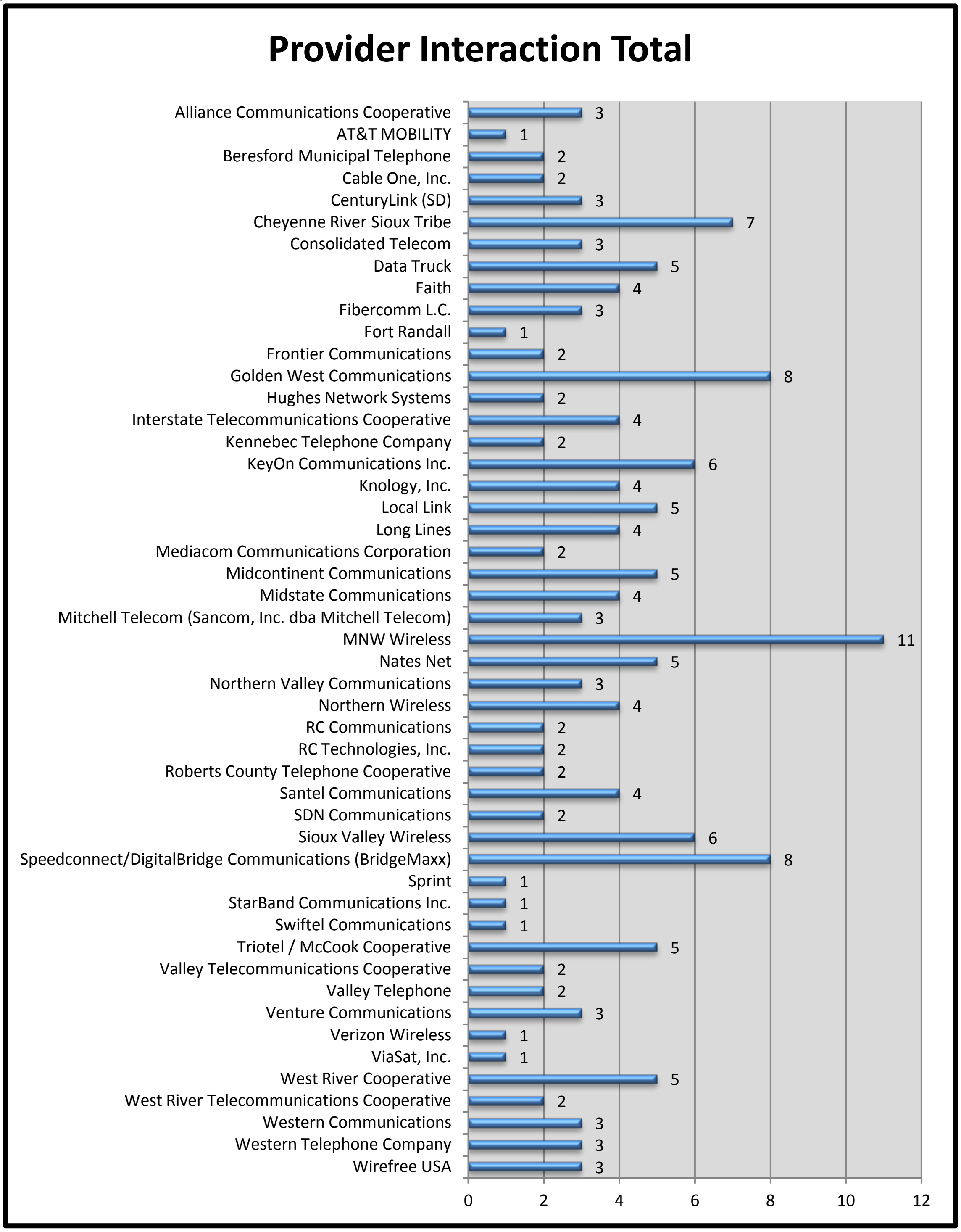
BroadMapper	--None--	BroadMap Status	Unassigned
Initial State Outreach Date		Initial Contact Vehicle	
Provider Origin		Member Association	
		Initial State Outreach	☐
		NDA Status	--None--
		NDA Not Required	☐
Provider Packet Exchanged	☐	NDA Requested	☐
Provider Packet Info Sent		NDA Exchanged	☐
Provider Meeting Status	--None--	NDA Exchange Date	
Technical Meeting Requested	☐	NDA Signed	☐
Technical Meeting Scheduled	☐	NDA Signed Date	
Number of Subscribers			
		Date Loaded	
		Source Closed Date	

BDIA Delivery 0412			Edit
Status	--None--	Provider Data Reviewed	☐
Outreach Date		Provider Data Reviewed Date	
Initial Response		FootPrint	
Meeting Date		MiddleMile	
No Update Date		Subscriber	
Waiting For Data Date		Provider Login	☐
Data Received Date		Provider Login Date	
Data Accepted Date			
Source Ingested		Source Ingested Date	

Additional Data

Notes			
Next Steps			
Inactive	☐	Owner	briordan
Created By	briordan 2011-06-13 12:06:35	Last Modified By	krousseau 2012-03-16 13:41:58

- In order to encourage participation throughout the life of the program, we feel it's important to foster relationships with the providers and encourage a collaborative team effort between all parties for each data submission. The chart below represents that interaction count with each provider.



- Update provider material that describes the data requirements and logistics for data transfer.
- Update Non-Disclosure Agreement (NDA) for use in the project, where applicable.
- Maintain multiple protocols for the provider to submit data, including Secure File Transfer Protocol (SFTP) technology when desired.
- Conduct one-on-one informational discussions with each provider to communicate the following:
  - Requirements of this project;
  - Broadband data required to support the product data model;
  - Submission protocols available;
  - Capability to validate how the supplied data is aggregated.
- Download/receive provider data.
- Establish a repeatable process with provider. Maintain provider communication, transaction and data handling records throughout the project (dates contacted, data received, etc.).

COMMUNITY ANCHOR INSTITUTION (CAI)

The collection of CAI information is handled through the following CAI Collection Process:

- Collect and maintain inventory of CAIs through currently known CAIs, data mining, and research.
- Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.
- Upload web-based data to Core Database for standardization.
- Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.
- Geocode CAI locations.
- Translate Core Database data to deliverable-ready format.
- Continue engagement with non-responsive institutions.

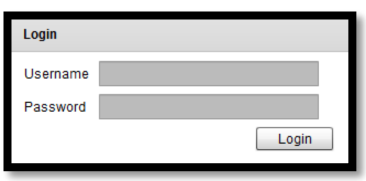
DATA INTEGRATION PROCESS

The data integration and processing mechanisms currently used allows for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

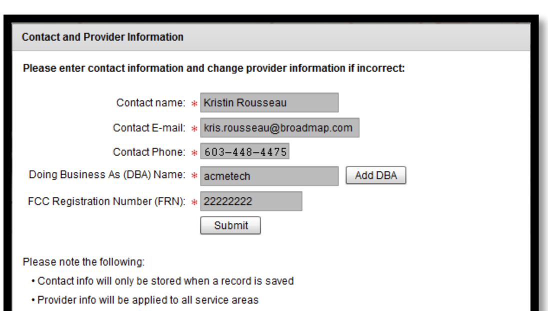
- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type category (addresses, block lists, paper maps, etc.).
- Standardize input based on data type within Staging Database.
- Create Compact Polygons (CP)—(internal methodology for generating area-based feature for coverage in Staging Database).
- Apply broadband attribution to CP; apply metadata to CP.
- Perform quality analysis of the CP against the source supplied to identify any completeness or accuracy issues.
- Request additional information from the provider if elements of coverage are missing or contain discrepancies. This is a second manual quality check to ensure data is complete.
    - Process coverage area to build the required NTIA data model layers.

With the deployment of the Provider Portal this round, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it supplies them with more visibility into how their data is being represented and gives them knowledge and ownership of their coverage representation. Below are some bullet points and supporting screen shots on how the portal is used.

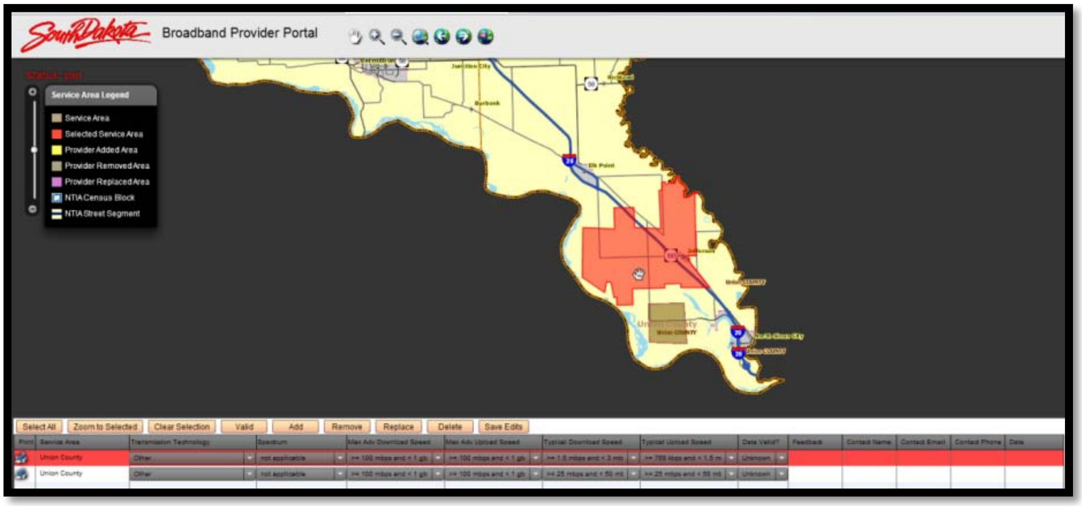
- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration



- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy

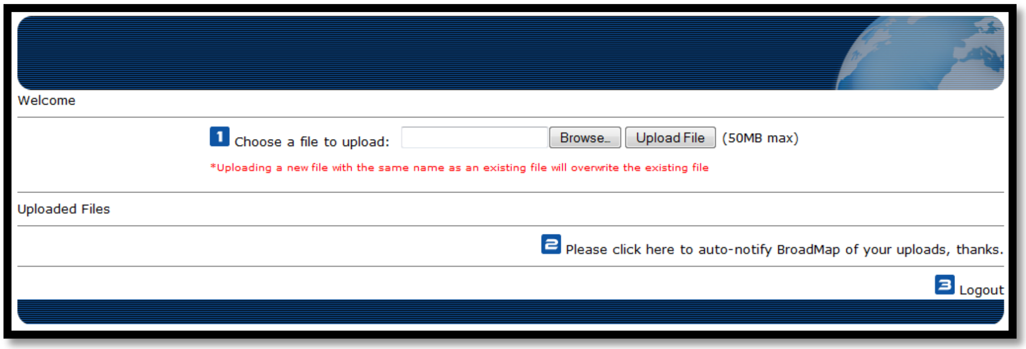


- Capability to review and request changes to the coverage footprint



  - The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

- File upload functionality to support providers that would prefer a shapefile, spreadsheet, PDF, KMZ/KML file be used to reflect changes for the data round



- Once the provider has reviewed completed changes to their coverage, they can then validate them by signing off that everything is accurate.

DATA VALIDATION AND VERIFICATION

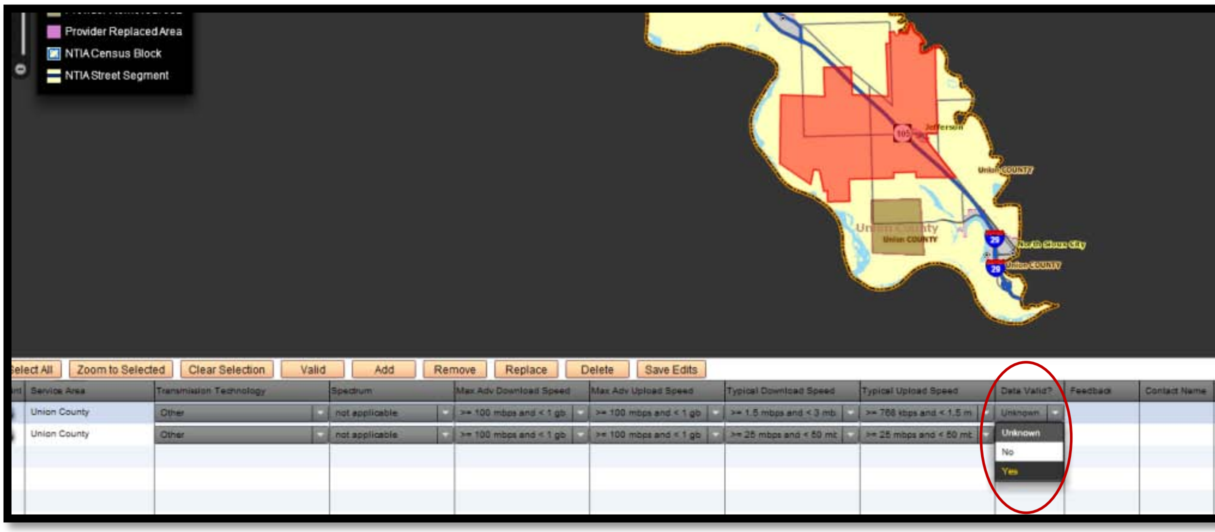
To ensure the data collected and processed is as accurate and as comprehensive as possible, South Dakota broadband verification encompasses many efforts. The methodologies employed are documented below:

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

First and foremost, all providers are given access to, and are trained in the use of, a web application we call the "provider portal". After each data collection and ingestion of provider data, representatives from the provider are able to review the polygons, segments, speeds, technologies, and other attribution that our GIS teams have developed based on the submitted data. Providers are given the opportunity to make changes to the data's attributes (speeds, technology, spectrum, etc…) as well as add/change/move/delete coverage areas. The requested changes are delivered to the GIS teams for full ingestion in our broadband database. This process is repeated until the provider representatives confirm that all aspects of the coverage areas are accurate and complete.

This portal is available 24/7/365 for providers to utilize, allowing those companies without GIS or mapping staff access to those technologies and benefits for review, presentations, and other business opportunities. This process has proven both successful and popular in the provider community.

- Coverage validation can be done on one record/footprint at a time or by selecting footprints and selecting the 'Valid' button. The provider could also print off or download their coverage for their own tracking purposes.



All validation results are tracked internally through our Validation Table, which also improves the overall **Confidence Value** as mentioned below.

FURTHER BROADBAND PROVIDER VALIDATION

Following the completion of each data submission, maps are supplied to each provider in PDF format for them to perform further validation and review with their staff. These maps are also utilized as marketing material for their websites, internal communications, etc., which further fosters participation.

Any feedback or changes received following the delivery of these maps are incorporated into the overall broadband map and reviewed again with the provider.

RF PROPAGATION – PREDICTIVE MODELING

For this data submission, we have started using EDX to perform RF propagation analysis and create predictive modeling of wireless coverage based on available tower data. The analysis performed thus far has not required us to make significant adjustments to the provider submitted shapefiles; however we are working with providers to collect further tower information, as well as potential extra signal strength that may be gained from repeaters.

We are also offering these maps created to providers as a service, so they can use it to further validate the coverage area and use it for marketing material. This will help ensure continuous participation in the program.

INDUSTRY KNOWLEDGE – SUBJECT MATTER EXPERTS

South Dakota's technology and telecommunications businesses are highly consolidated, with the State of South Dakota often being the largest consumer of services in the state. Given that, relationships and partnerships often already exist between the State of South Dakota and the broadband providers, giving a first-hand look at the services offered and where they are offered. In addition, the South Dakota broadband team has ready access to industry experts within the SD Public Utilities Commission, telecommunications association's boards, and technology industry experts in the fields of telecommunications and data networking.

Our office has met and consulted with these experts regarding provider data as issues were found. Examples of these consultations are the review of provider coverage areas against telecommunications exchange areas with the Public Utilities Commission and against known technological capabilities. Any anomalies or questioned material is relayed to the providers for review.

FIELD VERIFICATION

A number of field verification efforts have taken place during the last six months.

- For newly discovered fixed wireless providers, we send remote office staff out to document and photograph the tower infrastructure reported by the provider.

- For mobile wireless providers, broadband staff and other team members have completed over 40,000 miles of drive testing utilizing mobile wireless phones collecting information on coverage and broadband performance. This drive testing has collected over 1.86 million data points across the state that confirm the availability of wireless broadband signal at a geographic location by coordinates, with the data collected every 10 seconds during the drive testing. Tower location information and wireless speed test results were also collected during this drive testing, with over 25,000 test results collected. This gives us a total of 175,000 speed test results with the information collected during our field verification efforts and the Ookla mobile data.

An important point to note is that with the development of an automated toolset that allows team members to start data collection upon entering the vehicle and not need any further intervention, a number of staff members have been volunteering time to drive untested roads and territories of the state during vacations, other state business, or leisure time at no cost to the program.

Due to the nature of our organization being a centralized IT group for government and education, we are uniquely positioned to request field verification by our remote office staff. As technicians travel the state, they have performed speed tests at businesses, homes, and government offices, as well as surveyed remote office staff on availability of coverage areas at their homes.

THIRD-PARTY DATA VERIFICATION

The South Dakota broadband team has collected data from the FCC CBT and Mobile tests, the FCC dead zone reporting tool, FCC ASR datasets, our own hosted speed test application, provider speed test results, census data, provider exchange boundaries and commercially available datasets from Ookla to confirm the availability of broadband service. Of particular interest to our program were datasets that tied a specific address to the broadband data, as we have found other location-based services (IP geolocation) to be woefully inaccurate in our state.

Collected third-party data is overlaid against provider coverage areas for comparison. Most valuable has been our hosted speed test server (speedtest.sd.gov). This test collects specific address location information and provider details, while providing consumers the ability to directly provide more accurate location information via a clickable map in the event that their address is not geocoded correctly. This provides benefits to our verification effort as well as our Improved Address Files grant program.

Recently added to our verification efforts have been more accurate provider exchange boundaries and 2010 Census information on population density. Provider coverage areas are compared against known exchange boundaries, and census population density information is used to explain any possibly gaps in coverage.

CROWD SOURCING

In addition to our Crowd sourced speed test system, our state broadband website offers consumers the ability to report broadband dead zones, take surveys on available broadband and related topics, report inaccuracies in our online static/interactive maps, as well as any other relevant feedback about the broadband environment of South Dakota. This feedback is compared against provider coverage areas, with relevant information reported to the providers for comments and/or correction.

Website Hyperlink: **http://broadband.sd.gov/**

CONFIDENCE VALUES

All verification, validation and manual quality review results are tracked by provider/technology type and stored and maintained within a **Validation table**. A confidence value is assigned, based on internal assessments of the collected information, to highlight the provider coverage areas and/or attributions that would benefit from further investigation and/or enhancements.

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention.

QUALITY CONTROL

Following collection, processing and analysis of the provider and CAI data, the product is checked manually and algorithmically against the NTIA data model. Some of the items included within these checks are:

- Format correctness;
- Table and field structure;
- Valid values, including default values, where applicable;
- Geographic extent and topology errors.

Prior to data submission, another quality control script supplied by NTIA is run. This script, SBDD_CheckSubmission.py, creates an output in text form that is required to be submitted along with the final deliverable. All errors must come up clean, unless otherwise specified by NTIA.

DETAILED PROCESS REVIEW

To review the detailed process, please review the attached object:

BMap_ProcessDetails_2012_10_01.docx

PROVIDERS RESEARCHED

Below is a list of providers that were researched and contacted, but identified as non-broadband providers and didn't require inclusion within the data submission. Some may be due to different naming conventions or inaccurate FRN/DBA names and were therefore considered a closed source.

5LINX Enterprises, Inc.
Airespring, Inc.
Apptix, Inc.
Aptela, Inc.
Bandwidth.com, Inc.
Birch Communications Inc.
Broadvox Go!, LLC
BullsEye Telecom, Inc.
Cause Based Commerce Inc.
CommPartners Holding Corporation
Dickey Rural Telephone Cooperative
DigitalBridge Communications Corp.
Evertek, Inc.

Matrix Telecom, inc.
Megapath, Inc.
Metropolitan Telecommunications Holding Company
Millicorp
Minnesota Valley Television Improvement Corporation
Mitel Netsolutions Inc.
MobilePro Corp.
Nates Net
Native American Telecom
NextWave Wireless Inc.
nexVortex, Inc.
Northeast Nebraska Telephone Company
NOS Communications, Inc.

Farmers Mutual Telephone Company (MN & SD)	OrbitCom, Inc
Fionda VoIP, LLC	PaeTec Corporation
Granite Telecommunications, LLC	Phone.com, LLC
Great Plains Communications, Inc.	Proximiti Technologies, Inc.
GreatCall, Inc.	Siouxland WISP
Hickory Tech Corporation	Timber Lake Broadband
iCore Networks, Inc.	Trans National Communications International, Inc.
InPhonex.com, LLC	tw telecom inc.
Kosmaz Technologies, LLC	VoIP360, Inc.
Level 3 Communications, LLC	VoIPStreet, Inc.
Local Link	Vonage Holdings Corp.
LY Holdings, LLC	Wave2Wave Communications, Inc.

OFFICIAL OCTOBER 2012 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE STATE OF TENNESSEE

CONNECTED Tennessee

THE TRAIL TO INNOVATION®

October 1, 2012

TABLE OF CONTENTS

October 1, 2012

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

As the State Broadband Designated Entity, Connected Tennessee, in partnership with the Department of Finance and Administration's Office of Information Resources and the Department of Economic and Community Development and other agencies, please accept this submission from Connected Tennessee on behalf of the State of Tennessee's State Broadband Initiative (SBI) Grant Program.

The Connected Tennessee program and its collective stakeholder community continue to be faithful and energized contributors to the National Telecommunications and Information Administration's (NTIA) SBI program. Now more than ever, the significance of complete and validated data as compiled through the Federal Communications Commission's (FCC) National Broadband Map is instrumental in forging the innovation economy of the 21st century. As the Commission relies upon this unique resource to distribute monies under the Connect America Fund, through the Universal Service Fund reform, the Connected Tennessee program equally values this data in informing meaningful program interventions relating to broadband access, adoption, and use initiatives. Truly, this coordination embodies the spirit of the SBI and demonstrates the joint effort of the NTIA, FCC, state governments, industry, and non-profits like Connected Nation as it continues to serve as a key tool for the American public and policymakers. We are proud of the role that Connected Tennessee has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit broadband providers, consumers, and businesses nationwide.

The artifacts that comprise this submission should be found to be compliant with the October 1, 2012, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connected Tennessee: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in

		Census Blocks of No Greater Than Two Square Miles in Area
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A: 4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)	n/a	Accuracy and Verification Report
n/a	DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a	n/a	List of Changes and Corrections to the Dataset
n/a	n/a	Non-Participating Provider (NPP) Narratives
n/a	n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the April 2012 SBI data submission for the Connected Tennessee program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on August 9, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance
New to the semi-annual submission for October 2012 is a more robust version of the ReadMe text file. As per the template released on the Grantee Workspace on May 18, 2012, this file contains a high-level summary of the items contained within the submission, including the exact file deliverables, a description of the errors and warnings from the Check Submission report, and extraneous information of which the NTIA and other users of the dataset should be made aware.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the April 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That practice continues in this submission as technology and speed combinations are reviewed and scrutinized; any questionable information supplied by providers is reviewed more in depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

Also in this submission are narratives describing the data and coverage estimation of non-participating providers. While Connected Tennessee continues outreach to all providers prior to each submission period, the need to submit broadband service data for all providers regardless of their participation is evident as the SBI program continues into this sixth round of data submissions. The submission of this estimated broadband service area for providers that have not supplied data to Connected Tennessee is essential in being able to portray a more accurate depiction of the current broadband landscape.

In addition to the requirements mentioned above, please find this methodology paper to be inclusive of the ongoing section pertaining to industry mergers and acquisitions – specifically this section details any and all mergers or acquisitions that have taken place in Tennessee since the April 2012 submission. The intent of this updated section is to provide a better understanding of how the broadband provider landscape has changed since the last submission cycle.

This October 2012 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for approximately 96.55 percent of the Tennessee provider community, or 84 of 87 total providers. There are 82 participating providers and 2 additional non-participating providers whose estimated coverage areas have been submitted. Of the 82 participating providers, 27 supplied an update to their network or coverage area(s), while 34 have reported no change. The remaining 21 represent providers who previously supplied data but were non-responsive in the October 2012 update effort; therefore their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact record is contained herein. The 3 providers that are not represented in the attached datasets have refused to participate in the voluntary program or were non-responsive to multiple contact attempts.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connected Tennessee principals that all commercially reasonable efforts were made to account for 100 percent of the known Tennessee broadband provider community, pursuant to this semi-annual data update submission.

Connected Tennessee has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connected Tennessee conducts field validation efforts. To date, 63 (72.41percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connected Tennessee website, (www.connectedtn.org), continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connected Tennessee website encountered 4,635 unique visits during this reporting period (44,291 total to date for the life of the grant awarded on December 20, 2009). Additionally, this pronounced Web activity netted 81 broadband inquiries over this same reporting period (1,528 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connected Tennessee website and the Connected Tennessee interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connected Tennessee mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connected Tennessee to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connected Tennessee has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Outreach was conducted during this data update reporting period by Connected Tennessee to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connected Tennessee website. During this reporting period Connected Tennessee has continued working with a number of statewide entities such as NetTN to promote the importance of broadband connectivity at anchor institutions and participation in this data collection process. It became apparent that these relationships are beneficial to the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connected Tennessee will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connected Tennessee has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connected Tennessee is also working hard to clarify CAI information associated with wireless broadband. NTIA has requested in-depth questioning of CAI listing a wireless broadband service as their sole form of connectivity. This follow-up allows us to better understand the reason for adopting the wireless broadband service.

From our work in Tennessee, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connected Tennessee efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connected Tennessee program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great State of Tennessee, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,

Corey R. Johns
Executive Director
Connected Tennessee

Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

DATA ACQUISITION: TENNESSEE COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this sixth reporting period of the SBI, Connected Tennessee, working in close coordination with the State of Tennessee, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connected Tennessee has continued to identify and process CAI data obtained through an ongoing statewide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connected Tennessee through Esri ArcGIS software.

Connected Tennessee continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connected Tennessee website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the state as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the state client. Connected Tennessee will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link:
http://www.surveymonkey.com/s/RJK59FP

In addition to the survey, Connected Tennessee has continued working with a number of statewide associations such as NetTN to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connected Tennessee will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connected Tennessee has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connected Tennessee conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connected Tennessee continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connected Tennessee works with the Department of Finance and Administration's Office of Information Resources and the Department of Economic and Community Development and other agencies to identify existing relationships that can support CAI outreach.

Connected Tennessee has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connected Tennessee project as well as self-awareness of their own CAI connectivity (specifically upload and download speeds). Connected Tennessee will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the Department of Finance and Administration's Office of Information Resources and the Department of Economic and Community Development and other agencies will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the state.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	2,364	2,364	2,358	1,166	1,166	1,163
Libraries	317	317	317	225	225	225
Healthcare	821	821	816	120	119	119
Public Safety	748	748	744	266	113	113
Higher Ed Institutions	387	387	386	153	156	101
Other Government	1,289	1,289	1,281	1,220	1,183	1,183
Other Non-Government	164	164	163	73	69	69
Total	6,090	6,090	6,065	3,223	3,031	2,973

During the coming months, CAI data collection will be supported by regular reporting to the Connected Tennessee team. The CAI data is proving an invaluable resource to all components of the Connected Tennessee effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on August 9,

2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.

Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the State of Tennessee.

Inventory of Deliverables, Connected Tennessee: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the State of Tennessee have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Tennessee as a polygon of the state boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development is underway at CN as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

TENNESSEE FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets and Trips;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and
- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff conducted on-site validation tests in Tennessee on the following providers: Ardmore Telephone Company Inc.; AT&T; Aurora Cable TV; Beasley Wireless; Ben Lomand Rural Telephone Cooperative Inc.; BreezeAir.Net; Bristol Tennessee Essential Services; Cable ONE; Cellular South Inc.; CenturyLink; Charter Communications; Clarksville Department of Electricity (d.b.a. CDE Lightband); Clearwire Corporation; Columbia Power & Water Systems; Comcast; CRU Enterprises; DeKalb Telephone Cooperative Inc.; DotSpot Wireless; ECSIS.Net; FiberNet; Frontier Communications Corporation; High Country Online; InfoEd Wireless; Infostructure Cable; Jackson Energy Authority; James Cable; Ken-Tenn Wireless LLC;; Leap

Wireless International Inc.; Level 3 Communications; Loretto Telephone Company Inc.; Mediacom Southeast LLC. (d.b.a. Mediacom Communications Corporation; Rapid Communications LLC and Mediacom); MidSouth Satellite; Millington Telephone Company (also d.b.a. Big River); Morristown Utilities; NetEase; North Central Telephone; OrbWireless.net; Planet Connect Internet; QuickRelay Wireless Communications; Skyline Telephone Membership Cooperative; Softek; Spirit Broadband; Sprint Nextel Corporation; Surfmore; TDS Telecom; TEC of Jackson Inc.; Tele-Page; Inc.; Tennessee Wireless; Time Warner Cable (formerly under New Wave Communications); T-Mobile USA Inc.; TNWeb; Trenton Cable TV Company; Twin Lakes Telephone; U.S. Cellular; Ultra High Speed Internet; UltraNet; United Telephone Company; Verizon Communications Inc.; West Kentucky Rural Telephone; Wide Open West (formerly d.b.a. Knology of Tennessee Wisper LLC; Xpansion Network; and Zito Media.

In addition to the field verification tests that have been conducted, Connected Tennessee has also conducted work in the field to collect information for the non-participating providers, Tennessee Wireless and TNWeb which, by nature of the methodology required for this collection, are also included in the above list.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 63 companies (out of a universe of 87 viable providers) totaling 72.41 percent within the State of Tennessee. This percentage also considers the non-participating provider (NPP) records submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Providers" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on August 9, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

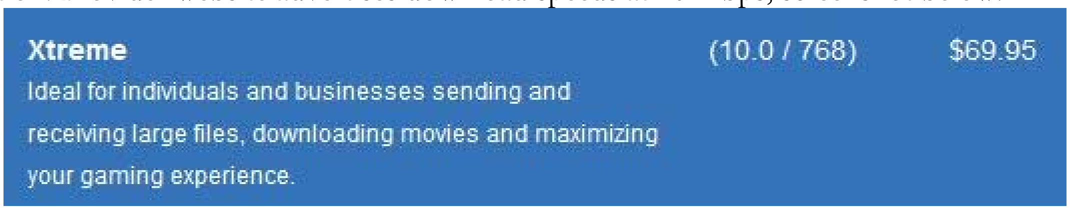
AT&T Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises download speeds up to 24 Mbps; screenshot below.

Compare Internet Packages

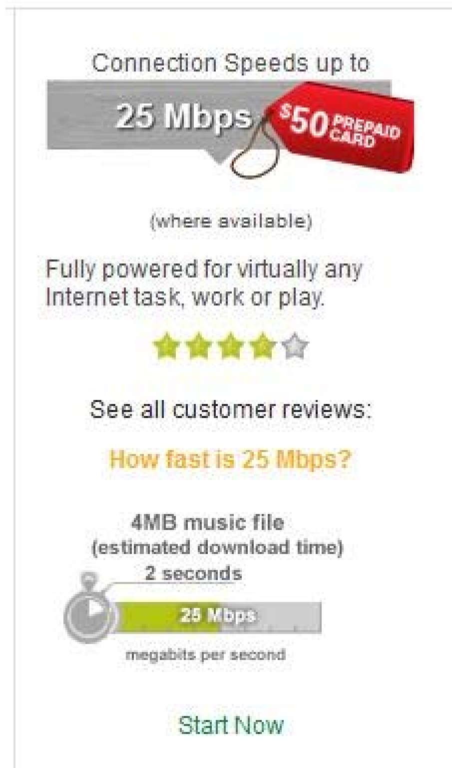
	Pro	Elite	Max	Max Plus	Max Turbo
Standard Monthly Rate	$38*	$43*	$48*	$53*	$63*
Downstream Speed	Up to 3 Mbps	Up to 6 Mbps	Up to 12 Mbps	Up to 18 Mbps	Up to 24 Mbps

AT&T Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider confirmed that tier 7 service is available.

Ben Lomand Rural Telephone Coop., Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises download speeds at 10 Mbps; screenshot below.



CenturyLink
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises download speeds packages at 25 Mbps; screenshot below.



Columbia Power & Water Systems
Issue: Technology of transmission code 41 with maximum advertised download speed in tier 8, higher than expected value range for the technology.
Resolution: Provider website advertises up to 50 Mbps service, which requires DOCSIS 3.0 modem; however, most of the system is still on DOCSIS 2.0; screenshot below.

Residential Service Packages for Cable TV Subscribers

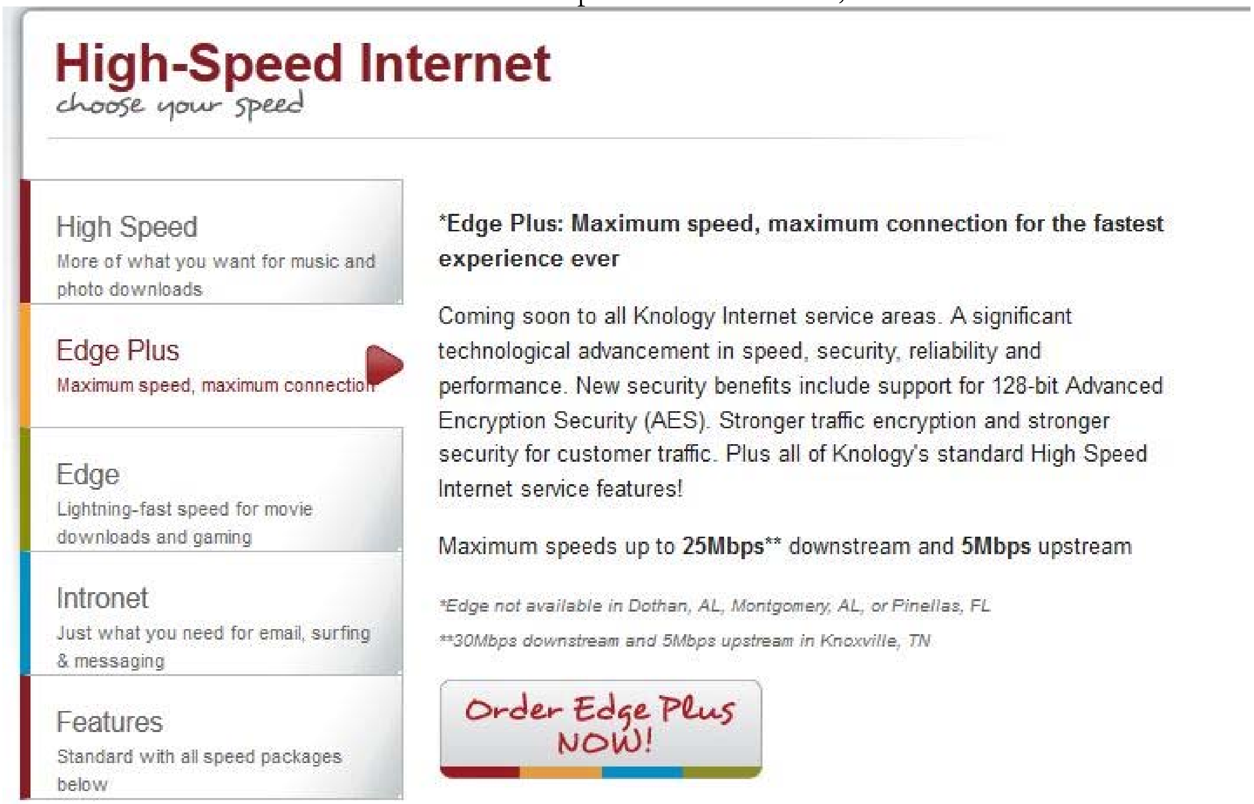
PowerNet Basic *Up to 3.0 Mbps download/384 kbps upload*	$ 24.95
PowerNet 5.0 *Up to 5.0 Mbps download/512 kbps upload*	$ 29.95
PowerNet 8.0 *Up to 8.0 Mbps download/896 kbps upload*	$ 34.95
PowerNet 12.0 *Up to 12.0 Mbps download/1.2 Mbps upload*	$ 42.50
PowerNet 18.0 *Up to 18.0 Mbps download/1.8 Mbps upload*	$ 52.95
PowerNet 50.0 *Up to 50.0 Mbps download/5.0 Mbps upload* *(Requires DOCSIS 3.0 modem.)*	$ 60.00

Comcast Cable Communications, LLC
Issue: Technology of transmission code 40 with maximum advertised download speed in tiers 6 and 7, lower than expected value range for the technology.
Resolution: Confirmed use of DOCSIS 3.0 with speed tier 7. Speeds are kept lower currently to be backwards compatible.

DeKalb Telephone Cooperative, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps; screenshot below.

(Max Download / Max Upload)
1M down / 512k up
3M down / 512k up
6M down / 512k up
12M down / 512k up

Knology of Tennessee, Inc.
Issue: Cable platform with maximum advertised download speed in tier 8.
Resolution: Provider website advertises 30 Mbps for Knoxville area; screenshot below.



MegaPath Inc.
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps and 45 Mbps service; screenshots below.

DSL service provides download speeds up to 20 Mbps over a nationwide, multi-redundant private network that optimizes performance and security. DSL is an ideal broadband solution for small and medium-sized businesses that download large files or use the Internet extensively.

For maximum connectivity at a minimum cost, there's no greater value than MegaPath Business Ethernet. Choose the bandwidth—2 Mbps up to 45 Mbps—that best fits your business' needs.

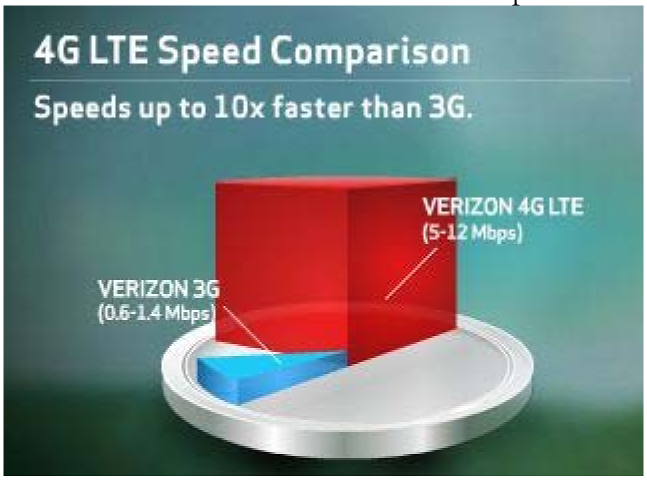
T-Mobile USA, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 4G services with speeds greater than speed tier 6.

> T-Mobile customers with 4G phones are already experiencing data speeds that are comparable to or faster than the speed of a home broadband network. And with recent improvements to our 4G network-doubling our theoretical download speeds-we're giving our customers enhanced 4G data speeds. We've seen average download speeds on our HSPA+ 42 Mbps-capable data stick approaching 10 Mbps with peak speeds of 27 Mbps, and download speeds approaching 8 Mbps with peak speeds of 20 Mbps on our upcoming HSPA+ 42 Mbps-capable smartphones.

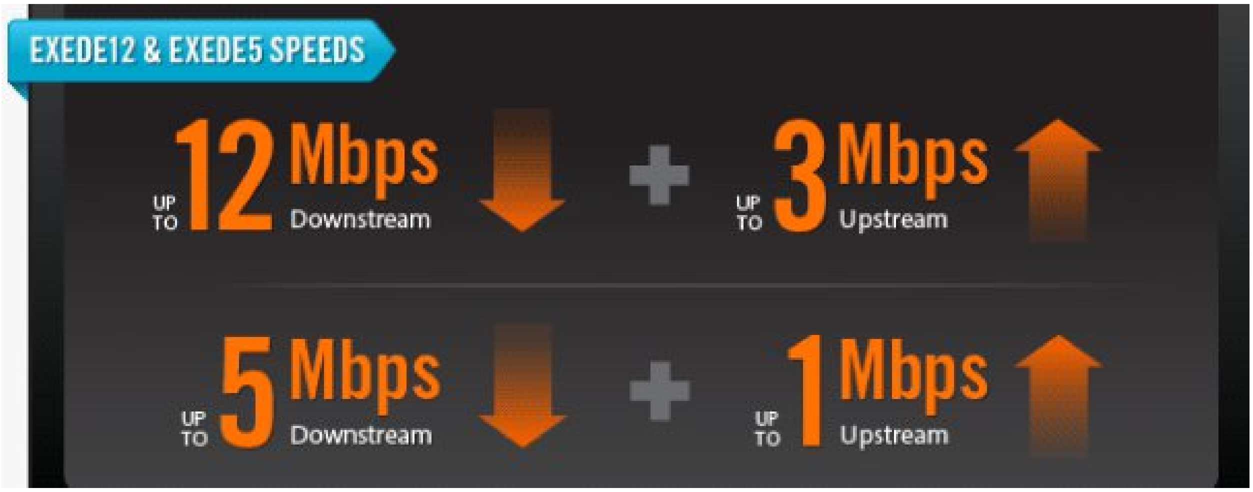
TDS Telecommunications Corporation
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider website advertises speeds at 15 and 25 Mbps; screenshot below.

Twin Lakes Telephone Cooperative Corporation
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative confirmed that 10 Mbps download and upload speeds are available to residential customers, but it is not readily advertised.

Verizon Communications, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 4G LTE service at 12 Mbps.



ViaSat, Inc.
Issue: Satellite platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.



DATA SUBMISSION AND COVERAGE ESTIMATION OF NON-PARTICIPATING PROVIDERS

As part of its ongoing broadband mapping efforts, CN has developed a series of processes with the goal of submitting coverage estimation mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of platform type (cable modem, DSL, fixed wireless, etc.). This state specific collection of coverage estimation methodology papers (see Appendix A) demonstrates the estimated broadband service territory for the providers in this state that have either been non-responsive or that have refused to participate in the SBI mapping initiative.

ACCURACY AND VERIFICATION: PROVIDER VALIDATION METHODOLOGY

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a statewide level, static maps of statewide and county-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Additionally, non-participating provider narratives that were submitted in previous mapping cycles are subjected to the same level of scrutiny. Occasionally, a provider may elect to voluntarily participate (thus eliminating the need for future data estimation activities in the field). However, more often than not, the NPP narrative is updated with a combination of data gleaned from the provider's website, data obtained through FCC research and/or data collected/verified in the field by a CN staff engineer.

Estimates derived from provider-validated data indicate that approximately 3.99 percent of Tennessee households do not have terrestrial fixed broadband service available, and approximately 0.23 percent of Tennessee households have neither mobile nor fixed broadband service available.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 7.41 percent of rural Tennessee households do not have terrestrial fixed broadband service available, and approximately 0.44 percent of rural Tennessee households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

Wireless Methodology

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or

located on the FCC's Spectrum Dashboard. This research often proves to be exceptionally effective when estimating the coverage area of an NPP.

6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. omni-directional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).
15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).
23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hillshade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

BROADBAND INQUIRIES METHODOLOGY

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connected Tennessee website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information requested by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at other such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,600 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connected Tennessee project has received a total of 81 inquiries (1,528 grant inception to date). As more inquiries are submitted to Connected Tennessee, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

My ConnectView Methodology

My ConnectView is an online, interactive mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connected Tennessee project launched My ConnectView on April 2, 2012, and received 1,100 visits this reporting period; to date, the interactive mapping applications have received 8,639 visits.

Speed Test Methodology

The 1,761 speed tests that are represented in the Connected Tennessee Speed Test Report during this reporting period (14,532 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connected Tennessee speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connected Tennessee project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connected Tennessee with the information on where broadband services are available. Second, unlike theoretical speed information which was received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the State of Tennessee.

PROVIDERS DEEMED NON-VIABLE

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the October 2012 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	21Globe, Inc.	www.21globe.com	General reseller of DSL and backhaul.
2	A 007 Access	www.a007.com	General reseller of Quest DSL and mobile wireless; DSL does not qualify as the max advertised speed is 768 kbps x 128 kbps.
3	Aaccess Network Communications	www.aaccess.net	Not a broadband provider; installs and maintains WiFi systems.
4	Access123.net	www.access123.net	URL no longer in service.
5	ACERX.NET	www.acerx.net	General reseller but no contact information listed on website; requests for information were never returned.
6	Adelphia	n/a	No longer in business; assets liquidated.
7	Aeneas Communications, LLC	www.aeneas.com	Facilities-based CLEC that resells dial-up, DSL, and VoIP to consumers and business accounts.
8	Airespring, Inc.	www.airespring.com	General reseller of VOIP, long distance and data circuits (non-residential).
9	Airewaves Broadband, LLC	www.airewaves.com	URL no longer in service.
10	Airmail247.com	www.airmail247.com	Business mailing list search site; not a broadband provider.
11	America Internet & Communications	www.americainter.net	Offers high-speed business DSL and wireless point-to-point wireless services to business accounts.

12	Antioch Wireless Broadband	www.antiochwirelessbroadband.com	Resells DSL and cellular service in Antioch, IL only.
13	Arrowheadnet.com	www.arrowheadnet.com	Domain registration and web hosting company.
14	Atris	www.atris.biz	Offers VoIP, data, and softphone services to business accounts.
15	bargainisp.net	www.bargainisp.net	Generic web directory site; company does not offer broadband.
16	BeaDun Communications	www.beasleywireless.net	Subsidiary of Beasley Wireless; services offered to business accounts fall below NTIA's definition of "broadband."
17	Broadband National	www.broadbandnational.com	Nonfacilities-based general reseller of DSL and satellite for 36 companies (e.g., ACC Business, HughesNet, et al.).
18	Broadcore, Inc.	www.broadcore.com	Provides business solutions such as VOIP and network integration services.
19	Broadview Networks Holdings, Inc.	www.broadviewnet.com	Wholesale reseller of partners' communication products and services; company is nonfacilities-based.
20	Broadwing Communications	www.level3.com	Acquired by Level 3.
21	BullsEye Telecom, Inc.	www.bullseyetelecom.com	Integrated suite of telecommunications services for businesses and general reseller of backhaul.
22	Business Telecom, Inc.	www.earthlinkbusiness.com	B2B services only.
23	Camino-Net Internet Services	www.camino-net.com	No longer in business; was dial-up only.
24	CCIS.net	www.ccis.net	Now owned by Beacon Technologies; offers dial-up and is general reseller of DSL in Pennsylvania.
25	Cebridge Connections	suddenlink.net	Acquired by SuddenLink.
26	Celito Communications	www.celito.net	Offers dial-up and wireless in North Carolina.

27	Cinergy Communications Company	n/a	Acquired by Windstream.
28	Cleartouch.Com	www.cleartouch.com	Inactive URL; out of business.
29	Cognisurf	www.cognisurf.com	Offers dial-up only.
30	Deltaforce	www.deltaforce.net	Dial-up and webhosting services only.
31	deluxehost.com	deluxe-host.com	Offers web hosting only.
32	DGUI	www.dgui.com	No longer in business; domain name for sale.
33	Dial National	www.dialnational.com	Inactive URL; out of business.
34	Dialer.net	www.dialer.net	Offers international dial-up services.
35	DIECA Communications, Inc.	n/a	Acquired by Covad; then acquired by MegaPath.
36	Dixie-Net, Incorporated	www.dixie-net.com/wireless	Offers fixed wireless and DSL in Mississippi only.
37	Dresden Cable	n/a	Provider does not offer broadband; limited to CATV and satellite services only.
38	DSL @ Interlync	www.interlync.com	General reseller of DSL, wireless, VoIP, dial-up, web hosting etc.
39	DTS-NET.COM	www.dts-net.com	Provider of wholesale and retail telecommunications services.
40	Eagle One Wireless	www.e1w.com	Offers direct connect wireless internet services to businesses in northeast Mississippi, south central Tennessee, and northwest Alabama.
41	Endless Sphere Technology	www.endless-sphere.com	Electric Vehicle Technology Forums.
42	Enventis Telecom Inc.	www.enventis.com	Doing business as Hickory Tech; general reseller in Iowa and Minnesota area; local agent claimed they do not offer "broadband services."
43	ETI - Connecting Your World	www.cyberenet.net	General reseller of DSL services from infrastructure owned by Verizon, AT&T, and Covad.
44	Fast Dependable Access	www.fda.net	Not a broadband provider.
45	Gainesboro CATV	n/a	Does not offer broadband, CATV

			only.
46	Global Crossing Telecommunications, Inc.	http://www.globalcrossing.com	Acquired by another company.
47	Haywood Cablevision	www.cbvnol.com	Out-of-state provider; offers service in the Carolina Mountain area.
48	Highertech.Net	www.highertech.net	Appears to have been acquired by Chattanooga Net.
49	Hubwest Protected Networks LLC	www.hubwest.com	Dial-up and web hosting only recently merged with Southwest Cyberport.
50	Imbris, Inc.	www.imbris.com	Provides fixed wireless in Idaho only.
51	IMGISP.NET	www.imgisp.net	Search engine, generic web page.
52	Incredible Networks	n/a	Inactive URL; out of business.
53	Inercom Communications Inc.	www.inercom.com	Inactive URL; out of business, url for sale.
54	Interactiveinfo.com Inc.	www.rocketbroadband.com	Offers cable television services in NY only.
55	iRadical	n/a	Inactive URL; out of business.
56	ISPartner.net	n/a	Inactive URL; out of business.
57	Jenco Speed Web	www.jencospeed.net	Offers wireless service in Ohio only.
58	LARIAT.NET	www.lariat.net	Offers fixed wireless services in Wyoming only.
59	LCSisp.com	www.lcsisp.com	Offers national dial-up services only.
60	Lightyear Network Solutions, LLC	www.lightyear.net	Nonfacilities-based general reseller.
61	LinkAmerica.Net	www.linkamerica.net	Inactive URL; out of business.
62	MacWebTown.Net Works	www.macwebtown.net	McIntosh web services and technical assistance.
63	MainBoard	www.mainboard.cc	General reseller in Virginia.
64	Maine Cable and Wireless	www.mainecableandwireless.com	Inactive URL; out of business.
65	Marcin Company	n/a	Inactive URL; out of business.

66	Metropolitan Telecommunications Holding Company	www.mettel.net	MetTel provides facilities-based and resold services (certified CLEC in some states). The company provides a variety of voice, including wireless, and data services to commercial customers.
67	Millenicom Inc.	www.millenicom.com	General reseller of dial-up and mobile broadband (Sprint network).
68	MYWEBSTAR	www.mywebstar.com	Inactive URL.
69	Nanomega.Com	www.nanomega.com	Inactive URL; out of business.
70	NetAccess, Inc.	www.nas.net	Offers wireless B2B services only.
71	NetFire	n/a	No longer in business.
72	NetSpeed Online	www.netspeed-online.net	Inactive URL; out of business.
73	NetStar Communications	n/a	Offers virtual ISP services and web hosting.
74	New Edge Network, Inc.	www.newedgenetworks.com	Company has no residential service and re-sells backhaul; acquired by Earthlink.
75	NewWave Communications	http://www.newwavecom.com/	Acquired by another company.
76	Northwest ISP	www.northwestisp.com	Inactive URL; out of business.
77	NTCH, Inc.	www.cleartalkwireless.net	Acquired by Cleartalk Wireless.
78	NuVox, Inc.	www.windstream.com	Acquired by Windstream.
79	OnWav, Inc.	www.onwav.com/	Acquired by Twin Lakes Telephone Cooperative.
80	Overarch Broadband	n/a	Offers services in Idaho only.
81	Pacific Internet Exchange	www.pie.us	Inactive URL; company appears to have gone out of business.
82	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company.
83	Paknet Limited	www.ptcl.com.pk	Subsidiary of Pakistan Telephone Company; no services offered in the U.S.
84	Planet Online	www.planetonline.net	Offers website hosting services.
85	Point2Point	www.p2p-innovations.com	Out of business.
86	PremoWeb	www.premoweb.com	Offers national dial-up services only.

87	Qwest Communications Company, LLC	www.centurylink.com	Acquired by CenturyLink.
88	Rapid Communications, LLC	n/a	Acquired by Mediacom; subsequently acquired by Comcast.
89	Renaissance Networks	www.renaissancenetworks.com	Offers IT support to small businesses in New Mexico.
90	Rural Tennessee Wireless Broadband (RTWB)	http://www.rtwb.net/	No longer in business.
91	Scott County Telephone Cooperative	www.sctc.org	CLEC offering business class services only.
92	Shentel Converged Services, Inc.	www.shentel.com	Shentel Converged Services is classified as a Private Cable Operator and offers service to MDU housing facilities.
93	SI Wireless	www.siwirelessco.com	Resells Sprint 3G services.
94	Simply Dialup A Metrogeek Company	www.simplydialup.com	Offers dial-up only.
95	Sling Broadband	www.slingbroadband.com	Out-of-state provider; offers DSL and wireless services to business accounts in Florida.
96	Smartresort Co, LLC	www.baldwincountyinternet.com	General reseller of local ISP services.
97	Solutions IT Consulting, LLC	www.solutionsitc.com	Technology consulting firm.
98	Sparkplug Chicago, Inc.	www.airband.com	Offers point-to-point wireless and business solutions in Illinois.
99	Spring City Cable	n/a	Out-of-state provider; offers services in Utah only.
100	Surferz.Net	www.surferz.net	Offers dial-up in upstate NY only.
101	T1 Shopper	www.t1shopper.com	Search engine for general reseller.
102	Talk America Inc.	www.cavtel.com	Acquired by Cavalier Business Communications.
103	Telovations, Inc.	www.telovations.com	IT and IP solutions consultant.
104	The Nexus Group, Inc.	www.nxs.net	General reseller of AT&T DSL.
105	Total Access Networks, Inc.	www.totalaccess.net	Inactive URL.
106	TSISP.NET	www.tsisp.net	Inactive URL; out of business.

107	Two Rivers Media	n/a	Inactive URL; acquired by MediaCom.
108	University Corporation for Advanced Internet Development	www2.ntia.doc.gov/grantee/university-corporation-for-advanced-internet-development	Currently ineligible under the parameters and guidance of the SBI grant program.
109	UNUM Telecommunications, Inc.	www.utinet.net	Inactive URL; out of business.
110	VOLstate, Inc.	www.volstate.net	Offers Internet solutions and technical support to business accounts.
111	Waypoint Wireless	n/a	Consulting firm.
112	WilTel Communications, LLC.	www.level3.com	Acquired by Level 3.
113	Wireless Roanoke, Inc.	www.wirelessroanoke.com	Inactive URL; out of business.
114	wisbin	www.wisbin.com	Wisconsin broadband provider.
115	WorldCom Broadband	n/a	Acquired by Verizon.
116	Worldspice.net	www.worldspice.net	Offers web hosting and connectivity to business accounts.
117	www.AmericanAngel.us	www.americanangel.us	Inactive URL; out of business.
118	XTN	www.xtn.net	URL redirects to Jones Media.
119	YEYZOO.NET	www.yeyzoo.net	Inactive URL; out of business.
120	YLISP (Your Local ISP)	www.itsyournet.com	Resells DSL and dial-up.
121	YourT1Wifi.com	yourt1wifi.com	Offers wireless service in Idaho only.
122	ZOOM Internet Services, LLC	n/a	Michigan-based dial-up provider and web hosting company.

APPENDIX A: ESTIMATION OF NON-PARTICIPATING PROVIDERS

Tennessee Wireless

TNWeb

TENNESSEE WIRELESS LLC

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) mapping project.

The following narrative provides detail regarding the recent, and ongoing, data collection and coverage estimation activities related to Tennessee Wireless, LLC, a wireless Internet service provider (WISP), located in Centerville, Tennessee, with a service area around Centerville and Grinder's Switch. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation and site verification techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 12 instances of communication via telephone and e-mail sessions since October 24, 2011, through August 30, 2012. Only one communication reply was received from a company representative on January 31, 2012, with a response of wanting to participate. Additionally, CN staff members visited the Tennessee Wireless office on July 24, 2012, to discuss the broadband mapping project in person with Tennessee Wireless staff, but the office was closed.

The Issue

Tennessee Wireless, by its lack of responsiveness since January 31, 2012, has predicated its unwillingness and/or inability to participate in the Tennessee broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain and from on-the-ground data collection and site identification. For example, CN reviewed the provider's website (www.tennwireless.com) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system, using multiple company name searches, did not yield an FRN **(Exhibit C).** Also, to support field validation of access points, the company name was referenced against the FCC Universal Licensing System (ULS) to identify any spectrum authorizations the provider might hold which could possibly enhance locating active wireless transmit and/or access points for the service area. This process yielded no attributes of any license issued to Tennessee Wireless, LLC **(Exhibit D).**

Exhibit A: Service Plans

Exhibit B: Service Area

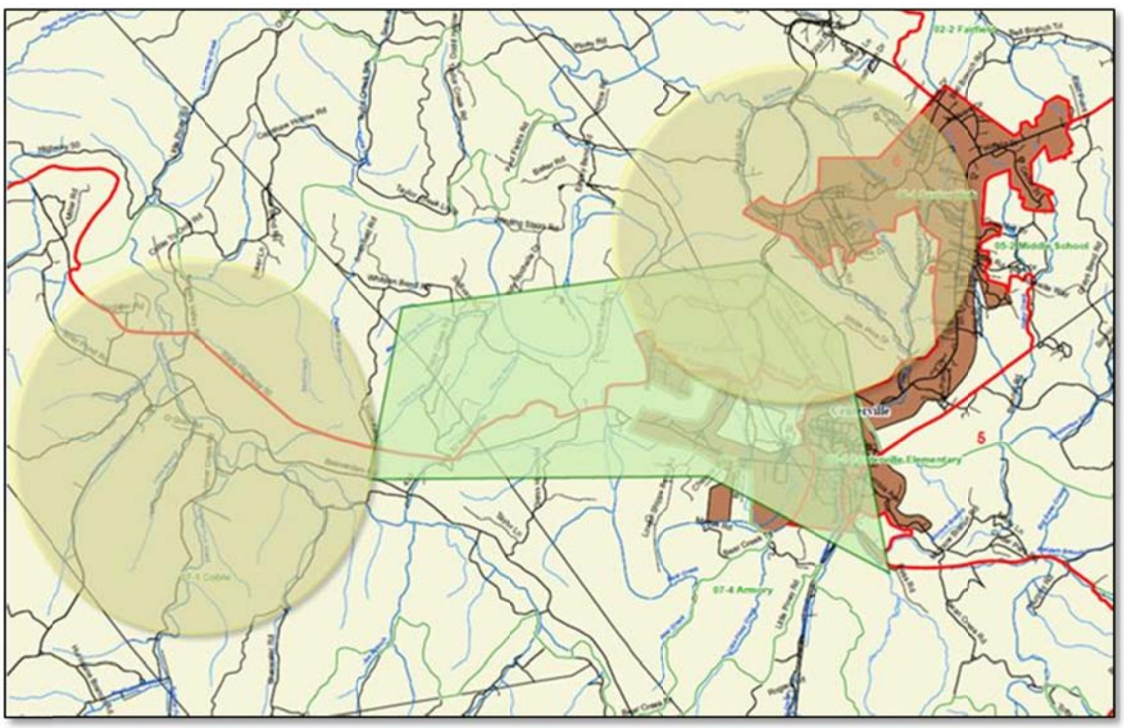
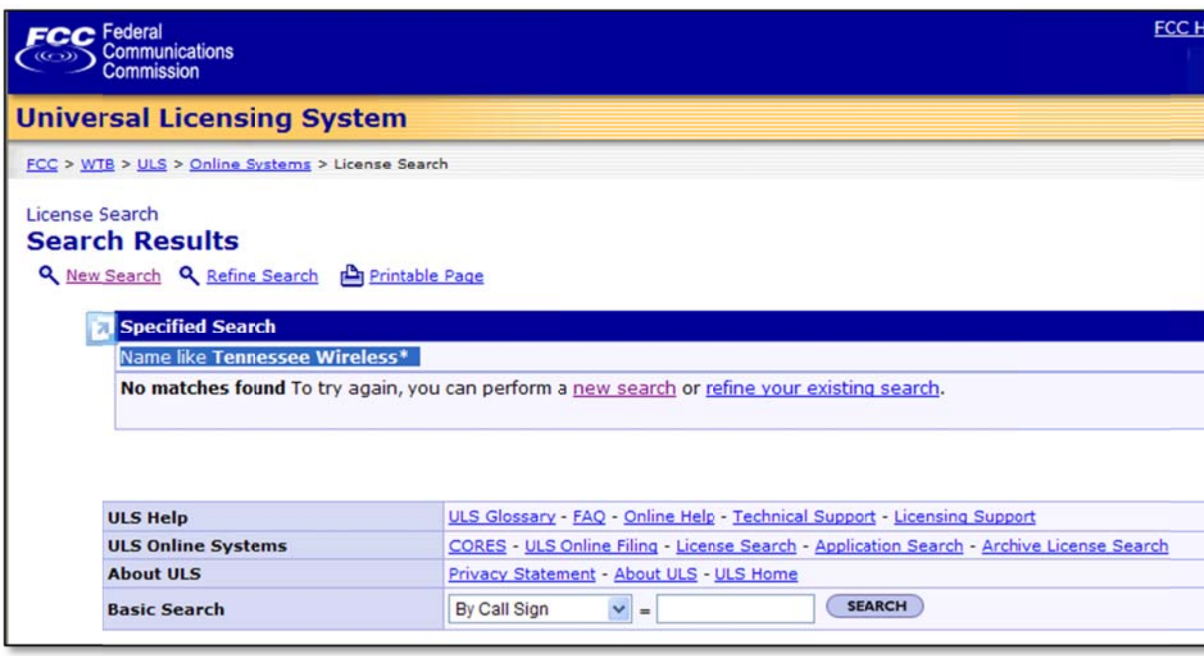


Exhibit C: Federal Registration Number Search Results

Exhibit D: License Search Results



Preliminary Identification of Provider's Coverage Area

Connected Nation extracted the Tennessee Wireless service area map from the provider's website, along with transmit site specific information from the same website. This combined information was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .1 mile (528 ft.) to establish a minimum search criteria of a given wireless transmit site and/or access point. The provider's service area depiction is represented by shaded symbols (polygons) as shown in **Exhibit B**. Using the site names (2 unique locations) available through the Tennessee Wireless website, a Google search was conducted to determine the locations of the sites. The coordinates for these 2 locations were entered into Google Earth and examined utilizing the zoom option of the aerial imagery. Both locations structures were identified. Both locations were then entered into the Microsoft *Streets & Trips* mapping application **(Exhibit F)** to develop a route for the on-the-ground data collection, site verification, and signal validation process.

Exhibit E: Google Earth: Provider's Service Area Image Overlay

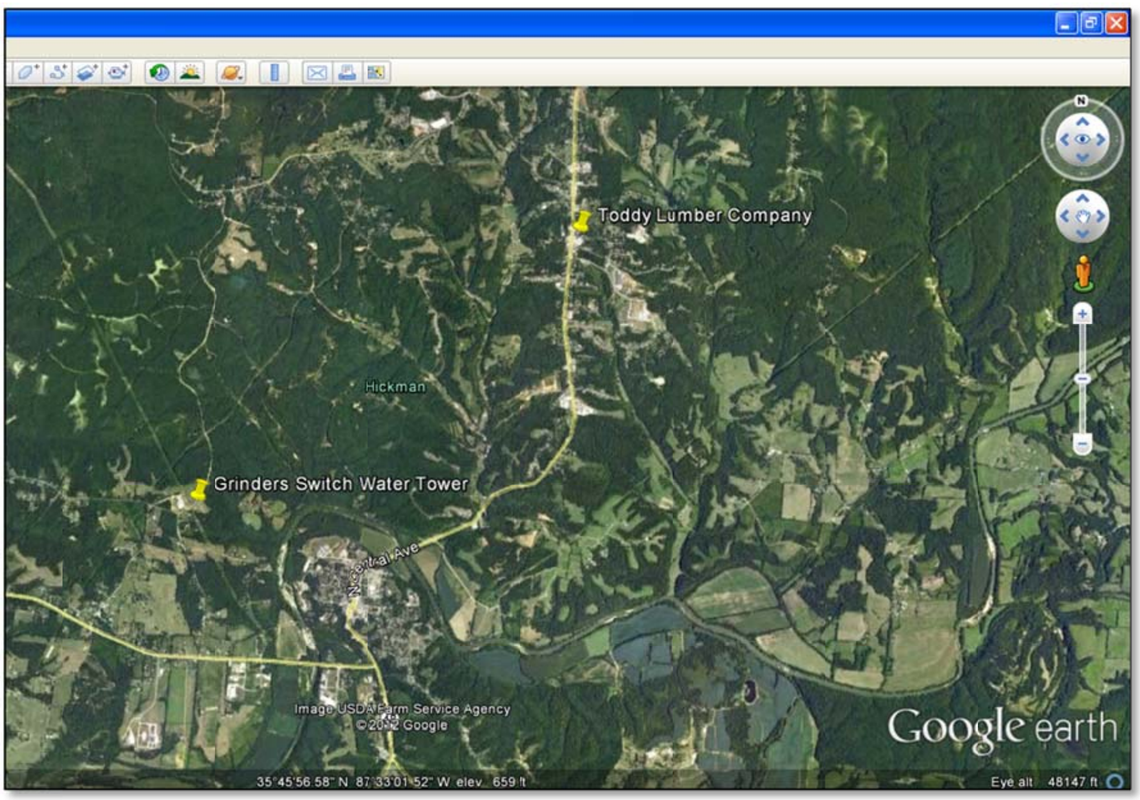
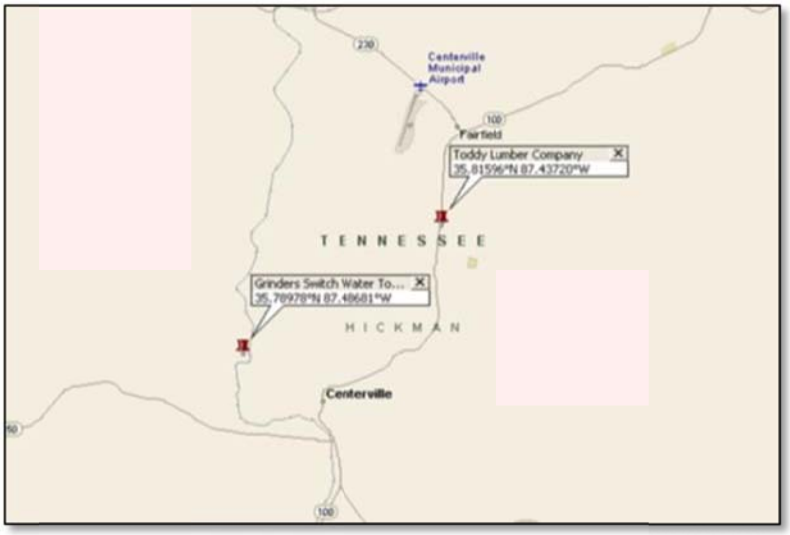


Exhibit F: Validation Points for AP Structures



Testing Techniques

A Connected Nation staff wireless engineer then developed a site validation route based on the datum established with the Google Earth image. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or directional antenna) and photographs were taken of the wireless transmit sites and access points.

Exhibit G: Field Data for Tennessee Wireless Toddy Lumber Location

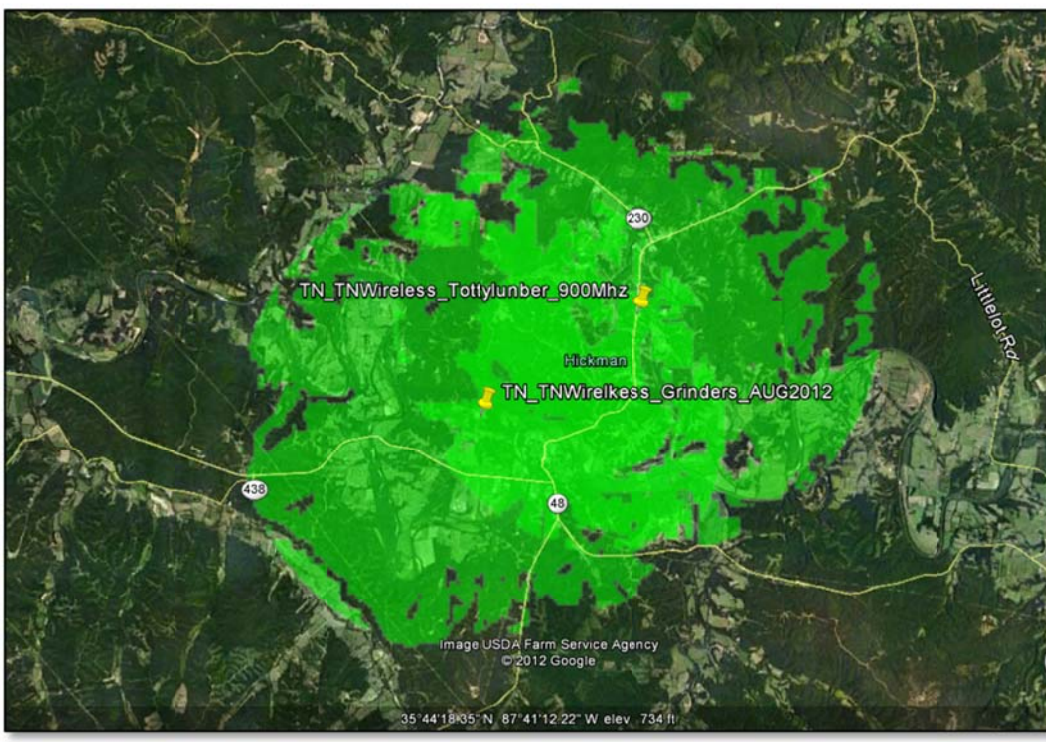
Results and Submission for October 2012

Of the 2 locations visited during the validation point route, 2 access points were identified and relative information was logged into the Tennessee Wireless field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the Connected Nation Provider Information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to Tennessee Wireless and the provider was advised that the information would be submitted to Connected Tennessee and to the NTIA if the provider did not respond with additions or discrepancies within a 48-hour period. To date, no response has been received from the provider.

Exhibit H: Field Validation Notes

	Provider	Location	Latitude	Longitude	Frequency Availability				Structure	Approximate Antenna Height	Notes
1											
2					900MHz	2.4GHz	3.65GHz	5.0GHz			
3	TennWireless	Toddy Lumber CO, Centerville, TN	35.815956	-87.437197	*				Free-standing towe	80	found thru press release on website. 3 sectors (105, 225, 345). Measured at 908 MHz @ -40.8 dBm
4	TennWireless	Grinders Switch	35.789780	-87.486810	*				Water Tower	100	found thru press release on website. 3 sectors (105, 225, 345). Measured at 908 MHz @ -36.8 dBm. Also captured SSID with network name of Grinders Switch
5											
6											
7											
8											
9											
10											
11											
12											

Exhibit I: Tennessee Wireless, LLC Composite Coverage



TNWEB, LLC

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) program.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to TNWeb, LLC (TNWeb), a wireless Internet service provider (WISP), located in Lewisburg, Tennessee, with a service area around Marshall County. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 18 instances of communication via telephone and e-mail sessions since January 7, 2010, through July 10, 2012. Telephone conversations took place during the April and October 2010 submissions, but the company was non-responsive during both submission periods. Since the April 2011 submission the provider has either chosen to not respond to telephone and e-mail outreach or has refused to participate. Additionally, a CN staff member visited the business office of TNWeb on July 10, 2012, to discuss the broadband mapping project in person with a representative of TNWeb. A staff member there provided a brochure but almost immediately, another staff member appeared stating their refusal to participate and asking the CN employee to leave at once.

The Issue

TNWeb, by its lack of responsiveness since October 2010, has predicated its unwillingness to participate in the Connected Tennessee broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (http://www.tnweb.com), and used the brochure obtained on July 10, 2012, to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0019020932 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced to the FCC Universal Licensing System (ULS) to identify any licenses the provider may hold which could possibly enhance locating active access points for the service area. This process yielded no results **(Exhibit D)**.

Exhibit A: Service Plans

TNWEB

Wireless Broadband Access

Phone: (931) 359-7960
Fax: (931) 359-3280
Toll free: 1-866-359-7960

Getting you there one click at a time

August 10, 2012
Home :: Sitemap

Home
Internet Access
Domain Hosting
Support
Downloads
Company Info
Computer Shop
Community Links

Sending harassing or mass unsolicited e-mail is prohibited. View the TNWEB user agreement, acceptable use, and privacy policies for more information on this and other TNWEB policies.

Wireless Broadband

Broadband Wireless Access for Businesses (Wi-Fi* 802.11) offers high-speed connections without wires. It works the same way a cordless phone does, transmitting a signal from a base station to a receiving device. TNWEB's Wi-FI signal operates in the 2.4 GHz radio band. The speed of the connection you receive is affected by several things including the amount of users using a single point, the distance the equipment is from the access point, any obstructions that might block the signal, and the speed of the line that connects to the access point.

Advantages of Broadband Wireless Internet Access:

- Deliver Internet Bandwidth without the cost of expensive Telco local loop charges.
- Cost Effective Dedicated Internet Access Solution, you can save thousands of dollars a year.
- Internet Access integrates directly into your existing Ethernet LAN.
- Wireless Broadband Internet Access is 40% to 50% less expensive traditional leased line dedicated Internet Access.
- Save the cost of monthly telephone line charges. Pay only for the equipment and Internet service.

Wireless Broadband Access			
Type of Service	Setup Fee	Access Fee	Equipment Rental
Residential	**$99.95** One Time	**$35.00/mo.**	**$4.95**** Per Month
Commercial	**$99.95** One Time	**$49.95/mo.** One Year Contract Required	**$4.95**** Per Month

* Wi-Fi is only available in select areas.
** Local TN Sales Tax applicable to equipment purchases and rentals.

Dialup Numbers	
Lewisburg Marshall	359-8170
Columbia Maury	223-3301
Nashville Davidson	324-3270
Full List	

Google SafeSearch
Google Search

TNWEB, LLC · P.O. Box 1542 · 812 W. Commerce St. · Lewisburg, TN · 37091
office@tnweb.com

Home · About Us · Sitemap · Webmail

Wireless

Wireless

Broadband Wireless Access for Businesses (Wi-Fi* 802.11) offers high-speed connections without wires. It works the same way a cordless phone does, transmitting a signal from a base station to a receiving device. TNWEB's Wi-Fi signal operates in the 900 MHz and 2.4 GHz radio bands. The speed of the connection you receive is affected by several things including the amount of users using a single point, the distance the equipment is from the access point, any obstructions that might block the signal, and the speed of the line that connects to the access point.

Advantages of Broadband Wireless Internet Access:

- Deliver Internet Bandwidth without the cost of expensive Telco local loop charges.
- Cost Effective Dedicated Internet Access Solution, you can save thousands of dollars a year.
- Internet Access integrates directly into your existing Ethernet LAN.
- Wireless Broadband Internet Access is 40% to 50% less expensive traditional leased line dedicated Internet Access.
- Save the cost of monthly telephone line charges. Pay only for the equipment and Internet service.

Residential

- Unlimited Hours per month*
- 5 e-mail address
- Billed monthly unless otherwise requested

One Time Fees:
Setup Fee: $99.95**
Router: $59.95 and up ◊

Monthly fee:
Access fee: $35.00
Equipment rental: $4.95

Commercial

- Unlimited Hours per month*
- 10 e-mail address
- Billed monthly unless otherwise requested

One Time Fees:
Setup Fee: $99.95**

Monthly fee:
Access fee: $79.95
Equipment rental: $4.95

* Unlimited access is not intended for dedicated usage
** Setup fee is for one machine. Networking multiple machines may incur additional charges
∗ Wi-Fi stands for Wireless Fidelity. This is not a "Hot Spot" and is not portable to multiple locations.
◊ A router is required for our wireless installations. Customer may provide one of their own for TNWEB techs to setup or may purchase one through TNWEB

Exhibit B: Service Area

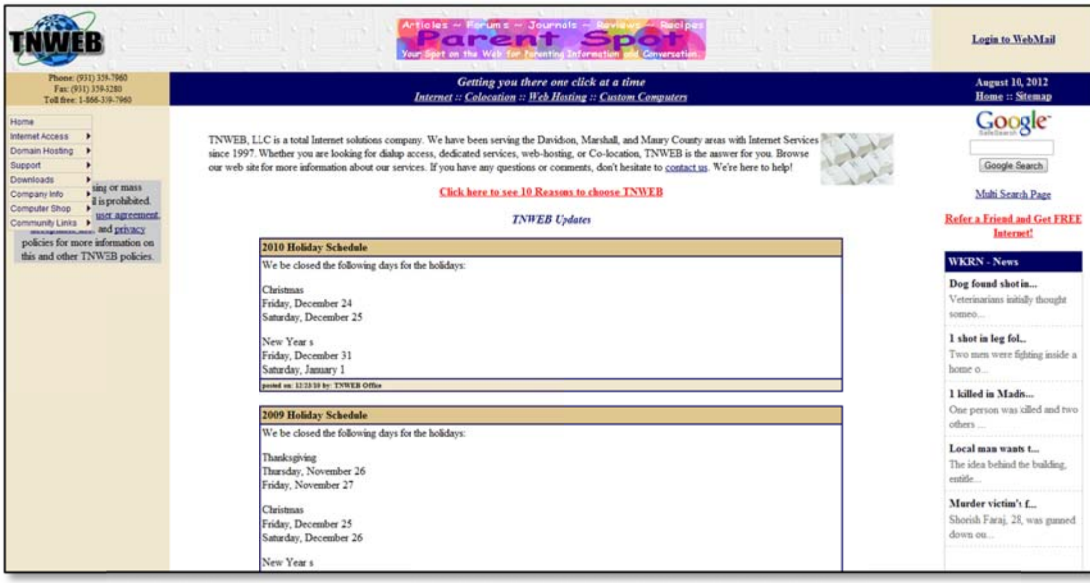
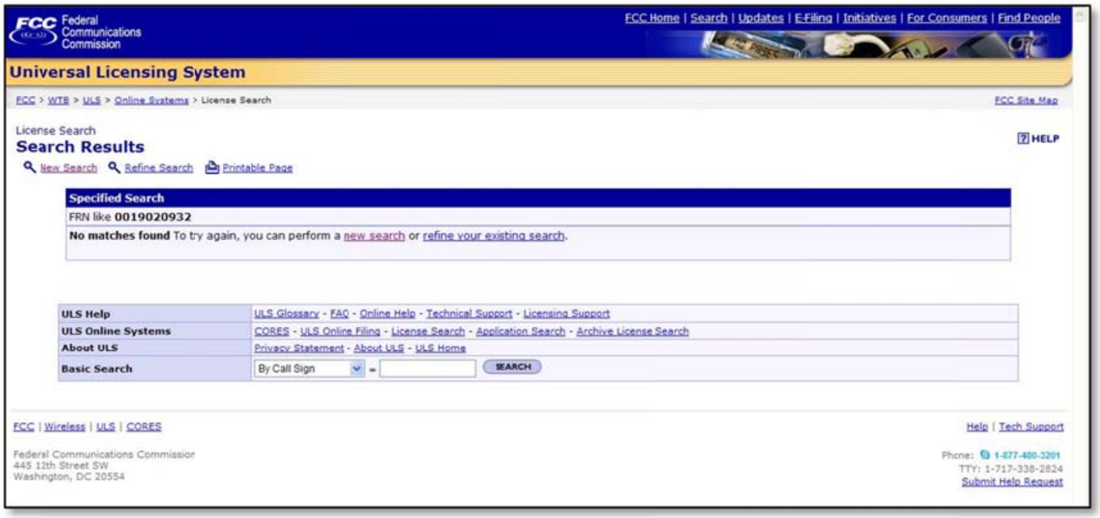


Exhibit C: Federal Registration Number

Registration Detail

FRN:	0019020932
Registration Date:	08/10/2009 08:22:00 PM
Last Updated:	
Business Name:	TNWEB LLC
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	TNWEB LLC
Contact Position:	CEO
Contact Name:	Mr Michael Hardrick
Contact Address:	812 West Commerce Street PO Box 1542 Lewisburg, TN 37091 United States
Contact Email:	office@tnweb.com
ContactPhone:	(931) 359-7960
ContactFax:	(931) 359-3280

Exhibit D: License Reference



<u>Preliminary Identification of Provider's Coverage Area</u>

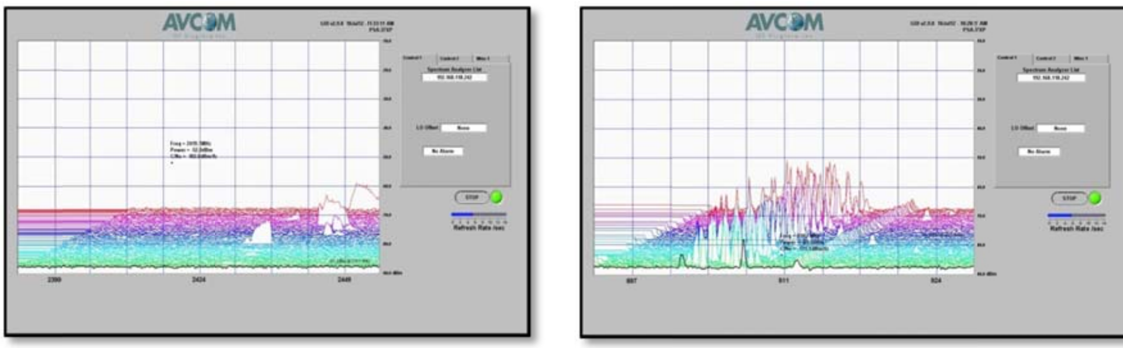
Connected Nation, using the information extracted from the TNWeb website, drove to the address given to validate that TNWeb was still in business. The address is the location of the TNWeb sales office, as well as the location of one of the identified towers for their wireless internet operations. The TNWeb, LLC sales office confirmed that the business is still operational and upon speaking with employees, wireless service availability was confirmed. The tower adjacent to the store was observed, coordinates were taken, and spectrum analysis was performed, along with pictures of the tower and equipment **(Exhibit E)**.

Exhibit E: TNWeb LLC Sales Office

Testing Techniques

Connected Nation staff developed a site validation route based on the information obtained from the TNWeb brochure and website. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit F)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored) and photographs were taken of the access points.

Exhibit F: Field Data for TNWeb Office/Hub Locations



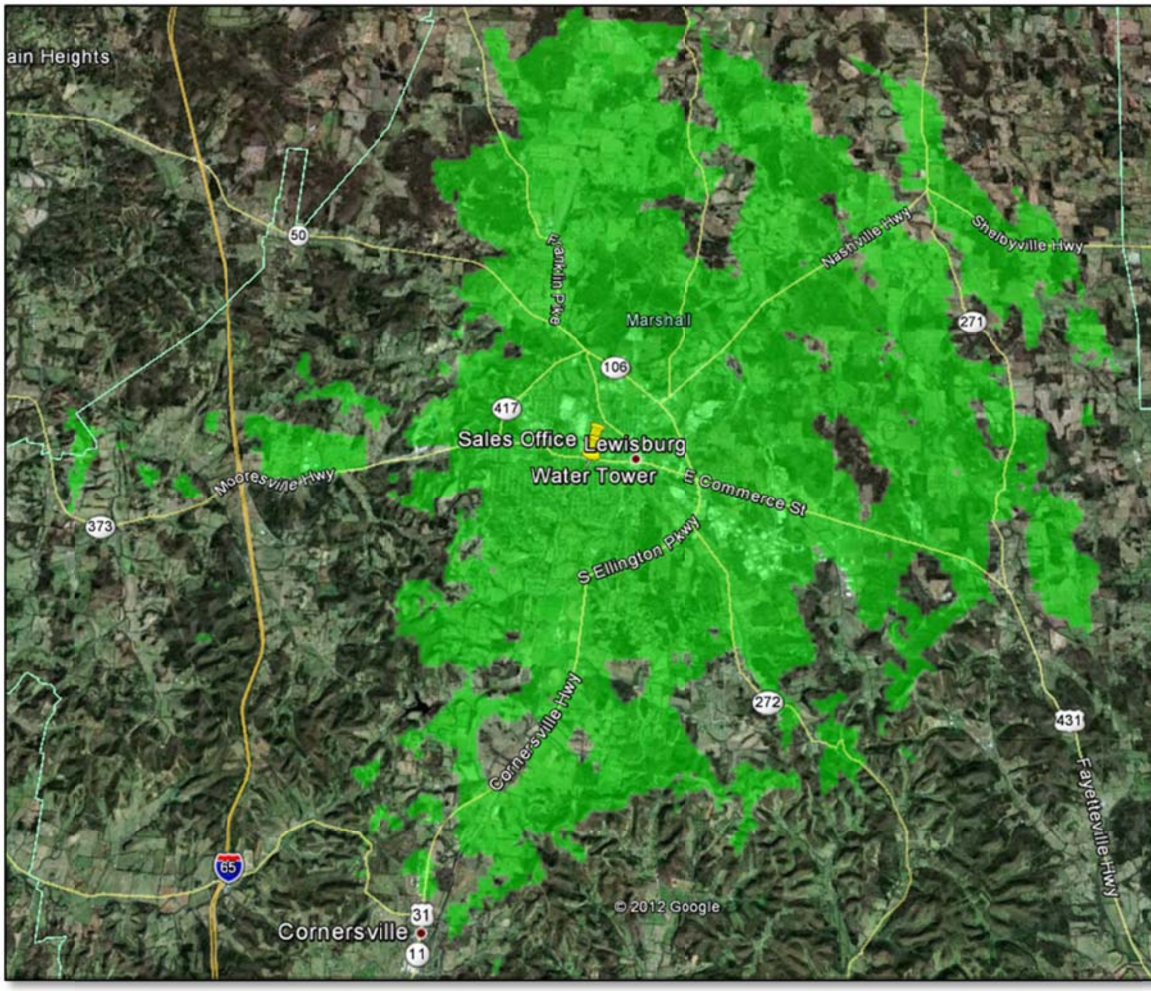
Results and Submission for October 2012

Of the 2 locations visited during the validation point route, 2 access points were identified and relative information was logged into the TNWeb field validation notes file **(Exhibit G)**. The field and the publicly available data were transferred to the CN Provider Information file. A composite propagation study was completed based on the field data **(Exhibit H)**. Both documents were forwarded to Bitwise Wireless as courtesy copies, and the provider was advised that the estimated coverage information would be submitted to Connected Tennessee and to the NTIA unless the provider notified CN within 48 hours of discrepancies of the estimated coverage. The provider did not respond to CN and, as of this date, CN believes the information to be an accurate estimation of the service area of TNWeb, LLC.

Exhibit G: Field Validation Notes

			Test Site Info			Engineer	Coordinates NAD 83 REQUIRED								Platform Type	
Site #	Date	Provider	Test County	Physical Address	Location Description	Engineer	Lat Deg	Lat Min	Lat Sec	(-) Long Deg	Long Min	Long Sec	(N) Lat Decimal	(-)(W) Long Decimal	Type	Presence Confirmed
1	7/10/12	TN Web	Marshall	812 W. Commerce St. Lewisbu	Sales office	Wes Kerr	35	27	3.3	-86	48	0.8	35.450917	-86.800222	Fixed Wir	Yes
2	7/10/12	TN Web		Near 8th Ave. and Cedar St. Le	Water Tower	Wes Kerr	35	26	53.9916	-86	48	2.3652	35.448331	-86.800657	Fixed Wir	Yes
3													0.000000	0.000000		
4													0.000000	0.000000		

Exhibit H: TNWeb Composite Coverage



APPENDIX B: BROADBAND PROVIDER LOG

CONNECTED Tennessee
THE TRAIL TO INNOVATION®

Broadband Provider Log

Complete	105
Non-Responsive/Refused	4
In Progress	6
Count of Datasets by Status	**115**
Total Unique Providers Represented	**87**

Provider Name	Platform	Status	NDA Execution Date	Notes
Ken-Tenn Wireless, L.L.C.	Fixed Wireless	Approval for Update Not Received - Data Still Submitted	1/25/2010	[SEP-14-12 Frank Aryee] Change: Provider added four fixed wireless towers.
AT&T Inc.	DSL	Data Added to Statewide Inventory	12/16/2009	[AUG-24-12 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
AT&T Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[AUG-21-12 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission. There was also a speed upgrade.
Ben Lomand Rural Telephone Coop., Inc.	DSL	Data Added to Statewide Inventory	10/21/2009	[JUL-17-12 Frank Aryee] Changes/Corrections: Provider expanded service area; also corrected coverage in Marion and Franklin Counties and made significant correction in Coffee County.
Ben Lomand Rural Telephone Coop., Inc.	Fiber	Data Added to Statewide Inventory	10/21/2009	[JUL-17-12 Frank Aryee] Change: Provider expanded service to additional areas in Van Buren, White, and Warren Counties.
BreezeAir.net	Fixed Wireless	Data Added to Statewide Inventory	8/17/2010	[AUG-02-12 Frank Aryee] Change: Provider activated new tower. There were also speed updates.
Capshaw Enterprises, LLC	Fixed Wireless	Data Added to Statewide Inventory	10/20/2011	[JUL-18-12 Frank Aryee] Change: Provider activated two new towers.
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[AUG-15-12 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission
Charter Communications, Inc.	Cable	Data Added to Statewide Inventory	12/15/2009	[AUG-03-12 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Comcast Cable Communications, LLC	Cable	Data Added to Statewide Inventory	12/7/2009	[AUG-30-12 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
DeKalb Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	2/24/2010	[SEP-14-12 Frank Aryee] Change: Provider expanded service to city limits of Carthage and South Carthage.
Frontier Communications Corporation	DSL	Data Added to Statewide Inventory	1/22/2010	[AUG-16-12 Frank Aryee] Change: Provider activated four new DSLAMs.
High Country Online LLC	Fixed Wireless	Data Added to Statewide Inventory	3/4/2010	[JUL-18-12 Frank Aryee] Change: Provider activated new tower.
JTM Broadband	Fixed Wireless	Data Added to Statewide Inventory		[JUL-17-12 Frank Aryee] Change: This is a brand new broadband provider in the market.
Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/6/2010	[AUG-02-12 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
MegaPath Inc.	DSL	Data Added to Statewide Inventory	2/15/2010	[AUG-31-12 Frank Aryee] Correction: Initial submission of provider's coverage, but they were in service previously.
Spacenet Inc.	Satellite	Data Added to Statewide Inventory		[SEP-14-12 Frank Aryee] Correction: Initial submission of provider's coverage, but they were in service previously.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[JUL-18-12 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[AUG-09-12 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.

TDS Telecommunications Corporation	DSL	Data Added to Statewide Inventory	1/27/2010	[AUG-21-12 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
TDS Telecommunications Corporation	Fiber	Data Added to Statewide Inventory	1/27/2010	[AUG-20-12 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission. There was also speed upgrade to fiber coverage.
TEC of Jackson, Inc	DSL	Data Added to Statewide Inventory	7/29/2010	[JUL-31-12 Ashley Hitt] Change: Provider activated a new DSLAM location.
TEC of Jackson, Inc	DSL	Data Added to Statewide Inventory	7/29/2010	[JUL-31-12 Ashley Hitt] Change: A DSLAM was decommissioned and a new one was installed at a new location near the previous site.
Time Warner Cable LLC.	Cable	Data Added to Statewide Inventory	12/21/2009	[AUG-15-12 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Verizon Communications, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[JUL-19-12 Frank Aryee] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
ViaSat, Inc.	Satellite	Data Added to Statewide Inventory	1/8/2010	[AUG-14-12 Frank Aryee] Change: Provider increased maximum advertised speeds.
Conterra Ultra Broadband, LLC	Backhaul	Backhaul Provider Only Processing Complete		
Iris Networks	Backhaul	Backhaul Provider Only Processing Complete	1/5/2010	
Sprint Nextel Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/14/2010	
T-Mobile USA, Inc.	Backhaul	Backhaul Provider Only Processing Complete	1/8/2010	
TDS Telecommunications Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/27/2010	
Columbia Power & Water Systems	Cable	Speed Only Update; Data Processing Complete		[JUL-17-12 Frank Aryee] Change: Provider upgraded infrastructure and can now offer tier 8 download speeds.
James Cable LLC	Cable	Speed Only Update; Data Processing Complete	1/11/2010	[AUG-20-12 Frank Aryee] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds.
TEC of Jackson, Inc	DSL	Speed Only Update; Data Processing Complete	7/29/2010	[JUL-31-12 Ashley Hitt] Change: Max download speed was upgraded on one DSLAM.
Trenton TV Cable Company	Cable	Speed Only Update; Data Processing Complete		[AUG-09-12 Frank Aryee] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds.
Tennessee Wireless, LLC	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[SEP-17-12 Ashley Hitt] Correction: Provider has not participated to date; coverage submitted was estimated by CN.
TNWEB, LLC	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[SEP-11-12 Frank Aryee] Correction: Provider has not participated to date; coverage submitted was estimated by CN.
Aurora Cable TV	Fixed Wireless	Partial Data Received	3/12/2010	[SEP-17-12 Ashley Hitt] Provider now offers fixed wireless service, but not enough information was received to create coverage; data should be submitted in April 2013.
Access Cable Television, Inc.	Cable	No Update to Provide		
Ardmore Telephone Company Inc	Backhaul	No Update to Provide	2/16/2010	
Ardmore Telephone Company Inc	DSL	No Update to Provide	2/16/2010	
AT&T Inc.	Backhaul	No Update to Provide	12/16/2009	
Aurora Cable TV	Cable	No Update to Provide	3/12/2010	
Bledsoe Telephone Cooperative Inc	DSL	No Update to Provide	1/20/2010	
Bristol Tennessee Essential Services	Fiber	No Update to Provide	9/1/2010	
Cable ONE Inc.	Cable	No Update to Provide	12/7/2009	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Clarksville Department of Electricity	Fiber	No Update to Provide		
Clearwire Corporation	Mobile Wireless	No Update to Provide	3/3/2010	
CRU Enterprises, Inc.	Fixed Wireless	No Update to Provide	2/4/2010	
DeKalb Telephone Cooperative, Inc.	DSL	No Update to Provide	2/24/2010	
DeltaCom, Inc.	Backhaul	No Update to Provide	2/16/2010	
Electric Power Board for the City of Chattanooga	Fiber	No Update to Provide		
ETC Communications, LLC	Cable	No Update to Provide	10/14/2009	
Fayetteville Public Utilities	Cable	No Update to Provide		
Highland Telephone Cooperative, Inc.	DSL	No Update to Provide	3/14/2010	
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	
iGiles.net	Fixed Wireless	No Update to Provide	2/25/2010	
Info-Ed Inc	Fixed Wireless	No Update to Provide	2/9/2010	
Jackson Energy Authority	Fiber	No Update to Provide	3/17/2010	
Loretto Telephone Company, Inc.	DSL	No Update to Provide	3/16/2010	
MegaPath Inc.	Backhaul	No Update to Provide	2/15/2010	
Millington CATV, Inc.	Cable	No Update to Provide	10/19/2009	
Millington CATV, Inc.	DSL	No Update to Provide	10/19/2009	
Monster Broadband, Inc.	Fixed Wireless	No Update to Provide	11/6/2009	
Morristown Utilities Commission	Fiber	No Update to Provide	3/25/2010	
NetEase	Fixed Wireless	No Update to Provide	2/3/2010	
North Central Communications	DSL	No Update to Provide	2/5/2010	
OrbWireless.net	Fixed Wireless	No Update to Provide		
Pickwick Cablevision, Inc.	Cable	No Update to Provide		

Skyline Telephone Membership Corporation	Backhaul	No Update to Provide	2/2/2010	
Skyline Telephone Membership Corporation	Fiber	No Update to Provide	2/2/2010	
TEC of Jackson, Inc	Backhaul	No Update to Provide	7/29/2010	
TEC of Jackson, Inc	Backhaul	No Update to Provide	7/29/2010	
TEC of Jackson, Inc	Backhaul	No Update to Provide	7/29/2010	
Tullahoma Utilities Board	Fiber	No Update to Provide		
tw telecom of tennessee, llc	Backhaul	No Update to Provide	3/31/2010	
Twin Lakes Telephone Cooperative Corporation	DSL	No Update to Provide	1/14/2010	
Twin Lakes Telephone Cooperative Corporation	Fixed Wireless	No Update to Provide	1/14/2010	
Ultranet High-Speed Internet	Fixed Wireless	No Update to Provide	2/23/2010	
United States Cellular Corporation	Mobile Wireless	No Update to Provide	2/15/2011	
West Kentucky and Tennessee Telecommunications	DSL	No Update to Provide	1/7/2010	
XO Communications, LLC	Backhaul	No Update to Provide	2/12/2010	
Beasley Wireless	Fixed Wireless	No Update Provided - Use Last Submission Data	1/19/2010	
Celina Cable Communications, Inc.	Cable	No Update Provided - Use Last Submission Data	1/15/2010	
Cellular South Licenses, LLC	Mobile Wireless	No Update Provided - Use Last Submission Data	4/12/2010	
ECSIS.NET	Fixed Wireless	No Update Provided - Use Last Submission Data	10/29/2009	
EnterSource	Backhaul	No Update Provided - Use Last Submission Data	7/7/2010	
EnterSource	Fixed Wireless	No Update Provided - Use Last Submission Data	7/7/2010	
InfoStructure Inc.	Cable	No Update Provided - Use Last Submission Data	10/2/2009	
Knology of Tennessee, Inc.	Cable	No Update Provided - Use Last Submission Data	7/13/2011	
Level 3 Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
Mediacom Southeast LLC	Cable	No Update Provided - Use Last Submission Data	1/12/2010	
Planet Connect Internet	Fixed Wireless	No Update Provided - Use Last Submission Data		
Pulaski Electric System	Fiber	No Update Provided - Use Last Submission Data	12/30/2009	
QuickRelay Wireless Communications	Fixed Wireless	No Update Provided - Use Last Submission Data		
Softek, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	1/14/2010	
Spirit Broadband	Cable	No Update Provided - Use Last Submission Data	3/29/2010	
Surfmore.Net, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	1/25/2010	
TELE-PAGE Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	1/26/2010	
United Telephone Company, Inc.	DSL	No Update Provided - Use Last Submission Data	2/25/2010	
United Telephone Company, Inc.	Fiber	No Update Provided - Use Last Submission Data	2/25/2010	
Wave2Wave Communications Inc.	Backhaul	No Update Provided - Use Last Submission Data	4/28/2010	
Windstream Communications	Backhaul	No Update Provided - Use Last Submission Data		
Zayo Group, LLC	Backhaul	No Update Provided - Use Last Submission Data		
Zito Midwest, LLC	Cable	No Update Provided - Use Last Submission Data	2/17/2011	
Windstream Communications	Backhaul	Solicited Initial Data		
Highland Telephone Cooperative, Inc.	Fiber	Other	3/14/2010	AUG-07-12 Chip Spann] Per company representative, the fiber project remains in BETA mode. Construction has been completed in the KY counties, but subscribers have not yet been "cut over" in the TN counties. Target for commercial deployment is September 2012.
North Central Communications	Fiber	Other	2/5/2010	[JUL-06-12 Chip Spann] Provider is apparently working in three counties and has a few test customers, but coverage is not fully available yet.
Twin Lakes Telephone Cooperative Corporation	Fiber	Other	1/14/2010	[AUG-15-12 Wes Kerr] A company representative noted that they did not yet have the ability to provide the data for this round; however they will participate in a timely fashion during the next round.
West Kentucky and Tennessee Telecommunications	Fiber	Other	1/7/2010	[SEP-17-12 Ashley Hitt] Provider indicated that the fiber coverage is not yet active; will confirm with provider for next submission and likely submit data in April 2013.
Birch Communications, Inc.	Backhaul	Refused to Participate		[JUN-27-12 Chip Spann] A company representative replied via e-mail that her company declines to participate.

EnterSource	Fixed Wireless	Non-Responsive to Multiple Attempts	7/7/2010	In addition to numerous contact attempts made during past mapping submission periods, 5 contact attempts were made this period.
Trinity Communications LLC	Cable	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 2 contact attempts were made this period.
Wisper, LLC	Fixed Wireless	Slated Field Audit for Estimated Coverage Analysis	2/22/2011	

OFFICIAL OCTOBER 2012 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE STATE OF TEXAS

October 1, 2012

TABLE OF CONTENTS

October 1, 2012

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

As the State Broadband Designated Entity for Texas, please accept this submission from Connected Nation on behalf of the state of Texas' State Broadband Initiative (SBI) Grant Program, known as Connected Texas.

The Connected Texas program and its collective stakeholder community continue to be faithful and energized contributors to the National Telecommunications and Information Administration's (NTIA) SBI program. Now more than ever, the significance of complete and validated data as compiled through the Federal Communications Commission's (FCC) National Broadband Map is instrumental in forging the innovation economy of the 21st century. As the Commission relies upon this unique resource to distribute monies under the Connect America Fund, through the Universal Service Fund reform, the Connected Texas program equally values this data in informing meaningful program interventions relating to broadband access, adoption, and use initiatives. Truly, this coordination embodies the spirit of the SBI and demonstrates the joint effort of the NTIA, FCC, state governments, industry, and non-profits like Connected Nation as it continues to serve as a key tool for the American public and policymakers. We are proud of the role that Connected Texas has played in creating and maintaining such a powerful tool that has benefitted and surely will continue to benefit broadband providers, consumers, and businesses nationwide.

The artifacts that comprise this submission should be found to be compliant with the October 1, 2012, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connected Texas: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area

Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A: 4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)	n/a	Accuracy and Verification Report
n/a	DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a	n/a	List of Changes and Corrections to the Dataset
n/a	n/a	Non-Participating Provider (NPP) Narratives
n/a	n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the April 2012 SBI data submission for the Connected Texas program. Specifically, these new requirements are:

SBI Data Transfer Model
The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model as released on the Grantee Workspace on August 9, 2012. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance
New to the semi-annual submission for October 2012 is a more robust version of the ReadMe text file. As per the template released on the Grantee Workspace on May 18, 2012, this file contains a high-level summary of the items contained within the submission, including the exact file deliverables, a description of the errors and warnings from the Check Submission report, and extraneous information of which the NTIA and other users of the dataset should be made aware.

This submission continues to follow the speed technology guidance released by the Program Office on August 9, 2012, to review speed tier codes in correspondence with technology of transmission codes. In the April 2012 submission, descriptions were provided in the methodology paper that offered an explanation for any submitted technology of transmission and speed combinations that were outside of the expected value range. That practice continues in this submission as technology and speed combinations are reviewed and scrutinized; any questionable information supplied by providers is reviewed more in depth with the provider to ensure the information is accurately captured or a proper explanation is provided as to why the speed information should be submitted as supplied even if it falls outside the expected value range.

Also in this submission are narratives describing the data and coverage estimation of non-participating providers. While Connected Texas continues outreach to all providers prior to each submission period, the need to submit broadband service data for all providers regardless of their participation is evident as the SBI program continues into this sixth round of data submissions. The submission of this estimated broadband service area for providers that have not supplied data to Connected Texas is essential in being able to portray a more accurate depiction of the current broadband landscape.

In addition to the requirements mentioned above, please find this methodology paper to be inclusive of the ongoing section pertaining to industry mergers and acquisitions – specifically this section details any and all mergers or acquisitions that have taken place in Texas since the April 2012 submission. The intent of this updated section is to provide a better understanding of how the broadband provider landscape has changed since the last submission cycle.

This October 2012 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for approximately 85.86 percent of the Texas provider community, or 170 of 198 total providers. There are 156 participating providers and 14 additional non-participating providers whose estimated coverage areas have been submitted. Of the 156 participating providers, 55 supplied an update to their network or coverage area(s), while 80 have reported no change. The remaining 21 represent providers who previously supplied data but were non-responsive in the October 2012 update effort; therefore their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact record is contained herein. Of the 28 providers that are not represented in the attached datasets, 26 have refused to participate in the voluntary program or were non-responsive to multiple contact attempts, and 2 providers are currently in some form of progress toward data submission but were not able to submit coverage areas at the time of this submission.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connected Texas principals that all commercially reasonable efforts were made to account for 100 percent of the known Texas broadband provider community, pursuant to this semi-annual data update submission.

Connected Texas has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connected Texas conducts field validation efforts. To date, 146 (73.74 percent) providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connected Texas website, (www.connectedtx.org), continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connected Texas website encountered 6,858 unique visits during this reporting period (47,133 total to date for the life of the grant awarded on January 1, 2010). Additionally, this pronounced Web activity netted 21 broadband inquiries over this same reporting period (534 grant inception to date). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are facilitated through the Connected Texas website and the Connected Texas interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connected Texas mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connected Texas to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connected Texas has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

In conjunction with the Texas Department of Agriculture, outreach was conducted during this data update reporting period by Connected Texas to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connected Texas website. During this reporting period Connected Texas has developed a number of new relationships with statewide associations such as the following:

Texas Association of Counties
Texas Computer Education Association
Texas Department of State Health Services
Texas Health Care Association
Texas HIE
Texas Hospital Association
Texas Library Association
Texas Municipal League
Texas State Teachers Association

Building relationships with entities such as these yields a positive impact in promoting the importance of broadband connectivity at anchor institutions and participation in this data collection process. It became apparent that these relationships are beneficial to the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connected Texas will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connected Texas has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connected Texas is also working hard to clarify CAI information associated with wireless broadband. NTIA has requested in-depth questioning of CAI listing a wireless broadband service as their sole form of connectivity. This follow-up allows us to better understand the reason for adopting the wireless broadband service.

From our work in Texas, as well as other states, we recognize the great value of this data to future collaboration efforts within the state as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connected Texas efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connected Texas program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the great state of Texas, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,

Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

DATA ACQUISITION: TEXAS COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

In this sixth reporting period of the SBI, Connected Texas, working in close coordination with the state of Texas, has established an ongoing mechanism for gathering data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. Since the April 2012 data submission, the CAI outreach process method has been modified to improve data collection. Specifically, the outreach process is a more focused sector-specific and relationship-oriented approach that generates more responses than general contact.

Connected Texas has continued to identify and process CAI data obtained through an ongoing statewide outreach campaign. Physical address information continues to be augmented through manual sourcing and geocoded by Connected Texas through Esri ArcGIS software.

Connected Texas continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connected Texas website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the state as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the state client. Connected Texas will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link:
http://www.surveymonkey.com/s/2S72YFV

In addition to the survey, Connected Texas has developed a number of new relationships with statewide associations such as: Texas Association of Counties, Texas Computer Education Association, Texas Department of State Health Services, Texas Health Care Association, Texas HIE, Texas Hospital Association, Texas Library Association, Texas Municipal League, and Texas State Teachers Association to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connected Texas will continue to build upon these new relationships over the coming months and utilize its contacts throughout the state to collect data and raise awareness of this project.

In addition to fostering and building relationships with state agencies, associations, and organizations, Connected Texas has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content.

Connected Texas conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connected Texas continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connected Texas works with the Texas Department of Education to identify existing relationships that can support CAI outreach.

Connected Texas has an ongoing mission to educate CAI throughout the state on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connected Texas project as well as self-awareness of their own CAI connectivity (specifically upload and download speeds). Connected Texas will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the Texas Department of Education will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the state.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Physical Address	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	10,601	10,601	10,102	105	97	97
Libraries	1,197	1,197	1,188	104	261	101
Healthcare	870	870	851	97	179	97
Public Safety	2,904	2,904	2,812	260	547	258
Higher Ed Institutions	441	441	425	36	106	35
Other Government	710	710	687	469	101	52
Other Non-Government	6	6	6	5	5	5
Total	16,729	16,729	16,071	1,076	1,296	645

During the coming months, CAI data collection will be supported by regular reporting to the Connected Texas team. The CAI data is proving an invaluable resource to all components of the Connected Texas effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI Data Submission Methodology

The submission of the broadband dataset for October 1, 2012, is contained within the SBI Data Transfer Model and additional components as released on the Grantee Workspace on August 9, 2012. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion.

Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the state of Texas.

Inventory of Deliverables, Connected Texas: October 1, 2012

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing.

The provider data collected by CN on behalf of the state of Texas have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Texas as a polygon of the state boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development is underway at CN as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs.

DATASETS FOR IN-KIND MATCH

All datasets used in this project have been contributed in-kind. Datasets used by the project to date and their respective in-kind contribution value are as follows:

- Commission on State Emergency Communications Regional Planning Commission's input - $7,395
- District & Municipal Public Safety Answering Point data - $1,419
- K-12 School address data - $26,895
- Texas ISD Superintendents and Technology Coordinators - $3,768
- Texas Water Board Orthoimagery - $465,000
- Texas Workforce Commission IT - $82
- Workforce Solutions data - $770

TEXAS FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;
- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft Streets and Trips;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and

- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff conducted on-site validation tests in Texas on the following providers: Aledo Broadband; Alenco Communications, Inc.; Allegiance Communications; Alpheus (d.b.a. Aspen Communications); AMATechTel; Anvil Communications; AT&T, Inc.; AwesomeNet, Inc.; Baja Broadband; Basin 2 Way Radio, Inc.; Basin Broadband, Inc.; Big Bend Telephone Company, Inc.; Blossom Telephone; Border to Border Communications, Inc.; Brazoria Telephone Company (d.b.a. Coastal Link); Broadband Data Services of Texas LLC; Broadcomm.US; Broadwaves; Buffalo Cable TV; Cable One, Inc.; Cameron Telephone Company LLC; Cap Rock Telephone Cooperative, Inc.; Central Texas Cable Partners, Inc.; Central Texas Telephone Cooperative, Inc.; CenturyLink; Cequel Communications (also d.b.a. Cebridge, Suddenlink); Charter Communications; CKS Wireless, Inc.; Clearwire Corporation; Coleman County Telephone Cooperative LLC; Colorado Valley Telephone Cooperative LLC; Comcast Cable Communications LLC; Community Telephone Company, Inc.; Consolidated Communications; Conterra Communications; Cumby Telephone Company, Inc.; DCT Texas.Net; Dell Telephone Cooperative, Inc.; DET-com; Digitex.com; Dot 10 Wireless (which went recently went out of business but was assumed operational as of June 10, 2012); East Texas Broadband; East Texas Cable; East Texas DSL; East Texas WiFi; Eastex Telephone Cooperative, Inc.; ECTISP; Electra Telephone Company; eNet; ENMR Telephone Cooperative, Inc. (d.b.a. ENMR Plateau Communications, Inc.); ERF Wireless; ETAN Industries; Etex Communications LP; ETS Cablevision Company, Inc.; Farm to Market Broadband LP; Five Area Telephone Company, Inc.; Ganado Telephone Company, Inc.; GEUS; Gilmer Cable; Gower Computer Support, Inc.; GoZoe Wireless, LLP; Grande Communications Network LLC; Grayson CableRocket LLC; Greasy Bend Ventures, Inc. (d.b.a. Live Air Networks); GTEK Communications; Guadalupe Valley Communications Systems; GVEC.net; Helmsco/CentralLink; Hill Country Telephone Cooperative; Hometown Computing; Iguana Net; Indian Creek Internet; Industry Telephone Company; Internet America; JAB Wireless(also d.b.a.Dot 11 Networks, Partnership Broadband, Element Networks, and KeyOn Communications, Inc.); James Cable; La Ward Telephone Exchange, Inc.; Lake Livingston Telephone Company; Leap Wireless International, Inc.; Livingston Telephone Company, Incorporated; Maverick Internet; McDonald Group; Mid-Plains Rural Co-op, Inc.; Millenium Telecom; NDemand; NetWest Online, Inc.; Neu Ventures, Inc.; Nortex Communications; North Texas Broadband LLC; North Texas Cellular, Inc.; Northland Communications; NTS Communications; Our Town Internet; Panhandle Telephone Cooperative, Inc.; Peoples Communication; Phantom Wave (d.b.a. Argon Technologies); Poka Lambro Telephone Cooperative, Inc.; Presdidio Community Wireless Network; Promptwireless LLP; RB3 LLC; Ridgewood Cable; Rioplex Wireless Ltd.; Riviera Telephone Company, Inc.; Rock Solid Internet & Telephone; Rodzoo Wireless; Santa Rosa Telephone Cooperative, Inc.; Skynet Communications; Skynet Country Online; Smithville System; SOS Communications; South Plains Telephone

Cooperative, Inc.; Southwest Arkansas Telephone Cooperative, Inc.; Southwest Texas Telephone Company; Speed of Light Broadband, Inc.; Sprint Nextel Corporation; Stamford Community Networks (scheduled to go out of business at the end of September); Starnet; Stelera Wireless LLC; Tatum Telephone; Taylor Telephone Cooperative, Inc.; Telecom Cable LLC; Texas Broadband, Inc.; Texas CellNet; Texas Wireless Internet; Texhoma Wireless; TheSPECnet (also d.b.a. ELC Internet Services, Inc.); TierOne Converged Networks, Inc.; Time Warner Cable, Inc.; TISD; T-Mobile USA, Inc.; Totalcom Communications, Inc.; TXOL Internet; Valley Telephone Cooperative, Inc.; Verizon Southwest, Inc.; Versalink Enterprises; VRFutureNet; WEHCo Video (d.b.a. Kilgore Video, Kilgore Cable); West Tex Connect; West Texas Rural Telephone Cooperative; Wes-Tex Telecommunications Ltd.; Wharton County Electric Cooperative, Inc.; Windjammer Communications, LLC; Windstream Communications; XIT Telecommunications & Technology Ltd.; Zito Midwest LLC (d.b.a. Galaxy Cable)and Zulu Internet.

In addition to the field verification tests that have been conducted, Connected Texas has also conducted work in the field to collect information for the non-participating providers, AMA TechTel, Anvil Communications, Broadwaves, CKS Wireless, East Texas Broadband, East Texas Cable Company, GoZoe Wireless, NDemand, Skynet Communications, StarNet Online, Telecom Cable, TheSPECnet, Inc., VRFuturnet, and Zulu Internet which, by nature of the methodology required for this collection, are also included in the above list.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 146 companies (out of a universe of 198 viable providers) totaling 73.74 percent within the state of Texas. This percentage also considers the non-participating provider (NPP) records submitted to NTIA as may be contained herein (see "Data Submission and Coverage Estimation of Non-Participating Providers" below).

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as published on the NTIA Grantee Workspace on August 9, 2012. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

Alenco Communications, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider representative indicated that tier 7 speeds are indeed available to all customers in the Knippa exchange.

AT&T Communications of Texas, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 24 Mbps; screenshot below.

Compare Internet Packages

	Pro	Elite	Max	Max Plus	Max Turbo
Standard Monthly Rate	$38*	$43*	$48*	$53*	$63*
Downstream Speed	Up to 3 Mbps	Up to 6 Mbps	Up to 12 Mbps	Up to 18 Mbps	Up to 24 Mbps

AT&T Communications of Texas, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider confirmed tier 7 service is available.

Big Bend Telephone Company, Inc.
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises up to 12 Mbps service; screenshot below.

Now offering speeds up to 12 Meg in Alpine and Ft. Davis!!!

Buffalo Cable TV
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 5, lower than expected value range for the technology.
Resolution: Provider representative confirmed that service area is DOCSIS 3.0, but lower speeds are still advertised and in use.

CenturyLink
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 25 Mbps service; screenshot below.

Cequel Communications (Suddenlink)
Issue: Technology of transmission code 40 with maximum advertised download speed in tiers 7 and 8, lower than expected value range for the technology.
Resolution: Provider representative confirmed that DOCSIS 3.0 is indeed in use, but speeds have not been turned up higher at this time.

Consolidated Communications
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps service; screenshot below.

Get The Internet Speed You Need

- 3 Mbps – Ideal for sharing photos with your family and friends
- 6 Mbps – Ideal for watching media-rich content, movies and gaming
- 10 Mbps – Ideal for multiple users in a household
- 20 Mbps – Ideal for all the above plus more

ENMR Telephone Cooperative, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

FiTTurbo

Downloads up to 15 Mb, uploads up to 3 Mb.

- All the speed you need for downloading music and movies, and uploading photos and streaming video.
- Free SPAM and e-mail virus protection services.
- Five e-mail accounts, each with 1 GB of storage.
- Access to Plateautel.net to share photos, check e-mail and more.
- Free Web Hosting with 20 M of storage.

$149.95
per month*

Guadalupe Valley Communications Systems
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

GVTC Broadband	768Kbps 128Kbps	1.5Mbps 384Kbps	5Mbps 512Kbps	8Mbps 1Mbps	12Mbps 1.5Mbps
Month to Month	$29.95	$34.95	$39.95	$44.95	$59.95
Double Play	$24.95	$29.95	$34.95	$39.95	$54.95
Triple Play	**$19.95**	**$24.95**	**$29.95**	**$34.95**	**$49.95**

MegaPath Inc.
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps and 45 Mbps service; screenshots below.

DSL service provides download speeds up to 20 Mbps over a nationwide, multi-redundant private network that optimizes performance and security. DSL is an ideal broadband solution for small and medium-sized businesses that download large files or use the Internet extensively.

For maximum connectivity at a minimum cost, there's no greater value than MegaPath Business Ethernet. Choose the bandwidth—2 Mbps up to 45 Mbps—that best fits your business' needs.

Millennium Telcom, LLC
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Use of DOCSIS 3.0 throughout service area was confirmed, even at lower speeds.

Nortex Communications
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

Package	Max Speeds	Monthly Price	Mail Boxes	Web Page	IP Address	Dial Up Account	DNS Hosting
DSL 3.0	3.0Mb x 512k	$39.95 $29.95 with Choice pkg.	5	5mb personal	1 dynamic	1	No
DSL 5.0	5.0Mb x 768k	$49.95 $39.95 with Choice pkg.	5	5mb personal	1 dynamic	1	No
DSL 8.0	8.0Mb x 1.0Mb	$59.95 $49.95 with Choice pkg.	5	5mb personal	1 dynamic	1	No
DSL 15.0	15.0Mb x 2.0Mb	$69.95 $59.95 with Choice pkg.	5	5mb personal	1 dynamic	1	No

Nortex Communications
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 7, lower than expected value range for the technology.
Resolution: Confirmed use of DOCSIS 3.0 throughout service area; however, speeds are currently kept lower to be backwards compatible.

North Texas Broadband, LLC
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 6, lower than expected value range for the technology.
Resolution: Use of DOCSIS 3.0 throughout service area was confirmed, even at lower speeds.

Panhandle Telephone Cooperative, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

Speed	Residential
12 Mbps download**/1 Mbps up*	$59.99
6 Mbps download/1 Mbps up*	$54.99
3 Mbps download/384 Kbps up*	$44.99

Poka Lambro Telephone Cooperative, Inc.
Issue: DSL platform with maximum advertised download speed in tiers 7 and 8, higher than expected value range for the technology.
Resolution: Provider website advertises up to 30 Mbps service; screenshot below.

Speeds up to 30
Mbps available
in certain areas!
Ask for details

Rock Solid Internet & Telephone
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 15 Mbps service; screenshot below.

The Top of The Rock™ - $99.95/mo.
Our finest service! Speeds of up to 15000k (15 Mbps) download and up to 1524k upload. There is no better service anywhere in South Texas! Gamers and Power Downloaders get priority routing of their service!

Skynet Communications
Issue: Fixed wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: While this is a non-participating provider, customer service confirmed that 10 Mbps service is available.

South Plains Telephone Cooperative, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 20 Mbps service; screenshot below.

SPTC is pleased to offer broadband internet service packages with speeds up to 20Mg download for residence and business.
We are confident you will find an option that will meet your needs and provide you good value for the price.

Stelera Wireless, LLC
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 10 Mbps; screenshot below.

Fast Facts

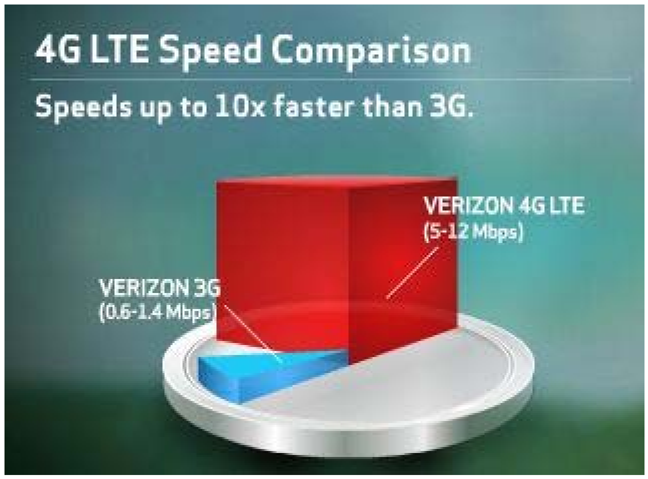
Network Technology:	HSPA (High-Speed Packet Access)
Frequency:	1700/2100 MHz FCC licensed spectrum
Current Speeds:	Up to 10mbps on downloads, UP to 2mbps on uploads
Headquarters:	Oklahoma City, OK

T-Mobile USA, Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than the expected value range for the technology.
Resolution: Provider website indicates that speeds higher than tier 6 are available; screenshot below.

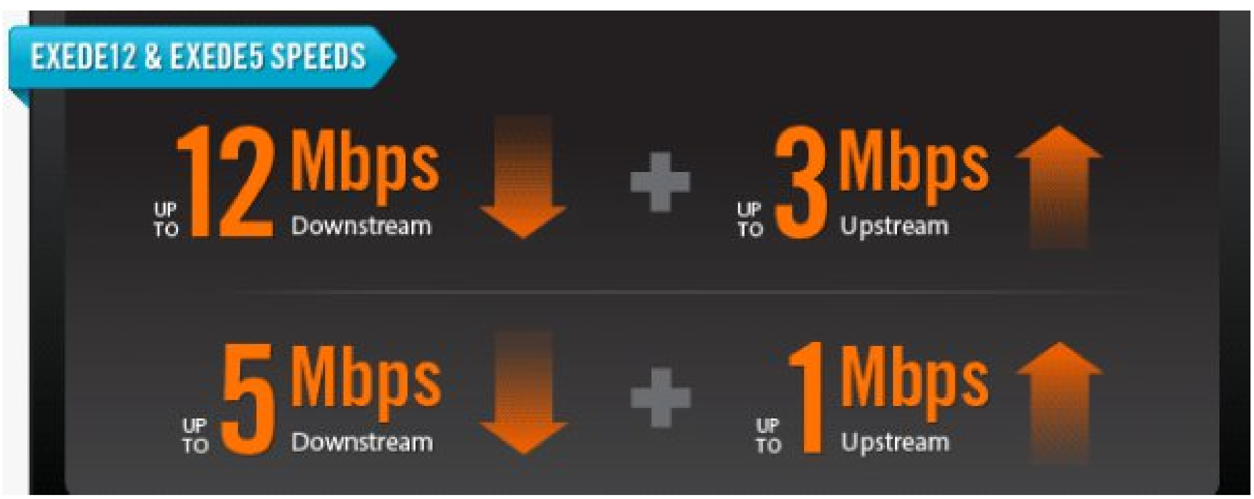
T-Mobile customers with 4G phones are already experiencing data speeds that are comparable to or faster than the speed of a home broadband network. And with recent improvements to our 4G network-doubling our theoretical download speeds-we're giving our customers enhanced 4G data speeds. We've seen average download speeds on our HSPA+ 42 Mbps-capable data stick approaching 10 Mbps with peak speeds of 27 Mbps, and download speeds approaching 8 Mbps with peak speeds of 20 Mbps on our upcoming HSPA+ 42 Mbps-capable smartphones.

Time Warner Cable LLC
Issue: Technology of transmission code 41 with maximum advertised download speed in tier 8, higher than expected value range for the technology.
Resolution: Provider website advertises 30 Mbps service; screenshot below.

Verizon Southwest Inc.
Issue: Mobile wireless platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.



ViaSat, Inc.
Issue: Satellite platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.



Windstream Communications
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider website advertises 12 Mbps service; screenshot below.

See which of our speeds matches your online activities. Choose the right Internet speed (WATCH VIDEO)	3 Mbps (Basic Use)	6 Mbps (Most Popular)	12 Mbps (Fastest Option)

West Texas Rural Telephone Cooperative, Inc.
Issue: DSL platform with maximum advertised download speed in tier 7, higher than expected value range for the technology.
Resolution: Provider confirmed that tier 7 service is now available in Friona and Bovina.

Data Submission and Coverage Estimation of Non-Participating Providers

As part of its ongoing broadband mapping efforts, CN has developed a series of processes with the goal of submitting coverage estimation mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of platform type (cable modem, DSL, fixed wireless, etc.). This state specific collection of coverage estimation methodology papers (see Appendix A) demonstrates the estimated broadband service territory for the providers in this state that have either been non-responsive or that have refused to participate in the SBI mapping initiative.

Accuracy and Verification: Provider Validation Methodology

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission.

Once the data collection has been aggregated at a statewide level, static maps of statewide and county-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Additionally, non-participating provider narratives that were submitted in previous mapping cycles are subjected to the same level of scrutiny. Occasionally, a provider may elect to voluntarily participate (thus eliminating the need for future data estimation activities in the field). However, more often than not, the NPP narrative is updated with a combination of data gleaned from the provider's website, data obtained through FCC research and/or data collected/verified in the field by a CN staff engineer.

Estimates derived from provider-validated data indicate that approximately 1.67 percent of Texas households do not have terrestrial fixed broadband service available, and approximately 0.10 percent of Texas households have neither mobile nor fixed broadband service available.

Within rural areas of the state, results derived from provider-validated data indicate that approximately 4.85 percent of rural Texas households do not have terrestrial fixed broadband service available, and approximately 0.30 percent of rural Texas households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire state.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard. This research often proves to be exceptionally effective when estimating the coverage area of an NPP.
6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).
8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).
10. Antenna pattern (e.g. omni-directional, 180°, 120°, 90°, etc.).
11. Azimuth of antenna (e.g. 360° with magnetic declination if known).
12. Approximate transmit radius (in feet, miles, or kilometers).
13. Polarity of transmit antenna (Vertical or Horizontal).
14. Transmit antenna gain (in dBi).
15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).
16. Mechanical and/or Electrical beam tilt (if applicable).
17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).
18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).
19. AMSL at base of tower site.
20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).
21. Foliage factors (Evergreens/Deciduous and percent of ground cover).
22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).

23. Average gain of receive antenna.
24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.
25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hillshade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

Broadband Inquiries Methodology

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the state, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connected Texas website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information requested by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at other such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 18,600 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connected Texas project has received a total of 21 inquiries (534 grant inception to date). As more inquiries are submitted to Connected Texas, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

My ConnectView Methodology

My ConnectView is an online, interactive mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connected Texas project launched My ConnectView on April 2, 2012, and received 1,641 visits this reporting period; to date, the interactive mapping applications have received 17,644 visits.

Speed Test Methodology

The 555 speed tests that are represented in the Connected Texas Speed Test Report during this reporting period (7,492 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connected Texas speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for county-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connected Texas project, speed test information is collected throughout the state. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connected Texas with the information on where broadband services are available. Second, unlike theoretical speed information which was received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the state of Texas.

PROVIDERS DEEMED NON-VIABLE

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the October 2012 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers, etc.

	Company Name	URL	Comments
1	01 Communications of Texas	http://www.o1.com	CLEC in California and a nonfacilities-based nationwide reseller.
2	1Source Tech	http://www.1sourcetc.com	Does not offer broadband services; not a broadband provider.
3	21Globe, Inc.	http://www.21globe.com/	Does not offer broadband services; not a broadband provider.
4	2473365 Wireless	n/a	No information could be located on company.
5	360networks	http://www.360networks.com/	Acquired by another company.
6	36db	n/a	Acquired by ERF Wireless.
7	4D Networks Corp.	http://www.4dn.com	Provider does not serve consumers in Texas; Oklahoma provider.
8	802DSL.com	n/a	No information could be located on company; not a broadband provider.
9	A 007 Access	http://www.a007.com/	Nonfacilities-based reseller of Quest DSL and mobile wireless.

10	AAA Internet Service	http://aaainter.net/dsl	Dial-up service and is also a nonfacilities-based DSL reseller.
11	Aaccess Network Communications, Inc.	http://www.aaccess.net	Not a broadband provider.
12	ABI Network Solutions, Inc.	http://abinetworksolutions.com	General reseller; requests for information were never returned.
13	AboveNet Communications, Inc.	http://www.abovenet.com	Company is a business provider only; does not offer residential service.
14	Acceris Communications Corporation	http://www.accerispartners.com	Company does not provide Internet service; not a broadband provider.
15	Access Integrated Networks, Inc.	http://www.birch.com/About/accesscommredirect.aspx	Company no longer exists; changed name to Birch Communications in 2006.
16	Access One, Inc.	http://www.accessoneinc.com/access_one_direct.php	Company is a business provider only; does not offer residential service.
17	Access Point, Inc.	http://www.accesspointinc.com/products.htm	General reseller; nonfacilities-based.
18	Access123.net	http://access123.net/	Website is a search engine for all types of products; company is not a broadband provider.
19	Access2Go, Inc.	http://www.acc2go.com/	General reseller; nonfacilities-based.
20	Accutel of Texas, LP	http://www.accutel.net/	No viable information could be located on company; URL inactive; not a broadband provider.
21	ACERX.NET	http://acerx.net/	General reseller; nonfacilities-based.
22	ACN Communications Services, Inc.	https://www.myacn.com/phone/dslbundle.html	General reseller; nonfacilities-based.
23	Adirondack Area Network	http://www.aanet.org/	Provider does not serve consumers in Texas; New York State provider.
24	Advance Telephone Services	http://www.advanced-telephone.com/	Company does not provide Internet service; not a broadband provider.
25	Advanced Communicating Techniques	n/a	No viable information could be located on company; URL inactive; not a broadband provider.

26	Advanced Integrated Technologies, Inc.	http://www.a-i-t.com/	Company does not provide Internet service; not a broadband provider.
27	Advanced Wireless Solutions	http://www.awsolutions.net	Company is B2B provider of networking solutions; not a broadband provider.
28	AEConnect	n/a	No information could be located on company; not a broadband provider.
29	AEI Wireless	http://www.aeiwireless.net	Based on website; speed offerings are not compliant to FCC broadband definition.
30	Aerie Network Services, Inc.	http://www.aerienetworks.com/	No viable information could be located on company; URL is web search engine; not a broadband provider.
31	Aero Communications, LLC	n/a	Company categorized under Telecommunications consultant; no website located and is not a broadband provider.
32	Aeroconnect	http://www.aeroconnect.net	Company is B2B provider of networking solutions; not a broadband provider.
33	Affinity Network, Inc.	http://www.affinitynetworkinc.com/	Company is B2B provider of long distance and calling card services; not a broadband provider.
34	Affordable USAWide.Net, Inc.	http://www.usawide.net	General reseller; non-facilities based; offers DSL and dial-up.
35	Air2LAN	n/a	Company was purchased by U.S. Wireless Online in February 2005; no longer in business.
36	AirChips Communcation, LLC	http://www.airchips.com	Company performs network consulting services and does not have broadband operations; not a broadband provider.
37	AIRDIS Telecom	http://www.airdis.com/	Company sells telecommunications equipment to business and does not have broadband operations; not a broadband provider.

38	Airewaves Broadband, LLC	www.airewaves.com	Airewaves is an Internet media download center; not a broadband provider.
39	Airimba Wireless, Inc.	http://airimba.com/	Provider supplies bulk level agreements to housing communities; B2B
40	Airmail247.com	http://airmail247.com/	No viable information could be located on company; URL is not located; not a broadband provider.
41	Airo Networks, LLC	http://www.aironetworks.com	No viable information could be located on company; URL is not located; not a broadband provider.
42	Airocom	http://www.airocom.net	Acquired by NetWest Online.
43	Akeva	n/a	Reseller of Verizon Mobile Phones in mall kiosk; not a broadband provider.
44	Alec, Inc.	http://www.singlepipecom.com	Nonfacilities reseller of DSL services; however does not serve the state of Texas.
45	Allo Telecommunications, Inc.	http://tc.allophone.com/	Nonfacilities reseller of business circuits.
46	Allumera	http://www.amirarif.com/	Not a broadband provider.
47	Almega Cable	http://almega.com	Currently only supplies Internet connectivity to one anchor institution in Texas; no residential services.
48	AltiComm, Inc.	n/a	Based on Internet research and PUCT report the organization is nonfacilities-based or resells internet services.
49	Amarillo Cell Telco	http://www.cell1amarillo.com/	Acquired by Alltel.
50	American Dial Tone (Ganoco, Inc.)	n/a	Company offers dial-up services only.
51	American Fiber Network, Inc.	https://www.afnltd.com	Company performs network consulting services and does not have broadband operations; not a broadband provider.

52	Americans Conex, LLC	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
53	America's Tele-Network Corp	n/a	Company is no longer in business.
54	AmeriMex Communications Corp.	http://www.amerimex.biz/	Company sells international calling plans and does not provide broadband services; not a broadband provider.
55	AMERIPHONE NETWORK, LLC	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
56	Amigos - Tu Compania De Telefono	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
57	Amtel	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
58	An Elite State Telephone Company	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
59	Annox, Inc.	n/a	Company is no longer in business and is listed as inactive in the state of Texas.
60	Antioch Wireless Broadband	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
61	AP Telecommunications	http://www.academicplanet.com	Company offers dial-up services only; not a broadband provider.
62	Apache Networks	http://www.apachenetworks.net	Company offers VOIP services only; not a broadband provider.
63	Apogee Telecom, Inc.	http://www.apogeenet.net	Company does not provide direct residential service; design and build networks for institutions of higher learning; not a broadband provider.
64	Arrowheadnet.com	http://www.arrowheadnet.com/	Company offers web hosting services only; not a broadband provider.

65	Artisan Communications	http://www.artisan.tv	Company offers telephony services to business only; not a broadband provider.
66	ATC Outdoor DAS, LLC	n/a	Company offers radio services for business only; not a broadband provider.
67	A-Tech Telecom, Inc.	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
68	Ateck Internet Providers	www.atxip.net/	Information located on company shows no longer in business.
69	AURIC Marketing LLC	n/a	Company offers Pots and Private T-1 services; not a broadband provider.
70	Austin Bestline Company	http://www.bestline.net/	Reseller who provides Internet access to business only; B2B provider.
71	Austin Teleco Usa, Inc.	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
72	AzleTexas.Net	n/a	Information located on company shows not a broadband provider.
73	Backbone Communications, Inc.	http://www.backbonecommunications.com/	Not a broadband provider; assist with development of technology platforms for classroom environment.
74	bargainisp.net	http://www.bargainisp.net/	Not a broadband provider; web search engine.
75	Basicphone, Inc.	n/a	Information located on company shows no longer in business.
76	BCN TELECOM, Inc.	http://www.bcntele.com/	General reseller; nonfacilities-based; business accounts only.
77	Bear Creek Copperfield ISP	n/a	Information located on company shows no longer in business.
78	Bear Technologies Corporation	http://www.beartech.com	Company offers services to business subscribers only.
79	Bellerud Communications, LLC	http://www.bellerudcommunications.com/	Company is not a Broadband provider; offers Telephone services to only.

80	Bellsouth BSE, Inc.	n/a	Assets were subsumed by Clearwire Corporation; inactive URL.
81	BelWave Communications	http://www.belwave.com	Company offers services to business subscribers only.
82	Best Line Communications	http://www.bestline.net/	Company offers services to business subscribers only.
83	BetterWorld Telecom, LLC	http://betterworldtelecom.com	Company offers services to business subscribers only.
84	BioVLAN	http://www.biovlan.com	Company offers turnkey solutions and is not a broadband provider.
85	Birch Communications	http://www.birch.com/About/birchlinkfamily.aspx	Company is a reseller of business services only.
86	Biztel, L.P.	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
87	Blonder Tongue Telephone, LLC	http://www.blondertongue.com/	Company offers equipment solutions and is not a broadband provider.
88	Blue Corner Communications, LLC	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
89	Blue Moon Solutions, Inc.	http://www.bmsol.com	No viable information could be located on company; URL is not located; not a broadband provider.
90	Blue Sky Telecommunications, LLC	http://www.blueskycommunications.net/contact-us	Company is not a Broadband provider; offers telephone services only.
91	Blue Wireless & Data, Inc.	http://www.bluewirelessdata.com/	No viable information could be located on company; URL is not located; not a broadband provider.
92	Bluebonnet Internet	http://www.bluebonnet.net	Company is not a Broadband provider; offers telephone services only.
93	Bold Communications networks, LLC	http://www.boldwireless.net/	No viable information could be located on company; URL is not located; not a broadband provider.

94	Border Wireless	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
95	Bravo Net	http://www.bravo.net	No viable information could be located on company; URL is not located; not a broadband provider.
96	Brazoria Dot Net	n/a	No viable information could be located on company; URL is not located; not a broadband provider.
97	Broadband National	http://www.broadbandnational.com	General reseller; nonfacilities-based.
98	Broadlink Telecom, LLC	http://www.broadlinktelecom.com/	Company is a reseller of business services only.
99	Broadvox-CLEC, LLC	n/a	Not a broadband provider; direct conversation determined entity does not have a network for broadband services.
100	Broadweave Networks Of Texas, LLC	n/a	According to Texas PUCT CLEC report; phone services only.
101	Budget Prepay, Inc.	http://www.budgetphone.com	According to Texas PUCT CLEC report they offer phone services only.
102	Business Telecom, Inc.	n/a	Now owned by Deltacom Inc. according to Texas PUCT CLEC report.
103	BYOTV Media Corporation	n/a	Not a broadband provider; specializes in broadcast video services.
104	Cable And Wireless Americas Operations, Inc.	www.cw.com	Not a broadband provider; Internet hosting service company.
105	CAC MediaNet, Inc.	n/a	Not a broadband provider.
106	Call One	http://www.callone.com	Not a broadband provider; business solutions services.
107	CallFree	n/a	Not a broadband provider; POTS and long-distance services only.
108	Camalott Communications	http://www.camalott.com	Acquired by Texas Communications.

109	Camino-Net Internet Services	http://www.camino-net.com	Not a broadband provider; offers dial-up only.
110	Candice Clark Consulting	http://www.candiceclarke.com/	Not a broadband provider; consulting firm.
111	Capital Telecommunications, Inc.	http://www.captel.com/	Not a broadband provider; hardware provider for the deaf's telecommunication devices.
112	Casey & Gentz	http://www.phonelaw.com/	Not a broadband provider.
113	CAT Communications International, Inc.	http://www.ccitelcom.com/	Not a state provider per representative of the company.
114	Cavalier Telephone LLC	http://www.cavtel.com/	Company merged with PAETEC.
115	CCG Consulting, LLC	http://www.c-c-g.com/	Not a broadband provider; telecommunications consulting services.
116	CCIS.net	http://www.ccis.net	Inactive; no longer in business.
117	Cdi Broadband	http://www.cdibroadband.com	Acquired by TierOne Converged Networks.
118	Celito Communications, Inc.	http://www.celito.net/	This company does not offer service in Texas.
119	Cellular One of Amarillo	n/a	Acquired by Alltel.
120	Centel Communications	n/a	No URL; no FRN; non-responsive to outreach activity.
121	CenTex Web Access	n/a	This company is not a broadband provider.
122	Central Telecommunications	n/a	This company is not a broadband provider.
123	Centramedia Inc.	http://www.centramedia.com	Acquired by ERF Wireless.
124	Century Alpha	n/a	This company is not a broadband provider.
125	Chaparral Broadband	n/a	Not a broadband provider in Texas.
126	Christoval Communications	n/a	Not a broadband provider per a representative of the company.

127	CIR Wireless Net	n/a	Unable to locate any current information on this company; no active website.
128	City of Brownsville	n/a	Grant Awardee; not a broadband provider.
129	City of El Paso	n/a	Grant Awardee; not a broadband provider.
130	CityNet Texas, LLC	n/a	This company is not a broadband provider.
131	Cleartouch.Com	n/a	Unable to locate any current information on this company; no active website.
132	Cleburne.com	n/a	Unable to locate any current information on this company; no active website.
133	Cletel Telephone Service, LLC	n/a	This company is no longer in business.
134	CloseCall America, Inc.	http://www.closecall.com/	General reseller; nonfacilities-based.
135	Cobalt Broadband	http://www.cobaltbroadband.com	Acquired by JAB Wireless.
136	Cobridge Communications	http://www.cobridge.net	Acquired by Time Warner.
137	Cognisurf	http://www.aboutus.org/CogNiSurf.com	Not a broadband provider.
138	CommCentral, Inc.	n/a	General reseller; nonfacilities-based; inactive URL.
139	Communication Lines, Inc.	n/a	Not a broadband provider; Texas PUCT CLEC report identifies POTS service only.
140	Communications Pearl, LLC	n/a	Reseller; nonfacilities-based.
141	Computer Network Technology Corporation	http://www.brocade.com	Not a broadband provider; sells communication equipment to operators.
142	ComTech 21, LLC	http://www.comtech21.com	Representative stated their organization does not provide service in Texas.

143	Comtel Services	http://www.comtelservices.com/	Not a broadband provider; provides wiring solutions.
144	Connect Insured Telephone Company	n/a	Inactive; no longer in business; Internet research rendered no valid information.
145	ConnectSouth	n/a	Not a broadband provider; managed services only.
146	Constant Communications, Inc.	www.constant.com	Inactive; no longer in business; invalid contact information.
147	Contel of Texas, Inc.	n/a	Acquired by GTE in 1992.
148	Convergent Communications Services, Inc.	http://converg.com/	This company is not a broadband provider.
149	Corban Networks	http://www.corbannetworks.com	Inactive; no longer in business; invalid contact information.
150	Cordia Communications Corporation	https://www.cordia.us/	Not a broadband provider; Texas PUCT CLEC report identifies POTS and long-distance services only.
151	Cost Plus	n/a	Not a broadband provider; Texas PUCT CLEC report identifies POTS and long-distance services only.
152	Cox Communications	n/a	Acquired by SuddenLink (Texas).
153	CP Telco, LLC	n/a	Not a broadband provider; no evidence of operations.
154	Crescent Broadband	n/a	Inactive; no longer in business; no active or valid information identified.
155	CrossConnect	n/a	Inactive; non-state provider.
156	Crosswind	http:/www.crosswind.net	Acquired by ERF Wireless.
157	CS Wireless Systems, Inc.	n/a	Acquired by Clearwire Corporation.
158	Cuda Communications	n/a	Inactive; non-state provider.
159	Current Communications of Texas, LP	n/a	Not a broadband provider.
160	Curtis Blakely	n/a	Not a broadband provider; certified public accountant.

161	CVC CLEC, LLC	n/a	Inactive-Non state provider per representative of the company.
162	Cyberbay	http://www.cyberbay.com	General reseller; nonfacilities-based.
163	CyberStation, Inc.	http://www.cst.net	Not a broadband provider.
164	Cybertel, LLC	www.westernbroadband.com	Inactive; no longer in business.
165	Cypress Communications Operating Company, LLC	n/a	Not a broadband provider; local and long distance services only.
166	DashLink	n/a	Inactive; no longer in business.
167	DATACentric Broadband	n/a	Inactive; no longer in business.
168	Del Rio LIVE!	n/a	Inactive; no longer in business.
169	DelRio.com	n/a	Inactive; no longer in business.
170	DeltaCom, Inc.	http://www.deltacom.com	Inactive; non-state provider.
171	Deltaforce	http://www.deltaforce.net	Not a broadband provider; dial-up services only.
172	deluxehost.com	http://deluxe-host.com	Not a broadband provider; web design and hosting.
173	DFW Broadband	http://www.dfwbroadband.net	Not a broadband provider; business to business service provider.
174	DGUI	http://www.dgui.com/	Inactive; no longer in business.
175	Dial National	http://www.dialnational.com/	Inactive; no longer in business.
176	Dialer.net	http://www.dialer.net/internet_access/United_States.html	Not a broadband provider; international dial-up services
177	Diamond Telco-Your Home Telephone Store	n/a	Not a broadband provider; POTS services only.
178	Digital Communities	n/a	Not a broadband provider; coalition organization for WIMAX development.
179	Digitalpath Texas	http://www.1txbb.net	Acquired by First Texas Broadband.
180	Direct Telephone Company, Inc.	n/a	Not a broadband provider; POTS services only.
181	DO Communications	n/a	Inactive; no longer in business.

182	Dot11 Networks	n/a	Acquired by JAB Wireless.
183	DR Telecom, Inc.	n/a	This company is not a broadband provider.
184	East Texas Rural Net	n/a	Inactive; no longer in business.
185	East Texas WISP	http://www.etwisp.net	Inactive; no longer in business.
186	Easton Telecom Services, LLC	n/a	Not a broadband provider; POTS and long-distance services only.
187	Easy Cellular, Inc.	n/a	This company is not a broadband provider.
188	Eccentrix Technologies, LLC	http://www.eccwireless.com/	Acquired by another company.
189	EdnaOnline	n/a	This company is not a broadband provider.
190	e-GWS	n/a	This company is not a broadband provider.
191	ELC Internet Services, Inc.	http://www.elc.net	Acquired by The SPECnet, Inc.
192	Element Networks, LLC	http://txairmail.net/residential.html	Acquired by Enet Internet Solutions.
193	Entelegent Solutions, Inc.	n/a	Not a broadband provider; business telephone services only.
194	Entex Telephone Cooperative	n/a	Inactive; no longer in business.
195	Ernest Communications, Inc.	http://www.ernetstelecom.com	Not a state provider per a representative of the company.
196	Esodus Communications, Inc.	n/a	Inactive URL and no direct contact information available; no longer in business.
197	Essential.com, Inc.	n/a	Texas PUCT CLEC reseller; no services identified; not a broadband provider.
198	Everybody's Phone Company	http://www.everybodysphonecompany.com/	Provides pre-paid phone services; not a broadband provider.
199	EveryCall Communications	http://www.everycall.com/	Local and long-distance phone plans to residential and business; not a broadband provider.

200	Excel Telecommunications, Inc.	www.excel.com	Local and long distance phone plans to residential and business; not a broadband provider.
201	Exigo Office	www.exigo.com	Not a broadband service provider; consulting firm.
202	Express Telephone Services, Inc.	n/a	Not a broadband service provider; POTS and long-distance resell only.
203	EZ Connect, Ltd.	n/a	Texas PUCT CLEC reseller; local and long distance; not a broadband provider.
204	EZ Phone, Inc.	n/a	No longer in business; telephone number disconnected; e-mail exchange error received.
205	EZ Talk Telecommunications	n/a	Texas PUCT CLEC report indicates bankruptcy; all contact information invalid; no longer in business.
206	Facilities Communications International	n/a	No longer in business; telephone number disconnected; e-mail exchange error received.
207	Familytel of Texas, LLC	n/a	Not a broadband provider; a company representative indicated the organization is a reseller of telephone services only.
208	Fast Dependable Access	http://www.fda.net/	No longer in business; invalid URL.
209	Fastline ISP	http://www.fastlineisp.com	No longer in business; telephone number disconnected; inactive URL.
210	Fiesta Telephone Company, Ltd.	n/a	Texas PUCT CLEC reseller; local and long distance; not a broadband provider.
211	First World Communications	n/a	No longer in business; all contact information is inactive.
212	Flow Communications	n/a	Not a broadband provider; no Texas PUC filing
213	Fort Bend Telephone Company	n/a	Not a broadband provider; no Texas PUC filing

214	France Telecom Corporate Solutions, Inc.	n/a	Not a broadband provider; received a response from a company representative indicating the organization does not provide broadband services.
215	Freedom Communications USA, LLC	n/a	Received an initial response to outreach activity.
216	Frontera Telecommunications, Inc.	www.fronteratelecom.com	Not a broadband provider per a representative of the company.
217	Frontier Broadband	http://www.frontierbroadband.com	Acquired by ERF Wireless.
218	Gerdes Web Services	n/a	Inactive; no longer in business; contact information invalid.
219	Global Connection Inc. of America	http://connectwithglobal.com	Not a broadband provider; provides local, long-distance, and dial-up Internet only.
220	Global Metro Networks Texas, LLC	n/a	No longer in business per Texas PUCT CLEC report-relinquished operations.
221	Globaltech 2000, Inc.	n/a	No longer in business; all contact information is inactive.
222	GO-COMM, Inc.	n/a	Acquired by Airband Communications.
223	Gordon Communications, Inc.	http://www.gordonone.com	Representative of the company indicated last mile connectivity is made available.
224	Grande River Technology Group	n/a	Not a broadband provider; Internet research identifies company as communication lines and tower construction company.
225	Granite Telecommunications, LLC	n/a	Not a broadband provider; representative indicated company is a regulatory consulting firm.
226	Great America Networks, Inc.	http://www.ganconference.com/	General reseller; nonfacilities-based.
227	Great West Services, LTD	n/a	No longer in business per Texas PUCT CLEC report-relinquished operations.

228	Group Long Distance, Inc.	n/a	Not a broadband provider; long-distance service provider only.
229	GST Telecomm Texas, Inc.	n/a	Acquired by Time Warner.
230	H.S.I. Communications, LLC	n/a	No longer in business; contact information invalid.
231	Habla Comunicaciones, Inc.	n/a	Internet research identified company filed Chapter 7 bankruptcy; no longer in business.
232	Hamilton Telecommunications	http://www.hamilton.net	Spoke to a representative of the company; no resell activity in Texas.
233	HBF Group, Inc.	n/a	Not a broadband provider; acquired by West Corporation; a VoIP service provider.
234	Hello Depot	http://www.hellodepot.com	General reseller; nonfacilities-based.
235	Home Wireless Company	n/a	No longer in business; no relative data found during Internet research.
236	Homefone Services, LLC	n/a	Not a broadband provider; phone services provider only.
237	Horizon Broadband	http://horizonbroadband.net	Non-state broadband provider.
238	Horizon WiFi Texas	http://horizonwifi.com	Not a broadband provider; confirmed with a representative of the company.
239	Hubwest	http://www.hubwest.com	Not a broadband provider; dial-up and web hosting services only.
240	Hubwest Protected Networks LLC	http://www.hubwest.com	Not a broadband provider; dial-up and web hosting services only.
241	HyperHog.Net	http://www.bci1.com	Speeds below FCC definition of broadband.
242	Hyperoam	n/a	No longer in business; inactive URL or viable data supporting operational status as active.
243	i9 Networks	n/a	No longer in business; inactive URL or viable data supporting operational status as active.

244	ICG ChoiceCom, LP	n/a	Reviewed Texas PUCT CLEC; recent transfer of ownership-June 2011; new contact identified.
245	I-Element, Inc.	n/a	Not a broadband provider; statement received from a representative of the company.
246	I-Link Communications, Inc.	n/a	Not a broadband provider; provider of webinar support and equipment.
247	Imbris, Inc.	http://www.imbris.com	Inactive; non-state provider.
248	IMGISP.NET	http://www.imgisp.net/	Not a broadband provider; search engine and buyers guide to ISP.
249	In Touch Communications	n/a	No longer in business; per Texas PUCT CLEC report.
250	Incredible Networks	http://www.incredible.gr	Not a broadband provider; provides WEB hosting services.
251	Inercom Communications Inc.	www.inercom.com	Inactive; no longer in business; contact information invalid; URL for sale.
252	Inetworks Group, Inc.	http://www.inetworksgroup.com	Received a refusal to participate from a representative of the company during the October 2011 outreach session; website identifies business type solutions; cannot interpret if the company is facilities-based.
253	Infotelecom, LLC	http://infotelecom.us	Not a broadband provider per statement received from a representative of the company.
254	Innercity Fibernet, LLC	http://www.innercityfiber.net	Not a broadband provider per statement received from a representative of the company.
255	Integra Telecom	http://www.integratelecom.com	Not a broadband provider per a statement from a company representative; non-facilities based long-distance service provider.
256	Integrated Communications Consultants, Inc.	http://www.cromaine.com	Based on website research, company is a telecommunications consulting firm.

257	Integrated Digital Solutions	http://www.integratedds.com	Not a broadband provider; website development service provider.
258	Integrity Online Brazos Valley	http://www.iolbv.com	Not a broadband provider; dial-up service offering only stated on website.
259	Interactiveinfo.com Inc.	http://www.rocketbroadband.com	Inactive; non-state provider.
260	Interlink Wireless	n/a	Acquired by Internet America Wireless.
261	Internap Network Services Corporation	http://www.internap.com	Not a broadband provider; business to business solutions provider.
262	Internet Texas	http://www.itexas.net	Acquired by ERF Wireless.
263	Internet Texoma, Inc.	http://www.texoma.net	Not a broadband provider; website advertises speeds below FCC standard.
264	Ionex Telecommunications, Inc.	n/a	Acquired by Birch Communications.
265	IPNS	http://www.ipns.com	Inactive; non-state provider.
266	iRadical	n/a	Not a broadband provider; Internet research rendered no organization information.
267	ISPartner.net	n/a	Not a broadband provider; Internet research rendered no organization information.
268	Jenco Speed Web	http://www.jencospeed.net	Inactive; non-state provider.
269	John Staurulakis Incorporated	http://www.jsitel.com	Not a broadband provider; consultant services only.
270	Jones Broadcasting	http://www.jonesbroadcasting.com	Not a broadband provider; consulting services only.
271	Kentucky Data Link, Inc.	http://www.kdlinc.com	Acquired by Windstream; Connected Nation national team outreach.
272	Kentucky Universal Telecom, Inc.	n/a	Not a broadband provider; Texas PUCT CLEC report identifies residential POTS only.
273	KeyOn Communications, Inc.	http://www.keyon.com	Acquired by JAB Wireless.
274	Koyote Internet	n/a	Acquired by eNet.

275	L&D Wireless	n/a	Inactive; no longer in business; per previous owner business operations was terminated.
276	Lake Country Internet	n/a	Inactive; no longer in business.
277	Lake Kiowa	n/a	Not a broadband provider; Internet research rendered no organization information.
278	LARIAT.NET	http://www.lariat.net/	Inactive; non-state provider.
279	LavonWeb.net	n/a	Acquired by TierOne Converged Networks.
280	LayerOne, Inc.	n/a	Not a broadband provider; acquired by Switch and Data-infrastructure and access management services.
281	LCSisp.com	http://www.lcsisp.com/index.cfm	Not a broadband provider; dial-up service only.
282	LEC Unwired, LLC	n/a	No longer in business; Internet research identified operations transitions to other companies.
283	Legacy Long Distance International, Inc.	http://www.golegacy.com	Long distance, pay telephone, pager, and customer services only provider; not a broadband provider.
284	Lightning Connect	http://www.lightningconnect.net	No longer in business; invalid contact information and extensive Internet research declares no operations.
285	LightSpeed Wireless	n/a	Acquired by Blue Wireless and Data.
286	Linden Wireless	n/a	Inactive; no longer in business; inactive URL or valid contact information.
287	LinkAmerica.Net	http://www.linkamerica.net/	No longer in business; telecommunications refurbishing was primary business.
288	Lipan Telephone Company, Inc.	www.lipan.net	Not a broadband provider; offers service below FCC standard.
289	Local Telecom Systems, Inc.	n/a	Not a broadband provider; local calling card services only.

290	Lone Star Communications	http://lonestarcom.com	General reseller; nonfacilities-based.
291	M.L.M. Telecommunications, Inc.	n/a	Inactive; no longer in business.
292	MainBoard	http://www.mainboard.cc/internet.htm	General reseller; nonfacilities-based.
293	Maine Cable and Wireless	http://www.mainecableandwireless.com	Not a broadband provider; system integrator and solutions provider.
294	Managed Services, Inc.	n/a	Not a broadband provider based on limited information available on the Internet.
295	Marcin Company	n/a	Not a broadband provider.
296	Master Call Communications, Inc.	http://www.choosemcc.com	General reseller; nonfacilities-based; resells long distance and phone cards; not a broadband provider.
297	McGraw Communications	http://www.mcgrawcom.net	General reseller; nonfacilities-based; received a reply from a company representative indicating non-facility based reseller.
298	Mesh.Net	http://www.mesh.net	Acquired by VRFuturenet.
299	METTEL (Metropolitan Telecommunications)	http://www.mettel.net	General reseller; nonfacilities-based; received a reply from a company representative indicating nonfacilities-based reseller.
300	MidTech	n/a	Not a broadband provider; no relevant information obtained from Internet research to classify as an ISP.
301	Millennium One Communications, Inc.	n/a	No longer in business; telephone disconnect message and e-mail returns via Microsoft Exchange.
302	Miracletel Telephone Service, LLC	www.miracletel.com	Inactive; no longer in business; invalid contact information.
303	Mobilelitie, LLC	http://www.mobilitie.com	Not a broadband provider; manages and leases tower infrastructures.

304	Momentum Internet & Computer Services	http://www.moment.net	Acquired by ERF Wireless.
305	Momentum Online	n/a	Acquired by ERF Wireless.
306	Momentum Telecom, Inc.	https://www.momentumtelecom.com/	General reseller; nonfacilities-based; wholesaler and dial-up service provider.
307	Moviestar Telecom, Inc.	n/a	CLEC Report indicates long distance and local telephone service; no URL listing.
308	Mundo Telecom	http://www.mundotelecom.biz	Inactive; no longer in business; Texas PUCT CLEC report identifies organization as being relinquished.
309	MXD	n/a	No services defined within CLEC report; telephone number disconnected; no response to e-mails.
310	N. Texas Wireless	n/a	Inactive; no longer in business; invalid contact information.
311	Nanomega.Com	www.nanomega.com	Inactive; no longer in business; invalid contact information.
312	National Clear Tone, LP	n/a	Inactive; no longer in business; invalid contact information.
313	National Discount Telecom, LLC	n/a	Inactive; no longer in business; invalid contact information.
314	Navigator Telecommunications, LLC	http://www.navtel.com	Representative of the company stated the organization does not provide broadband residential services; not a broadband provider.
315	Nei Datacom	http://neidatacom.com	Not a broadband provider; designs and constructs telecommunication infrastructure
316	Net Star Telecommunications	http://www.netstarwireless.com	Not a broadband provider; per a representative of the company only provides business to business solutions.
317	Net Talk.Com, Inc.	http://www.nettalk.com	General reseller; nonfacilities-based; VoIP and WiFi services offered.

318	NetAccess, Inc.	http://www.nas.net/	Not a broadband provider; business portal provider.
319	NetSpeed Online	www.netspeed-online.net	Inactive; no longer in business; URL inactive; no valid contact information identified.
320	Netstreamlive	http://www.netsreamlive.com	Not a broadband provider; provides webcasting events via satellite for special events.
321	NetVoice	n/a	Not a broadband provider; a representative stated service offering is VoIP.
322	Neutral Tandem-Texas, LLC	http://www.neutraltandem.com/	Not a broadband provider.
323	New Access Communications LLC	n/a	Not a broadband provider; provides POTS only.
324	New Edge Networks, Inc.	http://www.newedgenetworks.com/	Acquired by another provider.
325	NewGenWireless	http://www.newgenwireless.com	Not a broadband provider; provides cellular phone packages.
326	Newphone	http://www.newphone.com	Not a broadband provider; phone services only per Texas PUCT CLEC report.
327	Nextg Networks of Illinois, Inc.	http://www.nextgnetworks.net	Not a broadband provider; provider serves as an integrator; nonfacilities-based operations.
328	Nexus Communications, Inc.	http://www.tsihomephone.com/	Not a broadband provider; telephone services provider only.
329	NoDial.net	n/a	No active website; no longer in business.
330	NoDial.net	n/a	Acquired by Internet America Wireless.
331	North Dallas Wireless	n/a	Not a broadband provider; cellular telephone services only.
332	North East Texas Wireless Initiative	n/a	Not a broadband provider; Internet research leads to a BLOG website.

333	North Texas UnWired	n/a	Inactive; no longer in business; Internet research concludes no business operations and inactive URL.
334	North Texas Web Services	http://www.ntws.net	Acquired by eNet.
335	Northeast Texas Broadband, LLC	n/a	Acquired by eNet.
336	Northeast Texas Online	http://www.neato.net	Acquired by eNet.
337	Northwest ISP	http://www.northwestisp.com	Inactive; no longer in business.
338	NSN Wireless, L.P.	http://www.nsn-wireless.net	Not a broadband provider; business to business solutions provider.
339	Ntegrity Telecontent Services, Inc.	n/a	Not a broadband provider; content provider for MDU via other providers transport.
340	Ntera, Inc.	n/a	Inactive; no longer in business; invalid contact information and inactive URL.
341	Nucentrix Broadband Networks	n/a	Acquired by Clearwire Corporation.
342	Oklahoma ECG, L.L.C.	n/a	Not a broadband provider; POTS and long distance services only.
343	Omni Internet	www.omniglobal.net	Acquired by West Central Net.
344	One Connect	www.oneconnect.ca	Not a broadband provider; business to business solutions provider.
345	One Ring Network	http://www.cvc.net/	Not a broadband provider; business to business solutions provider.
346	One Star Long Distance, Inc.	http://www.onestarld.com/	Not a broadband provider; local and long-distance services only.
347	One-Call Telcom, Inc.	http://www.onecalltelecom.com/	General reseller; nonfacilities-based.
348	Open Range Internet	www.openrangecomm.com	Inactive; non-state provider.
349	Overarch Broadband	http://www.overarch.com	Inactive; non-state provider.
350	Pacific Internet Exchange	http://www.pie.us/	General reseller; nonfacilities-based.

351	Pac-West Telecomm Inc.	http://www.pacwest.com/	Not a broadband provider; wholesale telephone services.
352	PAETEC Communications, Inc.	http://www.paetec.com/	Acquired by another company.
353	Paknet Limited	n/a	Inactive; non-state provider.
354	Pampa Cyber Net	http://www.pan-tex.net/	Not a broadband provider; database management services.
355	Panaband	www.panaband.com	Inactive; no longer in business; invalid contact information and inactive URL.
356	Panoptos, LLC	n/a	Inactive; no longer in business; telephone number indicates disconnected service and no URL listing.
357	Partnership Broadband	http://www.partnershipwireless.com	Acquired by JAB Wireless.
358	Peerless Network of Texas, LLC	http:/www.peerlessnetwork.com	Non-state broadband provider.
359	Pelican Bay Internet	n/a	No information.
360	PELZER COMMUNICATIONS CORPORATION	www.pelzercom.com	Inactive; no longer in business; assets are being sold per company representative.
361	Permian Basin Online	http://www.netwest.com	Acquired by NetWest Online.
362	PhoneCo, L.P.	http://www.phoneco1.com	Not a broadband provider.
363	Phone-Link, Inc.	n/a	No longer in business; disconnected telephone service and inactive URL located.
364	Pics.Net	http://www.pics.net	Subsidiary of WesTex Connect (corporate staff).
365	Piney Woods Wireless	www.pineywoodswireless.com/	Inactive; no longer in business; a representative stated operations were terminated about 5 years ago.
366	Planet Online	http://www.planetonline.net/	Not a broadband provider; web-hosting services
367	Posner Telecommunications Inc.	n/a	Not a broadband provider; a paging service company.
368	PRAIRIENET	http://www.prairienet.us/	Acquired by JAB Wireless.

369	PremoWeb	http://www.premoweb.com/about_us/contact_us.html	Not a broadband provider; national dial-up service.
370	PRIDE Network, Inc.	n/a	Subsidiary of NTS Communications.
371	PrismNet	www.prismnet.com/	Not a broadband provider; statement of not providing broadband service received from a representative of the company.
372	Progressive Concepts, Inc.	http://www.progressive-concepts.com	Not a broadband provider; equipment supplier for broadcast applications.
373	Pro-Sky	http://www.prosky.net/products/residental_wireless/index.html#	Inactive; no longer in business; invalid contact information; inactive URL.
374	Provis Broadband	n/a	General reseller; nonfacilities-based; representative of the company indicated wireless assets were sold; selling other provider services only.
375	Purelyonline	www.purelyonline.com	Inactive; no longer in business; Internet research identified status of organization.
376	PVCo.net, LLC	http://www.mypvco.com	Acquired by Jab Wireless.
377	QPQ Marketing, Inc.	n/a	Not a broadband provider; Texas PUCT CLEC report identifies residential POTS only.
378	Quality Telephone, Inc.	http://www.qtelephone.com	Not a broadband provider; received a response from a company representative indicating the organization does not provide broadband services.
379	QuanTumNet ISP	http://www.qins.net	Inactive; no longer in business; invalid contact information and inactive URL.
380	Quick-Tel Communications, Inc.	http://www.quick-tel.com/	Not a broadband provider; a provider of business telecommunications equipment.
381	Qwest Communications Company, LLC	http://www.qwest.com/	Acquired by CenturyLink; Qwest had no operations in the state.

382	Qzip.Net	http://www.qzip.net	Not a broadband provider; business solutions services.
383	R2R Connectivity	www.r2rconnect,net	Not a broadband provider; provides service below FCC standard.
384	Randy White Telecommunications, Inc.	http://www.rwttelecommunications.com	General reseller; nonfacilities-based.
385	Reach Direct, Inc.	n/a	Not a broadband provider.
386	Reconnect Plus, LLC	n/a	Inactive; no longer in business; invalid contact information and inactive URL.
387	Region 18 Education Service Center	n/a	Grant awardee.
388	Regional Wireless Networks	n/a	Not a broadband provider; Internet research found no relevant information.
389	Reliant Communications, Inc.	http://www.reliant-communications.com/	General reseller; nonfacilities-based.
390	Renaissance Networks	http://www.renaissancenetworks.com/	Small business technology consulting and investment company serving Albuquerque, New Mexico.
391	Rhino Communications	http://www.rhinocommunications.net	Acquired by JAB Wireless.
392	RHO Wireless	http://www.rhowireless.com/Default.aspx	This company offers wireless and hardware/software small business solutions in the Dallas/Fort Worth area.
393	RioWave.net	http://www.svideo.com/wi.html	Company operates as Svideo offering hardware and wireless at speeds of 128Kbs up and 512Kbs down.
394	Rosebud Telephone	n/a	General reseller; nonfacilities-based; no URL listing.
395	Rx Technology	http://www.rx-tech.com	Web host and reseller for south Texas businesses and government entities.
396	Sage Telecom, Inc.	http://www.sagetelecom.net/	Not a broadband provider; dial-up services only.
397	Sanswire.Net	http://www.sanswire.com	This is a satellite surveillance company.

398	SATEXAS Communications Network, Inc.	http://www.satexas.com	This company services businesses and is an IT consultant, not a qualified broadband provider.
399	SC TXLINK, LLC.	n/a	Confirmed with company that they do not provide broadband internet services of any kind.
400	Seneca Communications, LLC	http://senecacommunications.com	This company offers business internet solutions only.
401	Servisense.com, Inc.	n/a	Inactive; no longer in business; telephone number-disconnected status; inactive URL.
402	Signatel Telephone Corp	n/a	Company indicated they are facilities-based and reseller for residence and commercial and work through PUC to provide required information only.
403	Simply Cellular & Telephone Reconnections, LLC	n/a	Inactive; no longer in business; logged telephone number assigned to another business firm; inactive URL.
404	Simply Dialup A Metrogeek Company	http://www.simplydialup.com/	Company offers only dial-up services.
405	SkyvueUSA	http://www.skyvueusa.com	Acquired by ERF Wireless.
406	Sling Broadband	http://www.slingbroadband.com/	Service provider in Broward and Dade County, Florida.
407	Smartcom Telephone, LLC	http://www.smartcomtelephone.com/	Commercial broadband provider, does not service a residential market with broadband.
408	Smartresort Co, LLC	www.discoverbeyond.com; http://www.smartresort.com;	General reseller; multi-state provider.
409	Soft Switch Communications Inc.	http://softswitchcom.com/	This company is a business telecommunications service provider and is not a broadband service provider.
410	Solarity Communications LLC	n/a	Inactive; no longer in business; continuous busy signal with logged telephone number; inactive URL; e-mail, Microsoft delivery rejection.

411	South Texas Internet	http://www.stic.net/	This company is a business telecommunications service provider and is not a broadband service provider.
412	Southwestern Bell Telephone, L.P.	n/a	Acquired by AT&T, Inc..
413	Southwestern Network Communications, Inc.	n/a	No longer operating; this company was a facilities-based reseller.
414	Speed Cell Communications	n/a	This company is no longer in business.
415	Speed Express Networks	http://speedexpress.net	This company is no longer in business.
416	Spindlemedia	http://www.spindle.net	This company offers no broadband services.
417	Sprint Broadband Direct	http://www.broadbandreports.com/shownews/ Sprint-Broadband-Direct-Goes-Offline-July-31-94556	This company is no longer in business.
418	Starlight Phone, Inc.	n/a	This company offers local phone service only.
419	Stealthwave, LLC	http://www.stealthwave.net	This company's identified speeds do not meet FCC broadband specifications.
420	Stellar Communication, Inc.	http://stellarcommunications.info	This company is no longer in business.
421	Stratos Global Services, Inc.	n/a	This company offers business internet solutions only.
422	Summit Communications	http://suminet.net	Not a state provider for broadband services.
423	Sunray	n/a	This company is not a viable broadband provider, no service offerings found.
424	Sunset Cablevision	n/a	This company is no longer in business.
425	Superior Phone Company, Inc.	n/a	This company was acquired and now operate under D&B Payphone as payphone servicer.
426	Sure-Tel, Inc.	n/a	This company is no longer in business.

427	Surferz.Net	http://www.surferz.net/	This company offers dial-up service.
428	SurfsideTX.Net	http://www.surfsidetx.net	This company's identified speeds do not meet FCC broadband specifications.
429	SurfTX	n/a	This company is no longer in business.
430	Symtelco, LLC	http://symtelco.com	This company, formerly a consulting firm, is no longer in business.
431	T1 Shopper	http://www.t1shopper.com/	This company provides backhaul and is not a broadband provider.
432	T3 Wireless	http://www.t3wireless.com/	This company does not provide residential service, only B2B.
433	Tel West Network Services Corporation	http://www.telwestservices.com	Acquired by TelePacific.
434	Telcentris Communications, LLC	http://www.telcentris.com	Business solutions provider only.
435	Telcove	n/a	This company offers business internet solutions only.
436	Telefamilia Communications, Inc.	http://www.atsi.net/	This company was acquired by ATSI Communications.
437	Telefonos De Tejas, Inc.	n/a	This company offers telephone service only.
438	Telenational Communications Inc.	http://www.telenational.net	Not a broadband provider per a company representative.
439	Tele-One Communications, Inc.	http://www.tele-onecom.com/	This company offers dial-up service.
440	TeleShare Wireless	http://www.teleshare.net/	Acquired by Internet America Wireless.
441	Teligent Services, Inc.	http://www.teligent.com	Not a broadband service provider; voice service only.
442	Telscape Communications, Inc.	http://www.telscape.com/	Not a broadband provider; consulting firm only per a representative of the company.
443	Telson Communications, Inc.	n/a	This company is no longer in business.

444	Terra Com Inc.	n/a	This company is an environmental consulting firm in Marianna, Florida.
445	Texas Air Net	n/a	This company operates as housing directory assistance.
446	Texas American	n/a	This company is no longer in business.
447	Texas Networking, Inc.	n/a	Texas PUCT report identifies no services available in Texas.
448	Texas One Internet	http://tex1.net	Dial-up service provider; no broadband capabilities.
449	Texas Unwired Networks	n/a	Acquired by Internet America Wireless.
450	Texas Web Networks	n/a	This company is no longer in business.
451	THE PHONE PROS	http://www.phonepro.com/	This company is no longer in business.
452	Tiagris Corporation	http://www.tiagris.net/	This company is no longer in business.
453	Tieless Communications	http://tieless.net/	This company is no longer in business.
454	TIM RON ENTERPRISES, LLC.	n/a	Not a broadband provider; local and long distance service only.
455	TMC Communications	http://www.tmccom.com/	Not a broadband provider; VoIP services.
456	TNCI, Inc.	http://www.tncii.com/	No residential services available; B2B provider.
457	TopGun Telecom	n/a	Acquired by Internet America Wireless.
458	TopMost Connects, Inc.	n/a	No longer in business; representative of the company stated the organization has been out of business for 5 or 6 years.
459	Total Access Networks, Inc.	http://www.totalaccess.net/	Not a wisp; website reflects it is a reseller.
460	Total Telephone Service Company	http://www.totaltelephone.com/	This company offers voice services only.

461	Trinsic Communications, Inc.	http://www.trinsic.com/main.asp	Not a broadband provider based on LinkedIn information; telephone number disconnected; no responses to e-mails.
462	TSISP.NET	www.tsisp.net	This company is no longer in business.
463	TSTAR Internet	http://www.tstar.net/wireless_service.htm	Acquired by ERF Wireless.
464	Twilight Communications	http://www.twilightcommunications.com	Acquired by JAB Wireless.
465	TXK Communications, Inc.	n/a	Inactive; no longer in business; invalid contact information.
466	UCN, Inc.	http://www.incontact.com/	Not a broadband provider; long-distance and calling card services.
467	Unidial Communications	www.lightyear.net	This company was acquired by Lightyear.
468	UNIVERSAL TELEPHONE EXCHANGE, Inc.	n/a	This company is no longer in business.
469	University Corporation for Advanced Internet Development	n/a	This is a community anchor institution network.
470	UNUM Telecommunications, Inc.	http://www.utinet.net/	This company is no longer in business.
471	UrNet	http://www.urnet.net/	Acquired by Digital Passage.
472	US Cable Corporation	http://www.uscablegroup.com/	Acquired by another company.
473	US LEC COMMUNICATIONS Inc.	http://www.paetec.com/	This company is a reseller of frame relay services and does not qualify as a broadband provider.
474	US Wireless Online	n/a	This company was purchased by iElement and is no longer in business.
475	USA Airnet, Inc.	www.usaairnet.com	This company is no longer in business.
476	USA Online, Inc.	http://www.usaonline.net/	This company was acquired by Whitehorse.

477	USA QUICK PHONE, Inc.	n/a	This company is no longer a general reseller of broadband.
478	USTelecom	http://www.ustelecom.org/Video_Blogs/Broadband-Now.html	Inactive; no longer in business.
479	V3 Global, Inc.	n/a	This company is no longer a general reseller of broadband.
480	Valley Telecom Group, Inc.	http://www2.vtc.net/	This company is a reseller of phone services only.
481	Vantage Systems	n/a	This is a software company.
482	VCI COMPANY	n/a	This company is a Comcast affiliate.
483	VCOM SOLUTIONS	http://www.vcomsolutions.com/	Not a broadband provider.
484	Vectren Communications Services, Inc.	http://www.vectren.com/	This company is a national gas company and not a qualified broadband provider.
485	Vertex Communications, Inc.	n/a	This company offers dial-up service.
486	Viteris, Inc.	n/a	Acquired by Internet America Wireless.
487	Viyu Communications	n/a	This company is no longer in business.
488	Voice Runner, Inc.	http://www.voicerunner.com/	This company is not a broadband provider.
489	VoicePaq Prepaid, LLC	n/a	Not a broadband provider.
490	VOLO COMMUNICATIONS OF TEXAS, Inc.	http://www.volocommunications.com/	No longer in business.
491	VSS Wireless	n/a	This company is no longer in business.
492	Warp Speed Internet	n/a	Acquired by ERF Wireless.
493	Wave2Wave Communications Inc.	http://www.wave2wave.com	This company does not have a footprint in TX and only operates in NY. CT, NJ, IL, and PA.
494	Waymark Communications	http://www.waymark.net/	Website research indicates a business to business service provider.
495	WCS Communications	n/a	General Reseller; non-facilities based; satellite services.

496	WDSL Net	n/a	This company is no longer in business.
497	Webatron Internet Solutions	http://www.webatron.net	This company is no longer in business.
498	Webcheetah	n/a	This company is a web design firm.
499	WEST TELCOM, Inc.	n/a	This company operated in California and is no longer in business.
500	West Texas Internet Services	n/a	This company is no longer in business.
501	West Texas Online	n/a	This company is no longer in business.
502	WhiteHorse Communications	http://www.net	This company offers dial-up service only.
503	Winstar Communications, LLC	http://gvcwinstar.net/	This company is no longer in business.
504	Wireless Frontier	n/a	This company is no longer in business.
505	Wireless Roanoke, Inc.	http://www.wirelessroanoke.com/	This company is no longer in business.
506	Wireless TelCorp	http://www.wirelesstelcorp.com	This company, formerly serving businesses, is no longer in business.
507	Wirestar, Inc.	http://www.wirestar.net/	This company is not a broadband provider.
508	WireWeb	http://www.wireweb.net	Acquired by Internet America Wireless.
509	wisbin	http://www.wisbin.com/	This company is no longer in business.
510	Wi-Speed	n/a	This company is no longer in business.
511	World Link Communications	n/a	This company offers dial-up service only.
512	WTX Communications	n/a	This company is no longer in business.
513	www.AmericanAngel.us	http://www.americanangel.us/	This company is no longer in business.
514	Xanadoo, LLC	http://www.xanadoo.com	This company is no longer in business; under bankruptcy filings.

515	Xramp Wireless	n/a	This company was acquired by Wireless Frontier.
516	Xspedius Management Co. Switched Services, L.L.C	n/a	This company and web-hosting was acquired by Time-Warner.
517	YEYZOO.NET	http://www.yeyzoo.net/	This company is no longer in business.
518	YFT.Net	http://www.yft.net	Acquired by AMA Technologies, Inc.
519	YLISP (Your Local ISP)	http://www.itsyournet.com	General reseller; multi-state provider.
520	YourT1Wifi.com	http://yourt1wifi.com/	This company does not service the Texas market and is an Idaho WISP.
521	ZOOM Internet Services, LLC	n/a	This company does not service the Texas market and is a Michigan WISP.

Appendix A: Estimation of Non-Participating Providers

AMA TechTel

Anvil Communications

Broadwaves

CKS Wireless, Inc.

East Texas Broadband

East Texas Cable

GoZoe Wireless

NDemand, Inc.

Skynet Communications

Starnet Online Systems

Telecom Cable, LLC

TheSPECnet, Inc.

VRFuturenet

Zulu Internet, Inc.

AMA TechTel

As part of its ongoing broadband mapping efforts, Connected Nation has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the SBI mapping initiative.

The following narrative provides detail regarding continued data collection activities related to AMA TechTel, a wireless Internet service provider (WISP), located in Amarillo, Texas with a service area around the Central Panhandle, including but not limited to, the city of Amarillo and multiple surrounding towns and rural areas. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data. As of April 2012 CN identified additional service areas during routine exploration and field validation activity in Abilene, Texas and surrounding rural areas. The narrative for the October 2012 activity is located at the end of this document (after Exhibit I) and titled *Results for October 2012 Submission.*

<u>Background</u>
CN staff members have continued trying to obtain the participation of the provider with 33 instances of communication via telephone and e-mail sessions since September 9, 2009, through August 6, 2012. Communication reply received from a company representative on February 4, 2011, with a response of electing not to participate due to the nationwide providers' involvement in the mapping project. Additionally, a CN staff member visited the AMA TechTel office on October 4, 2011, to discuss the broadband mapping project in person with AMA TechTel staff but decision-making staff members were not available.

<u>The Issue</u>
AMA TechTel, by its lack of responsiveness since September 9, 2009, has predicated its unwillingness to participate in the Connected Texas broadband mapping initiative.

<u>Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing</u>
CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (http://www.amatechtel.com/) and called the AMA TechTel office to determine the residential service plans offered to Residential as 1.1 Mbps download and 512 Kbps upload, which is well within the website speeds and OOKLA data sample (Over 2,800 total speed tests) in service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) **(Exhibit C)** system yielded an FRN of 0008064941 and 0013822721 with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN's were referenced to the FCC Universal Licensing System (ULS) to identify any licenses the provider may hold which could possibly enhance locating active access points for the service area. This process yielded license WQJC218 **(Exhibit D)**, Radio Service: WQJC218 with 10 unique locations.

Exhibit A: Service Plans

Services

High-Speed Internet Access	Web Site Hosting	Collocation
512Kb up to 45Mb	Dedicated and Shared (virtual) hosting plans available	By collocating your servers in our Network Operating Center (NOC), you are free from the cost of expensive routers, hubs, switches and firewalls.
Network Administration	**Virtual Private Networking (VPN)**	**Internet & Network Security**
Affordable network administration is provided by a company who knows networking. You can choose to pay by the hour or purchase discounted service plans.	Virtual Private Networking provides secures network access to home or remote business sites.	We offer a security level that provides the IPSec 168 bit 3DES encryption needed to meet OCC and HIPAA requirements to

test_date	download_k	upload_kbp	latency	server_nam	isp_name	client_cit	client_lat	client_lon	miles_betw	CNTY_FIPS	FULLNAME
40173	996	282	73	Clovis, NM	AMA Communications, LLC	Canyon	34.9511	-101.897	84.278	381	Randall County
40173	1020	291	73	Clovis, NM	AMA Communications, LLC	Canyon	34.9511	-101.897	84.278	381	Randall County
40174	909	343	63	Clovis, NM	AMA Communications, LLC	Canyon	34.9511	-101.897	84.278	381	Randall County
40252	1086	346	42	Clovis, NM	AMA Communications, LLC	Canyon	34.9511	-101.897	84.278	381	Randall County
40309	1467	682	88	Muleshoe, TX	AMA Communications, LLC	Canyon	34.9511	-101.897	68.9108	381	Randall County
40309	1461	697	88	Muleshoe, TX	AMA Communications, LLC	Canyon	34.9511	-101.897	68.9108	381	Randall County
40309	1467	697	88	Muleshoe, TX	AMA Communications, LLC	Canyon	34.9511	-101.897	68.9108	381	Randall County
40316	1374	471	104	Muleshoe, TX	AMA Communications, LLC	Canyon	34.9511	-101.897	68.9108	381	Randall County
40317	1358	460	113	Muleshoe, TX	AMA Communications, LLC	Canyon	34.9511	-101.897	68.9108	381	Randall County
40317	1275	468	104	Muleshoe, TX	AMA Communications, LLC	Canyon	34.9511	-101.897	68.9108	381	Randall County
40120	936	271	26	Dallas, TX	AMA Communications, LLC	Lubbock	33.5663	-101.883	299.241	303	Lubbock County
40316	1132	316	123	Muleshoe, TX	AMA Communications, LLC	Lubbock	33.5663	-101.883	66.7461	303	Lubbock County
40259	923	212	166	Muleshoe, TX	AMA Communications, LLC	Lubbock	33.5663	-101.883	66.7461	303	Lubbock County

Exhibit B: Service Area

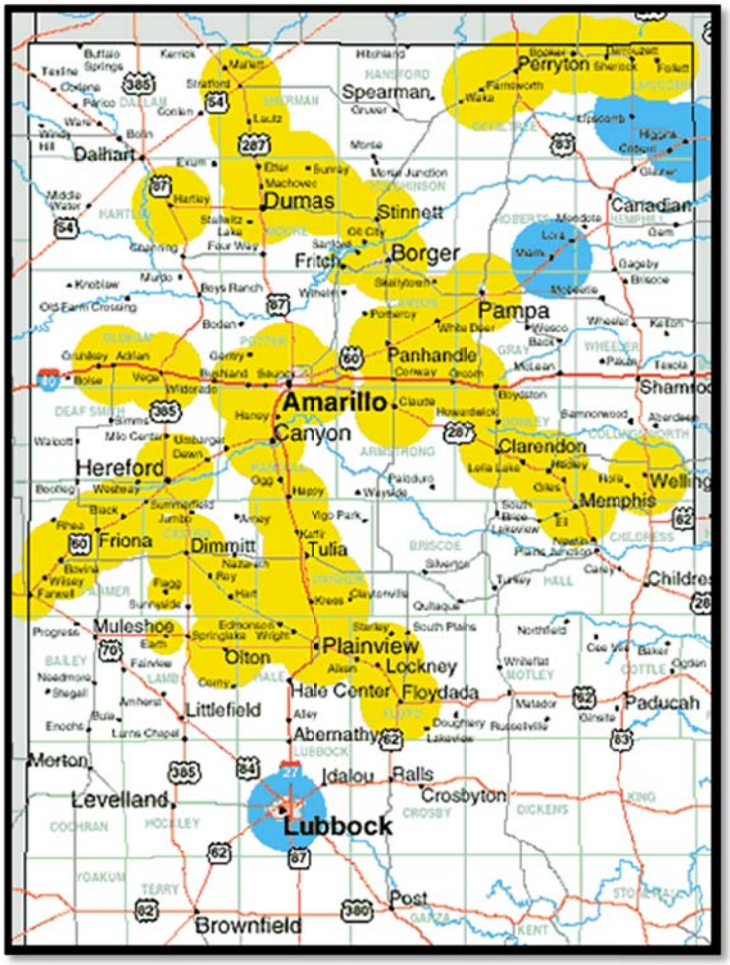


Exhibit C: Federal Registration Number

FRN:	0013822721
Registration Date:	07/29/2005 06:14:25 PM
Last Updated:	
Business Name:	AMA Communications
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	AMA TechTel
Contact Position:	VP
Contact Name:	Mr. Douglas Campbell
Contact Address:	4909 Canyon Dr Amarillo, TX 79110-2329 United States
Contact Email:	dcampbell@amatechtel.com
Contact Phone:	(806) 242-3500 545
Contact Fax:	(806) 352-3327

FRN:	0008064941
Registration Date:	12/10/2002 03:34:18 PM
Last Updated:	08/31/2011 05:08:38 PM
Business Name:	AMA Communications, L.L.C.
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	AMA Communications, L.L.C.
Contact Position:	Regulatory Compliance
Contact Name:	Mr. Dell Purdy
Contact Address:	4630 50th Street Amarillo, TX 79414 United States
Contact Email:	dpurdy@amatechtel.com
Contact Phone:	(806) 722-2247
Contact Fax:	

Exhibit D: WQJC218 License Reference

FCC Federal Communications Commission

FCC Home | Search | Updates | E-Filing | Initiatives | For Cons

Universal Licensing System

FCC > WTB > ULS > Online Systems > License Search

3650-3700 MHz License - WQJC218 - AMA Communications, LLC

Locations Summary

New Search | Refine Search | Printable Page | Reference Copy | Map License

MAIN | ADMIN | LOCATIONS

Call Sign	WQJC218	Radio Service	NN - 3650-3700 MHz

22 Total Locations
10 Locations per Summary Page

1 2 3 [Next >>]

	Location	Latitude,Longitude	Transmitter Azimuth
1	Panhandle	35-20-26.8 N, 101-22-48.6 W	240.0 degrees
2	WHITE DEER	35-26-12.5 N, 101-10-14.3 W	185.0 degrees
3	CLARENDON	34-56-26.9 N, 100-53-24.0 W	130.0 degrees
4	STINNETT	35-50-45.1 N, 101-27-13.6 W	137.0 degrees
5	MIAMI	35-42-22.8 N, 100-38-43.6 W	153.0 degrees
6	Gruver Tower	36-16-02.7 N, 101-24-27.7 W	128.0 degrees
7	Hart Tower	34-23-12.2 N, 102-07-01.9 W	170.0 degrees
8	LEFORS	35-25-59.8 N, 100-47-53.6 W	327.0 degrees
9	MAY	31-58-01.2 N, 098-55-48.7 W	60.0 degrees
10	MAY	31-58-01.2 N, 098-55-48.7 W	180.0 degrees

22 Total Locations
10 Locations per Summary Page

1 2 3 [Next >>]

Done | Internet

FCC Federal Communications Commission

FCC Home | Search | Updates | E-Filing | Initiatives | For C

Universal Licensing System

FCC > WTB > ULS > Online Systems > License Search

3650-3700 MHz License - WQJC218 - AMA Communications, LLC

Locations Summary

New Search | Refine Search | Printable Page | Reference Copy | Map License

MAIN | ADMIN | LOCATIONS

Call Sign	WQJC218	Radio Service	NN - 3650-3700 MHz

22 Total Locations
10 Locations per Summary Page

[<<Previous] 1 2 3 [Next >>]

	Location	Latitude,Longitude	Transmitter Azimuth
11	MAY	31-58-01.2 N, 098-55-48.7 W	300.0 degrees
12	CROSS PLAINS FD	32-07-54.0 N, 099-09-34.0 W	90.0 degrees
13	CROSS PLAINS	32-07-54.0 N, 099-09-34.0 W	180.0 degrees
14	CROSS PLAINS	32-07-54.0 N, 099-09-34.0 W	270.0 degrees
15	CROSS PLAINS FD	32-07-34.6 N, 099-09-57.4 W	270.0 degrees
16	RISING STAR	32-05-47.0 N, 098-58-16.0 W	90.0 degrees
17	RISING STAR	32-05-47.0 N, 098-58-16.0 W	180.0 degrees
18	RISING STAR	32-05-47.0 N, 098-58-16.0 W	270.0 degrees
19	BLACKWELL	32-05-30.0 N, 100-18-54.0 W	165.0 degrees
20	BLACKWELL	32-05-30.0 N, 100-18-54.0 W	180.0 degrees

22 Total Locations
10 Locations per Summary Page

[<<Previous] 1 2 3 [Next >>]

Internet

FCC Federal Communications Commission

FCC Home | Search | Updates | E-Filing | Initiatives | For C

Universal Licensing System

FCC > WTB > ULS > Online Systems > License Search

3650-3700 MHz License - WQJC218 - AMA Communications, LLC

Locations Summary

New Search Refine Search Printable Page Reference Copy Map License

MAIN | ADMIN | LOCATIONS

Call Sign	WQJC218	Radio Service	NN - 3650-3700 MHz
22 Total Locations 10 Locations per Summary Page			

[<<Previous] 1 2 3

	Location	Latitude,Longitude	Transmitter Azimuth
21	BLACKWELL	32-05-30.0 N, 100-18-54.0 W	195.0 degrees
22	MCLEAN	35-14-28.5 N, 100-36-36.8 W	135.0 degrees

22 Total Locations
10 Locations per Summary Page

[<<Previous] 1 2 3

ULS Help	ULS Glossary - FAQ - Online Help - Technical Support - Licensing Support
ULS Online Systems	CORES - ULS Online Filing - License Search - Application Search - Archive License Search
About ULS	Privacy Statement - About ULS - ULS Home
Basic Search	By Call Sign = SEARCH

FCC | Wireless | ULS | CORES

Internet

ULS License - 3650-3700 MHz License - WQJC218 - A...

Page ▾ Safety ▾ Tools ▾

ULS License

3650-3700 MHz License - WQJC218 - AMA Communications, LLC

HELP

New Search Refine Search Return to Results Printable Page Reference Copy Map License

MAIN | ADMIN | LOCATIONS

Call Sign	WQJC218	Radio Service	NN - 3650-3700 MHz
Status	Active	Auth Type	Regular
Dates			
Grant	07/22/2008	Expiration	07/22/2018
Effective	04/22/2011	Cancellation	

Area of Operation: N

Operating Nationwide including Hawaii, Alaska, and US Territories.

Frequency Bands

003650.00000000-003700.00000000

Licensee

FRN	0013822721 (View Ownership Filing)	Type	Corporation

Licensee

AMA Communications, LLC 7201 I-40 W. Suite 200 Amarillo, TX 79106 ATTN Douglas Campbell	P:(806)322-2222 F:(806)322-2121 E:dcampbell@amatechtel.com

Contact

AMA COMMUNICATIONS, LLC 7201 I-40W, Suite 200 Amarillo, TX 79106 ATTN Douglas Campbell	P:(806)322-2222 F:(806)322-2121 E:dcampbell@amatechtel.com

Ownership and Qualifications

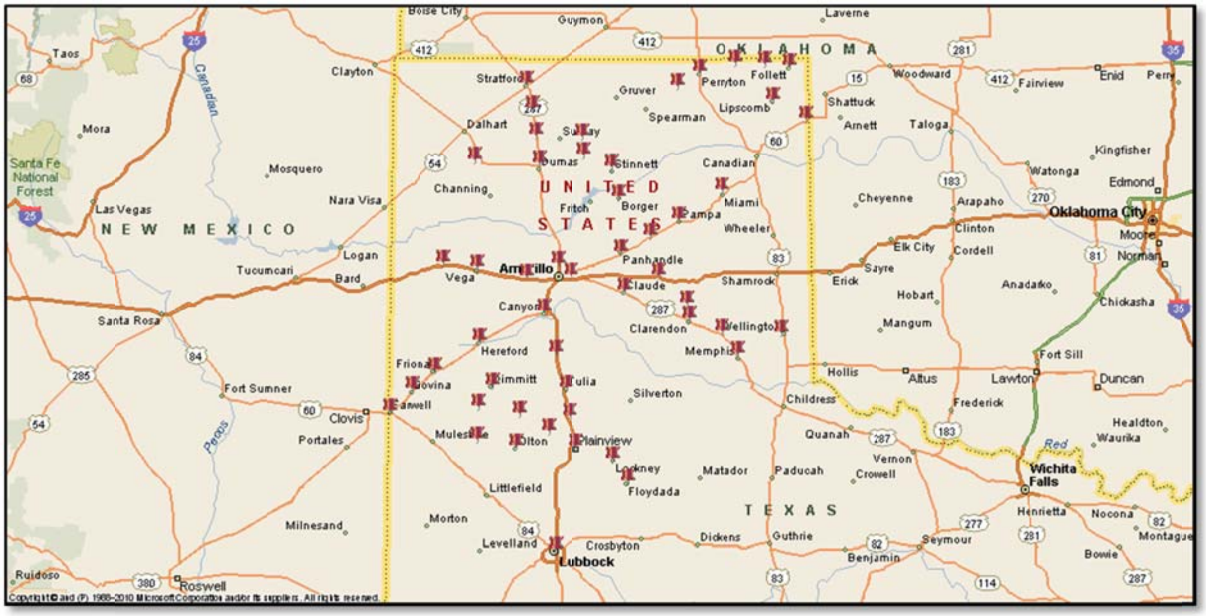
Internet 75%

Preliminary Identification of Provider's Coverage Area

Connected Nation extracted the AMA TechTel service area map from its website and the information through the FCC ULS database in reference to license WQJC218. The website service area was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .5 mile (2640 ft.) to establish a minimum search criteria of a given access point. The provider's service area depiction is represented by tower symbols as shown in **Exhibit B**. Using the coordinates (10 unique locations) available through the FCC ULS license search an accuracy validation of the image overlay was conducted to determine the feasibility of utilizing the tower symbols for identifying coordinates of the remaining 40 locations. The 10 licensed locations' coordinates were inputted into Google Earth and examined utilizing the zoom option of the aerial imagery. Six locations structures were identified within the provider's website defined coverage area. This provided a means of establishing coordinates for the 44 remaining access point locations. All 50 locations were entered into the Microsoft *Streets & Trips* mapping application **(Exhibit F)** to develop a route for the validation process.

Exhibit E: Google Earth: AMA TechTel's Service Area Image Overlay

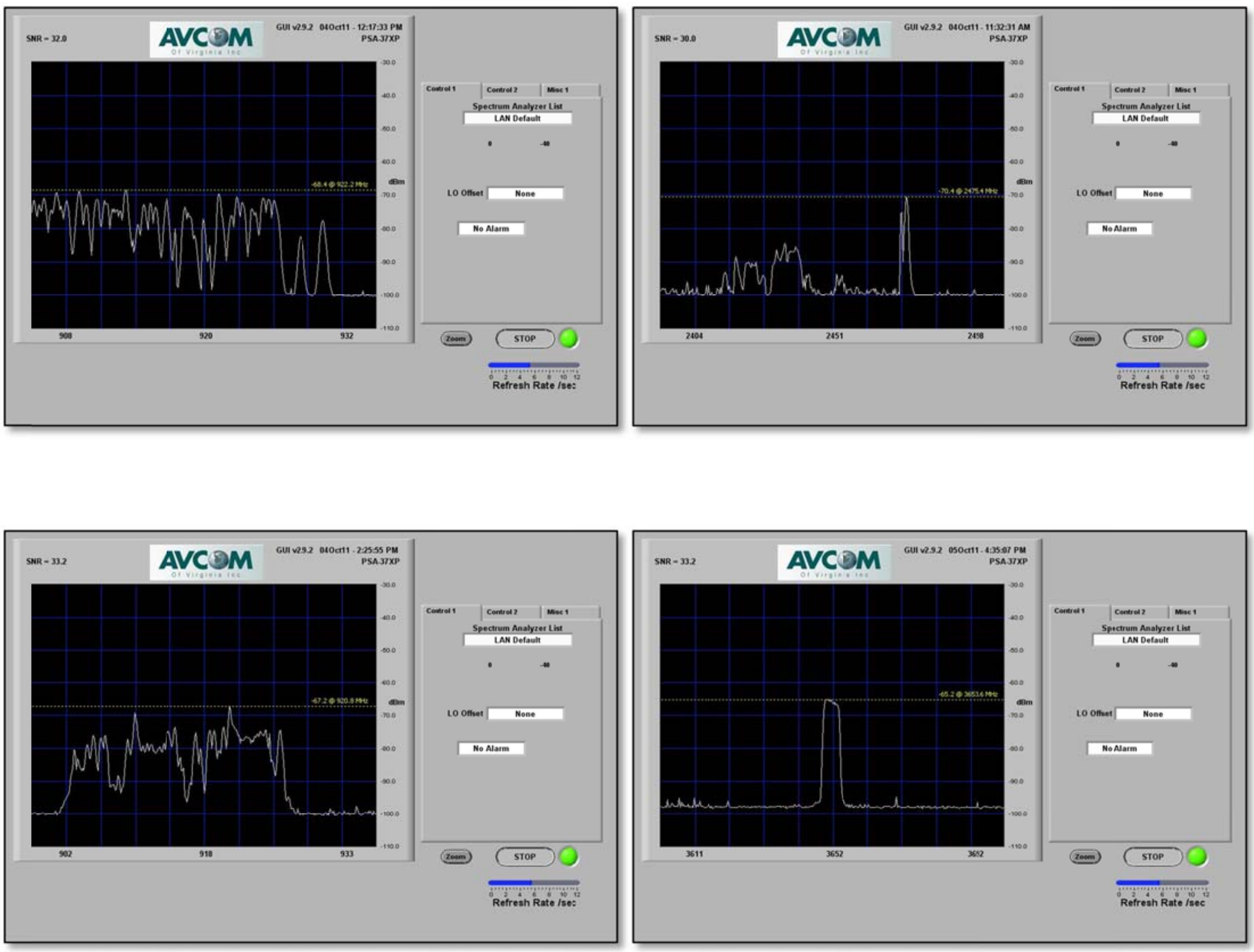
Exhibit F: Validation Points for AP Structures

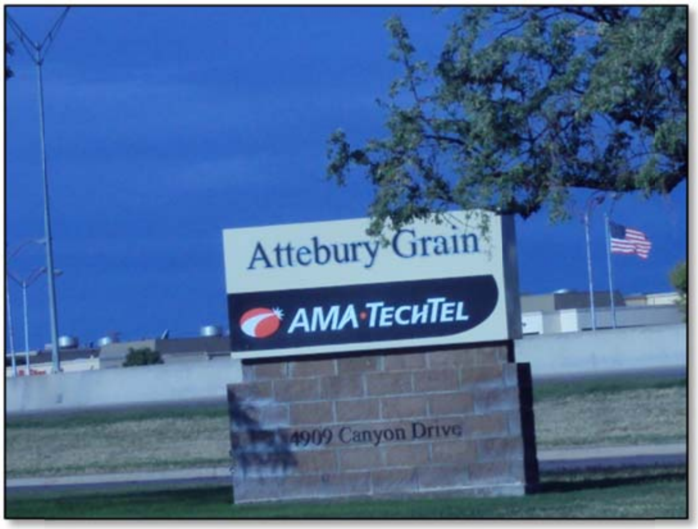


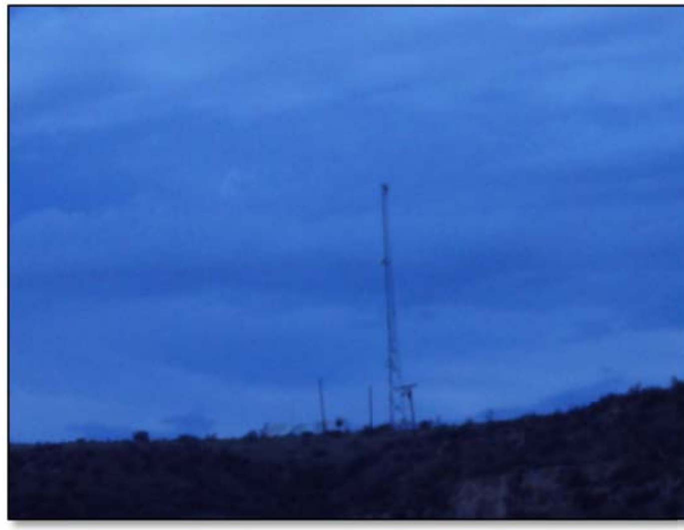
Testing Techniques

Connected Nation staff developed a site validation route based on data established with the Google Earth image overlay and publicly available data through the FCC ULS database for AMA TechTel WQJC218 radio service. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored) and photographs were taken of the access points.

Exhibit G: Field Data for AMA TechTel Hub Location




Attebury Grain
AMA·TECHTEL
4909 Canyon Drive




HART

Primary Population Center Covered by Service (city, county, etc)	**Transmission Location** (water tank, tower, silo, rooftop or other structure)	**Decimal Degree Conversion** (automatically converted here if you completed columns K, L and M)	**Decimal Degree Conversion** (automatically converted here if you completed columns O, P and Q)	**Is the Transmit Antenna Omni-Directional?**	**Transmit Frequency** (MHz)	**Polarity** (V or H)	**Antenna Elevation** (feet above ground)	**Comments:** Tell us anything you feel is important for us to know about your system (e.g., foliage).
Lubbock	**Rooftop**	*33.585520*	*-101.849920*	☐ Yes ☑ No	**900 - 2400**	☐ V ☑ H	**200**	**Urban area**
Farwell	**Elevator**	*34.387820*	*-103.043420*	☐ Yes ☑ No	900	☐ V ☑ H	130	Small trees 5%
Bovina	Elevator	*34.523310*	*-102.887500*	☑ Yes ☐ No	2400	☐ V ☑ H	140	Small trees 5%
Friona	Elevator	*34.635050*	*-102.717690*	☑ Yes ☐ No	900	☐ V ☑ H	140	Small trees 5%
Adrain	Elevator	*35.271730*	*-102.665370*	☐ Yes ☐ No	900	☐ V ☑ H	140	Small trees 5%
Earth, Lamb	Water Tower	*34.233700*	*-102.409220*	☑ Yes ☐ No	2400	☐ V ☑ H	130	Small trees 5%
Flagg	Elevator Leg	*34.425840*	*-102.410200*	☐ Yes ☑ No	900	☐ V ☑ H	100	Small trees 1%
Olton	Elevator Leg	*34.189360*	*-102.140120*	☑ Yes ☐ No	900	☐ V ☑ H	180	Smal Trees 5%
Hart	Water Tower	*34.386770*	*-102.116700*	☐ Yes ☑ No	900	☐ V ☑ H	120	Small trees 5%
Dimmitt	Water Tower	*34.547030*	*-102.306830*	☑ Yes ☐ No	900	☐ V ☑ H	120	Small trees 5%
Hereford	Elevator	*34.811465*	*-102.400090*	☐ Yes ☑ No	900	☐ V ☑ H	140	Small trees 5%
Edmonson	Elevator	*34.283195*	*-101.901593*	☐ Yes ☑ No	900	☐ V ☑ H	140	Small trees 1%
Plaimview	Elevator	*34.194420*	*-101.706450*	☑ Yes ☐ No	2400	☐ V ☑ H	200	Small trees 5%
Kress	Elevator	*34.368290*	*-101.748610*	☐ Yes ☑ No	900	☐ V ☑ H	120	Small trees 1%
Floydada	Elevator	*33.986200*	*-101.331000*	☐ Yes ☑ No	900	☐ V ☑ H	140	Small trees 5%
Lockney	Elevator	*34.117660*	*-101.440040*	☑ Yes ☐ No	900	☐ V ☑ H	160	small trees 5%
Tuila	Elevator	*34.534060*	*-101.777460*	☐ Yes ☑ No	900-2400	☐ V ☑ H	140	Small trees 5%
Happy	Elevator	*34.745530*	*-101.854480*	☐ Yes ☑ No	900	☐ V ☑ H	140	Small trees 5%
Canyon	Elevator	*34.983140*	*-101.938020*	☐ Yes ☑ No	900	☐ V ☑ H	140	Small trees 10%
Claude	Elevator	*35.112500*	*-101.361216*	☐ Yes ☑ No	900	☐ V ☑ H	140	Small trees 5%
Vega	Elevator	*35.244530*	*-102.425120*	☐ Yes ☑ No	900	☐ V ☑ H	140	Small trees 1%
Bushland	Elevator	*35.192220*	*-102.064260*	☐ Yes ☑ No	2400	☐ V ☑ H	140	Smal trees 5%
Hartley	Water tower	*35.883056*	*-102.451944*	☐ Yes ☑ No	900	☐ V ☑ H	140	small trees 10%
Dumas	Elevator	*35.862778*	*-101.978333*	☐ Yes ☑ No	900	☐ V ☑ H	160	small trees 10%
Catus	Elevator	*36.027500*	*-102.001667*	☐ Yes ☑ No	900	☐ V ☑ H	150	Low foliage 1 % trees
Rural Strafford	Elevator	*36.185833*	*-102.032222*	☑ Yes ☐ No	900	☐ V ☑ H	140	Low foliage 1 % trees
Strafford	Elevator	*36.333333*	*-102.071389*	☑ Yes ☐ No	900	☐ V ☑ H	120	Low foliage 1 % trees
N Amerillo	Tower 1212262	*35.269167*	*-101.839167*	☐ Yes ☑ No	900	☐ V ☑ H	150	Rural 15% Foliage
Amerillo	Elevator	*35.203700*	*-101.742610*	☑ Yes ☐ No	900	☐ V ☑ H	130	Low Foliage 5%
Panhandle	Elevator	*35.340833*	*-101.380556*	☐ Yes ☑ No	900	☐ V ☑ H	200	Low foliage 10 %
Stinnett	Tower	*35.844722*	*-101.447222*	☐ Yes ☑ No	900	☐ V ☑ H	160	Low foliage some terrain
Borger	Tower	*35.664722*	*-101.397222*	☑ Yes ☐ No	900	☐ V ☑ H	100	Urban area
Sumray	Elevator	*36.023333*	*-101.663611*	☑ Yes ☐ No	900	☐ V ☑ H	130	Low foliage 1% trees
Morton-Dumas Rura	Elevator	*35.910276*	*-101.650666*	☑ Yes ☐ No	900	☐ V ☑ H	180	Low foliage 1% trees
Howardwick	Pole	*35.035370*	*-100.906330*	☑ Yes ☐ No	900	☐ V ☑ H	60	Low foliage 5% trees
Claredon	Elevator	*34.940730*	*-100.890790*	☐ Yes ☑ No	900	☐ V ☑ H	160	Urban trees small
Hedley	Water tower	*34.868560*	*-100.662710*	☐ Yes ☑ No	900	☐ V ☑ H	140	Small town
Memphis	Water Tower	*34.731940*	*-100.540150*	☐ Yes ☑ No	2400	☐ V ☑ H	120	Small town
Wellington	Tower	*34.852640*	*-100.225980*	☑ Yes ☐ No	900	☐ V ☑ H	200	Small town 20% foliage
White Deer	Elevator	*35.436750*	*-101.170650*	☐ Yes ☑ No	900	☐ V ☑ H	140	Small Town Low Foliage
Groom	Elevator	*35.200100*	*-101.109090*	☐ Yes ☑ No	900	☐ V ☑ H	180	Small Town Low foliage
Pampa	Elevator	*35.528370*	*-100.965100*	☐ Yes ☑ No	900	☐ V ☑ H	170	South Part of Town foliage 10%
Miami	Tower	*35.703730*	*-100.652150*	☐ Yes ☑ No	3650	☑ V ☐ H	100	North part of town
Farnsworth	Elevator	*36.319940*	*-100.969550*	☑ Yes ☐ No	900	☐ V ☑ H	160	Small town foliage 5%
Perrytown	Elevator	*36.399900*	*-100.803740*	☐ Yes ☑ No	900	☐ V ☑ H	180	Small town foliage 5%
Booker	Elevator	*36.455890*	*-100.535690*	☐ Yes ☑ No	900	☐ V ☑ H	160	Small town low foliage 5%
Liscomb	Tower	*36.233490*	*-100.270500*	☐ Yes ☑ No	2400	☐ V ☑ H	70	Low tower on county land small town no homes
Darrouzett	Elevator	*36.442890*	*-100.327810*	☐ Yes ☐ No	900	☐ V ☑ H	140	Small town lowfoliage
Higgins	Water tower	*36.117450*	*-100.028933*	☐ Yes ☑ No	900	☐ V ☑ H	160	two locations on Tank opucipied
Follett	Elevator	*36.430419*	*-100.142424*	☐ Yes ☑ No	2400	☐ V ☑ H	160	Small town

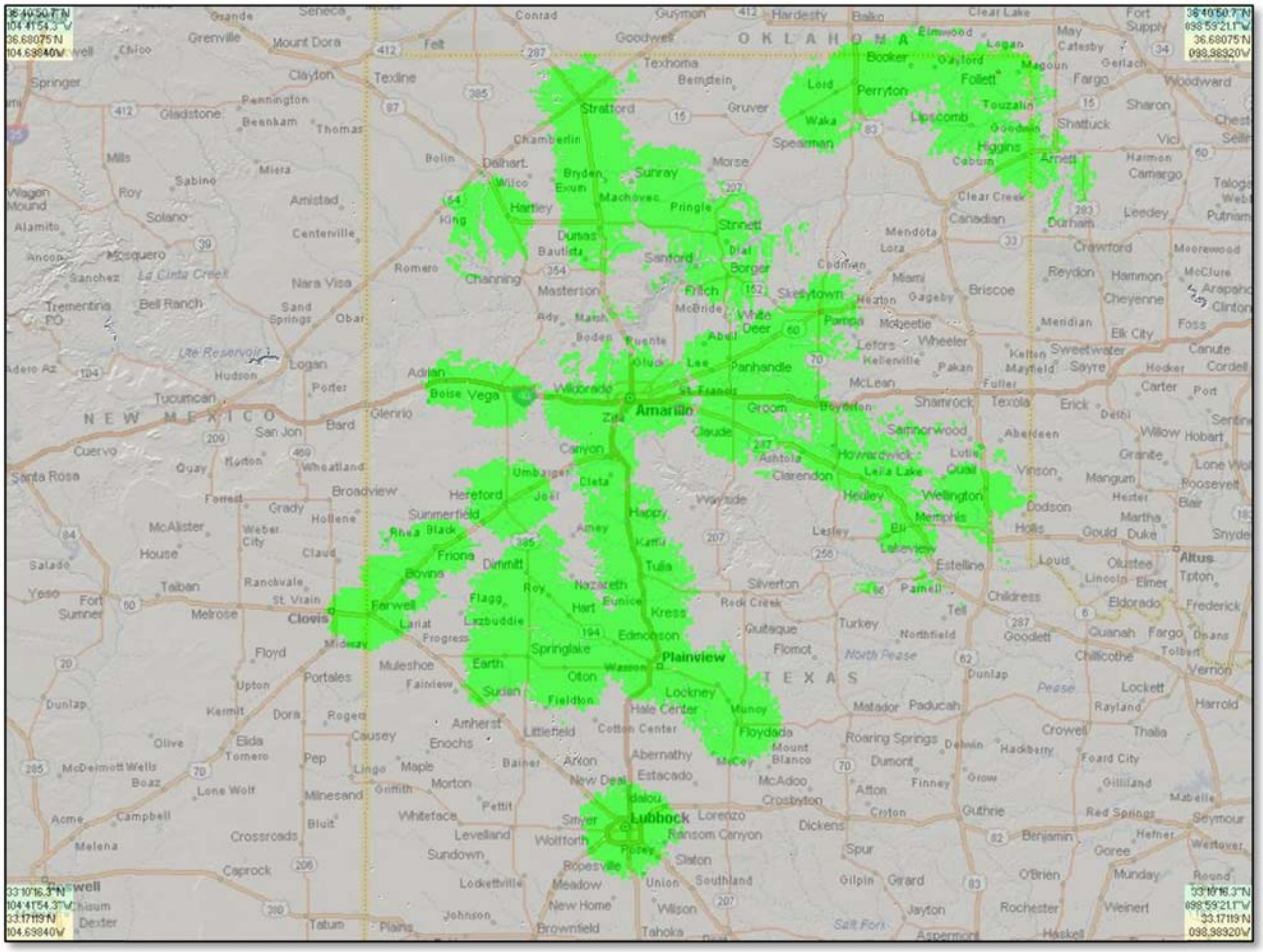
Results and Submission for April 2012

Of the 50 locations visited during the validation point route, 50 access points were identified and relative information was logged into the AMA TechTel field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the Connected Nation Provider Information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to AMA TechTel and advised the information will be submitted to Connected Texas and the NTIA broadband mapping project for processing if there are no discrepancies of the estimated coverage received from the provider within a 48-hour period.

Exhibit H: Field Validation Notes

Test City	Test State	Location Description	(N) Lat Decimal	(-)(W) Long Decimal	Peak Freq	Peak Sig Strength	Spectrum Analyzer	Images	
Lubbock	TX	Rooftop	33.585520	-101.849920	900 - 2400	-68	Avcom PSA-37XP	Yes	**Urban area**
Farwell	TX	Elevator	34.387820	-103.043420	900	-70	Avcom PSA-37XP	Yes	Small trees 5%
Bovina	TX	Elevator	34.523310	-102.887500	2400	-68	Avcom PSA-37XP	Yes	Small trees 5%
Friona	TX	Elevator	34.635050	-102.717690	900	-70	Avcom PSA-37XP	Yes	Small trees 5%
Adrian	TX	Elevator	35.271730	-102.665370	900	-68	Avcom PSA-37XP	Yes	Small trees 5%
Earth	TX	Water Tower	34.233700	-102.409220	2400	-70	Avcom PSA-37XP	Yes	Small trees 5%
Flagg	TX	Elevator Leg	34.425840	-102.410200	900	-68	Avcom PSA-37XP	Yes	Small trees 1%
Olton	TX	Elevator Leg	34.189360	-102.140120	900	-70	Avcom PSA-37XP	Yes	Small Trees 5%
Hart	TX	Water Tower	34.386770	-102.116700	900	-68	Avcom PSA-37XP	Yes	Small trees 5%
Dimmitt	TX	Water Tower	34.547030	-102.306830	900	-70	Avcom PSA-37XP	Yes	Small trees 5%
Hereford	TX	Elevator	34.811465	-102.400090	900	-68	Avcom PSA-37XP	Yes	Small trees 5%
Edmonson	TX	Elevator	34.283195	-101.901593	900	-70	Avcom PSA-37XP	Yes	Small trees 1%
Planview	TX	Elevator	34.194420	-101.706450	2400	-74	Avcom PSA-37XP	Yes	Small trees 5%
Kress	TX	Elevator	34.368290	-101.748610	900	-70	Avcom PSA-37XP	Yes	Small trees 1%
Floydada	TX	Elevator	33.986200	-101.331000	900	-68	Avcom PSA-37XP	Yes	Small trees 5%
Lockney	TX	Elevator	34.117660	-101.440040	900	-70	Avcom PSA-37XP	Yes	small trees 5%
Tulia North	TX	Elevator	34.534060	-101.777460	900-2400	-74	Avcom PSA-37XP	Yes	Small trees 5%
Happy	TX	Elevator	34.745530	-101.854480	900	-68	Avcom PSA-37XP	Yes	Small trees 5%
Canyon	TX	Elevator	34.983140	-101.938020	900	-70	Avcom PSA-37XP	Yes	Small trees 10%
Claude	TX	Elevator	35.11249988	-101.3612162	900	-68	Avcom PSA-37XP	Yes	Small trees 5%
Vega	TX	Elevator	35.24453	-102.42512	900	-71	Avcom PSA-37XP	Yes	Small trees 1%
Bushland	TX	Elevator	35.19222	-102.06426	2400	-73	Avcom PSA-37XP	Yes	Small trees 5%
Hartley	TX	Water tower	35.88305556	-102.4519444	900	-68	Avcom PSA-37XP	Yes	small trees 10%
Dumas	TX	Elevator	35.86277778	-101.9783333	900	-70	Avcom PSA-37XP	Yes	small trees 10%
Cactus	TX	Elevator	36.0275	-102.0016667	900	-74	Avcom PSA-37XP	Yes	Low foliage 1 % trees
Rural Strafford	TX	Elevator	36.18583333	-102.0322222	900	-70	Avcom PSA-37XP	Yes	Low foliage 1 % trees
Strafford	TX	Elevator	36.33333333	-102.0713889	900	-68	Avcom PSA-37XP	Yes	Low foliage 1 % trees
Amerillo N	TX	Tower 1212262	35.26916667	-101.8391667	900	-70	Avcom PSA-37XP	Yes	Rural 15% Foliage
Amarillo E	TX	Elevator	35.2037	-101.74261	900	-74	Avcom PSA-37XP	Yes	Low Foliage 5%
Panhandle	TX	Elevator	35.34083333	-101.3805556	900	-68	Avcom PSA-37XP	Yes	Low foliage 10 %
Stinnett	TX	Tower	35.84472222	-101.4472222	900	-70	Avcom PSA-37XP	Yes	Low foliage some terrain
Borger	TX	Tower	35.66472222	-101.3972222	900	-68	Avcom PSA-37XP	Yes	Urban area
Sunray	TX	Elevator	36.02333333	-101.6636111	900	-68	Avcom PSA-37XP	Yes	Low foliage 1% trees
Dumas Rural	TX	Elevator	35.91027622	-101.650666	900	-70	Avcom PSA-37XP	Yes	Low foliage 1% trees
Howardwick	TX	Pole	35.03537	-100.90633	900	-68	Avcom PSA-37XP	Yes	Low foliage 5% trees
Claredon	TX	Elevator	34.94073	-100.89079	900	-68	Avcom PSA-37XP	Yes	Urban trees small
Hedley	TX	Water tower	34.86856	-100.66271	900	-70	Avcom PSA-37XP	Yes	Small town
Memphis	TX	Water Tower	34.73194	-100.54015	2400	-74	Avcom PSA-37XP	Yes	Small town
Wellington	TX	Tower	34.85264	-100.22598	900	-68	Avcom PSA-37XP	Yes	Small town 20% foliage
White Deer	TX	Elevator	35.43675	-101.17065	900	-70	Avcom PSA-37XP	Yes	Small Town Low Foliage
Groom	TX	Elevator	35.2001	-101.10909	900	-68	Avcom PSA-37XP	Yes	Small Town Low foliage
Pampa	TX	Elevator	35.52837	-100.9651	900	-70	Avcom PSA-37XP	Yes	South Part of Town foliage 10%
Miami Blue	TX	Tower	35.70373	-100.65215	3650	-74	Avcom PSA-37XP	Yes	North part of town
Farnsworth	TX	Elevator	36.31994	-100.96955	900	-71	Avcom PSA-37XP	Yes	Small town foliage 5%
Perrytown	TX	Elevator	36.3999	-100.80374	900	-68	Avcom PSA-37XP	Yes	Small town foliage 5%
Booker	TX	Elevator	36.45589	-100.53569	900	-70	Avcom PSA-37XP	Yes	Small town low foliage 5%
Liscomb Blue	TX	Tower	36.23349	-100.2705	2400	-68	Avcom PSA-37XP	Yes	Low tower small town no homes
Darrouzett	TX	Elevator	36.44289	-100.32781	900	-68	Avcom PSA-37XP	Yes	Small town lowfoliage
Higgins Blue	TX	Water tower	36.11745	-100.0289332	900	-70	Avcom PSA-37XP	Yes	Two locations on Tank occupied
Follett	TX	Elevator	36.43041903	-100.1424236	2400	-74	Avcom PSA-37XP	Yes	Small town

Exhibit I: AMA TechTel Composite Coverage (April 2012)



Results for October 2012 Submission

During a routine exploration and field validation routine on April 22, 2012 a CN staff member identified an AMA TechTel business office **(Exhibit J)** located in Rising Star, Texas. A brief visit with office personnel identified broadband Internet service being available in Rising Star, May, Cross Plains, and Blackwell, Texas; a brochure **(Exhibit K)** was provided identifying the rate and service level availability. The CN staff member reviewed the AMA TechTel 3.65 GHz license WQJC218 (Exhibit D) via the FCC ULS database to pinpoint registered site locations. The coordinates were obtained and entered into the *Streets & Trips* mapping application **(Exhibit L)** to develop a route for a site and radio frequency (RF) validation process. RF presence was obtained at each location **(Exhibit M)** and antenna arrays **(Exhibit N)** were validated based on the location registration. Propagation studies **(Exhibit O)** were completed based on field validation and utilization of radio and antenna parameters defined within the FCC ULS location record. Documents were forwarded to AMA TechTel and they were advised the information will be submitted to Connected Texas and the NTIA broadband mapping project for processing if there are no discrepancies of the estimated coverage received from the provider within a 48-hour period.

Exhibit J: AMA TechTel Business Office-Rising Star, Texas

Exhibit K: AMA TechTel Brochure

Exhibit L: AMA TechTel 3.65 GHz Location Route

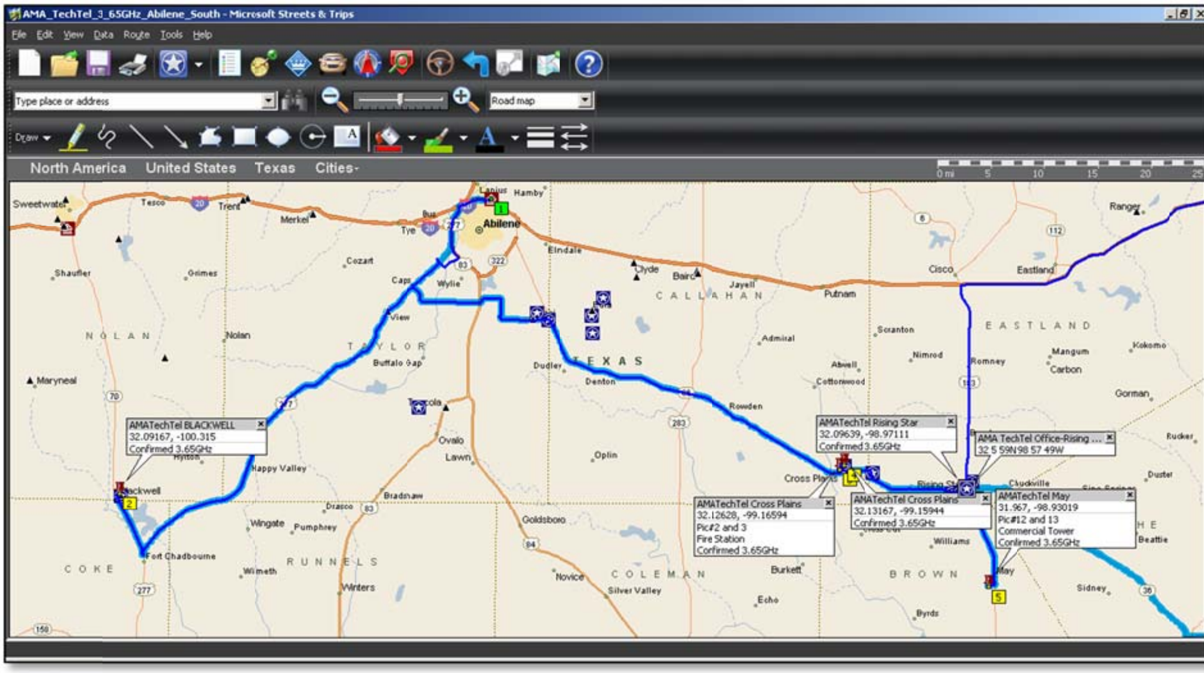


Exhibit M: AMA TechTel 3.65 GHz RF Testing Validation Sample - Rising Star

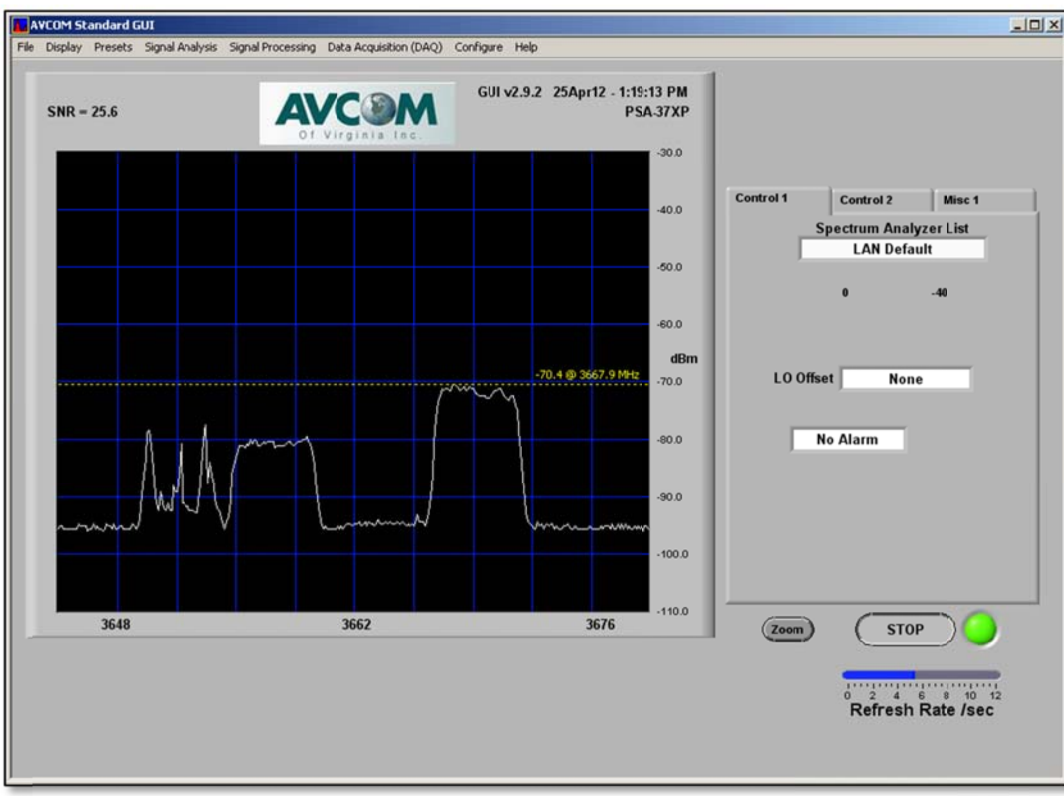
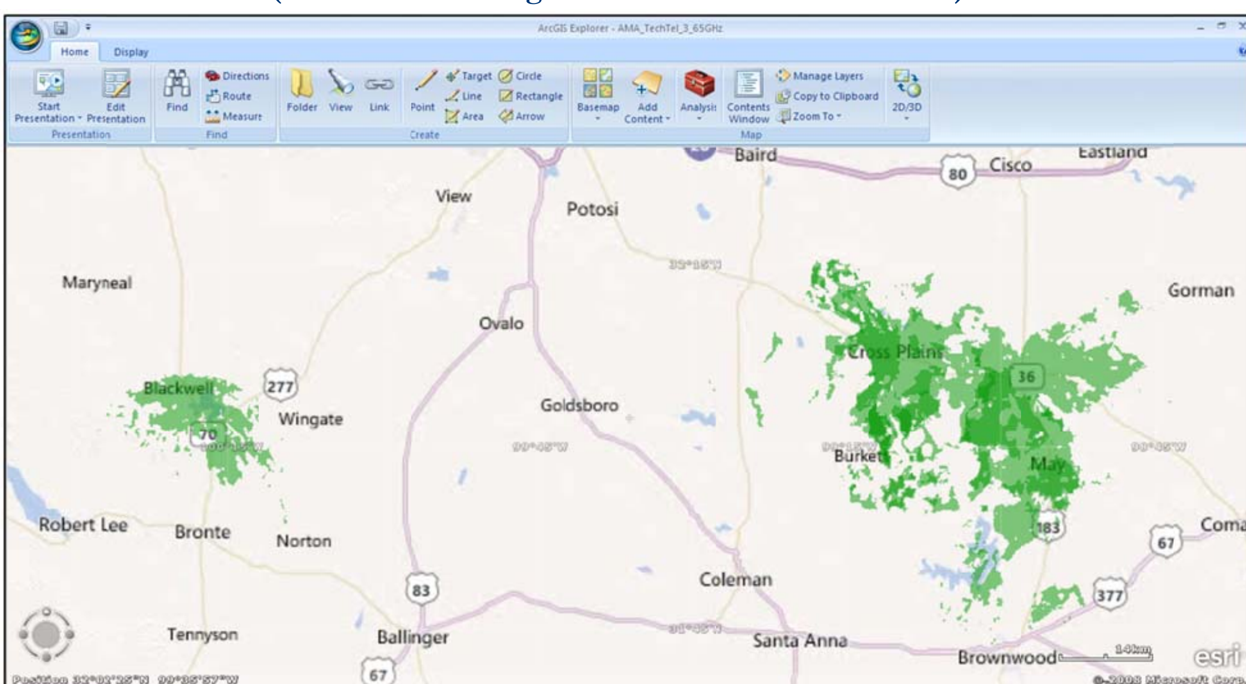


Exhibit N: AMA TechTel 3.65 GHz Antenna Validation Sample - Rising Star

Exhibit O: AMA TechTel 3.65 GHz Composite Propagation Study
(Additional Coverage for October 2012 Submission)



ANVIL COMMUNICATIONS

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the SBI mapping initiative.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to Anvil Communications, a wireless Internet service provider (WISP) located in Wimberley, Texas, with a service area throughout most of Hays County, Texas. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation and/or estimation techniques that support the underlying data.

Background
CN staff members have attempted to obtain the participation of the provider with 16 instances of communication via telephone, e-mail, and personal visits from September 9, 2009 to August 1, 2012. The provider has refused to participate on more than one occasion. Most recently, a CN technician visited the provider's office to discuss the program, but the provider again refused stating that the data collection process was "too intrusive."

The Issue
Connected Nation has been unable to obtain this provider's broadband coverage information through typical outreach efforts. Anvil Communications has, since March 2010, repeatedly stated its refusal to participate in the Connected Texas broadband mapping initiative.

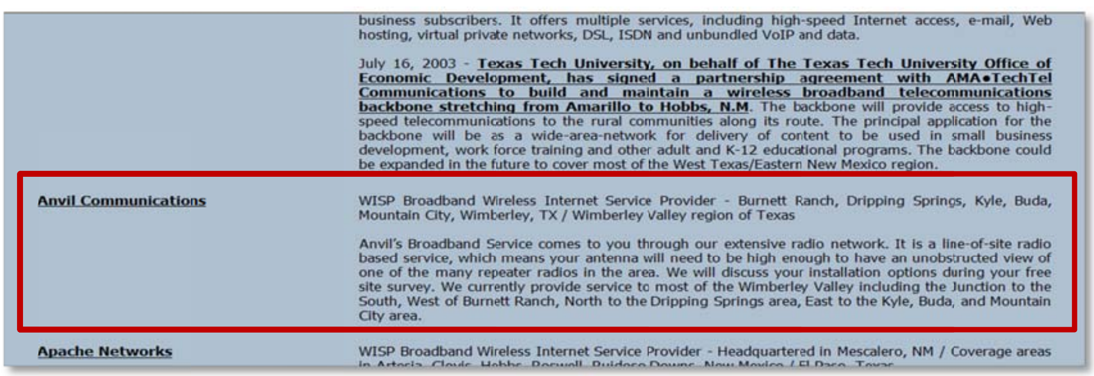
Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing
CN has built a file of research information based on information obtained through the public domain. For example, CN reviewed the provider's website (www.anvilcom.com) to determine the residential service plans and the service area of the provider's wireless network. Although the website does not advertise specific speeds or a designated coverage area, indications of both items were found through extensive research throughout the Internet. For example, the provider's website states that its Internet access speed "…varies from installation to installation depending on location…" **(Exhibit A)**. Further research suggested that advertised download speeds have been as high as 3-4 Mbps, while a market analysis completed by the provider's host city specified a comparative download speed of "Up to 5 Mbps" for this provider.

Similarly, the provider's website does not specify a coverage or service area except for a reference to "central Texas"; however, Internet research led to an alphabetical listing in a WISP directory that specified certain geographic areas **(Exhibit B)**.

A search for a Federal Registration Number (FRN) for the provider on the FCC COmmission REgistration System (CORES) using the company business name did not reveal a verifiable FRN. A similar search in the Texas business licensing system also did not identify Anvil Communications as an entity licensed to do business in the state. Finally, a search of the FCC's Universal Licensing System (ULS) for Hays County, Texas, did not identify any wireless licenses held by the provider.

Exhibit A: Service Plans

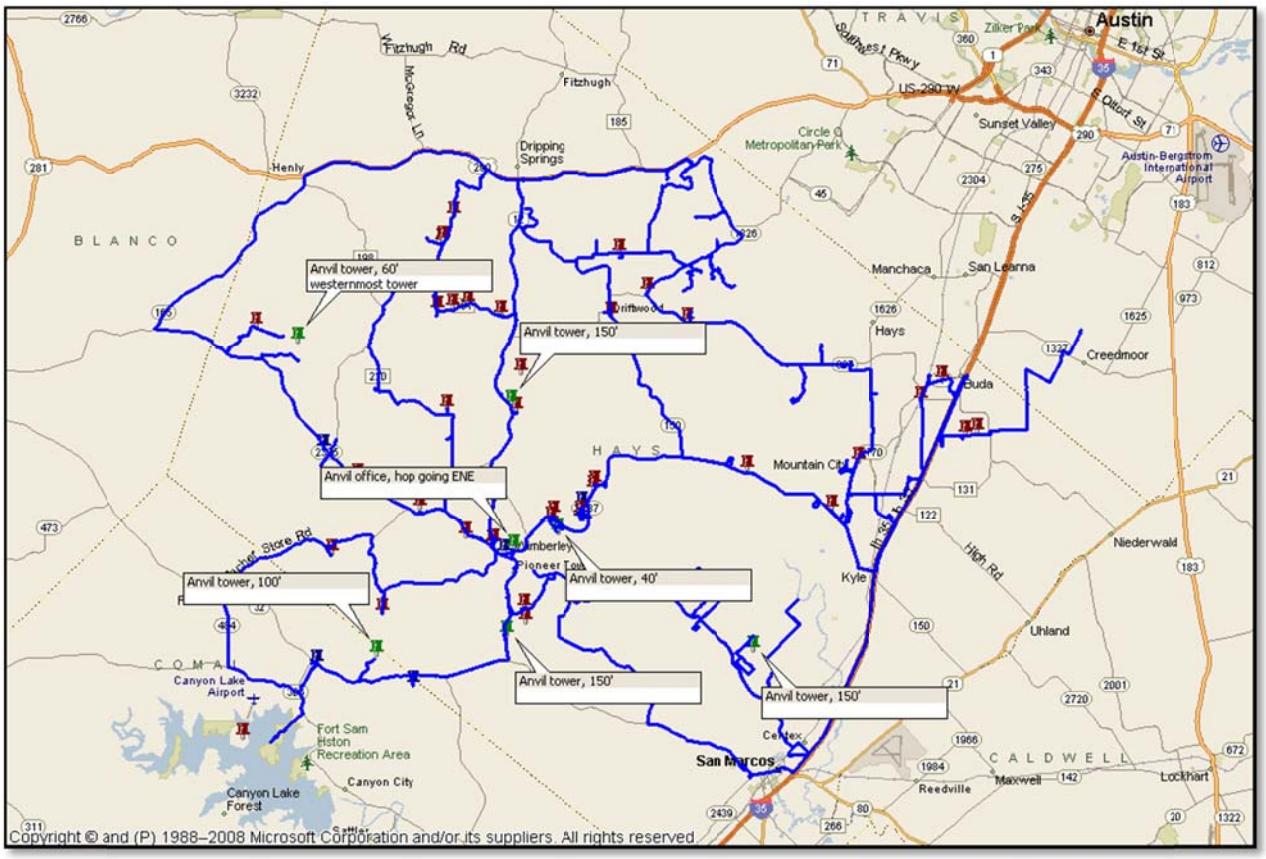
Exhibit B: Service Area



Preliminary Identification of Provider's Coverage Area

Because Connected Nation was unable to (a) extract a service area map from the provider's website and (b) identify licensing information through the FCC ULS database, alternate methods were required to identify and to confirm tower sites for the provider. A CN technician drove hundreds of miles throughout Hays County seeking wireless transceivers, triangulating the transmission paths of those receivers to pinpoint tower locations, conducting interviews with wireless Internet customers, and performing directional frequency tests. Utilizing Microsoft *Street and Trips* software, the field research results are depicted in **Exhibit C**. Although the researched provider claims a service area of as much as one thousand square miles (Hays County covers 680 square miles), CN's conversations with the provider's office personnel determined that the provider (i) did not offer service north of Dripping Springs, and (ii) offered little practical service south of the county line. Further, Internet research suggested the westernmost tower was within Hays County lines. To the east, wireless Internet service is dominated by another provider, and Anvil's service area does not appear to extend eastward beyond the interstate highway (I-35).

Exhibit C: Confirmed Tower Sites for Anvil Communications



In all, more than sixty (60) points of research were mapped and documented (with the pushpins in the exhibit above), with many serving as confirmation of the provider's tower locations. Where possible, the CN technician confirmed (through a third party) that the tower location was being utilized by Anvil. One example is the confirmation of the Anvil tower north of Wimberley offered by a neighboring land manager. In other instances, using Intel PROSet/WiFi Connection Utility, the presence of network signatures or nomenclatures identified the Anvil network on a tower as in **Exhibit D**. Photographs were also taken at each tower site of the equipment, the support structure, and the general location of the site (e.g., populated vs. rural).

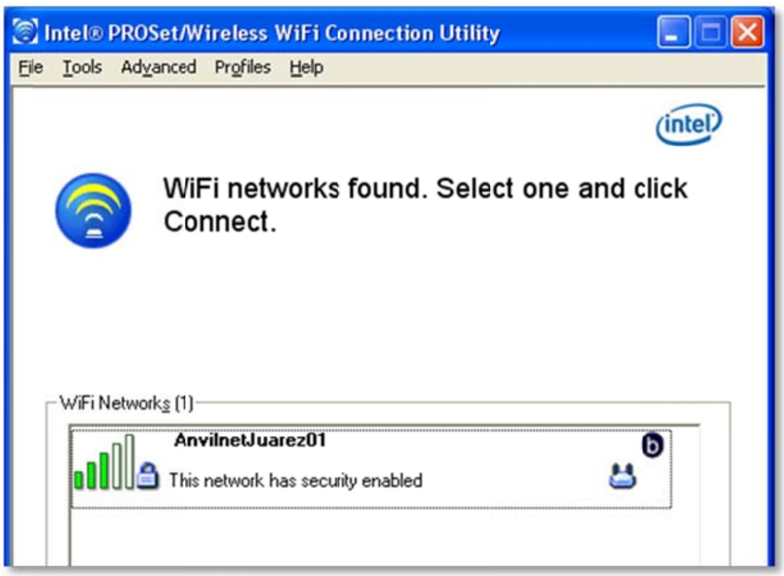
It is important to note that certain tower locations are better characterized as relay points connecting disparate locations along river valleys that would otherwise not be able to receive service from a centralized tower due to terrain blockage.

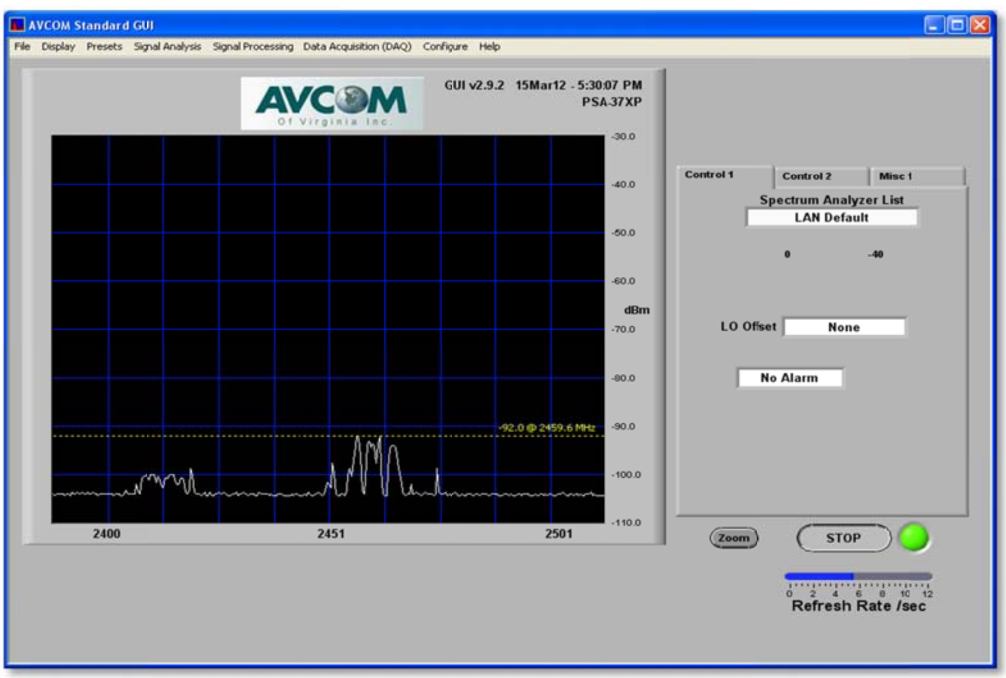
Exhibit D: Network Nomenclature at El Rancho Cima Location

Field Testing Techniques

Having confirmed tower locations comprising Anvil's service area, the CN technician then performed signal tests for the detection of active wireless frequencies typically utilized to provide WISP service. The CN technician was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands. At each signal test location, the CN technician attempted to be isolated from unrelated Wi-Fi networks in the test area, facilitated spectrum readings from the AVCOM analyzer, and captured the results of the frequency tests as validation data for wireless tower transmissions (**Exhibit E**).

Exhibit E: Frequency Test Data for Juarez (Westernmost) Tower Location





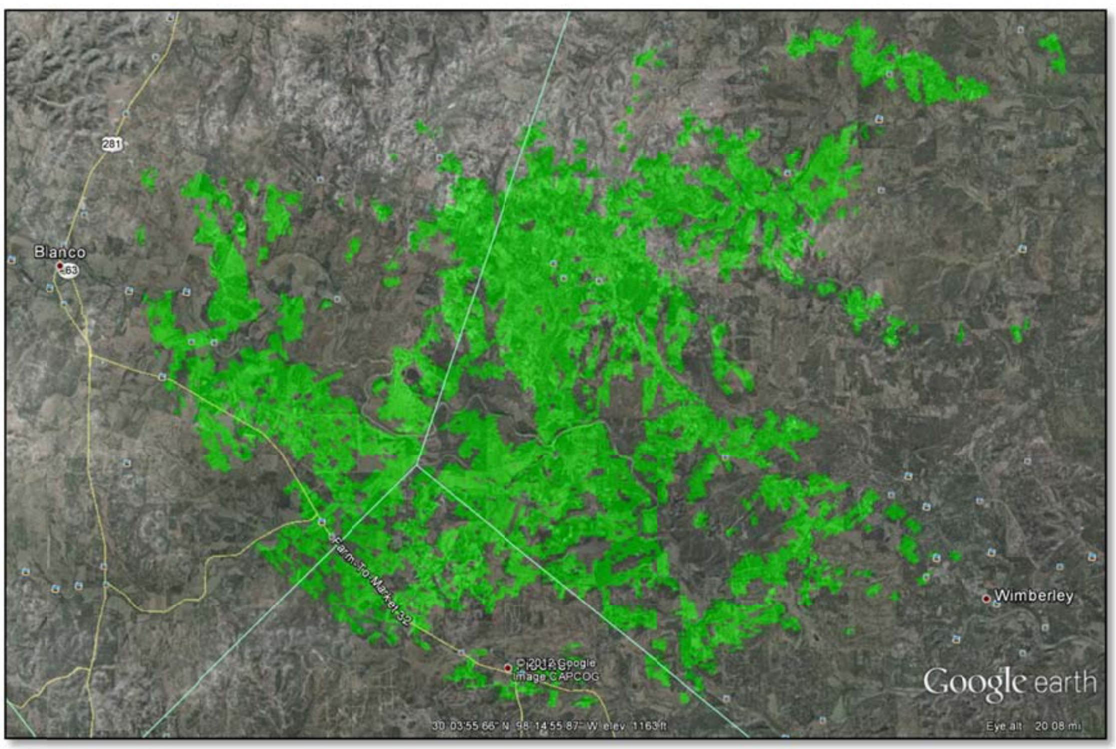
Signal Propagation Maps

At each confirmed tower site, the CN technician estimated the antenna height, determined the GPS coordinates for the tower, and recorded this and other information into the standard Excel provider data collection format. With the objective of reasonably representing the provider's practical service area, the CN technician utilized the information for each tower site (**Exhibit F**), and prepared propagation maps (**Exhibit G**) based on that information.

Exhibit F: Tower Research and Propagation Data

Wireless Provider Information											
Provider Name (Legal entity)			Anvil Communications								
DBA ("Doing Business As") Name											
FRN # (10-digit FCC Registration Number)			N/A								
Name of Location:	**Status**	**Pop Center**	**Structure**	**Latitude**	**Longitude**	**Omni?**	**Radius**	**Frequency**	**Gain**	**Power**	**Elevation**
Lone Man Mountain	Active	Wimberley	Tower	30.07029	-98.0882	Yes	10	2400	12	26	150
Office	Active	Wimberley	Tower	29.99915	-98.08984	Yes	8	2400	12	24	40
Arrowlake	Active	Valley	Rooftop	30.01347	-98.06773	No	6	2400	12	24	40
Deertrail	Active	San Marcos	Tower	29.94678	-97.94532	Yes	10	5800	12	24	150
Panorama	Active	Wimberley	Tower	29.95426	-98.09372	Yes	8	2400	12	24	150
El Rancho Cima	Active	Fischer	Tower	29.94377	-98.1717	No	8	2400	12	24	100
Juarez	Active	Burnet Ranch	Tower	30.10845	-98.22714	Yes	10	2400	12	26	60

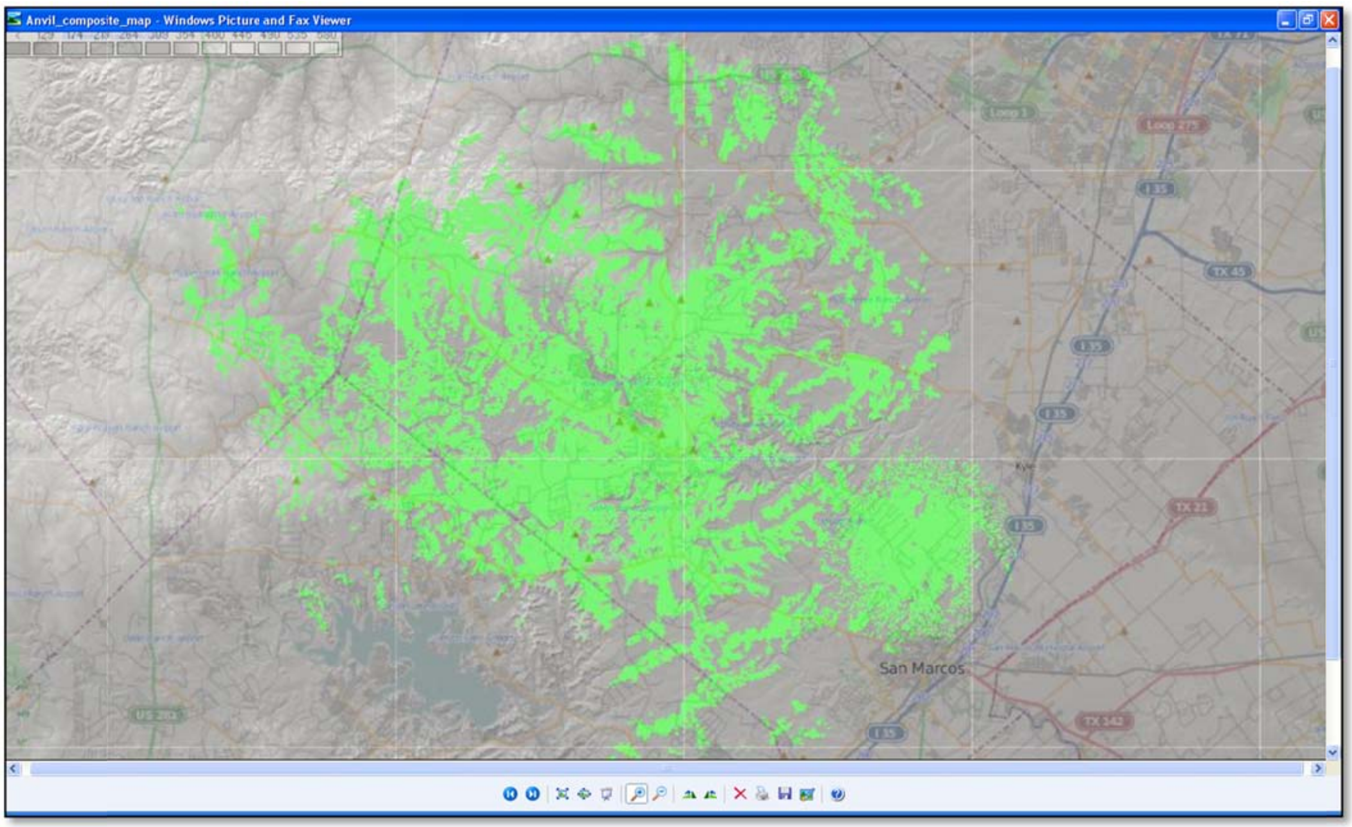
Exhibit G: Propagation Map for the Juarez (Westernmost) Tower Location



<u>Results and Submission for October 2012</u>

Seven tower locations for Anvil which were likely to be operational were visited and tested, as well as numerous additional sites in the search for customer premise equipment, frequencies utilized by potential competitors, and other verification data points. Testing determined that wireless signal was available for broadband service. A composite propagation analysis was completed **(Exhibit H)**, which reasonably represents the estimated broadband coverage area based on all information identified as of August 1, 2012. The composite propagation map was forwarded to the provider for review and feedback prior to CN's inclusion of the coverage area in the Texas Broadband Map's October 2012 iteration; however, no response was received by August 15, 2012.

Exhibit H: Anvil Communications Composite Coverage



BROADWAVES

As part of its ongoing broadband mapping efforts, Connected Nation has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative (SBI) mapping program.

For the, April 2012 mapping cycle, CN submitted an updated white paper detailing the determination of the coverage area for Broadwaves, a wireless Internet service provider (WISP), located in Brenham, Texas, with a service area in and around Washington County. This document accounts for updates to the coverage area for this October 2012 mapping cycle.

Background

Subsequent to the accumulation of research related to the service area for Broadwaves as of June 30, 2011, the CN technician most familiar with this provider noted changes to the coverage information on the provider's website. At that time, the advertised coverage area included nine concentric circles representing the provider's wireless access points **(Exhibit A.1)**. In early September 2011 the CN technician plotted the likely center points for each circle, and in October and November of 2011, performed field research at more than 30 locations in Washington County to determine the actual tower locations **(Exhibit B). A**fter conducting site verification and field data collection he used the data to create a coverage estimation map of Broadwaves **(Exhibit A.2)**.

The CN technician spoke extensively with the owner of Broadwaves on October 26, 2011, in regard to the mapping project. The provider refused to offer assistance (e.g. tower locations) or other useful information. When asked if all the advertised tower sites were active, the provider indicated some of them were but would not specify which sites were inactive. Further, the provider stated that he did not want to be part of the state map, and remarked that the state should be told that the company was going out of business in a couple of months so as to eliminate the need to collect required information. Further conversation suggested that the company was not actively pursuing buyers for the business, and would not be terminating service in the near term.

Exhibit A.1: Broadwaves Advertised Coverage Subsequent to June 30, 2011

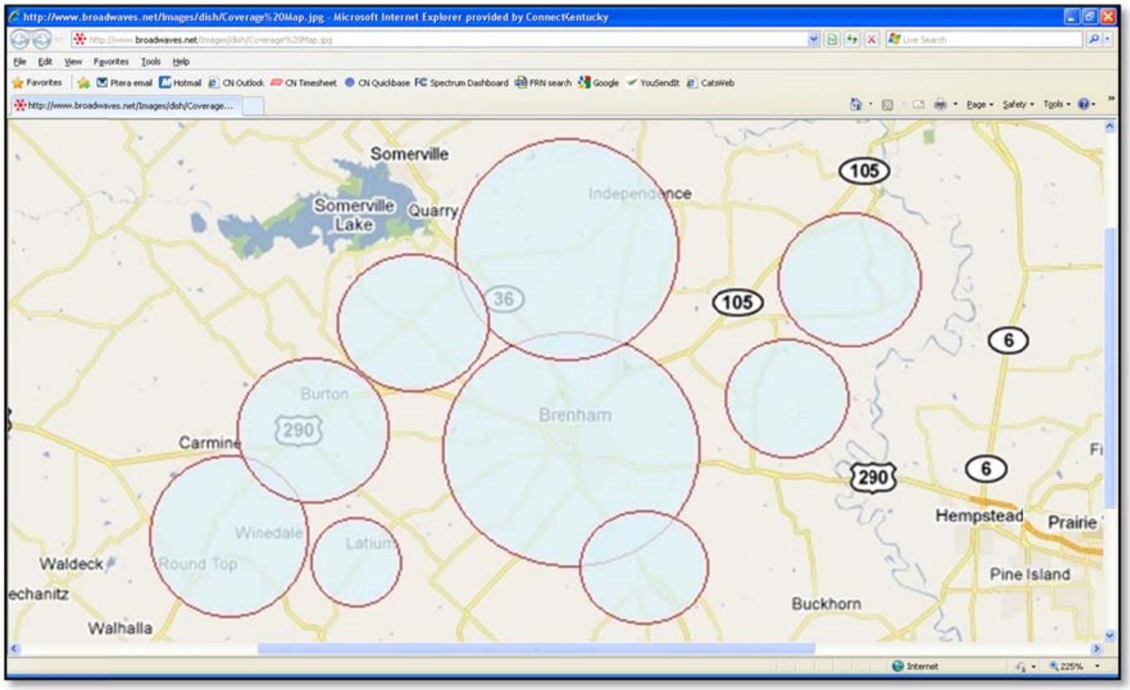


Exhibit A.2: Broadwaves Estimated Coverage for April 2012

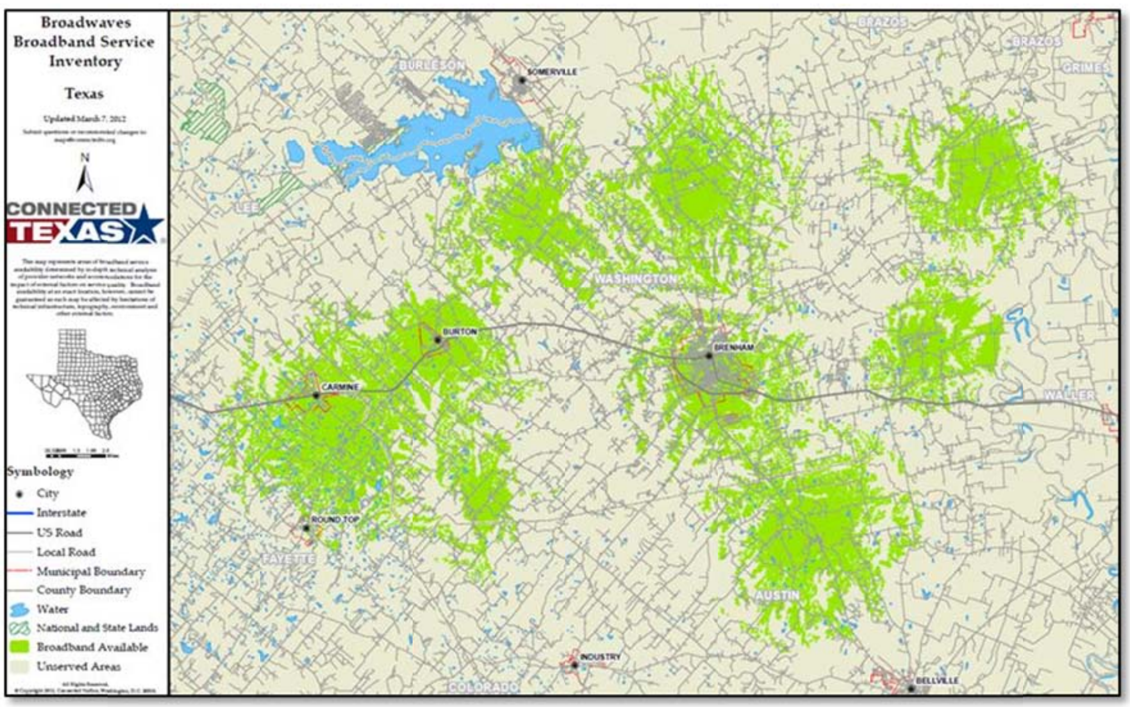
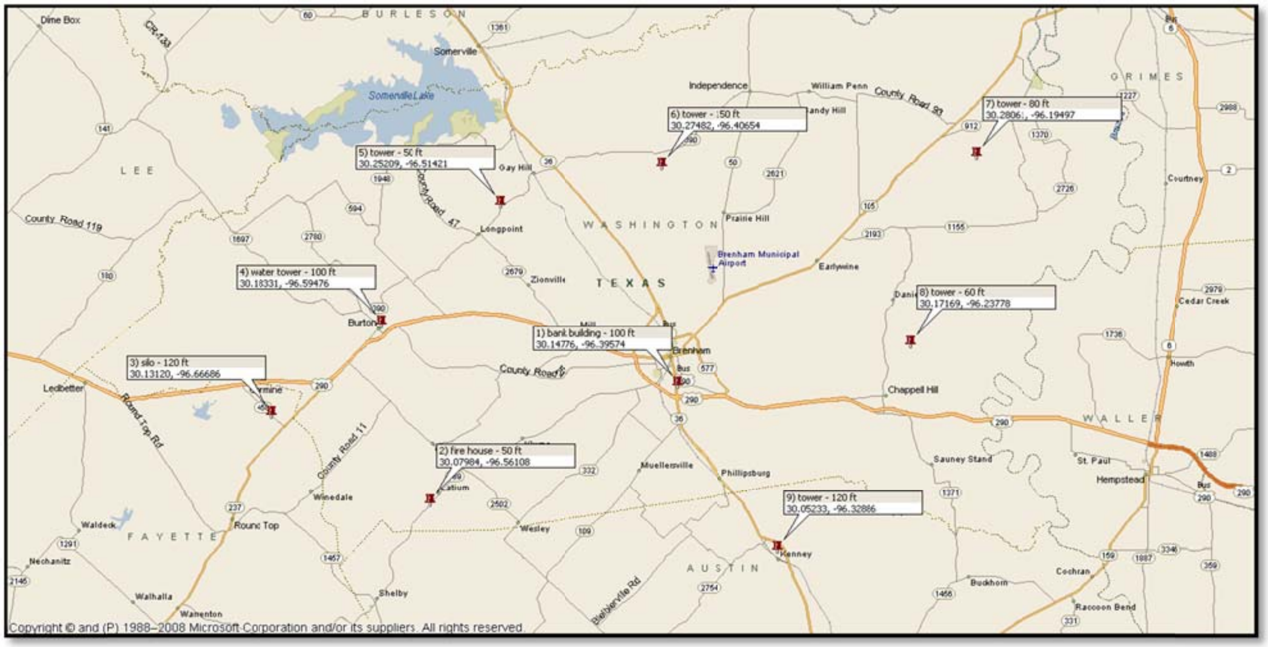


Exhibit B: Actual Tower Locations

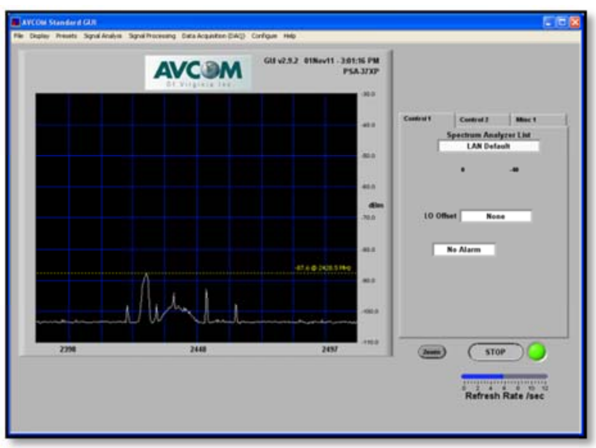


Field Testing Techniques

Where possible, the CN technician confirmed (through a third party or by other independent means) that the tower location was actually being utilized by Broadwaves. Confirmation from a bank representative that Broadwaves' equipment was operational on the rooftop of the Brenham Bank, a customer in Kenney pointing out the tower on which Broadwaves provides service, and comparison of network nomenclatures between markets all support this known tower location. In other instances, the presence of identical wireless transmission gear (on multiple tower locations) added confidence to the identification of the likely Broadwaves tower sites. Photographs were taken at each tower site of the equipment and the support structure.

Having established the tower location for each circular coverage area represented on the Broadwaves website, the CN technician then performed signal tests for the detection of active wireless frequencies. The CN technician was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands. At each signal test location, the CN technician attempted to be isolated from Wi-Fi networks in the test area, facilitated spectrum readings from the AVCOM analyzer and captured the results of the frequency tests as validation data for wireless tower transmissions. One such sample is illustrated below as **Exhibit C**.

Exhibit C: Signal Test Results for the Washington Service Area



Signal Propagation Maps

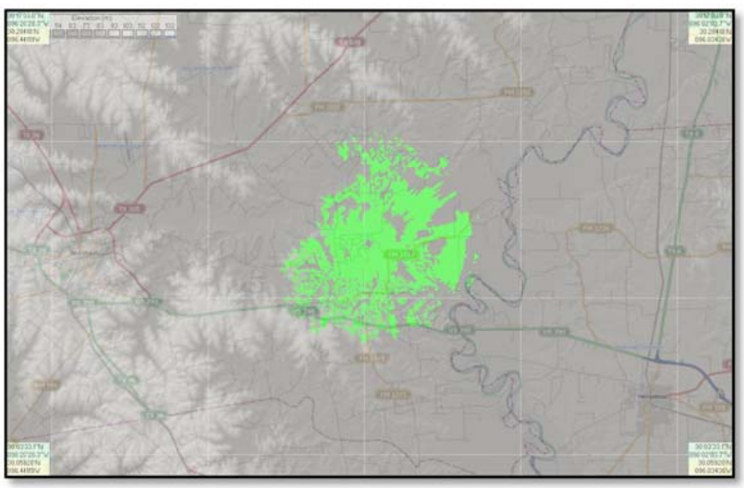
Upon making a reasonable confirmation that the tested tower site was a Broadwaves tower site, the CN technician estimated the antenna height, determined the GPS coordinates for the tower, and recorded this and other information into the standard Excel provider data collection format. With the objective of reasonably representing the provider's practical service area, the CN technician catalogued information for each tower site **(Exhibit D)**, and prepared propagation maps **(Exhibit E)** based on that information as well as the provider's own advertised service area representations.

Exhibit D: Tower Research and Propagation Data

Wireless Provider Information	
Provider Name (Legal entity)	**Broadwaves**
DBA ("Doing Business As") Name	N/A
FRN # (10-digit FCC Registration Number)	not found

Name of Location	Status	Pop Center	Structure	Latitude	Longitude	Omni?	Radius	Frequency	Gain	Power	Elevation
Brenham	Active	Brenham	bank building	30.14776	-96.39574	Yes	10	2400	12	26	100
Latium	Active	Latium	side-mount tower	30.07984	-96.56108	Yes	5	2400	12	23	50
Carmine	Active	Carmine	silo	30.1312	-96.66686	Yes	10	2400	12	26	120
Burton	Active	Burton	water tower	30.18331	-96.59476	Yes	10	2400	12	26	100
Longpoint	Active	Longpoint	tower	30.25209	-96.51421	Yes	10	2400	12	26	50
Independence	Active	Independence	tower	30.27482	-96.40654	Yes	10	2400	12	26	150
Washington	Active	Washington	tower	30.28061	-96.19497	Yes	10	2400	12	26	80
Chappell Hill	Active	Chappell Hill	tower	30.17169	-96.23778	Yes	10	2400	12	23	60
Kenney	Active	Kenney	tower	30.05233	-96.32886	Yes	10	2400	12	26	120

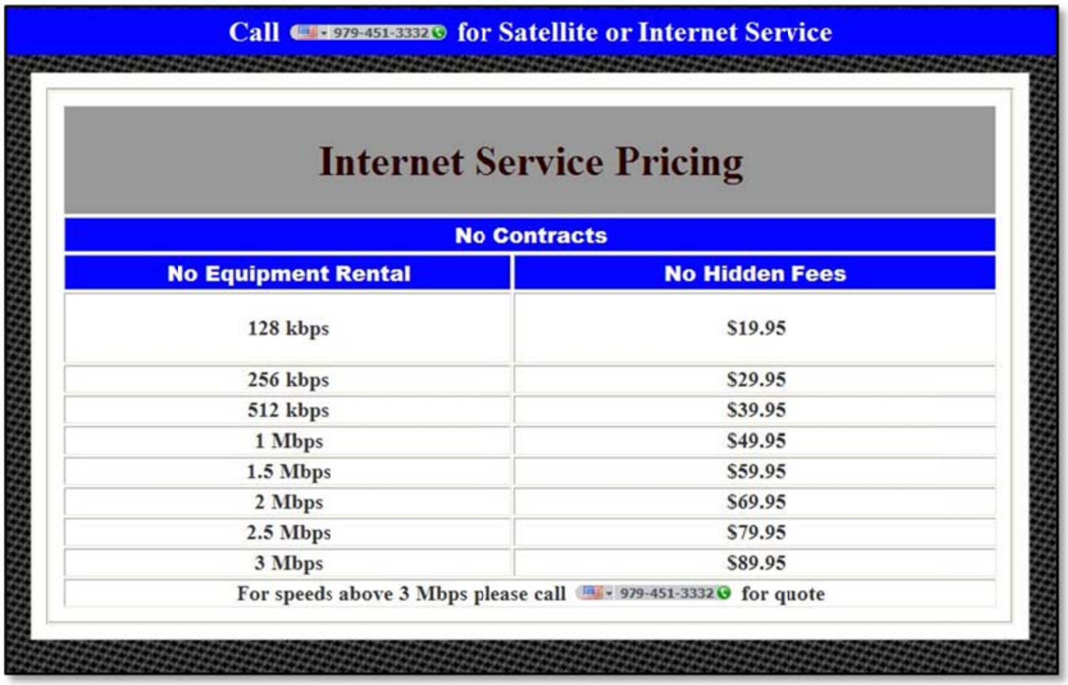
Exhibit E: Sample Propagation Map for the Chappell Hill Tower Location



Legacy Results and Submission from April 2012

After driving several hundred miles combing the highways, streets, and county roads of the provider's overall service area, nine access points were identified, eight of which were confirmed independently, and one which was confirmed through common network nomenclature. The composite propagation study (Exhibit A.2) reasonably represented (at the time) the researched service area based on then current information. Additionally, the provider's website listed maximum advertised downstream speeds and pricing structures represented herein as **Exhibit F**.

Exhibit F: Broadwaves Speed Tiers & Pricing Structures



Call 979-451-3332 for Satellite or Internet Service

Internet Service Pricing

No Contracts

No Equipment Rental	No Hidden Fees
128 kbps	$19.95
256 kbps	$29.95
512 kbps	$39.95
1 Mbps	$49.95
1.5 Mbps	$59.95
2 Mbps	$69.95
2.5 Mbps	$79.95
3 Mbps	$89.95
For speeds above 3 Mbps please call 979-451-3332 for quote	

Results and Submission for October 2012

Recently, a review of the provider's website revealed the addition of a wireless propagation-style coverage map **(Exhibit G)**.

Between June 15 and August 15, 2012, at least three attempts were made to contact the provider and seek insight into the website map. The provider did not respond. Comparing Exhibits A.1 and G, the towers identified by CN for the April 2012 update are all represented in the provider's latest coverage map, and an expanded coverage is theoretically possible assuming the use of directional antennas, lowered line loss, higher gain customer premise antennas, etc.

Exhibit H represents the provider's coverage estimate for this October 2012 mapping update. The coverage map represents the green signal areas in the depiction from the provider's website, based on propagation software parameters utilized by a CN engineer to reasonably replicate the website map. For the April 2013 update cycle, CN will perform field tests to validate the extended signal propagation as indicated by the provider's website map.

Exhibit G: Broadwaves Website Coverage Map

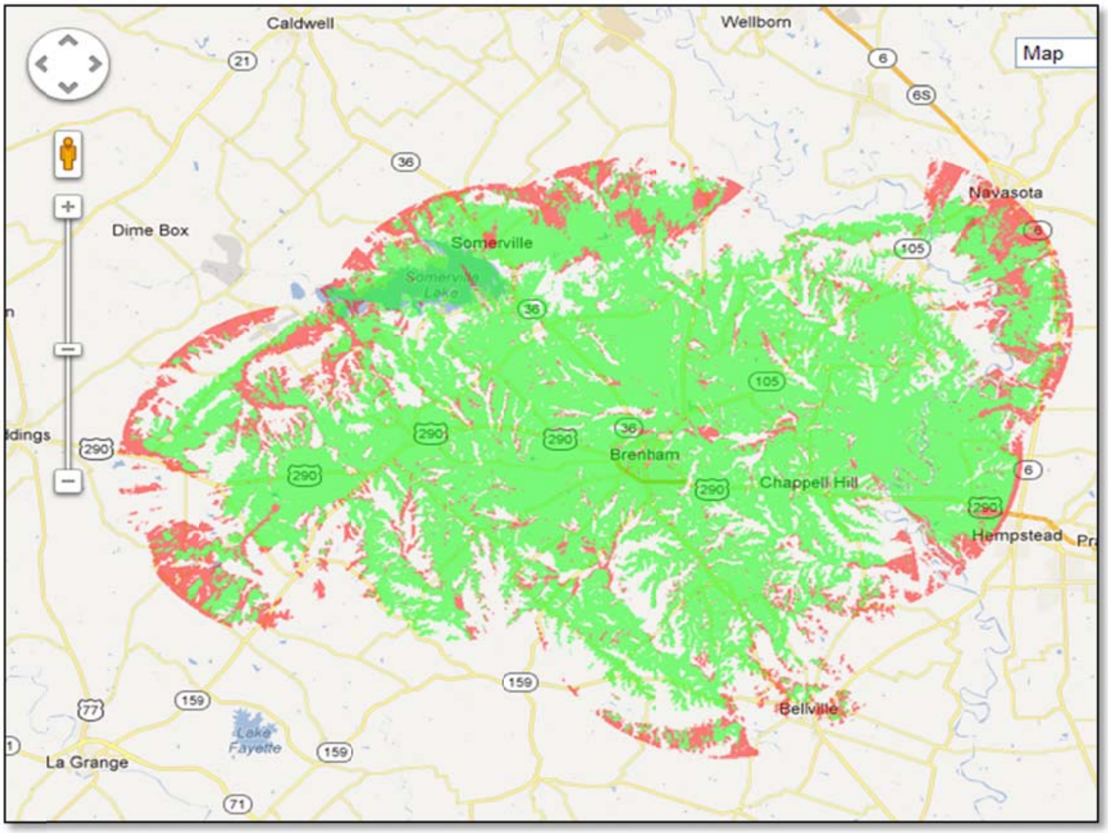
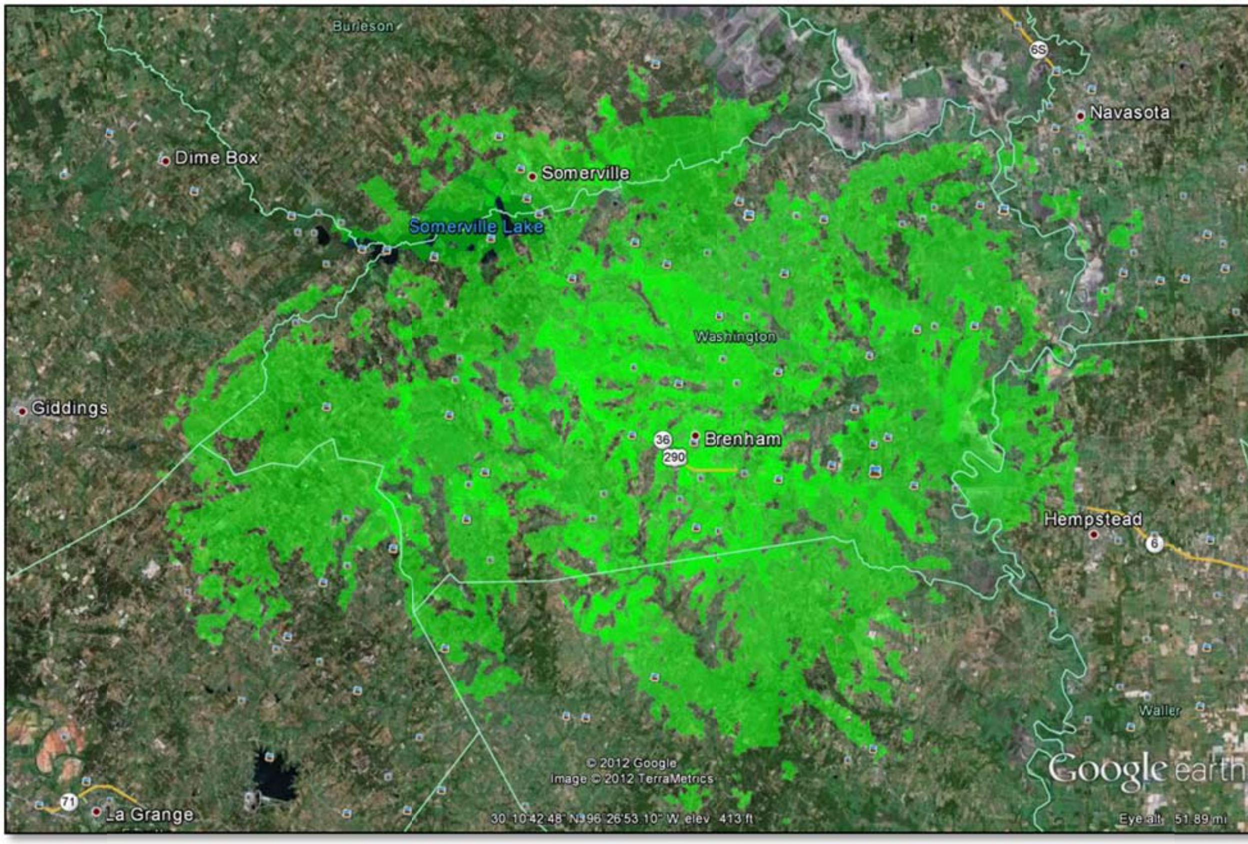


Exhibit H: Broadwaves October 2012 Coverage Map Update



CKS Wireless, Inc.

As part of its ongoing broadband mapping efforts, Connected Nation has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the SBI mapping initiative.

The following narrative provides detail regarding the recent, and ongoing, data collection and coverage estimation activities related to CKS Wireless, Inc., a wireless Internet service provider (WISP), located in Jacksonville, Texas with a service area around Mount Selman, Ponta, Jacksonville, and Rusk, Texas. The narrative will include information regarding how and where CN obtained publicly available data and used on-the-ground validation techniques that support the underlying data.

October 2012 Submission Commentary

Connected Nation created this coverage estimation document during the October 2011 submission period as a result of the ongoing non-participatory status of the provider. Since the inception of the SBI program, CN made 30 attempts to contact the provider (either by phone, e-mail or in person). On August 12, 2012, the estimated coverage map **(Exhibit I),** that had been produced during the October 2011 submission cycle, was once again presented to the provider requesting their review and comments. As of August 27, 2012, no replies were received from the provider.

CN has continued to closely monitor the provider's website to determine if any changes to the coverage area or maximum advertised speeds have occurred. To date, CN has been unable to locate evidence of any recent changes reported on the provider's website for infrastructure that was current as of June 30, 2012. To that end, CN is resubmitting this coverage estimation narrative, substantially in its original format, and will continue to monitor the provider's website as well as ensure ongoing outreach until either the expiration of the SBI grant or until such time as the provider voluntarily contributes data. Given the very recent update for tower locations **(Exhibit J)**, CN engineers have flagged this provider's file and will conduct additional field validation and site verification activities in order to update this document for the April 2013 mapping cycle.

The Issue

CKS Wireless, Inc. by its lack of responsiveness since May 13, 2010, has predicated its unwillingness to participate in the Connected Texas broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN has built a file based on research information and, as time progressed, enriched the file with information obtained through the public domain or through on-the-ground research and site verification. For example, CN reviewed the provider's website (www.ckswireless.com) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) the system yielded an FRN of 0006165625 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced to the FCC Universal Licensing System (ULS) to identify any licenses the provider may hold which could possibly enhance locating active access points for the service area. This process yielded license WQJW906 **(Exhibit D)**, Radio Service: NN-3650-3700MHz with 7 reported (5 unique) locations.

Exhibit A: Service Plans

service plans

SPEED	HOME	BUSINESS
384 kbps	$49.99/mo	$79.99/mo
512 kbps	$59.99/mo	$89.99/mo
768 kbps	$69.99/mo	$99.99/mo
1 mb	$79.99/mo	$109.99/mo
1.5 mb	$119.99/mo	$164.99/mo
2 mb	$159.99/mo	$219.99/mo
2.5 mb to 5 mb	CALL FOR QUOTE	CALL FOR QUOTE

EXISTING CUSTOMERS - Don't forget about our REFERRAL PROGRAM! For every new customer that you refer to us, we will credit your account with 1 FREE MONTH of INTERNET SERVICE!

installation prices

The price of installation varies, depending on the location of you home or business, and surrounding terrain. Exact price is determined at the time of the site survey, but is usually between $150.00 and $250.00. This is a one time, upfront cost for installation only, as CKS maintains ownership of the equipment.

Home About us Coverage Email Terms Employment

©cks wireless All right reserved.

101 Nance Street (PO Box 2125), Jacksonville, Texas 75766

Exhibit B: Service Area

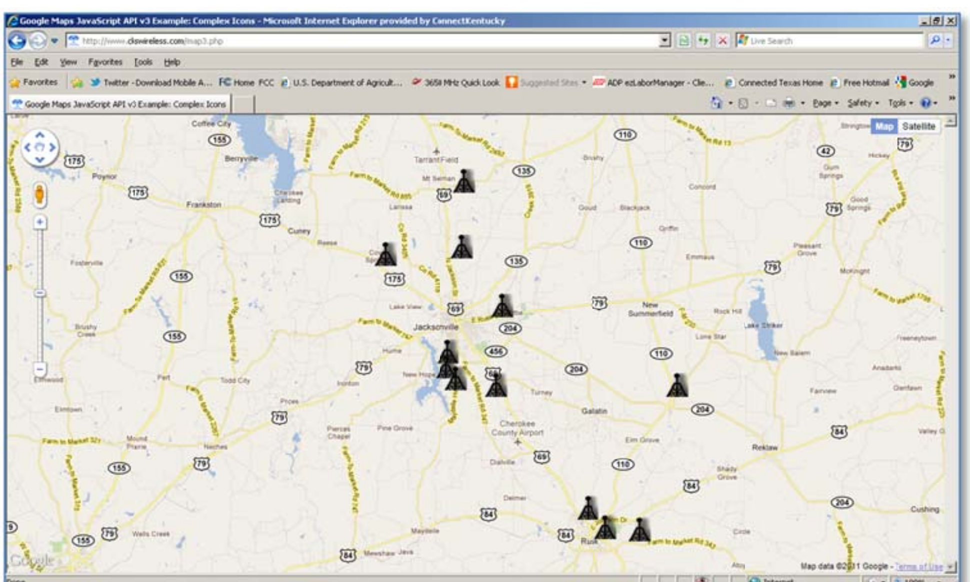


Exhibit C: Federal Registration Number

Registration Detail

FRN:	0006165625
Registration Date:	01/15/2002 01:57:48 PM
Last Updated:	01/28/2009 02:19:35 PM
Business Name:	CKS Management, Inc.
Business Type:	Private Sector , Corporation
Contact Organization:	
Contact Position:	ASR Registrant
Contact Name:	Jon P Kelley
Contact Address:	101 Nance Street Jacksonville, TX 75766 United States
Contact Email:	jonpaul@cksmgmt.com
ContactPhone:	(903) 589-5369
ContactFax:	(903) 541-0889

Exhibit D: WQJW906 License Reference

FCC Federal Communications Commission

FCC Home | Search | Updates | E-Filing | Initiatives | For Consumers | Find People

Universal Licensing System

FCC > WTB > ULS > Online Systems > License Search

FCC Site Map

License Search

Search Results

HELP

New Search Refine Search Printable Page Query Download Map License

Specified Search

Call Sign like **wqjw906**

Matches **1**- **1** (of **1**)

PA = Pending Application(s)
TP = Termination Pending
L = Lease

Page 1

	Call Sign/Lease ID	Name	FRN	Radio Service	Status	Expiration Date
1	WQJW906	CKS Wireless, Inc.	0006165625	NN	Active	01/29/2019
	Call Sign/Lease ID	Name	FRN	Radio Service	Status	Expiration Date

Page 1

FCC Federal Communications Commission

FCC Home | Search | Updates | E-Filing | Initiatives | For Consumers | Find People

Universal Licensing System

FCC > WTB > ULS > Online Systems > License Search

FCC Site Map

3650-3700 MHz License - WQJW906 - CKS Wireless, Inc.

Locations Summary

HELP

New Search Refine Search Return to Results Printable Page Reference Copy Map License

MAIN | ADMIN | LOCATIONS

Call Sign	WQJW906	Radio Service	NN - 3650-3700 MHz

7 Total Locations
10 Locations per Summary Page

	Location	Latitude,Longitude	Transmitter Azimuth
1	CKS TOWER	31-58-03.7 N, 095-14-44.0 W	184.3 degrees
2	ARRINGTON LUMBER	31-52-46.8 N, 095-12-45.8 W	342.3 degrees
3	CKS TOWER	31-58-03.7 N, 095-14-44.7 W	325.2 degrees
4	North Jacksonville	32-00-49.0 N, 095-16-59.0 W	145.2 degrees
5	CT Water Tank	31-54-19.0 N, 095-15-04.0 W	4.3 degrees
6	Not Assigned	31-47-33.5 N, 095-07-07.5 W	271.5 degrees
7	KOA	31-47-33.5 N, 095-07-07.5 W	271.5 degrees

Preliminary Identification of Provider's Coverage Area

Connected Nation extracted the CKS Wireless, Inc. service area map from its website and the information through the FCC ULS database in reference to license WQJW906. The website service area was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .1 mile (528 ft.) to establish a minimum search criteria of a given access point. The provider's service area depiction is represented by tower symbols as shown in Exhibit B. Using the coordinates (5 unique locations) available through the FCC ULS license search an accuracy validation of the image overlay was conducted to determine the feasibility of utilizing the tower symbols for identifying coordinates of the remaining 7 locations. Coordinates were entered into Google Earth for the 5 unique 3650 MHz licensed locations and examined utilizing the zoom option of the aerial imagery. All five locations structures were identified. This provided a means of establishing coordinates for the remaining access point locations. All 12 locations were entered into the Microsoft *Streets & Trips* software program **(Exhibit F)** to develop a route for the validation process.

Exhibit E: Google Earth - Provider's Service Area Image Overlay

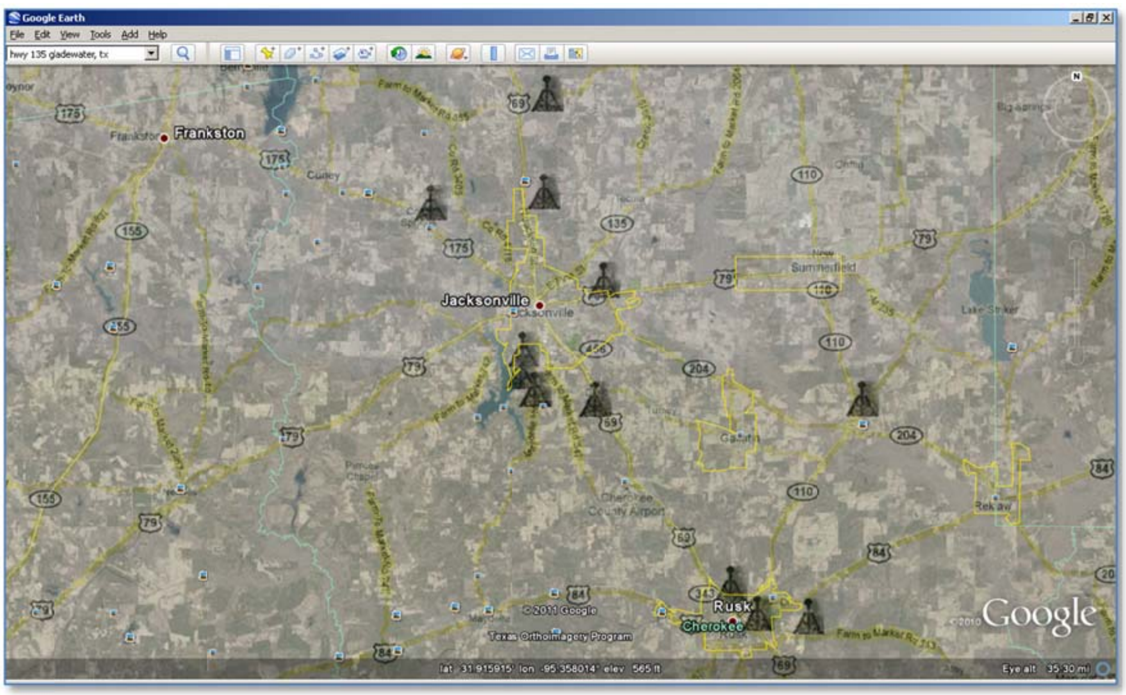
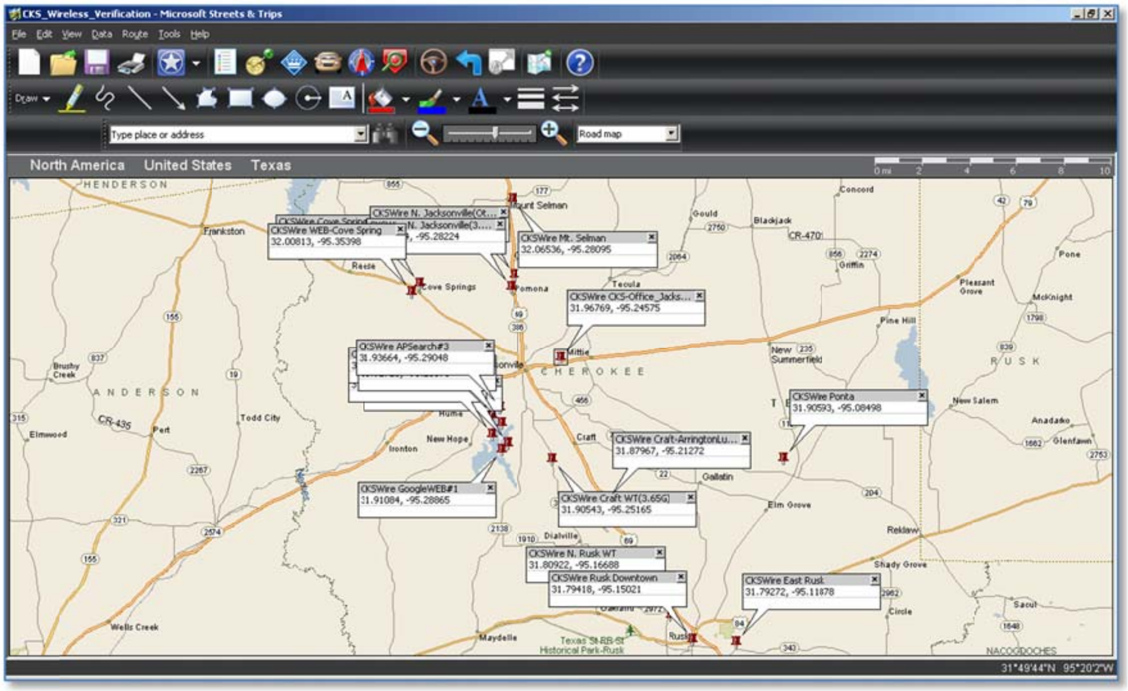


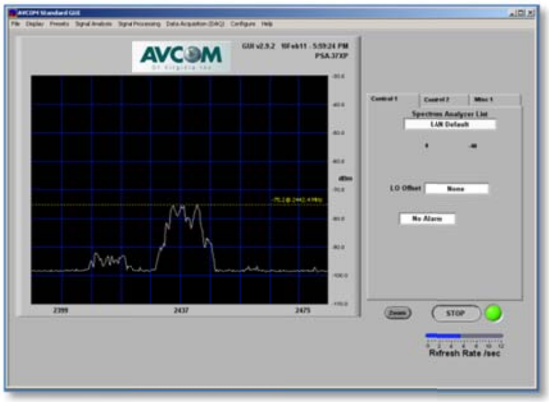
Exhibit F: Validation Points for AP Structures

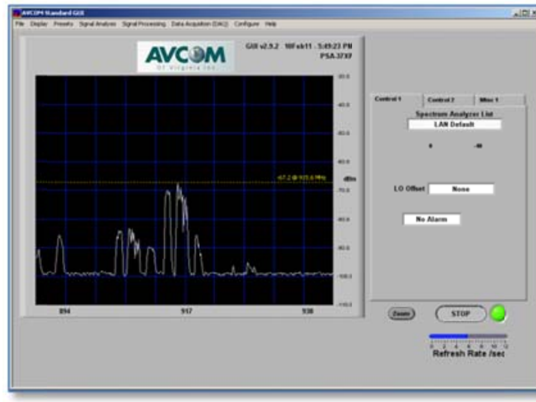


Testing Techniques

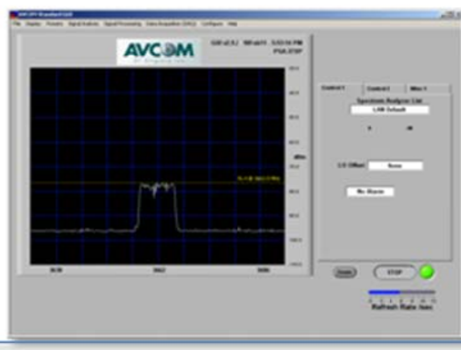
Connected Nation staff developed a site validation route based on data established with the Google Earth image overlay and publicly available data through the FCC ULS database for CKS Wireless, Inc. 3650-3700MHz radio service. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored) and photographs were taken of the access points.

Exhibit G: Field Data for CKS Wireless, Inc. Office/Hub Location





Provider	Location	Latitude	Longitude	Frequency Availability				Structure	Approximate Antenna Height	Notes
				900MHz	2.4GHz	3.65GHz	5.0GHz			
CKSWire	CKS-Office_Jacksonville(3.65G)	31.967694	-95.245750			X		Tower	39 meters	3.65GHz, azimuth 184 degrees, vertical polarity-39 meters/azimuth 325 degrees, horizontal polarity-39 meters (serving as backhaul)
				X					120 ft.	Estimated height. Omni antenna.
					X				120 ft.	Estimated height. Sector array-120 degrees.



Background Results and Submission for October 2012

Of the 18 locations visited during the validation point route, 12 access points were identified and relative information was logged into the CKS Wireless, Inc. field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the Connected Nation Provider Information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to CKS Wireless, Inc. and advised the information will be submitted to Connected Texas and the NTIA broadband mapping project for processing if there are no discrepancies of the estimated coverage received from the provider within a 48-hour period. Despite that aforementioned call-to-action and the 3 additional contact attempts during this mapping cycle, the provider continues to be non-responsive.

Exhibit H: Field Validation Notes

Provider	Location	Latitude	Longitude	Frequency Availability				Structure	Approximate Antenna Height	Notes
				900MHz	2.4GHz	3.65GHz	5.0GHz			
CKSWire	Mt. Selman	32.065356	-95.280947	X				Tower	180 ft.	Estimated height.
CKSWire	N. Jacksonville(3.65G)	32.011444	-95.282236			X		Tower	115 meters	3.65GHz, azimuth 145 degrees, horizontal polarity-115 meters (serving as backhaul)
				X					300 ft.	Estimated height.
CKSWire	N. Jacksonville(Other)	32.018719	-95.279750							Mobile providers structure. No CKS assets.
CKSWire	Cove Spring WT	32.013108	-95.347769							Did not observe any antenna structures.
CKSWire	WEB-Cove Spring	32.008128	-95.353983	X				Rohn-Residential	90 ft.	Coordinates approximated; Rohn tower structure visible while driving. Could not locate a safe location to park to capture a picture.
CKSWire	CKS-Office_Jacksonville(3.65G)	31.967694	-95.245750			X		Tower	39 meters	3.65GHz, azimuth 184 degrees, vertical polarity-39 meters/azimuth 325 degrees, horizontal polarity-39 meters (serving as backhaul)
				X					120 ft.	Estimated height. Omni antenna.
					X				120 ft.	Estimated height. Sector array-120 degrees.
CKSWire	Craft WT(3.65G)	31.905431	-95.251653			X		Water Tank	160 meters	3.65GHz, azimuth 4 degrees, vertical polarity-160 meters
				X					140 ft.	Omni-approximate height.
					X				140 ft.	2.4GHz sector array; approximate height.
							5.3GHz			Serving as backhaul.
CKSWire	Craft-ArringtonLumber(3.65G)	31.879667	-95.212722			X		Pole	18 meters	3.65GHz, azimuth 342 degrees, vertical polarity-18 meters. The 3.65GHz serves as a business application for the lumber yard. The lumber yard operates a 2.4GHz WiFi system routed through the 3.65GHz access.
CKSWire	APSearch#1	31.914639	-95.284536							Search location.
CKSWire	SE LakeJack	31.910836	-95.288650	X				Rohn-Residential	90 feet	Identified; approximated coordinates-private land. Estimated height.
CKSWire	APSearc#2	31.927233	-95.28871111							Search location.
CKSWire	SW LakeJack	31.920053	-95.295992	X				Rohn-Residential	90 feet	Identified; approximated coordinates-private land. Estimated height.
CKSWire	APSearch#3	31.936639	-95.290475							Search location.
CKSWire	NW LakeJack	31.93175	-95.295992	X					90 feet	Identified; approximated coordinates-private land. Estimated height.
								Rohn-Residential		
CKSWire	N. Rusk WT	31.809217	-95.16687778	X					150 ft.	900MHz omni; approxmate height.
CKSWire	Rusk Downtown(Police and Fire Dept. Station)	31.794183	-95.15021389		X			Rohn	80 ft.	WEB site illustrates tower for coverage; photo identifies BH connectivity mounted on ROHN atop the fire department. Assuming 2.4GHz operation in the area. Height assumption 80 ft.
CKSWire	East Rusk-KOA(3.65GHz)	31.792722	-95.11878333			X		Tower	127 meters	3.65GHz, azimuth 271 degrees, horizontal polarity-127 meters (serving as backhaul)
					X				120 ft.	Sector array approximate height. Tower FCC ASR: 1058081
CKSWire	Ponta	31.905928	-95.084975		X			Tower	130 ft.	2.4GHz sector array; approximate height.
				X					100 ft.	900MHz omni; approximate height. FCC ASR: 1024425

Exhibit I: CKS Wireless, Inc. Composite Coverage

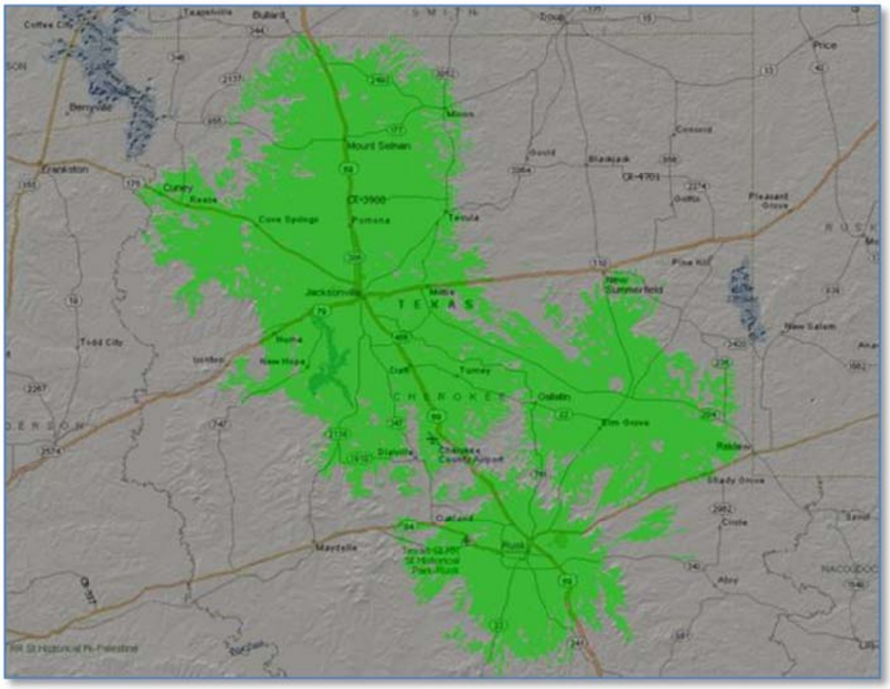
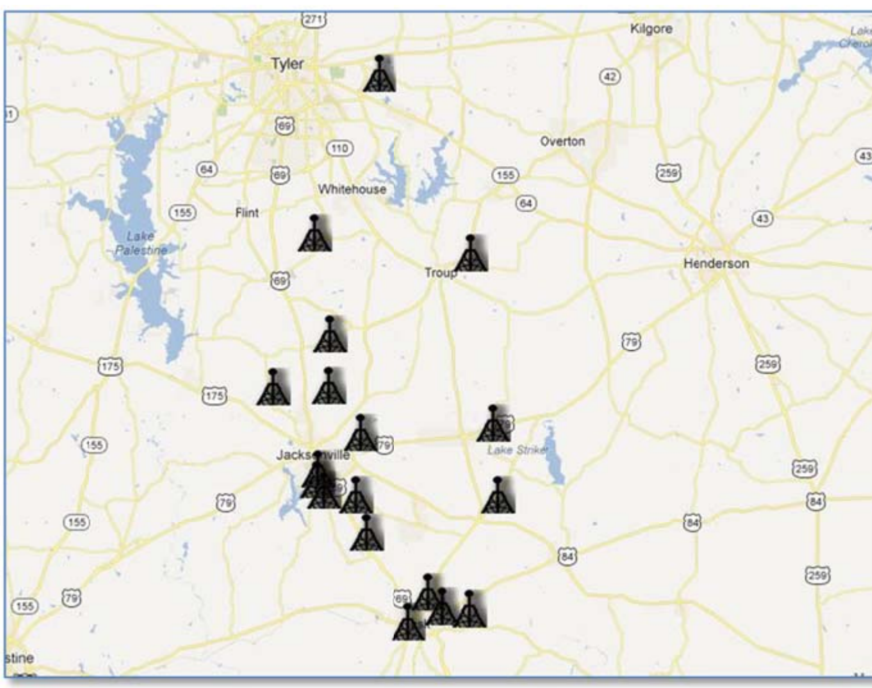


Exhibit J: New Wireless Transmit Site Locations



EAST TEXAS BROADBAND

As part of its ongoing broadband mapping efforts, Connected Nation has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the SBI mapping initiative.

The following narrative provides detail regarding the recent data collection activities related to East Texas Broadband, a wireless Internet service provider (WISP), located in Palestine, Texas, with a service area around Palestine, Elkhart, and Elmwood, Texas. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

October 2012 Submission Commentary
Connected Nation created this coverage estimation document during the October 2011 submission period as a result of the ongoing non-participatory status of the provider. In addition to the 7 instances of e-mail and/or telephone communication during the October 2011 and April 2012 submission periods (as previously reported), CN made 4 additional attempts to contact the provider during this mapping cycle. On August 12, 2012, the estimated coverage map **(Exhibit G)** which was produced during the October 2011 submission cycle was once again forwarded to the provider requesting review and comments. As of August 27, 2012, no replies were received from the provider.

CN has continued to closely monitor the provider's website to identify any changes in the coverage area or maximum advertised speeds but did not locate evidence of any recent changes. To that end, CN is resubmitting this coverage estimation narrative, substantially in its original format, and will continue to monitor the provider's website as well as ensure ongoing outreach until either the expiration of the SBI grant or until such time as the provider voluntarily contributes data.

The Issue
East Texas Broadband, by its lack of responsiveness since February 4, 2011, has predicated its unwillingness to participate in the Connected Texas broadband mapping initiative.

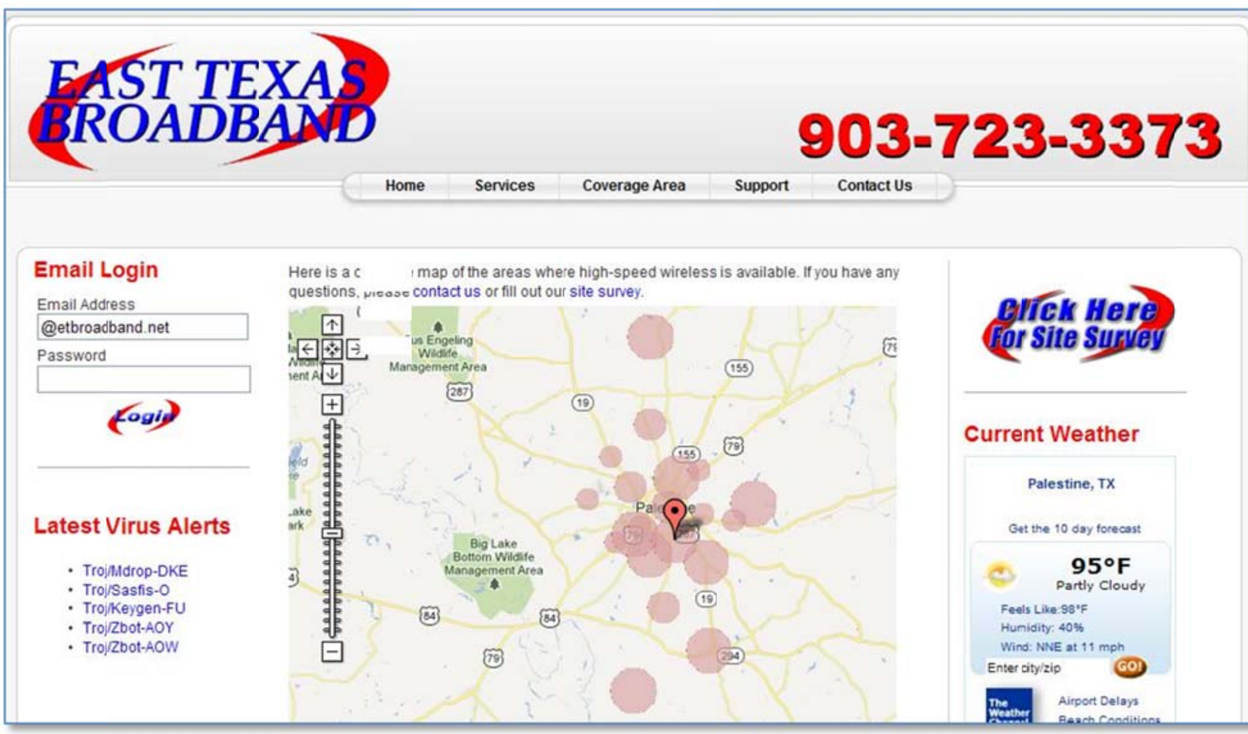
Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing
CN has built a file based on research information and as time has progressed, enriched the file with information obtained through the public domain or by phone inquiry through the provider's customer support line. Additionally, CN staff spent substantial time in the field compiling data, verifying infrastructure, and generating this coverage estimation document. For example, CN reviewed the provider's website (http://www.etbroadband.net) to determine the residential service plans. However, the website did not identify the residential service plans. A telephone call was placed through customer support and the residential plans were quoted over the phone **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network was identified. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded no FRN for East Texas Broadband. Also, to support field validation of access points, the FCC Universal Licensing System (ULS) was utilized to identify any licenses the provider may

hold which could possibly enhance locating active access points for the service area. This process yielded no licensed frequencies associated to East Texas Broadband, indicating the provider's broadband delivery is by way of the unlicensed Wi-Fi frequencies band (900 MHz, 2.4 GHz, and 5 GHz).

Exhibit A: Service Plans

Speed Tier Offerings		Residential Service Price
Download	**Upload**	
512Kbps	256Kbps	$24.95
1Mbps	512Kbps	$39.95
2Mbps	1Mbps	$54.95
3Mbps	1Mbps	$69.95

Exhibit B: Service Area



<u>Preliminary Identification of Provider's Coverage Area</u>

Connected Nation extracted the East Texas Broadband service area map from its website. The website service area was utilized to create a Google Earth image overlay **(Exhibit C).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .1 mile (528 ft.) to establish a minimum search criteria of a given access point. The provider's service area depiction is represented by circular type polygons as shown in Exhibit B. Based on the provider's website coverage depiction there are nineteen (19) locations identified as possible locations for access point structures. Utilizing Google Earth with the provider's coverage overlay (Exhibit C), coordinates were established of the circular polygons center points for route development. Further enhancement for possible structure identification was completed by a satellite aerial imagery and street level session with the Google Earth application. Possible structure locations were identified around the center points. This provided a means of establishing coordinates for the access point locations. Twenty-one (21) locations were entered into Microsoft *Streets & Trips* software program **(Exhibit D)** to develop a route for the validation process.

Exhibit C: Google Earth - Provider's Service Area Image Overlay

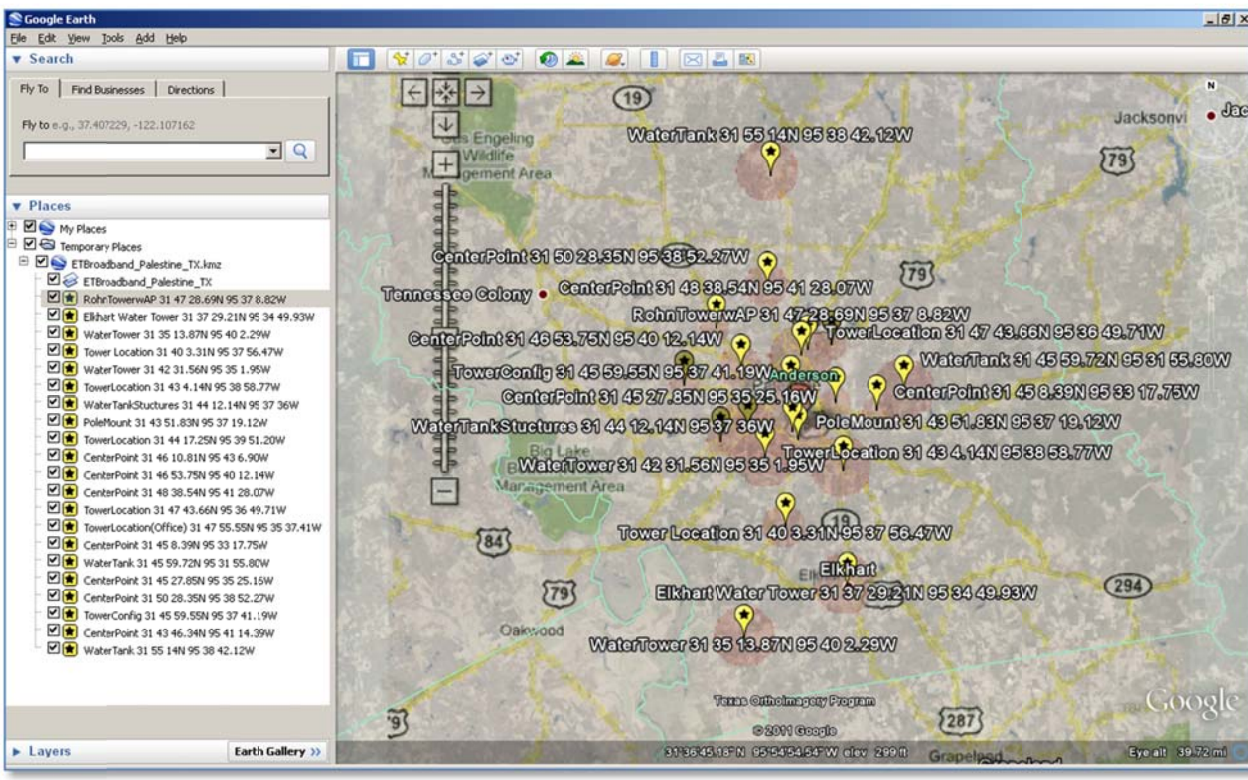
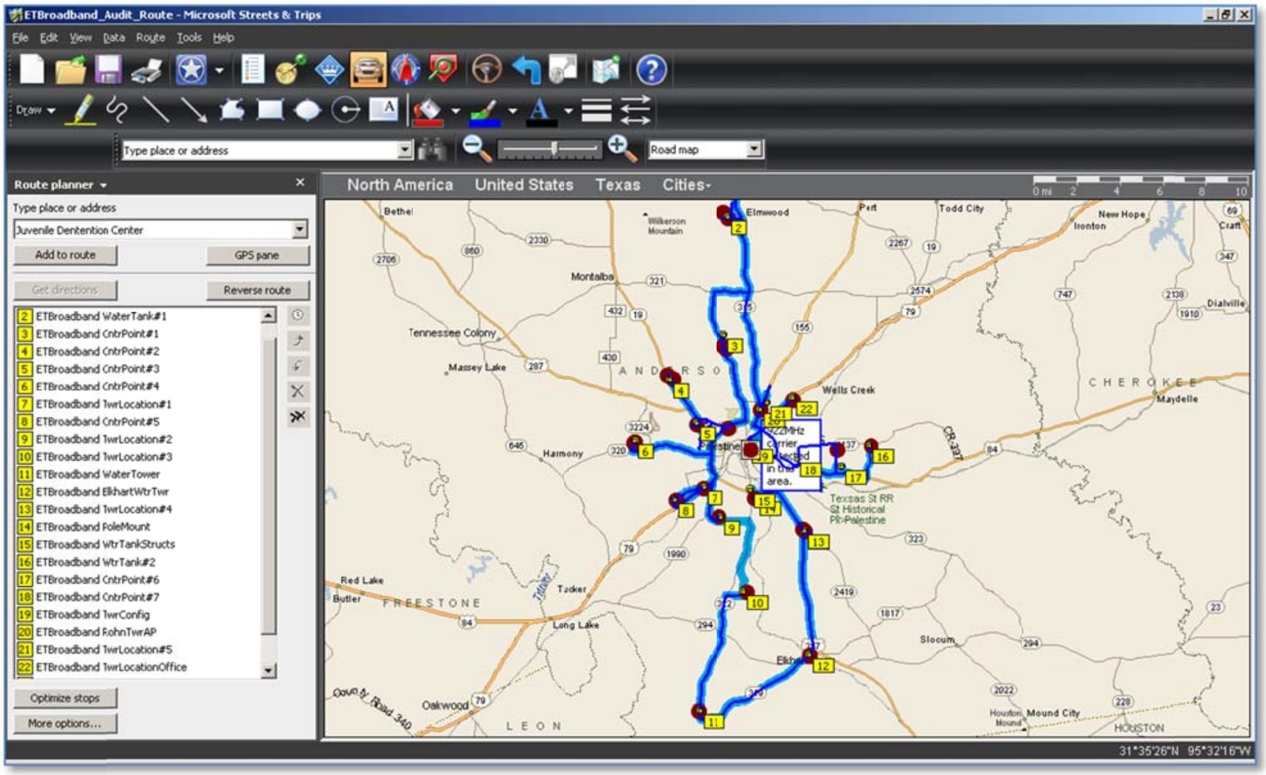


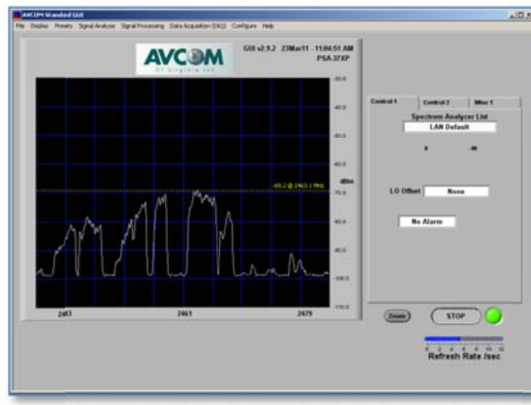
Exhibit D: Validation Points for AP Structures



Testing Techniques

Connected Nation staff developed a site validation route based on data established with the Google Earth image overlay and publicly available data through East Texas Broadband's website. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit E)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, and antenna type (omnidirectional or sectored), and photographs were taken of the access points.

Exhibit E: Sample Field Data for East Texas Broadband
CR433-ROHN (CntrPoint#2) Location



Provider	Location	Latitude	Longitude	Frequency Availability				Structure	Approximate Antenna Height	Notes
				900MHz	2.4GHz	3.65GHz	5.0GHz			
East Texas BB	CR433-ROHN (CntrPoint#2)	31.813611	-95.693056		X			Residential Rohn	80	

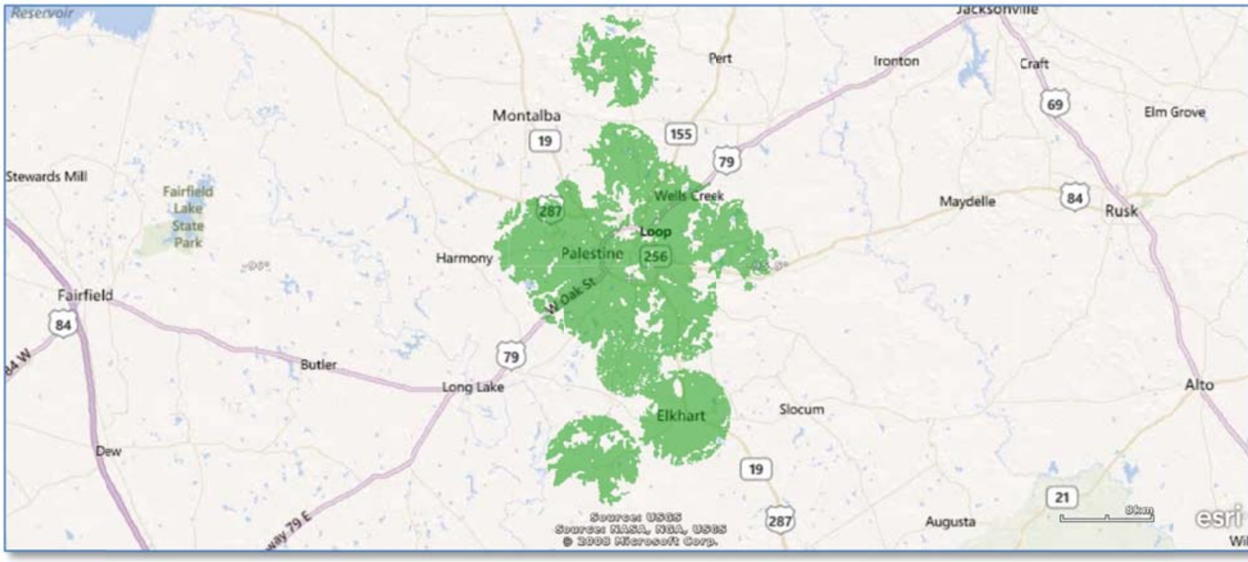
<u>Background Results and Submission for October 2012</u>

Of the 21 locations visited during the validation point route, 17 access points were identified and relative information was logged into the East Texas Broadband field validation notes file **(Exhibit F)**. The field and the publicly available data were transferred to the Connected Nation Provider Information file. A composite propagation study was completed based on the field data **(Exhibit G)**. Both documents were forwarded to East Texas Broadband and advised the information will be submitted to Connected Texas and the NTIA broadband mapping project for processing if there are no discrepancies of the estimated coverage received from the provider within a 48-hour period. Despite that aforementioned call-to-action and the 4 additional contact attempts during this mapping cycle, the provider continues to be non-responsive.

Exhibit F: Field Validation Notes

Provider	Location	Latitude	Longitude	Frequency Availability				Structure	Approximate Antenna Height	Notes
				900MHz	2.4GHz	3.65GHz	5.0GHz			
East Texas BB	Elmwood-WaterTank#1	31.920556	-95.645033	X				Water Tank	100	
East Texas BB	CR404 WT (CntrPoint#1)	31.831667	-95.645833	X				Water Tank	100	
East Texas BB	CR433-ROHN (CntrPoint#2)	31.813611	-95.693056		X			Residential Rohn	80	
East Texas BB	CR419-ROHN (CntrPoint#3)	31.780833	-95.670000	X				Residential Rohn	70	
East Texas BB	BroylesChapel-ROHN (CntrPoint#4)	31.769444	-95.718611	X				Residential Rohn	80	
East Texas BB	Hwy79SW-Lattice (TwrLocation#1)	31.738125	-95.664222	X				Lattice	120	
East Texas BB	Larkspur Ln-ROHN (CntrPoint#5)	31.729167	-95.685833	X				Residential Rohn	60	
East Texas BB	CR2012B-GuyedTwr (TwrLocation#2)	31.717817	-95.649658	X				Commercial Guyed	100	No FCC Registration sign posted at location.
East Texas BB	TwrLocation#3	31.667586	-95.632353							No WIFI RF detection observed. Used coordinates as a ETBB web coverage depiction point.
East Texas BB	Hwy322-WaterTower	31.587222	-95.667778	X				Water Tank	120	
East Texas BB	Elkhart-WaterTower	31.624781	-95.580536	X				Water Tower	150	
East Texas BB	PoleMount	31.731064	-95.621978							No WIFI RF detection observed.
East Texas BB	WtrTankStructs	31.736706	-95.626667							No WIFI RF detection observed.
East Texas BB	FM3266 WtrTwr (WtrTank#2)	31.766944	-95.531389	X				Water Tank	80	
East Texas BB	CntrPoint#6	31.752331	-95.554931							
East Texas BB	CntrPoint#7	31.757736	-95.590322							
East Texas BB	CntrPoint#6and#7 Approximation	31.756111	-95.597222	X					90	Identified a WIFI carrier at 922MHz; could not obtain a visual on AP structure due to heavy foliage in immediate area. Approximated lat/long to represent provider's ring map coverage for the location.
East Texas BB	N. Church-BldgROHN (TwrConfig)	31.763889	-95.626667		X			3 story w 40Ft. Rohn	80	
East Texas BB	Hwy155 (RohnTowerAP)	31.791303	-95.619117		X			Residential Rohn	100	
East Texas BB	TwrLocation#5	31.795461	-95.613808							No WIFI RF detection observed.
East Texas BB	Hwy79N_ROHN (TwrLocationOffice)	31.798764	-95.593725	X				Residential Rohn-G	120	
East Texas BB	WalstonSpringsWT (TwrLocation#4)	31.708767	-95.583875	X				Water Tower	80	
East Texas BB	ETBB Office	31.730833	-95.623333		X		5.1	Commercial Guyed	150	

Exhibit G: East Texas Broadband Composite Coverage



EAST TEXAS CABLE

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the SBI mapping initiative.

The following narrative provides detail regarding the recent data collection activities related to East Texas Cable, a cable broadband Internet provider in Canton, Texas. The narrative will include information regarding how and where CN obtained publicly available data and the consumer-provided validation techniques that support the underlying data.

October 2012 Submission Commentary

Connected Nation created this coverage estimation document during the October 2012 submission period as a result of the ongoing non-participatory status of the provider. In addition to the 6 instances of e-mail and/or telephone communication during the April 2012 submission period (as previously reported), CN made 4 additional attempts to contact the provider during this mapping cycle, yet the provider remained non-responsive.

CN has closely monitored the provider's website to identify any information related to maximum advertised speed tiers, coverage areas or other information that could be used as part of this coverage estimation document. CN presents, herein, its methodologies used for creating a coverage estimation of East Texas Cable.

The Issue

East Texas Cable, by its lack of responsiveness since the inception of the State Broadband Initiative (SBI) program, has predicated its unwillingness to participate in the Texas broadband mapping program.

Identification of Provider's Legal Name, d.b.a., and FRN

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (www.etcable.net) to determine the residential service plans **(Exhibit A)**. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0003782166 **(Exhibit B)**.

Exhibit A: Residential Service Plan

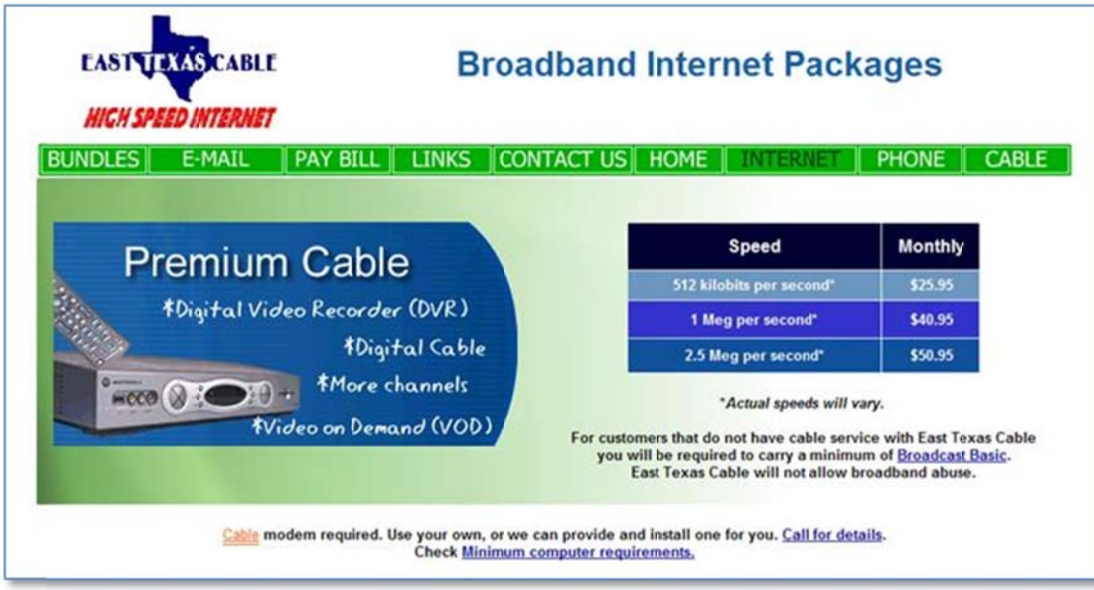


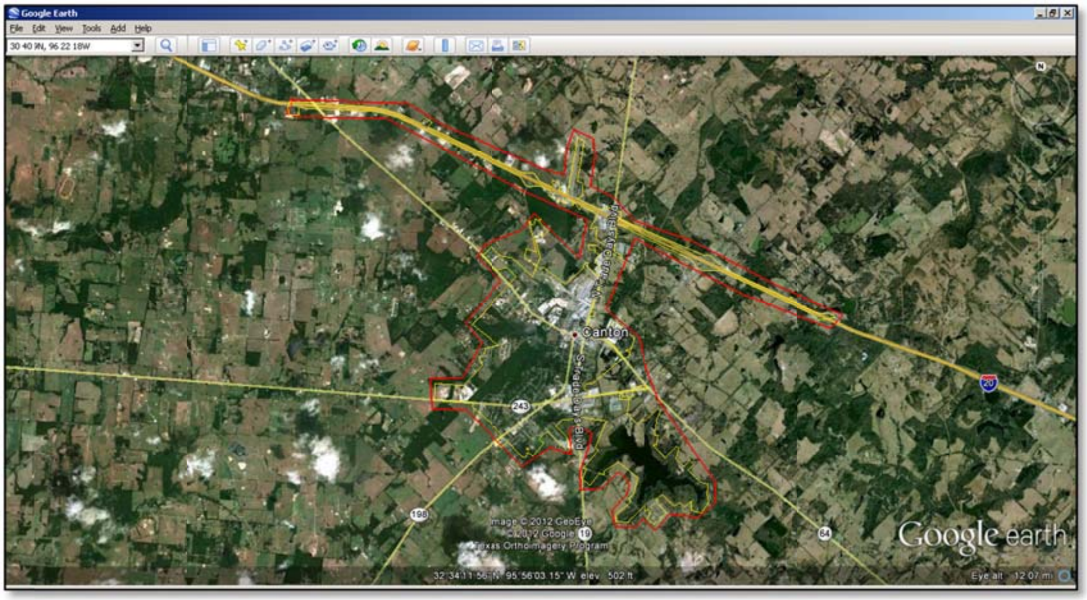
Exhibit B: FRN

Registration Detail	
FRN:	0003782166
Registration Date:	09/19/2000 12:44:43 PM
Last Updated:	04/01/2009 11:33:06 AM
Business Name:	east texas cable
Business Type:	Private Sector , Corporation
Contact Organization:	east texas cable
Contact Position:	Jim Roby / owner
Contact Name:	Mr Jim D Roby
Contact Address:	301 E. Hwy. 243 suite# 103 Canton, TX 75103 United States
Contact Email:	etcanton@aol.com
ContactPhone:	(903) 567-2260
ContactFax:	(903) 567-4048

Identification of Provider's Coverage Area

Connected Nation identified the municipality boundary for Chandler, Texas via *Google Earth* application **(Exhibit C)**. The identification of the municipality boundary was utilized to establish possible "end of line (termination points)" of the East Texas Cable network distribution along the thoroughfares (easements). Markers were established for these points **(Exhibit D)** to develop a route for the CN staff member to complete a field audit of the cable television delivery system for identifying components and the distribution routing of the East Texas Cable network.

Exhibit C: Boundary



Testing Techniques

Possible "end of line" reference points **(Exhibit D)** were pre-selected and entered into Microsoft *Streets & Trips* software. The goal was to drive through each thoroughfare and determine the existence (or lack thereof) of CATV plant and identify the end of line (termination points). As distribution components and assets of East Texas Cable were identified, markers were placed within *Streets & Trips* **(Exhibit E)** pinpointing the end of line (termination points) and identifying the area where service was likely to exist.

Exhibit D: End of Line Reference Points

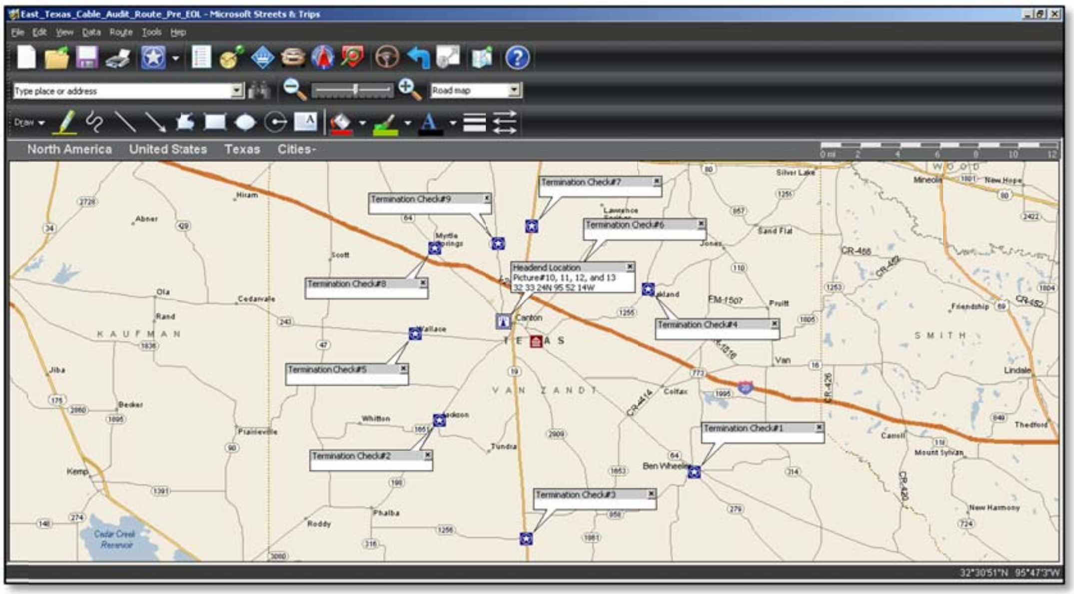
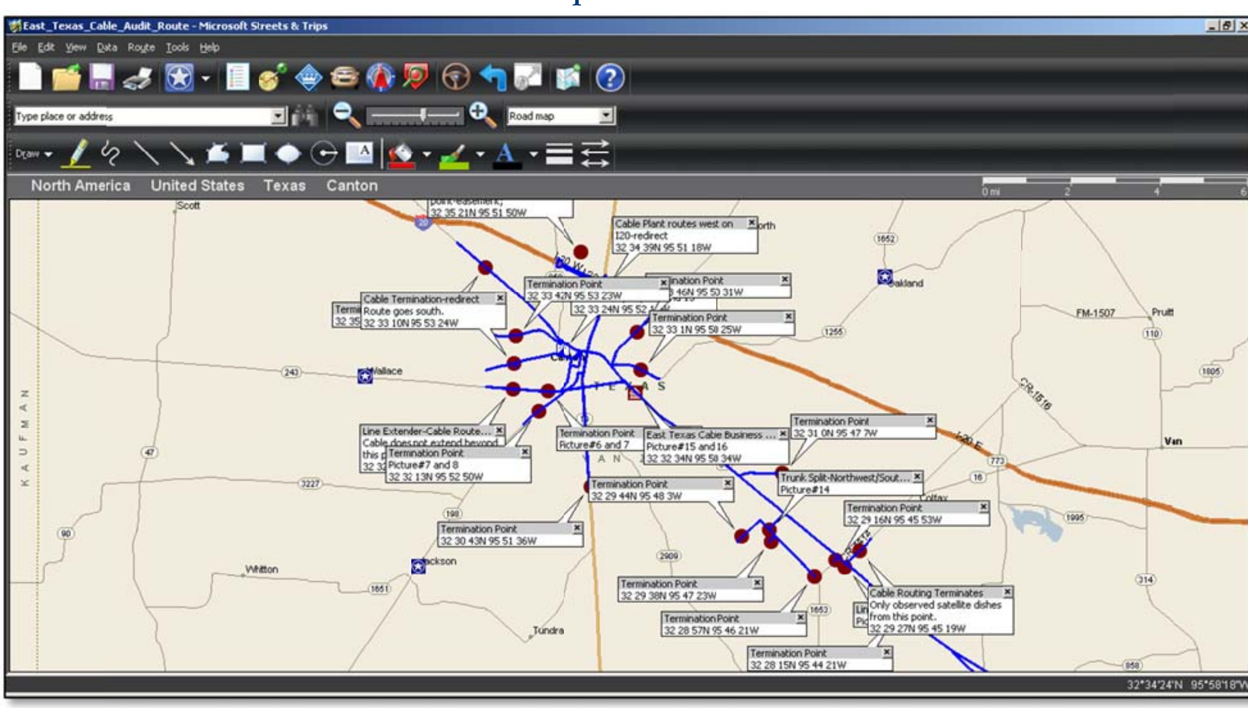


Exhibit E: Cable Components and Asset Locations



Visual identification of the headend **(Exhibit F and G)** and the business office **(Exhibit H)** were relatively easy and straightforward.

Exhibit F:
Cable Headend Tower

Exhibit G:
Cable Headend Satellite Dishes & Equipment Building

Exhibit H: East Texas Cable Business Office

The Connected Nation staff member (former Sr. Field Engineer for a CATV supplier) had very little difficulty in identifying CATV line distribution components. The images below **(Exhibit I and J)** demonstrate that the Connected Nation staff member was able to obtain visuals to assist with an estimated coverage. The depictions are just a sample observed throughout the audit route.

Exhibit I:
Trunk Distribution AmplifierAerial Plant

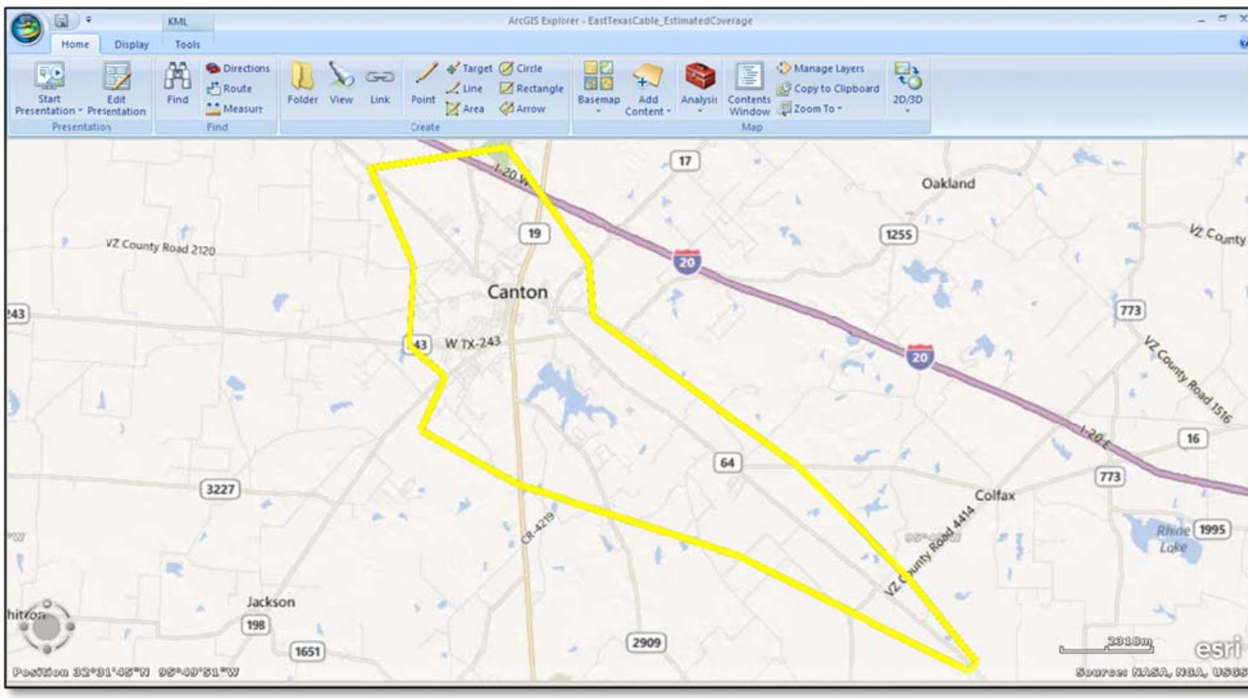
Exhibit J:
End of Line – Termination Point

Results and Submission for October 2012

As a result of the collection of publicly available information, and the on-the-ground validation efforts, Connected Nation is submitting this document in support of its coverage estimation for the cable modem broadband service area of East Texas Cable. Without provider participation and support of the SBI mapping initiative, CN proceeded with a logical, relevant and feasible methodology for collecting and validating the service area of this non-participating broadband provider.

Exhibit K depicts the estimated coverage area based on the results of data gathered through publically available sources combined with visual drive testing techniques.

Exhibit K: Validation Results



GoZoe Wireless

As part of its ongoing broadband mapping efforts, Connected Nation has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the SBI program.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to GoZoe Wireless, a wireless Internet service provider (WISP), located in Marshall, Texas, with a service area around Marshall, Texas, Harrison County. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

October 2012 Submission Commentary

Connected Nation created this coverage estimation document during the April 2012 submission period (as a result of the ongoing non-participatory status of the provider). Fifteen total instances of e-mail and/or telephone communication have occurred leading up to this mapping cycle. On August 12, 2012, the estimated coverage map **(Exhibit I),** which was produced during the April 2012 submission cycle, was once again presented to the provider requesting review and comments. As of August 27, 2012, no replies were received from the provider.

CN has continued to closely monitor the provider's website to determine if any changes in the coverage area or maximum advertised speeds have occurred but did not locate evidence of any recent changes. To that end, CN is resubmitting this coverage estimation narrative, substantially in its original format, and will continue to monitor the provider's website as well as ensure ongoing outreach until either the expiration of the SBI grant or until such time as the provider voluntarily contributes data.

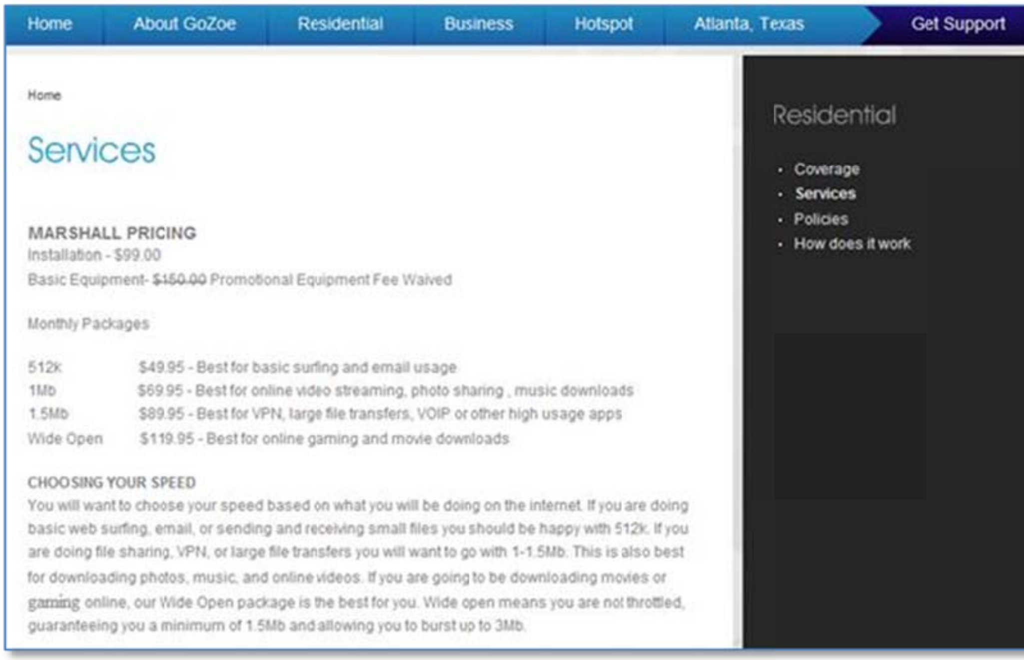
The Issue

GoZoe Wireless, by its lack of responsiveness since October 17, 2011, has predicated its unwillingness to participate in the Connected Texas broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (http://www.gozoe.com/) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0019577873 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any spectrum authorizations that may be held by the provider that could supplement the dataset of estimated coverage by isolating and identifying active wireless access points for the service area. This process yielded license WQMG924 **(Exhibit D)**, Radio Service: NN-3650-3700 MHz with 0 active locations.

Exhibit A: Service Plans



Home | About GoZoe | Residential | Business | Hotspot | Atlanta, Texas | Get Support

Home

Services

MARSHALL PRICING
Installation - $99.00
Basic Equipment- ~~$150.00~~ Promotional Equipment Fee Waived

Monthly Packages

512k	$49.95 - Best for basic surfing and email usage
1Mb	$69.95 - Best for online video streaming, photo sharing , music downloads
1.5Mb	$89.95 - Best for VPN, large file transfers, VOIP or other high usage apps
Wide Open	$119.95 - Best for online gaming and movie downloads

CHOOSING YOUR SPEED
You will want to choose your speed based on what you will be doing on the internet. If you are doing basic web surfing, email, or sending and receiving small files you should be happy with 512k. If you are doing file sharing, VPN, or large file transfers you will want to go with 1-1.5Mb. This is also best for downloading photos, music, and online videos. If you are going to be downloading movies or gaming online, our Wide Open package is the best for you. Wide open means you are not throttled, guaranteeing you a minimum of 1.5Mb and allowing you to burst up to 3Mb.

Residential
- Coverage
- Services
- Policies
- How does it work

Exhibit B: Service Area

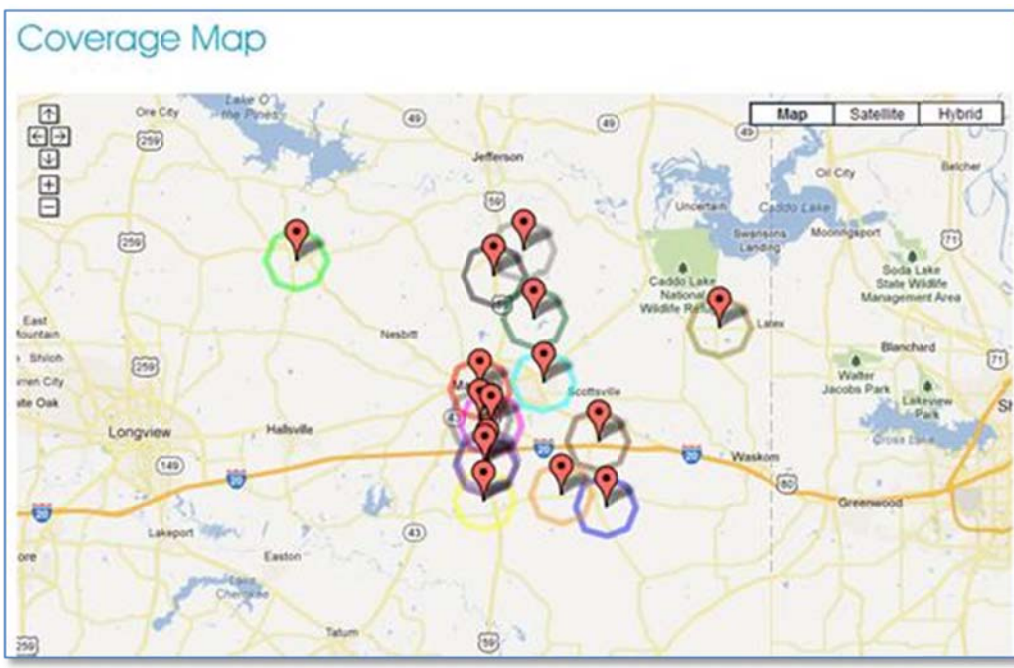


Exhibit C: Federal Registration Number

Registration Detail	
FRN:	0019577873
Registration Date:	02/15/2010 05:51:00 PM
Last Updated:	08/03/2010 05:15:06 PM
Business Name:	Gozoe Wireless LLP
Business Type:	Private Sector , Partnership
Contact Organization:	Gozoe Wireless
Contact Position:	Partner
Contact Name:	Mr Ashton S Closner
Contact Address:	2660 East uthend Blvd S suite 113 Marshall, TX 75672 United States
Contact Email:	ashteclan@hotmail.com
ContactPhone:	(903) 935-0876
ContactFax:	(903) 935-0893

Exhibit D: WQMG924 License Reference

MAIN | ADMIN | LOCATIONS

Call Sign	WQMG924	Radio Service	NN - 3650-3700 MHz

Applications

Receipt Date	File Number and Type	Status
08/11/2010	0004350814 RL - Register Link/Location	Dismissed
08/11/2010	0004350798 RL - Register Link/Location	Dismissed
08/04/2010	0004343599 NE - New	Granted

Automated Letters and Authorizations

08/05/2010	Authorization -- Licensee

Comments

None

MAIN | ADMIN | LOCATIONS

Call Sign	WQMG924	Radio Service	NN - 3650-3700 MHz

0 Total Locations
10 Locations per Summary Page

No Locations

0 Total Locations
10 Locations per Summary Page

<u>Preliminary Identification of Provider's Coverage Area</u>
CN extracted the GoZoe Wireless service area map directly from the provider's website. Information from that website was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .1 mile (528 ft.) to establish a minimum search criteria of a given wireless access point. The provider's service area depiction is represented by polygons as shown in **Exhibit B**. Using the Google Earth image overlay each location was examined via an aerial zoom and street level observation to identify possible wireless access point structures at the center points of the polygons. This process provided a means of establishing coordinates for 15 validation points to identify structures with operational wireless transmit equipment. All 15 locations were entered into Microsoft *Streets & Trips* **(Exhibit F)** to develop a route for the data collection and validation process.

Exhibit E: Google Earth: Provider's Service Area Image Overlay

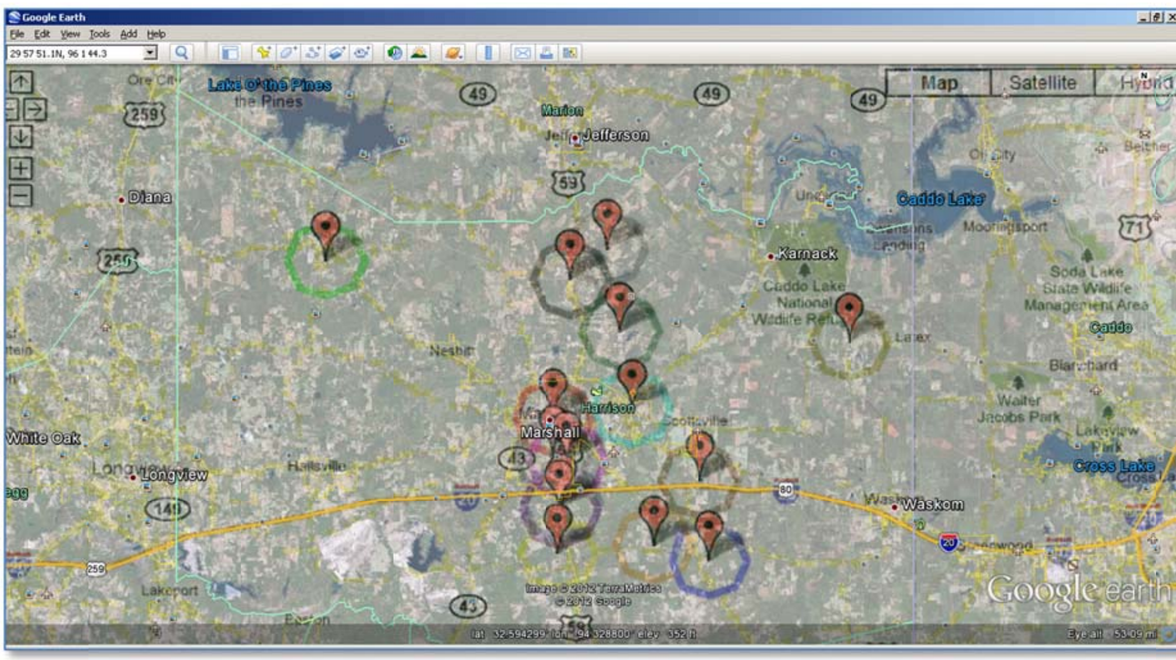
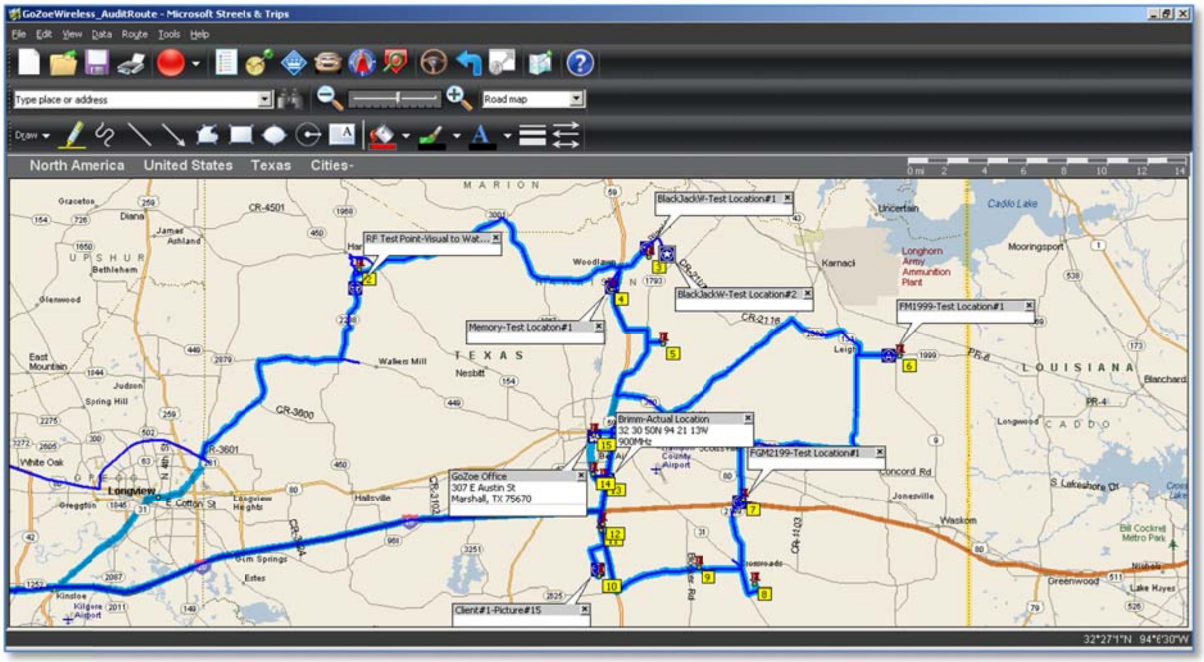


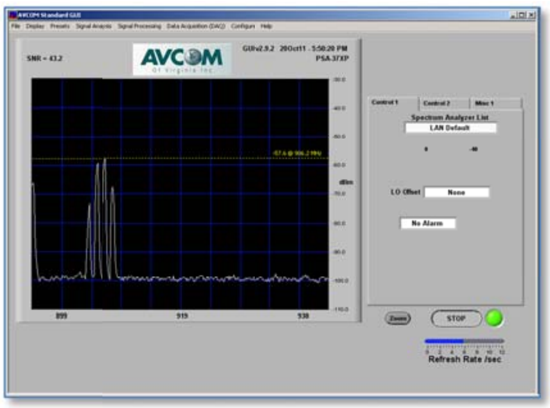
Exhibit F: Validation Points for AP Structures

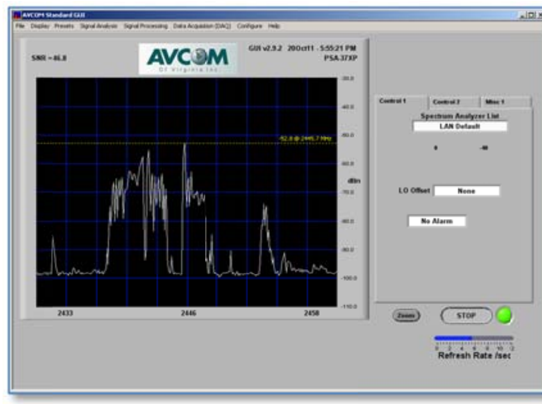


Testing Techniques

CN staff developed a data collection and site validation route based on information derived from the Google Earth image overlay of GoZoe Wireless' publicly available coverage on its website. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored) and photographs were taken of the access points.

Exhibit G: Field Data for GoZoe Wireless Office/Hub Location





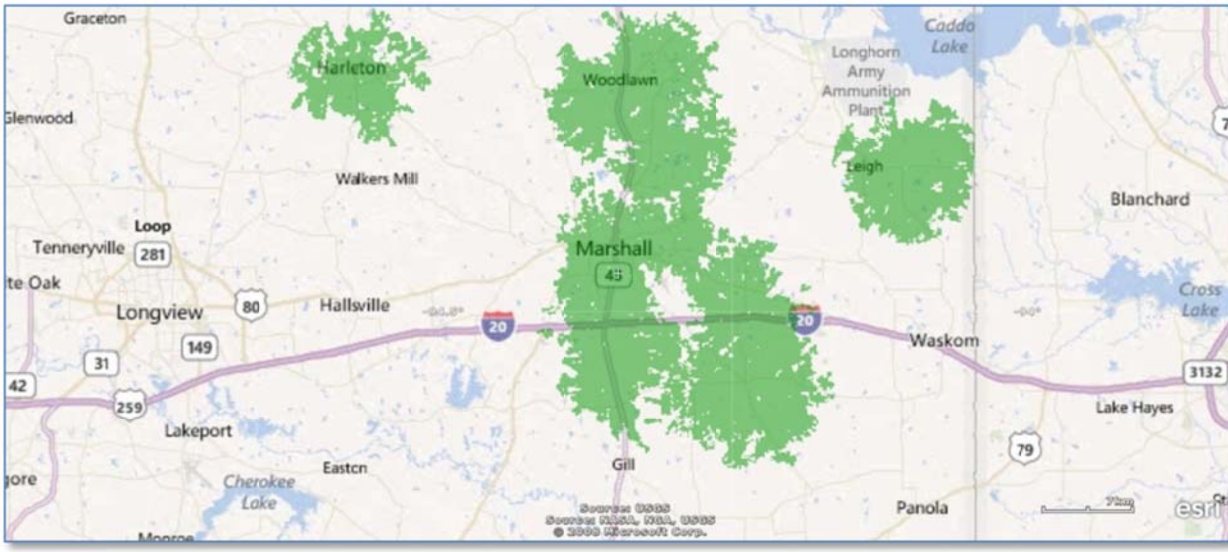
Results and Submission for October 2012

Of the 15 locations visited during the coverage estimation and validation point route, 14 access points were identified and relative information was logged into the GoZoe field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the CN Provider Information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to GoZoe Wireless as courtesy copies, and the provider was advised the estimated coverage information would be submitted to Connected Texas and to the NTIA unless the provider notified CN, within 48 hours, of discrepancies of the estimated coverage. The provider did not respond to CN and, as of this date, CN believes the information to be an accurate estimation of the service area of GoZoe Wireless.

Exhibit H: Field Validation Notes

Location	Latitude	Longitude	Frequency Availability		Structure	Approximate Antenna Height	Notes
			900MHz	2.4GHz			
AbbieLane	32.443889	-94.361017	X		Guyed Rohn	120 ft.	No visual on AP; estimated height and location (based on Google Earth overlay). RF presence; private property. Screen print of GE aerial imagery.
Hwy59-1	32.476792	-94.359497	X		Guyed Rohn	120 ft.	NAPA truck center; hub distribution point; multiple backhaul links.
Hwy59-2	32.481733	-94.358119	N/A	N/A	N/A	N/A	**No tower structure; only guy anchor posts; site decom.**
Hwy59-3	32.513619	-94.356717					
Hwy59-3 Revised Coords	32.513889	-94.353611	X		Guyed Rohn	120 ft.	**Sector antenna approximately 270 degrees azimuth**; 180 degree panel. 5.3GHz backhaul (SSID capture).
Washington	32.518367	-94.366317		X	Rohn	70 ft.	2.4GHz detected; backhaul antennas mounted on top.
Lafayette	32.546483	-94.365128	X	X	Rohn-Rooftop Mnt.	110 ft.	GoZoe hub and office location.
Commerce	32.553639	-94.296431	X		Rohn Guyed	100 ft.	Industrial park area; identified Tsunami access equipment operating at channels 2, 7, and 11.
Shadowood	32.613081	-94.306108	X		Guyed Rohn	120 ft.	Sector antenna arrays; 360 degree coverage.
Memory	32.652858	-94.350017	X			120 ft.	No visual on AP; estimated height and location (based on Google Earth overlay). RF presence; private property.
BlackJackW	32.675925	-94.318119	X			120 ft.	No visual on AP; estimated height and location (based on Google Earth overlay). RF presence; private property.
FM450/2208	32.666883	-94.568447	X		Water Tank	150 ft.	No access to site; private road.
FM1999	32.603986	-94.101294	X		Free Standing Comm	160 ft.	"old" AT&T comm site; SBA Site: TX 14398; FCC# 104897; operating 2.4GHz and 5.7GHz backhaul (SSID captures).
FM2199	32.499297	-94.236131	X		Guyed Rohn	110 ft.	Omni at 900MHz; 2.4GHz and 5.7GHz backhaul (SSID captures).
FM2625	32.449783	-94.275753	X		Guyed Rohn	100 ft.	**Sector at approximately 180 degrees azimuth**; 180 degree panel
FM31	32.437633	-94.226956	X			120 ft.	No visual on AP; estimated height and location (based on Google Earth overlay). RF presence; private property.

Exhibit I: GoZoe Wireless Composite Coverage



NDEMAND, INC.

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the SBI mapping initiative.

The following narrative provides detail regarding the recent data collection activities related to NDemand, Inc., a wireless Internet service provider (WISP) located in Katy, Texas, with its service area in Nacogdoches County and Shelby County in eastern Texas. This narrative will include information regarding how and where CN obtained publicly available data, and the on-the-ground validation techniques that support the resulting broadband coverage estimate.

Background

CN staff members have attempted to obtain the participation of the provider with at least 15 recorded instances of communication via telephone and e-mail from September 19, 2011, through August 8, 2012. During that period, three personal visits were also made to the provider's office in Katy, Texas.

The Issue

NDemand, by its lack of responsiveness since September 19, 2011, has predicated its unwillingness to participate in the Connected Texas broadband mapping initiative. Connected Nation has been unable to obtain NDemand's broadband coverage information through typical outreach efforts, and the provider continues to show reluctance to participate in the Connected Texas broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. As a first step, CN reviewed the provider's website (www.ndemand.com) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** advertised for the provider's wireless network.

Exhibit A: Advertised Service Plans

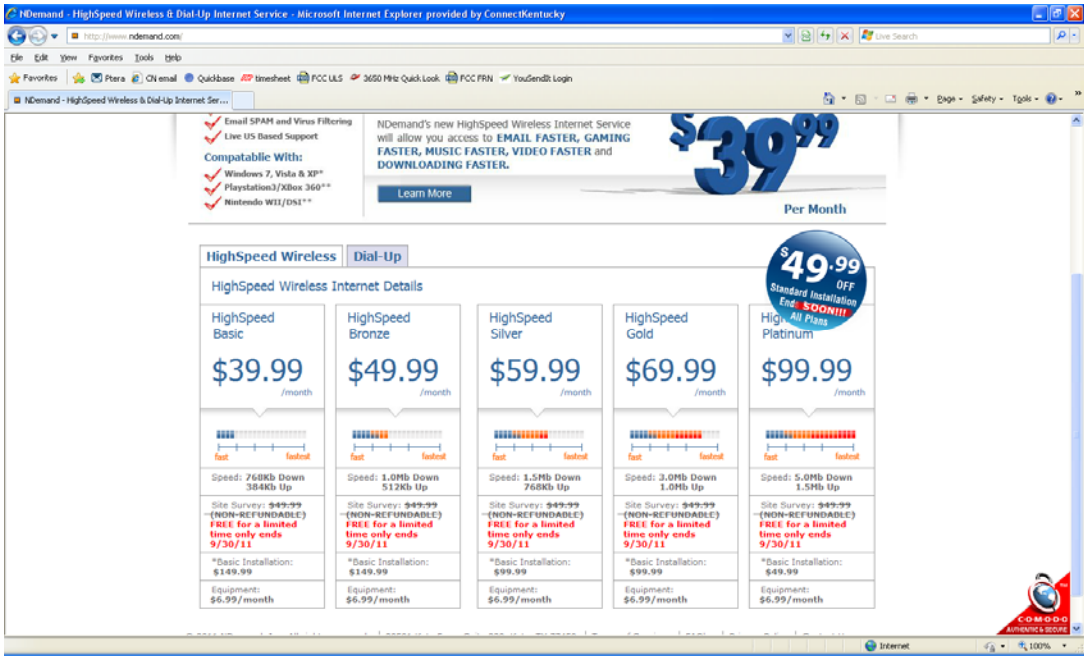
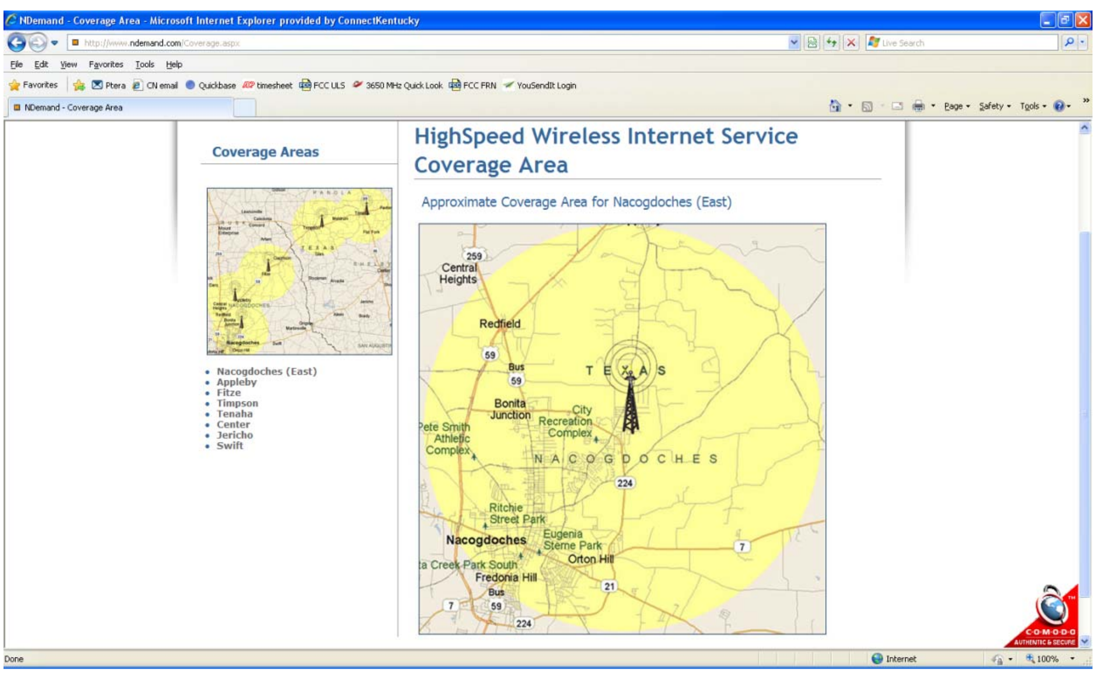


Exhibit B: Advertised Service Area



A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0019660794 **(Exhibit C)** with company contact information. Also, to support field validation of access points, the FRN was referenced to the FCC Universal Licensing System (ULS) to identify any licenses the provider may hold which could assist in specifying active access points for the service area. This process yielded license WQLX343 **(Exhibit D)** utilizing frequencies at 3650-3700 MHz (FCC Radio Service Code "NN"), with 14 unique locations. Other licenses were also identified, however, these other licenses appeared to be specific to microwave backhaul usage rather than to last-mile residential wireless broadband service.

Exhibit C: Federal Registration Number

Registration Detail	
FRN:	0019660794
Registration Date:	03/15/2010 04:01:00 PM
Last Updated:	04/20/2012 09:47:04 AM
Business Name:	Ndemand, Inc
Business Type:	Private Sector , Corporation
Contact Organization:	Ndemand, Inc.
Contact Position:	President
Contact Name:	Mr Brian S Doyle
Contact Address:	20501 Katy Fwy Katy, TX 77450 United States
Contact Email:	bdoyle@ndemand.com
ContactPhone:	(713) 559-9650
ContactFax:	(713) 559-9700

Exhibit D: FCC License Information and Map for Call Sign WQLX343

Specified Search

Name like **ndemand**

Matches **1- 10** (of **12**)

PA = Pending Application(s)
TP = Termination Pending
L = Lease

	Call Sign/Lease ID	Name	FRN	Radio Service	Status	Expiration Date
1	WQLX343	NDemand Wireless, LLC	0019660794	NN	Active	05/18/2020
2	WQMJ611	Ndemand Wireless, LLC	0019660794	MG	Active	08/24/2020
3	WQMJ612	Ndemand Wireless, LLC	0019660794	MG	Active	08/24/2020
4	WQMJ613	Ndemand Wireless, LLC	0019660794	MG	Terminated	08/24/2020
5	WQMJ614	Ndemand Wireless, LLC	0019660794	MG	Active	08/24/2020
6	WQMJ615	Ndemand Wireless, LLC	0019660794	MG	Terminated	08/24/2020
7	WQMJ616	Ndemand Wireless, LLC	0019660794	MG	Active	08/24/2020
8	WQMK574	Ndemand Wireless, LLC	0019660794	MG	Active	09/02/2020
9	WQMM325	Ndemand Wireless, LLC	0019660794	MG	Active	09/21/2020
10	WQMM352	Ndemand Wireless, LLC	0019660794	MG	Terminated	09/21/2020
	Call Sign/Lease ID	Name	FRN	Radio Service	Status	Expiration Date

FCC Federal Communications Commission

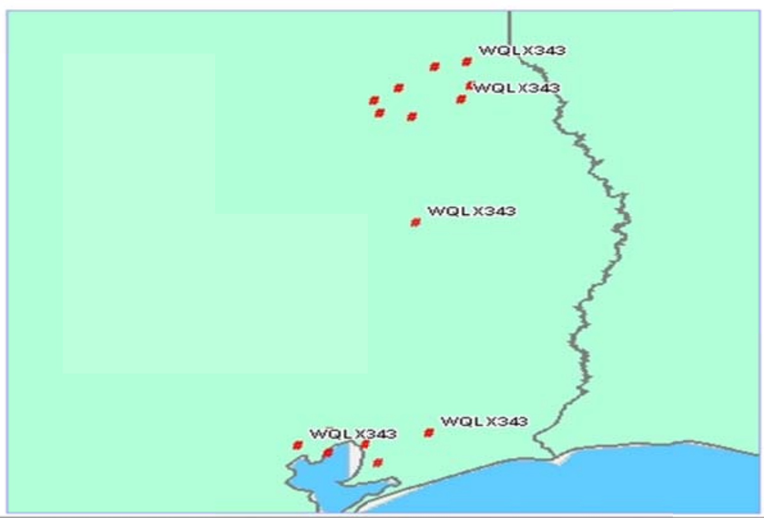
Universal Licensing System

FCC > WTB > ULS > Online Systems > ULS-GIS

3650-3700 MHz License - WQLX343 - NDemand Wireless, LLC

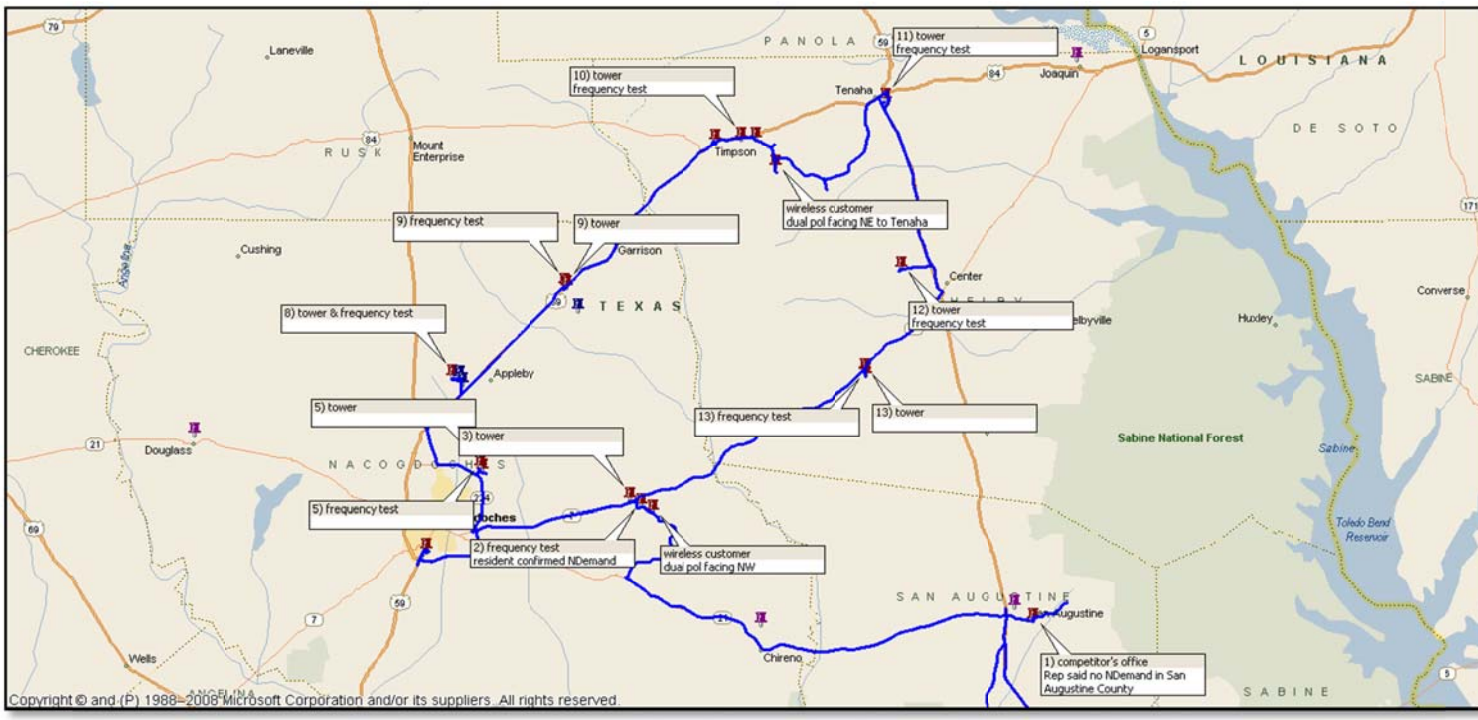
ULS-GIS

New Search | Return to Results | Return to License | Printable Page



<u>Preliminary Identification of Provider's Coverage Area</u>
Utilizing location information contained in the license for WQLX343, images from the provider's website, and through other research (including a call to the provider's customer service telephone number), a CN staff member determined that no more than 8 of the license's 14 identified coordinates (shown above) were currently able to provide last-mile broadband service. Those 8 locations were compiled into a service area map for NDemand, and recorded in the Microsoft *Streets & Trips* mapping application **(Exhibit E)** to develop a route for the validation process.

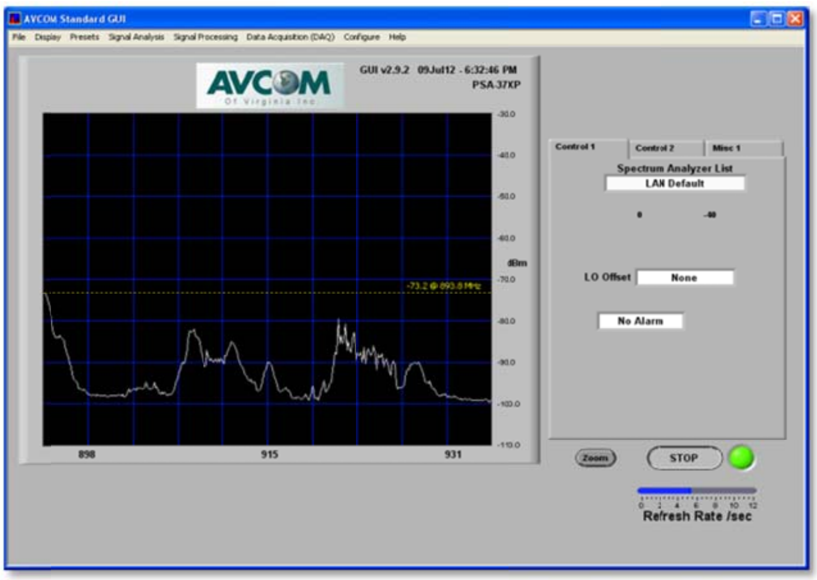
Exhibit E: Validation Points for Tower Structures

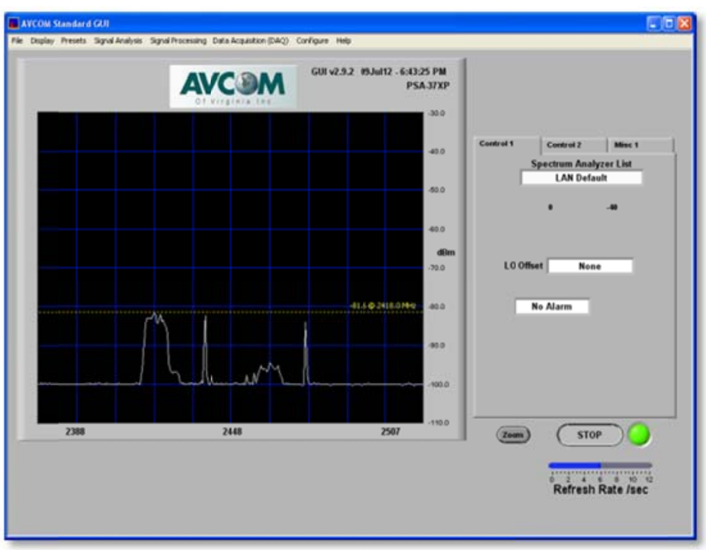


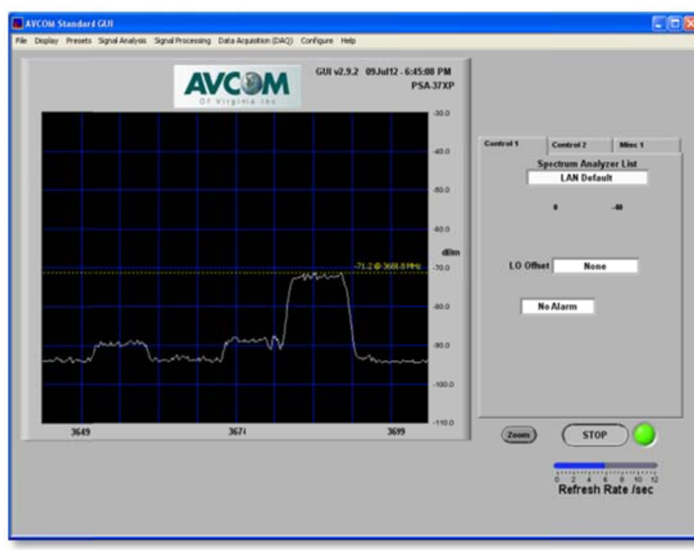
Field Testing Techniques

Having recorded the licensed locations for each of the circular coverage areas represented on the NDemand website, a CN technician drove to each location and performed signal tests for the detection of active wireless frequencies typically utilized to provide WISP service. The CN technician was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands. At each signal test location, the CN technician attempted to be isolated from Wi-Fi networks in the test area, facilitated spectrum readings from the AVCOM analyzer, and captured the results of the frequency tests as validation data for wireless tower transmissions (**Exhibit F**).

Exhibit F: Signal Test Results for the Swift, Texas Tower Location







Signal Propagation Maps

In order to prepare propagation maps for each tower location, the CN technician identified the antenna height from the license information, verified the GPS coordinates for the tower while on-site, and recorded this and other information for each location into the standard Excel provider data collection format (**Exhibit G**). With the objective of reasonably representing the provider's practical service area, CN staff prepared propagation maps (**Exhibit H**) based on that information.

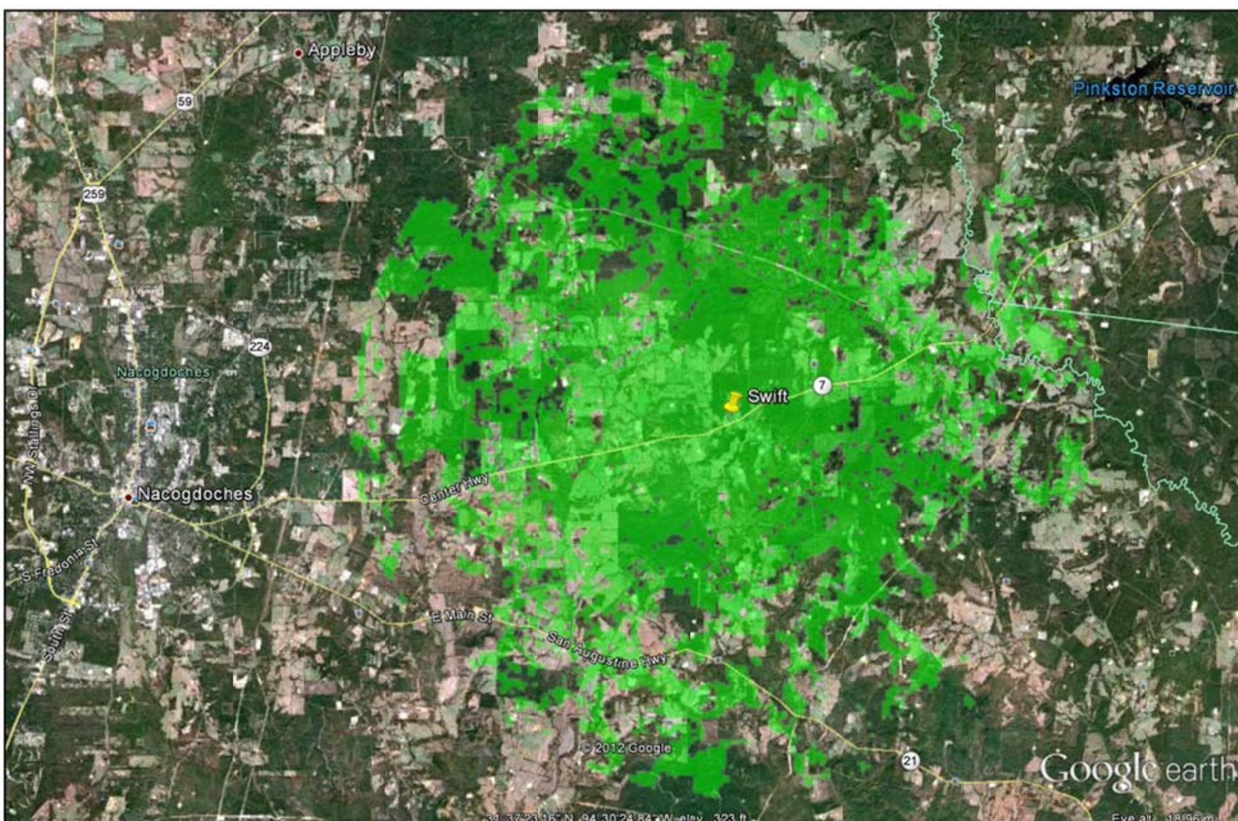
Exhibit G: Tower Research and Propagation Data

Wireless Provider Information

Provider Name (Legal entity)	**Ndemand, Inc.**
DBA ("Doing Business As") Name	N/A
FRN # (10-digit FCC Registration Number)	0019660794

Name of Location	Status	Pop Center	Structure	Latitude	Longitude	Omni?	Radius	Frequency	Gain	Power	Elevation
Swift	Active	Swift	broadcast tower	31.62363	-94.47672	Yes	10	2400	10	24	180
Nacogdoches	Active	Nacogdoches	broadcast tower	31.64608	-94.61432	Yes	10	5800	10	24	180
Appleby	Active	Appleby	broadcast tower	31.72083	-94.64249	Yes	10	2400	10	24	200
Fitze	Active	Fitze	broadcast tower	31.79188	-94.53539	Yes	10	2400	10	24	200
Timpson	Active	Timpson	broadcast tower	31.90989	-94.37318	Yes	10	2400	10	24	200
Tenaha	Active	Tenaha	broadcast tower	31.94061	-94.23801	Yes	10	2400	10	24	200
Center	Active	Center	broadcast tower	31.80684	-94.22317	Yes	10	2400	10	24	250
Jericho	Active	Jericho	broadcast tower	31.72628	-94.25772	Yes	10	2400	10	24	250

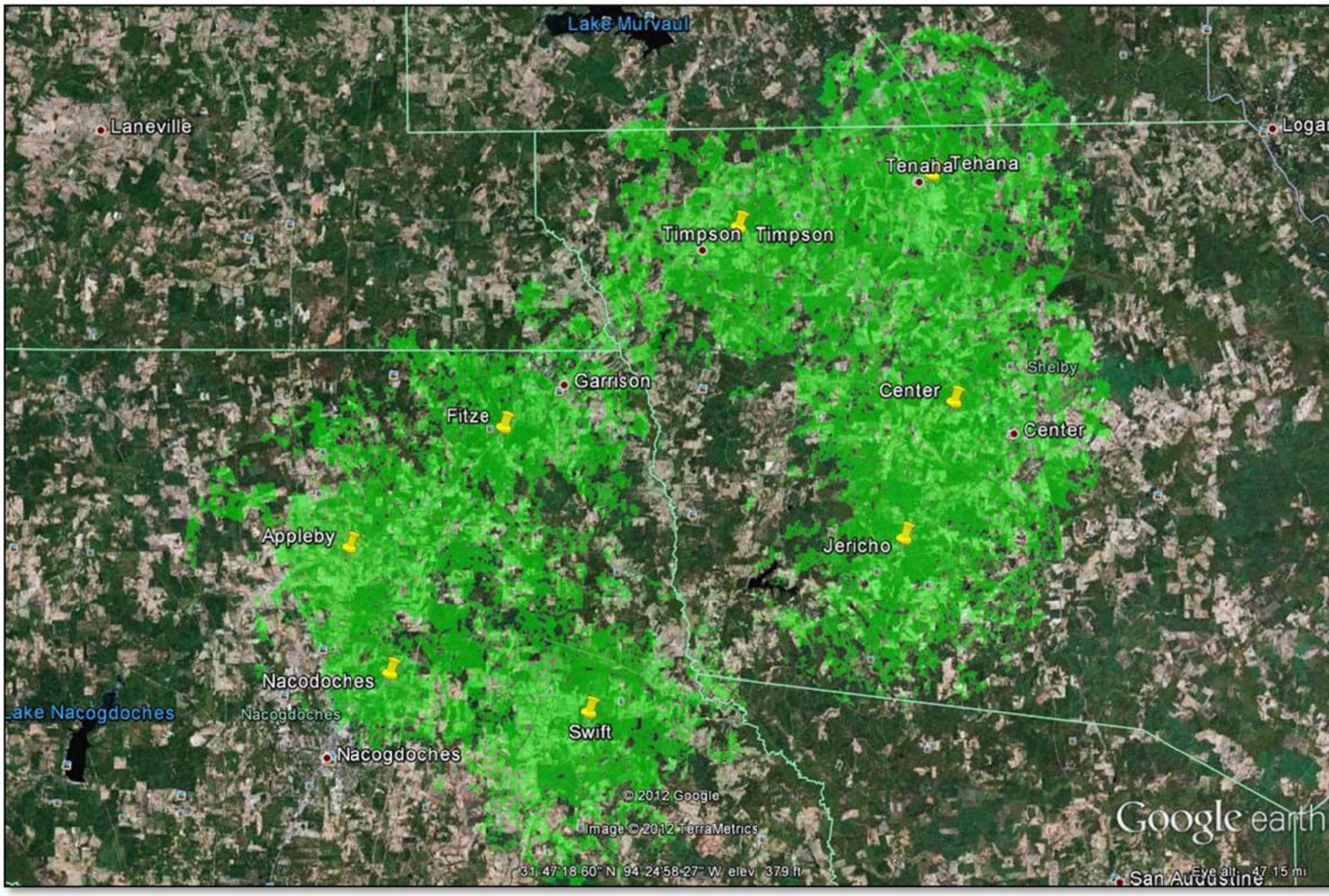
Exhibit H: Propagation Map for the Swift, Texas Location



Results and Submission for October 2012

All eight licensed tower locations for NDemand which were likely to be operational were visited and tested, as well as numerous additional sites in the search for customer premise equipment, frequencies utilized by potential competitors, and other verification data points. Testing at each site determined that wireless signal was available for broadband service. A composite propagation analysis was completed **(Exhibit I)**, which reasonably represents the estimated broadband coverage area based on all information identified as of July 10, 2012. The composite propagation map was forwarded to the provider for review and feedback prior to CN's including the coverage area in the Texas Broadband Map's October 2012 iteration; no response was received as of August 15, 2012.

Exhibit I: NDemand, Inc. Composite Coverage



SKYNET COMMUNICATIONS

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the SBI mapping initiative.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to Skynet Communications (Skynet), a wireless Internet service provider (WISP) located in Fulshear, Texas, with its service area in the counties of Fort Bend, Wharton, and Brazoria. This narrative will include information regarding how and where CN obtained publicly available data, and the on-the-ground validation and site verification techniques that support the resulting broadband coverage estimate.

Background
CN staff members have attempted to obtain the participation of the provider with at least 12 instances of communication via telephone, e-mail, and personal visits from November 24, 2011, through August 1, 2012. Although the provider indicated that the company would likely participate in the mapping project, the lead representative has been reluctant to take the final step of reviewing the propagation maps for edits.

The Issue
Skynet, by its lack of active participation since November 24, 2011, has predicated its refusal to participate in the Connected Texas broadband mapping initiative. Connected Nation has been unable to obtain Skynet's broadband coverage information through typical outreach efforts, and the provider continues to show reluctance to participate in the Connected Texas broadband mapping initiative, even after being presented with a pre-populated datasheet and a complete set of propagation studies created after the field verification exercise.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing
CN discovered the presence of the provider through a wireless license search of the geographic area. Typical outreach efforts yielded little action on the part of the provider. Thus, CN began building a file based on information available from the public domain (website and other on-line) research. As a first step, CN reviewed the provider's website (www.skynetwisp.com) to determine the residential service plans and the service area advertised for the provider's wireless network. The website did not identify any broadband service plans, and the displayed coverage area was a combination of active and proposed transmission sites (**Exhibit A**). A few weeks after the original website research was completed, a revised search of the website revealed a new coverage map (**Exhibit B**).

Exhibit A: Advertised Service Area, Original Version

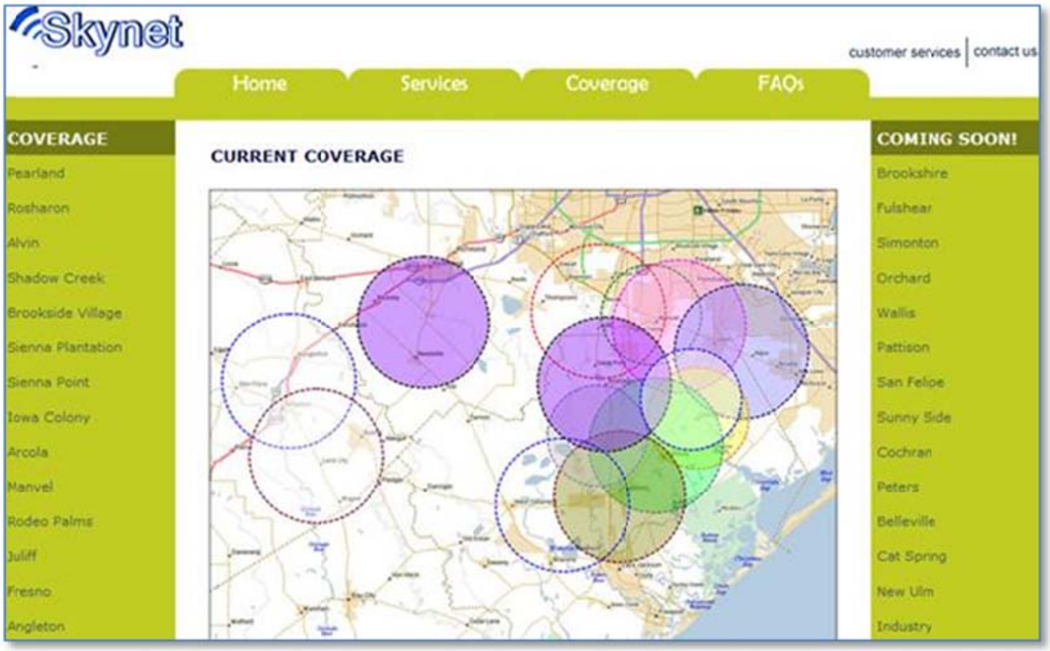
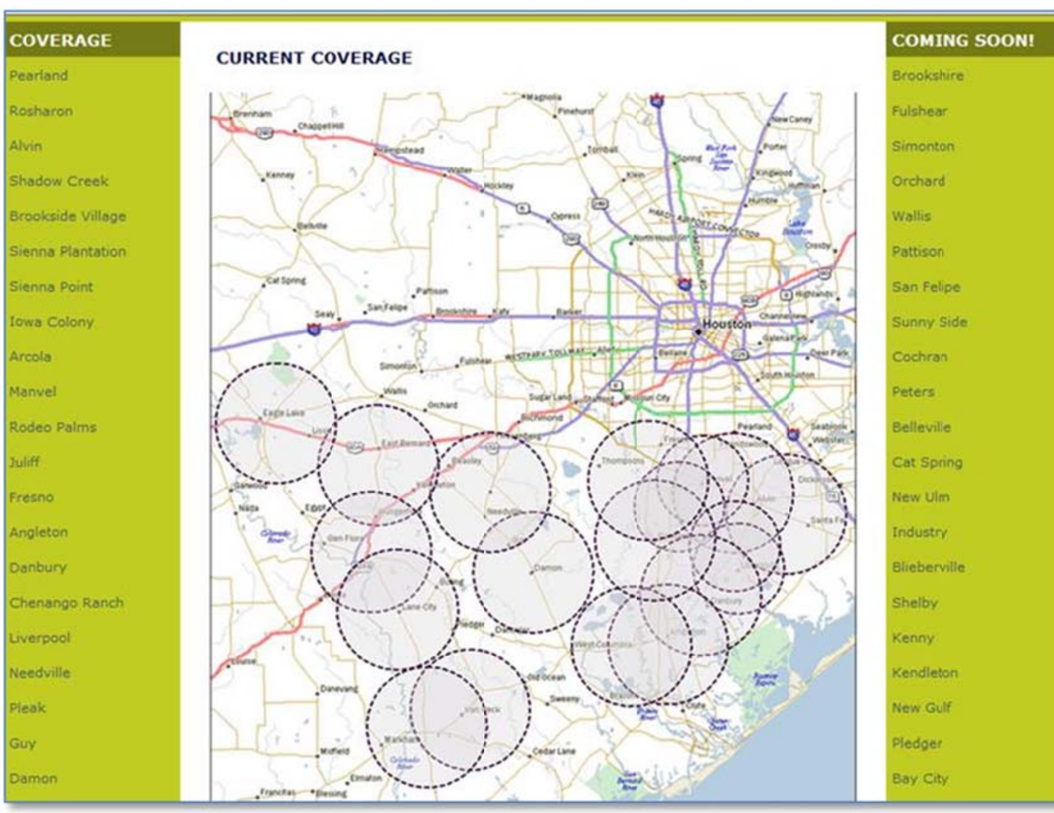


Exhibit B: Advertised Service Area, Latest Version



A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) yielded an FRN of 0018610774 (**Exhibit C**) with company contact information. The original license search was performed utilizing the FCC Universal Licensing System, which specified call sign WQMI310 (**Exhibit D**), utilizing frequencies at 3650-3700 MHz, with 317 unique locations. Other licenses were also specified, however, an analysis of all licensed locations revealed that WQMI310 provided the principal basis for the identification of operational tower locations.

Exhibit C: Federal Registration Number

Registration Detail	
FRN:	0018610774
Registration Date:	03/18/2009 01:23:00 PM
Last Updated:	
Business Name:	Skynet Communications
Business Type:	Private Sector , Corporation
Contact Organization:	
Contact Position:	President
Contact Name:	Janie LeBlanc
Contact Address:	PO Box 219010 Houston, TX 77218-9010 United States
Contact Email:	Janie@skynethouston.com
ContactPhone:	(713) 545-0597
ContactFax:	

Exhibit D: FCC WQMI310 License Information

License Search - Search Results - Microsoft Internet Explorer provided by ConnectKentucky

FCC Federal Communications Commission

FCC Home | Search | Updates | E-Filing | Initiatives | For Consumers | Find People

Universal Licensing System

FCC > WTB > ULS > Online Systems > License Search

FCC Site Map

License Search

Search Results

HELP

New Search Refine Search Printable Page Query Download Map License

Specified Search

FRN like **0018610774**

Matches **1- 8** (of **8**)

PA = Pending Application(s)
TP = Termination Pending
L = Lease

Page 1

	Call Sign/Lease ID	Name	FRN	Radio Service	Status	Expiration Date
1 PA	WQLS493	SKYNET COMMUNICATIONS	0018610774	MG	Active	04/14/2020
2 PA	WQLS803	SKYNET COMMUNICATIONS	0018610774	MG	Active	04/16/2020
3 PA	WQMI310	Skynet Communications	0018610774	NN	Active	08/13/2020
4 PA	WQOZ296	Skynet Communications	0018610774	MG	Active	03/09/2022
5 PA	WQOZ297	Skynet Communications	0018610774	MG	Active	03/09/2022
6	WQPI228	Skynet Communications	0018610774	MG	Active	05/24/2022
7	WQPI229	Skynet Communications	0018610774	MG	Active	05/24/2022
8 PA	WQPJ944	SKYNET COMMUNICATIONS	0018610774	MG	Active	06/08/2022
	Call Sign/Lease ID	Name	FRN	Radio Service	Status	Expiration Date

Page 1

MAIN | ADMIN | LOCATIONS

Call Sign	WQMI310	Radio Service	NN - 3650-3700 MHz

317 Total Locations
10 Locations per Summary Page

1 2 3 4 5 6 7 8 9 10 [Next >>]

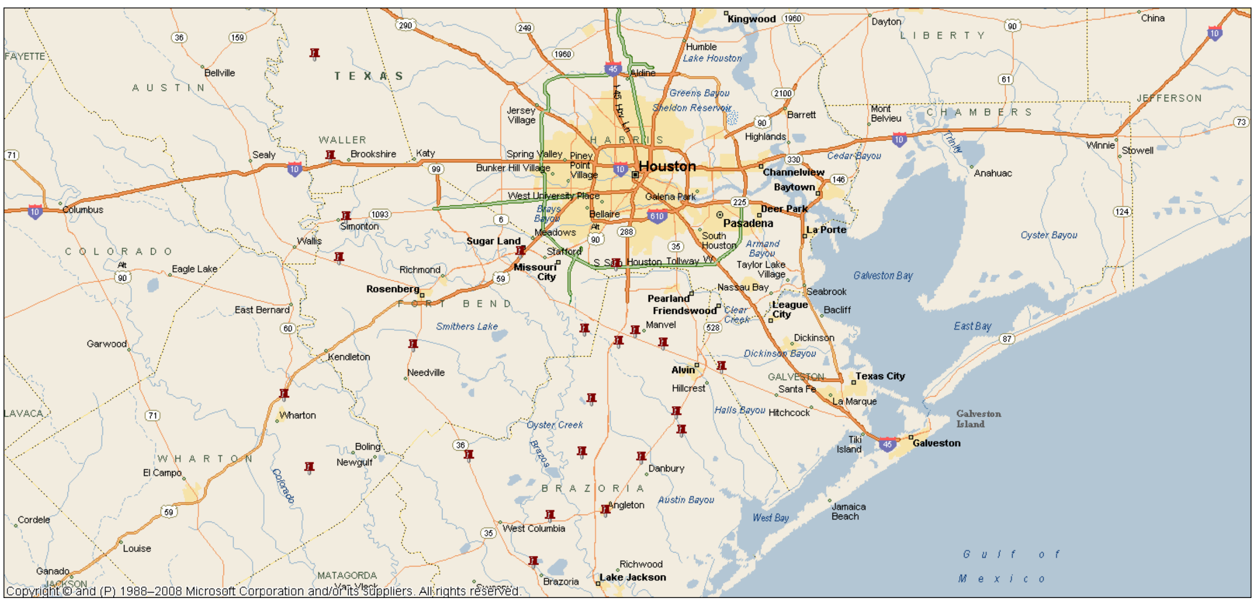
	Location	Latitude,Longitude	Transmitter Azimuth
1	Rosharon	29-21-12.0 N, 095-27-40.0 W	0.0 degrees
2	Pearland	29-35-33.0 N, 095-24-41.0 W	0.0 degrees
3	Manvel	29-28-26.0 N, 095-22-16.0 W	0.0 degrees
4	Liverpool	29-17-49.0 N, 095-16-38.0 W	0.0 degrees
5	Lippman Hwy 36	29-26-56.0 N, 095-49-31.0 W	0.0 degrees
6	Iowa Colony	29-27-21.0 N, 095-24-20.0 W	0.0 degrees
7	Danbury	29-14-55.0 N, 095-21-33.0 W	0.0 degrees
8	Arcola	29-28-37.0 N, 095-28-29.0 W	0.0 degrees
9	Alvin	29-27-06.0 N, 095-18-51.0 W	0.0 degrees
10	Algoa	29-24-37.0 N, 095-11-43.0 W	0.0 degrees

317 Total Locations
10 Locations per Summary Page

<u>Preliminary Identification of Provider's Coverage Area</u>

By comparing the coordinate information from Skynet's wireless licenses and the website coverage maps of concentric circles, 23 possible tower locations were identified (red pushpins in **Exhibit E)** that required testing and verification.

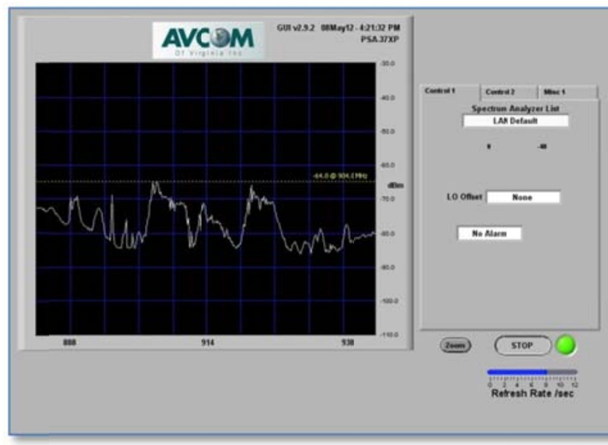
Exhibit E: Validation Test Points for Tower Structures

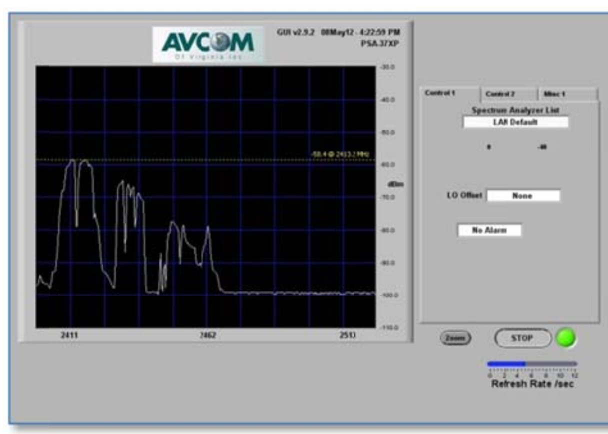


Field Testing Techniques

Having recorded the licensed locations for each of the circular coverage areas represented on the Skynet website, as well as other possible tower locations, CN technicians and engineers drove to each location and performed signal tests for the detection of active wireless frequencies typically utilized to provide WISP service. The technicians and engineers were equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands. At each signal test location, the CN technicians attempted to be isolated from Wi-Fi networks in the test area, facilitated spectrum readings from the AVCOM analyzer, and captured the results of the frequency tests as validation data for wireless tower transmissions (**Exhibit F**).

Exhibit F: Signal Test Results for the Manvel, Texas Tower Location





Signal Propagation Maps

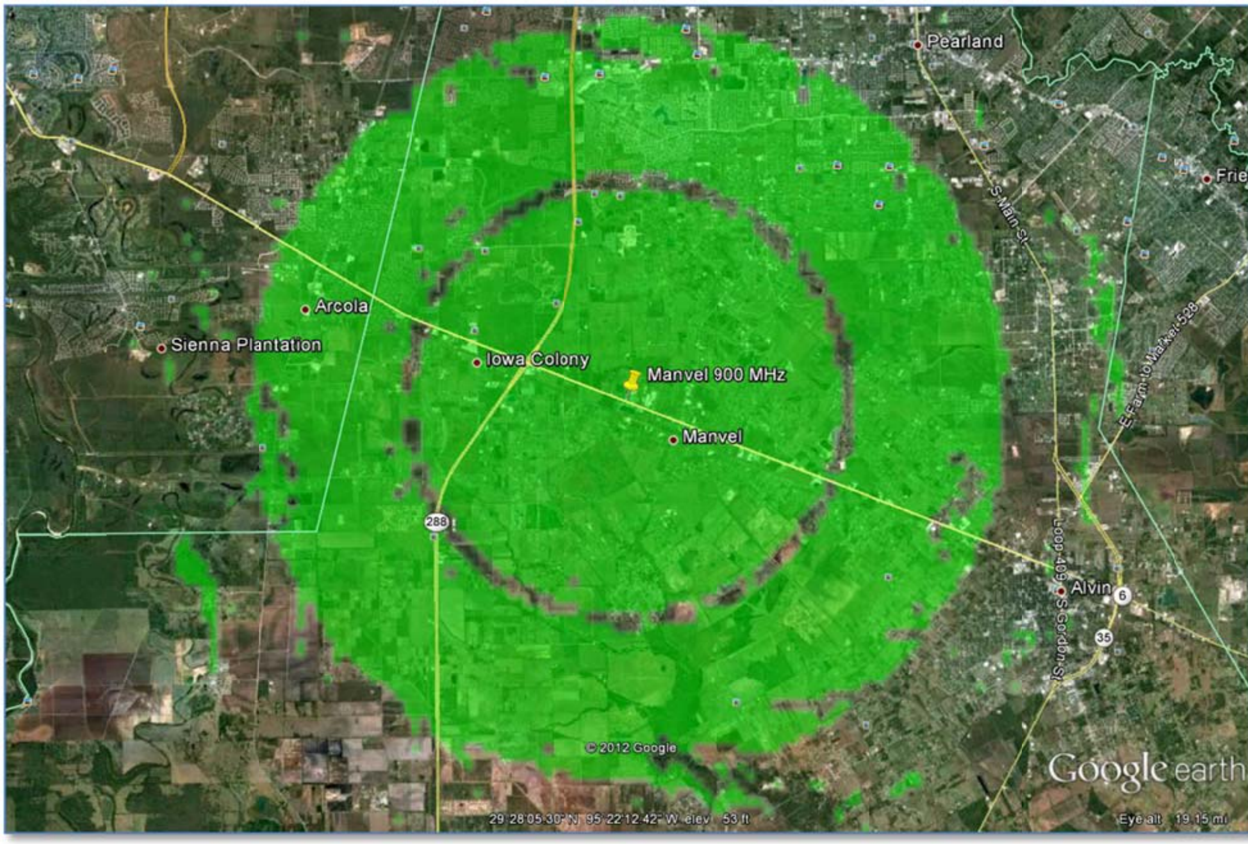
In order to prepare propagation maps for each tower location, the CN technicians and engineers identified the antenna height from the FCC ULS license information, verified the GPS coordinates for the tower while on-site, and recorded this and other information for each viable location into the standard Excel provider data collection format (**Exhibit G**). With the objective of reasonably representing the provider's practical service area, CN staff prepared propagation maps (**Exhibit H**) based on that information.

Exhibit G: Tower Research and Propagation Data

Wireless Provider Information	
Provider Name (Legal entity)	**Skynet Communications**
DBA ("Doing Business As") Name	N/A
FRN # (10-digit FCC Registration Number)	0018610774

Name of Location	Status	Pop Center	Structure	Latitude	Longitude	Omni?	Radius	Frequency	Gain	Power	Elevation
Lane City	Active	Lane City	broadcast tower	29.22912	-96.03456	Yes	10	3650MHz	10	24	200
Gayle Estates	Active	Damon	broadcast tower	29.25250	-95.71081	Yes	10	2400MHz	10	24	200
Lippman	Active	Needville	broadcast tower	29.44888	-95.82527	Yes	10	900MHz	10	24	200
Arcola	Active	Arcola	broadcast tower	29.47694	-95.47471	Yes	10	900MHz	10	24	200
Rosharon	Active	Rosharon	broadcast tower	29.35333	-95.46109	Yes	10	900MHz	10	24	200
Chenango	Active	Chenango	broadcast tower	29.25922	-95.47886	Yes	10	900MHz	10	24	200
Bailey's Prairie	Inactive	Bailey's Prairie	broadcast tower	29.14610	-95.54472	N/A	N/A	none	N/A	N/A	N/A
Angleton	Active	Angleton	broadcast tower	29.15467	-95.43211	Yes	10	900MHz	10	24	200
Manvel	Active	Manvel	broadcast tower	29.47383	-95.37106	Yes	10	900MHz	10	24	200
Alvin	Active	Alvin	broadcast tower	29.45172	-95.31401	Yes	10	900MHz	10	24	200
Algoa	Active	Alvin	broadcast tower	29.41044	-95.19524	Yes	10	900MHz	10	24	200
Liverpool	Active	Liverpool	broadcast tower	29.29693	-95.27719	Yes	10	900MHz	10	24	200
Danbury	Active	Danbury	broadcast tower	29.24917	-95.35967	Yes	10	900MHz	10	24	200

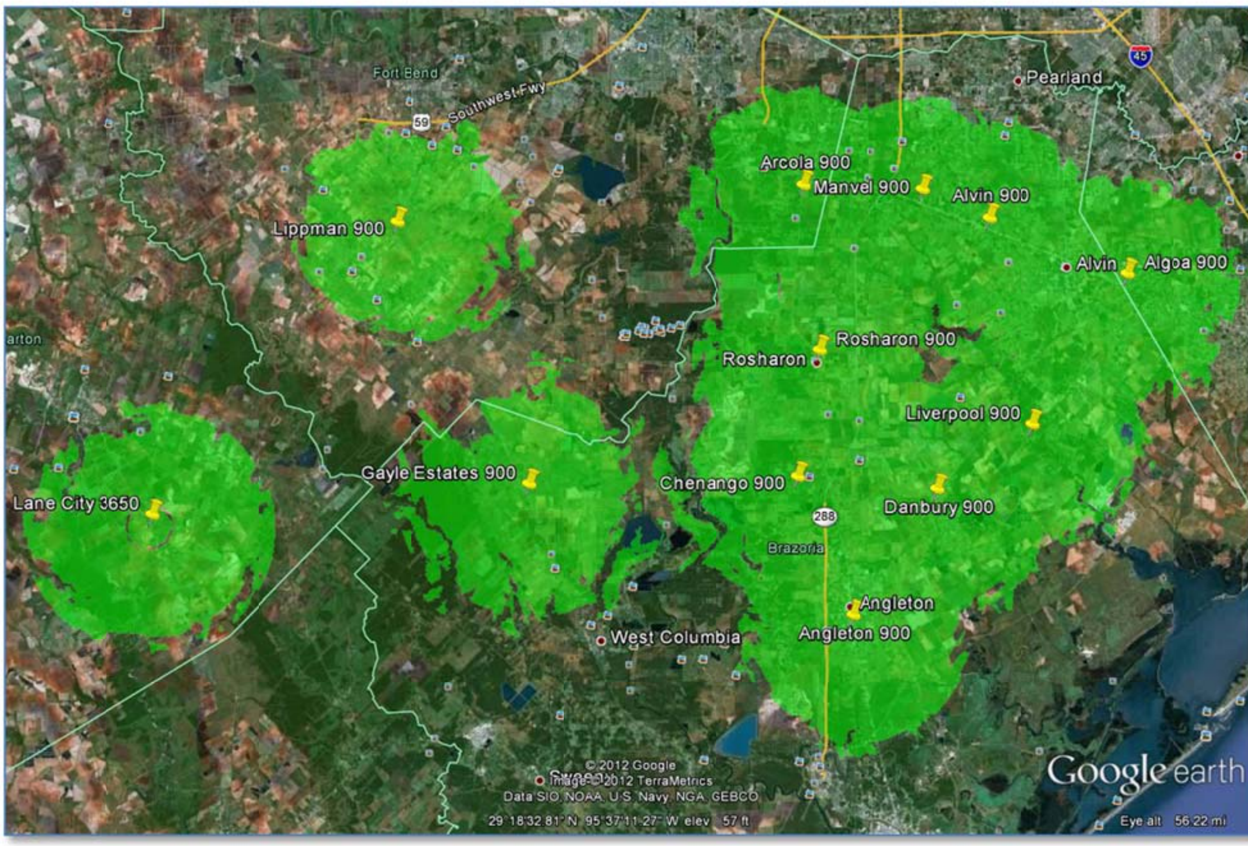
Exhibit H: Propagation Map for the Manvel, Texas Location



Results and Submission for October 2012

Of the 23 original test locations for Skynet, 12 towers were determined to be operational based on two separate in-the-field site verification tests. These tests determined that wireless signal was indeed available for broadband service at each site. A composite propagation analysis was completed **(Exhibit I)**, which reasonably represents the estimated broadband coverage area based on all information identified as of August 3, 2012. The provider's customer service department reports maximum advertised speeds of 10 Mbps (downstream) by 3 Mbps (upstream). The composite propagation map was forwarded to the provider for review and feedback prior to CN's inclusion of the coverage area in the Texas Broadband Map's October 2012 iteration; however, no definitive response was received by August 15, 2012.

Exhibit I: Skynet Communications Composite Coverage



STARNET ONLINE SYSTEMS

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the State Broadband Initiative mapping program.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to Starnet Online Systems (SOS) , a wireless Internet service provider (WISP), located in Paris, Texas, with a primary service area of Lamar County. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground site verification and validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 24 instances of communication via telephone and e-mail sessions since September 10, 2009, through August 14, 2012. Only one communication reply was received from a company representative on May 6, 2011, with a response of electing not to participate. Since that date the provider has been non-responsive to multiple outreaches.

The Issue

SOS, by its lack of responsiveness since May 6, 2011, has predicated its unwillingness to participate in the Connected Texas broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN has built a file based on research information from the public domain and, as time progressed, enriched the file with information obtained through the on-the-ground site verification and data collection exercises. For example, CN reviewed the provider's website (www.1starnet.com) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0016093411; the FRN reference to the SOS operations was correlated to a Dun and Bradstreet report **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced to the FCC Universal Licensing System (ULS) to identify any licenses the provider may hold which could possibly enhance locating active access points for the service area. This process yielded license WQNG630 **(Exhibit D)**, Radio Service: NN 3650-3700 MHz with 0 unique locations.

Exhibit A: Service Plans

Exhibit B: Service Area Locations

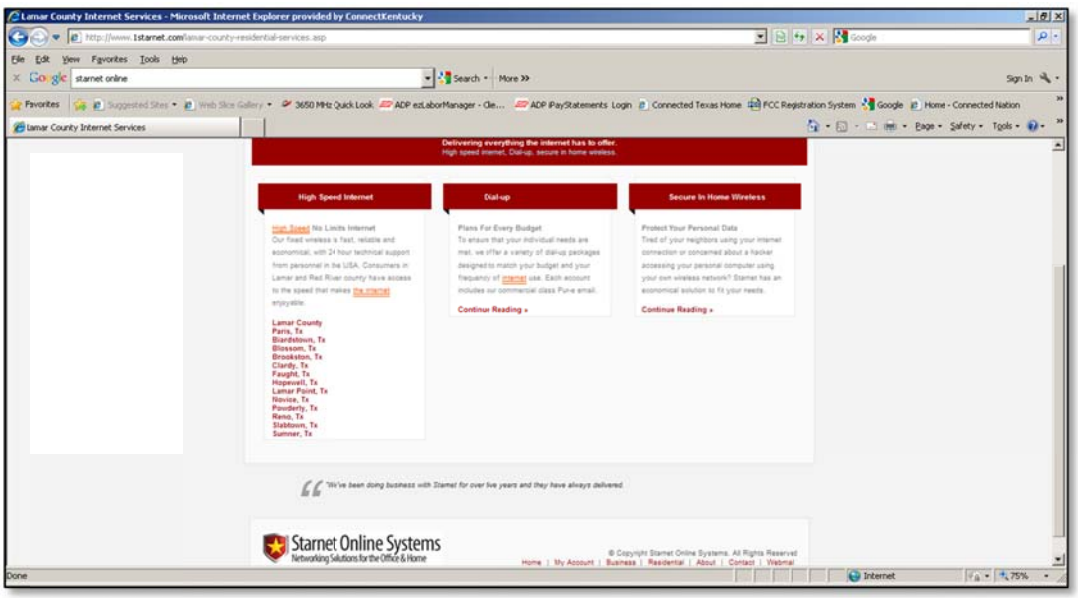


Exhibit C: Federal Registration Number

Registration Detail	
FRN:	0016093411
Registration Date:	02/11/2007 05:37:00 PM
Last Updated:	
Business Name:	Ansteorra Inc.
Business Type:	Private Sector , Corporation
Contact Organization:	
Contact Position:	CEO
Contact Name:	Mr Larry L Rhea Sr.
Contact Address:	108 Lamar Avenue Paris, TX 75460 United States
Contact Email:	lrhea@1starnet.com
ContactPhone:	(903) 785-5533
ContactFax:	

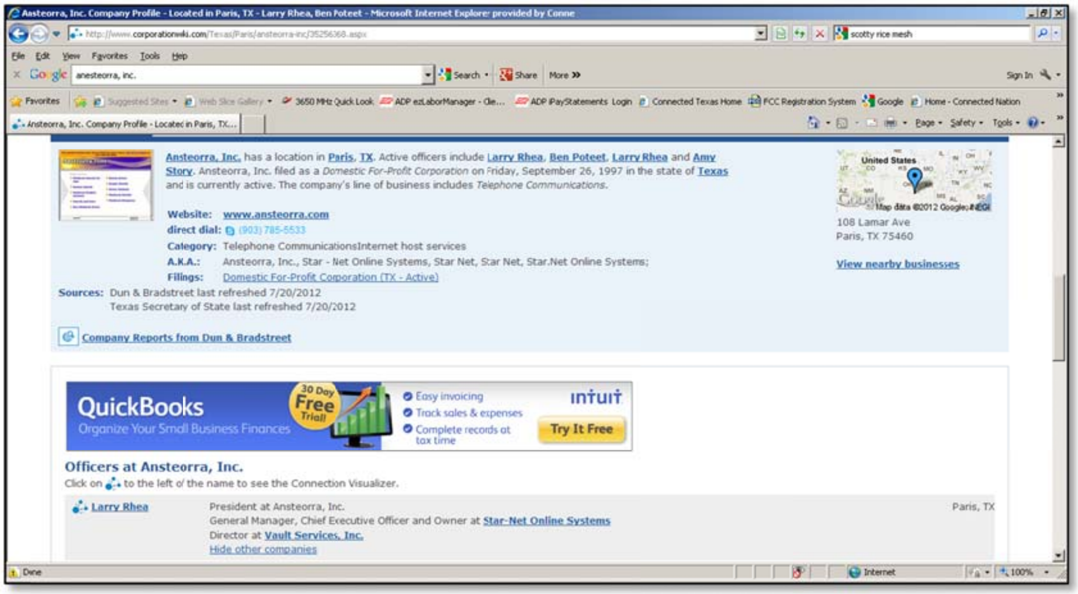


Exhibit D: WQNG630 License Reference

Call Sign	WQNG630	Radio Service	NN - 3650-3700 MHz
Status	Active	Auth Type	Regular
Dates			
Grant	02/01/2011	Expiration	02/01/2021
Effective	02/01/2011	Cancellation	
Area of Operation: N			
Operating Nationwide including Hawaii, Alaska, and US Territories.			
Frequency Bands			
003650.00000000-003700.00000000			
Licensee			
FRN	0016093411 (View Ownership Filing)	Type	Corporation
Licensee			
Ansteorra Inc. 108 Lamar Avenue Paris, TX 75460 ATTN Larry Rhea Sr.		P: (903)785-5533 E:lrhea@1starnet.com	
Contact			
Ansteorra Inc. 108 Lamar Avenue Paris, TX 75460 ATTN Larry Rhea Sr.		P: (903)785-5533 E:lrhea@1starnet.com	

Preliminary Identification of Provider's Coverage Area

Connected Nation extracted SOS's service locations from its website as identified in Exhibit B. The website service locations were utilized to develop a reference point **(Exhibit E)** for potential service areas. Using Google Earth an image overlay **(Exhibit F)** was developed. The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image was maintained at less than .1 mile (528 ft.) to establish minimum search criteria of a potential access point structure within the service area. The zoom option with Google Earth's aerial imagery was utilized to establish potential structures serving as access point mounts. The process only yielded 2 possible water towers within the service area. Combined with the water tower locations and Starnet Online Systems service locations a route was developed with the Microsoft *Streets & Trips* mapping application for the validation process as illustrated with Exhibit E.

Exhibit E: Provider's Service Area Reference

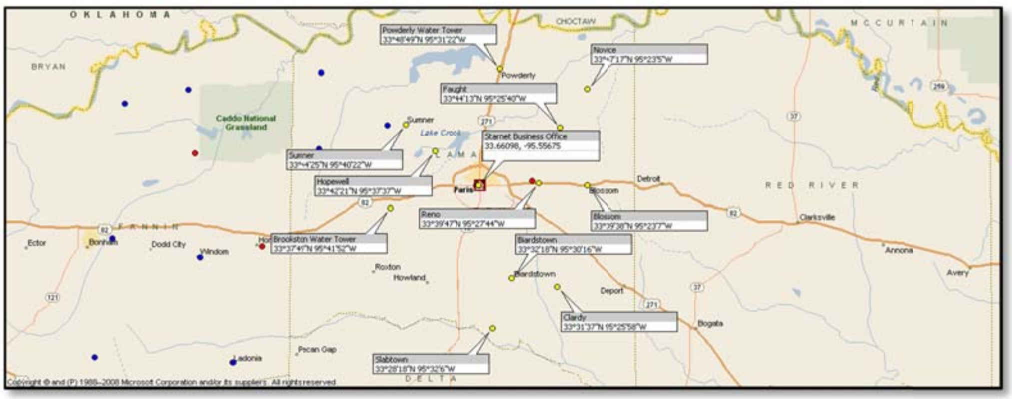
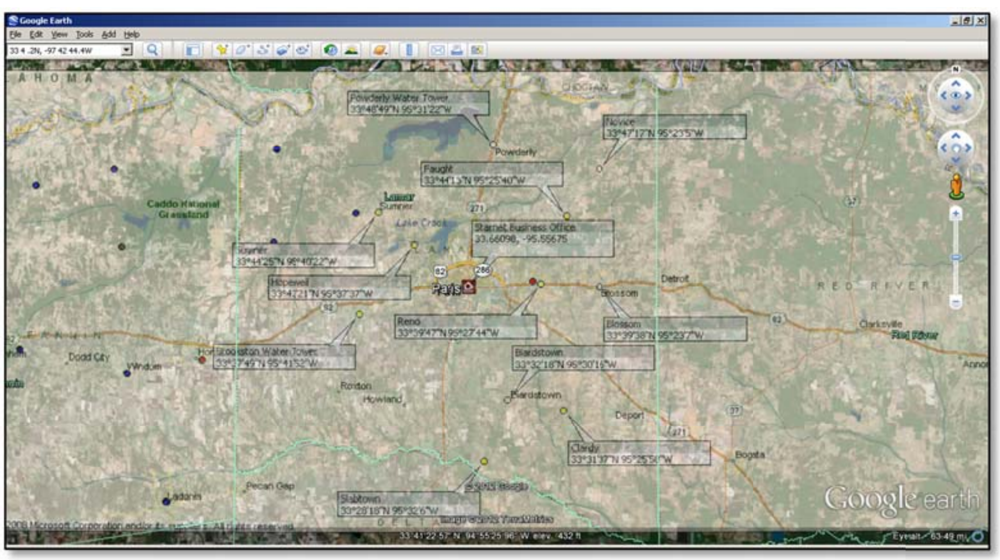


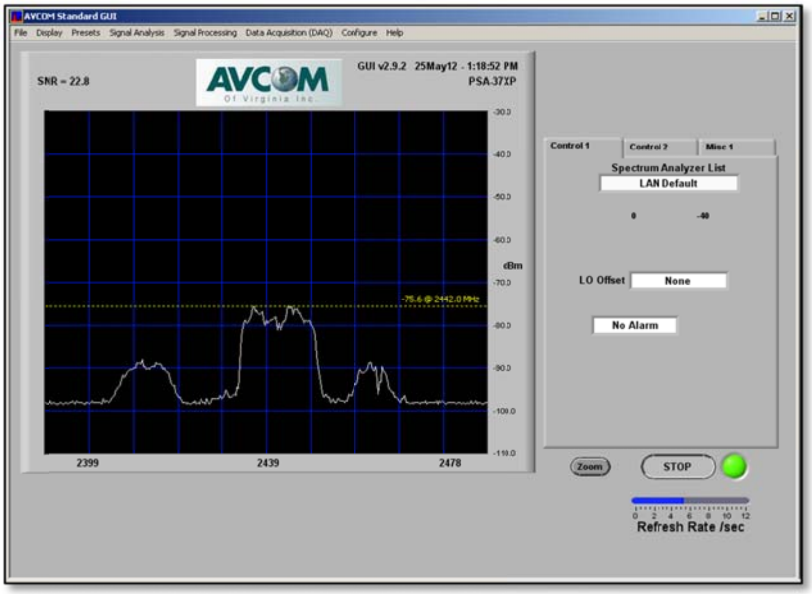
Exhibit F: Google Earth: Provider's Service Area Reference Image Overlay for AP Structures



Testing Techniques

Connected Nation staff then developed a site validation route based on data established with the Google Earth image overlay and publicly available data through SOS website. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or directional antenna) and photographs were taken of the access points.

Exhibit G: Field Data for Starnet Online Systems - Faught Location



Provider	Location	Latitude	Longitude	Frequency Availability				Structure	Approximate Antenna Height	Notes
				900MHz	2.4GHz	3.65GHz	5.0GHz			
StarNet Online Faught		33 44 55N	95 24 54W		X			Comm Towwer	160ft.	Sectored 120 degrees (3); 2.4GHz; Confirmed
StarNet Online Faught_AP Search Location		33°44'13"N	95°25'40"W							

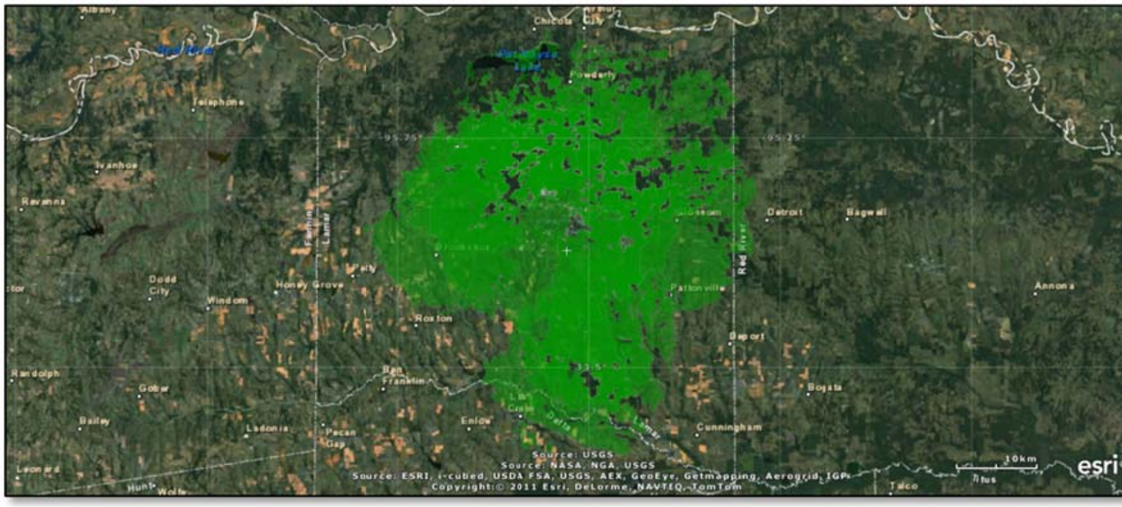
Results and Submission for October 2012

Of the 12 locations targeted during the validation point route, 12 access points were identified and relative information was logged into the SOS field validation notes file **(Exhibit H)**. The field data and the publicly available data were transferred to the Connected Nation Provider Information file. A composite propagation study was completed based on the composite data **(Exhibit I)**. Both documents were forwarded to SOS and the provider was advised that the information would be submitted to Connected Texas and the NTIA broadband mapping project for processing if the provider did not respond within 48-hours with deletions, revisions or other datum related to this coverage estimation whitepaper. As of this report date, no response has been received from the provider.

Exhibit H: Field Validation Notes

Location	Latitude	Longitude	Frequency		Structure	Approximate Antenna Height	Notes
			2.4GHz				
Slabtown	33 28 45N	95 31 35W	X		Rohn	120ft.	Omni; 2.4Ghz; Confirmed
Slabtown_AP Search Location	33°28'18"N	95°32'6"W					
Clardy	33 32 18N	95 28 29W	X		Rohn	80ft.	Omni; 2.4Ghz; Confirmed
Clardy_AP Search Location	33°31'37"N	95°25'58"W					
Biardstown	33 32 18N	95 29 59W	X		Rohn	80ft.	Omni; 2.4GHz; Confirmed
Biardstown_AP Search Location	33°32'18"N	95°30'16"W					
Reno	33 40 25N	95 28 27W	X				Did not obtain a visual of AP structure; RF anlysis isolated approximate location. SSID capture.
Reno_AP Search Location	33°39'47"N	95°27'44"W					
Blossom	33 39 35N	95 23 28W	X		Comm Tower	140ft.	Omni; 2.4GHz; Confirmed
Blossom_AP Search Location	33°39'38"N	95°23'7"W					
Faught	33 44 55N	95 24 54W	X		Comm Tower	160ft.	Sectored 120 degrees (3); 2.4GHz; Confirmed
Faught_AP Search Location	33°44'13"N	95°25'40"W					
Powderly	33 47 1N	95 31 33W	X		Rohn	80ft.	Omni; 2.4GHz; Confirmed
Powderly_AP Search Location	33°48'49"N	95°31'22"W					
Caviness FD	33 45 30N	95 36 46W	X		Rohn	80ft.	Identified access point during field audit; in route to a website location call out.
Caviness_2AP	33 45 16N	95 34 56W	X				Identified access point during field audit; in route to a website location call out.
Hopewell	33 42 4N	95 38 34W	X		Rohn	80ft.	Omni; 2.4GHz; Confirmed
Hopewell_AP Search Location	33°42'21"N	95°37'37"W					
Brookston	33 38 31N	95 40 54W	X		Rohn	70ft.	Omni; 2.4GHz; Confirmed
Brookston_AP Search Location	33°37'49"N	95°41'52"W					
Paris	33 39 42N	95 33 26W	X		Bldg/Rohn	160ft.	Omni; 2.4GHz; Confirmed
Paris_AP Search Location	33 39 40N	95 33 19W					Business Office Location.
Sumner_AP Search Location	33°44'25"N	95°40'22"W					No Structure Identified; nor RF detected for Starnet operations; No CPEs identified to determine possible serving AP.
Novice_AP Search Location	33°47'17"N	95°23'5"W					No AP Identified; customer CPEs oriented to Faught AP location.

Exhibit I: Starnet Online Systems Composite Coverage



TELECOM CABLE, LLC

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the SBI mapping initiative.

The following narrative provides detail regarding the recent data collection activities related to Telecom Cable, LLC, a cable broadband Internet provider in Corrigan, Oyster Creek, and Weston Lakes, Texas. The narrative will include information regarding how and where CN obtained publicly available data and the consumer-provided validation techniques that support the underlying data.

October 2012 Submission Commentary

Connected Nation created this coverage estimation document during the October 2012 submission period as a result of the ongoing non-participatory status of the provider. Since commencement of Texas' SBI program in 2010, CN engineers have conducted 8 rounds of personal telephone outreach and 10 attempts via e-mail, with 6 instances of e-mail and/or telephone communication occurring during the April 2012 and October 2012 mapping submission cycles. On August 2, 2012, a company representative responded to e-mail outreach and closed the response as follows "I reiterate my full intent to provide no information pertaining to any internet services our company provides or where we elect to offer them." CN has closely monitored the provider's website to identify any information related to maximum advertised speed tiers, coverage areas, or other information that could be used as part of this coverage estimation document.

The Issue

Telecom Cable, through its unwillingness to participate since the inception of the SBI program, has clearly articulated its desire to remain a non-participant in regard to the Texas broadband mapping program.

Identification of Provider's Legal Name, d.b.a., and FRN

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the State-Issued Certificate of Franchise Authority (SICFA) database purposed to facilitate the identification of local telecommunications providers serving municipalities within the State of Texas through the Texas Public Utility Commission (PUC) website (www.puc.state.tx.us), in order to further verify the provider's residential service area **(Exhibit A)**. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0016605263 **(Exhibit B)**.

Exhibit A: Residential Service Plan

Docket/Project/Control Numbers

35742
Type: PROJECT
Open Date: 6/2/2008
Close Date: 6/24/2008
Filings: New
Note: SICFA Application - City Limits of Weston Lakes, Texas.

36738
Type: PROJECT
Open Date: 2/25/2009
Close Date: 3/19/2009
Filings: Service Area Change
Note: AMENDMENT - Service Area Addition - City Limits of Bruni, Encincal, Oilton and Stockdale, Texas.

37374
Type: PROJECT
Open Date: 8/20/2009
Close Date: 9/14/2009
Filings: Service Area Change
Note: AMENDMENT - Service Area ADDITION - City Limits of Oyster Creek and Freeport, Texas. Service Area DELETION - City Limits of Bruni, Encincal, Oilton and Stockdale, Texas.

Cities

City: Freeport
Municipality: City of Freeport
Notes:

City: Oyster Creek
Municipality: City of Oyster Creek
Notes:

City: Weston
Municipality: City of Weston
Notes:

Counties

County: Fort Bend
Code: 079
Notes: Weston Lakes Subdivision

Exhibit B: FRN

Registration Detail	
FRN:	0016605263
Registration Date:	06/15/2007 08:08:00 PM
Last Updated:	01/02/2012 11:36:07 AM
Business Name:	Telecom Cable LLC
Business Type:	Private Sector , Limited Liability Corporation
Contact Organization:	
Contact Position:	
Contact Name:	Mr Anthony Luna
Contact Address:	13121 Louetta Road Suite 1020 Houston, TX 77429 United States
Contact Email:	tonyluna1234@yahoo.com
ContactPhone:	(303) 881-8315
ContactFax:	(281) 257-1265

Identification of Provider's Coverage Area

Upon review of the provider's website to determine residential service offerings (http://www.telecomcable.net/), the provider continues to exclude information pertaining to internet services or packages via the "internet services" link; however, the provider website does contain detailed information for cable television service areas, as well as a link to a member services portal, "MyAccount" (http://myaccount.telecomcable.net/), which allows broadband subscribers to access the tool as a "control panel for your Broadband Connection" **(Exhibit C)** after logging in.

Exhibit C: Broadband Connection Portal

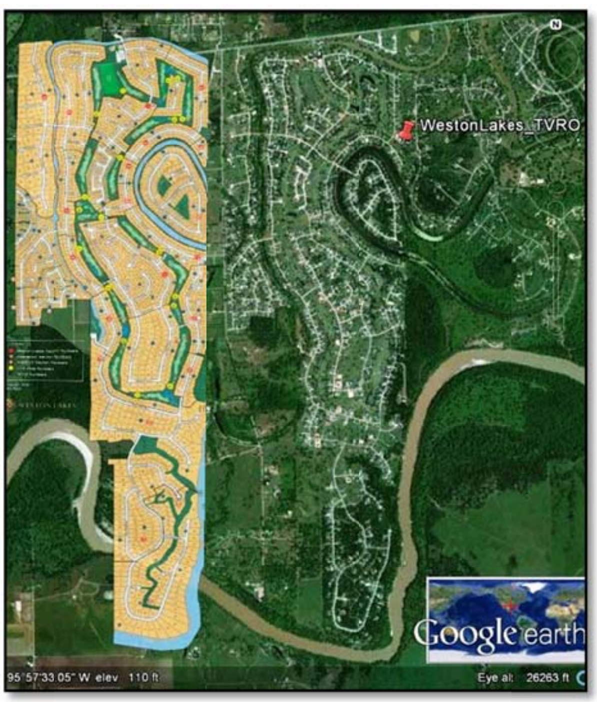
Connected Nation identified TVRO locations via *Google Earth* application for Corrigan, Weston Lakes, and Oyster Creek areas **(Exhibit D).** A boundary for Weston Lakes Community was identified, and access to the gated community was provided by on-site developer and HOA office, who also provided a neighborhood map for use with validation. A route was then established for the entire Weston Lakes community using an informed community map and TVRO location **(Exhibit E).**

Exhibit D: Identified TVRO Locations

Using the *Google Earth* application, Connected Nation successfully identified Telecom Cable TVRO locations for Corrigan, Weston Lakes, and Oyster Creek areas.

Prior to field verification, Connected Nation identified the municipality boundary for Corrigan and Oyster Creek Areas via *Google Earth* application and established a route using TVRO locations as starting point. The identification of the community boundary was utilized to establish possible end of line (termination points) of the Telecom Cable network distribution along the thoroughfares (easements) during on-site validation within the community boundary as shown in Exhibit E.

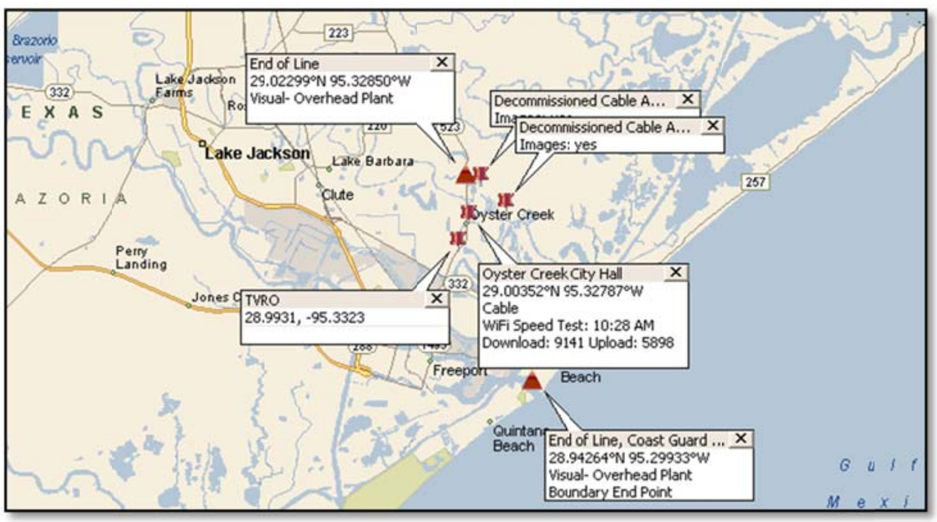
Exhibit E: Boundary Identification

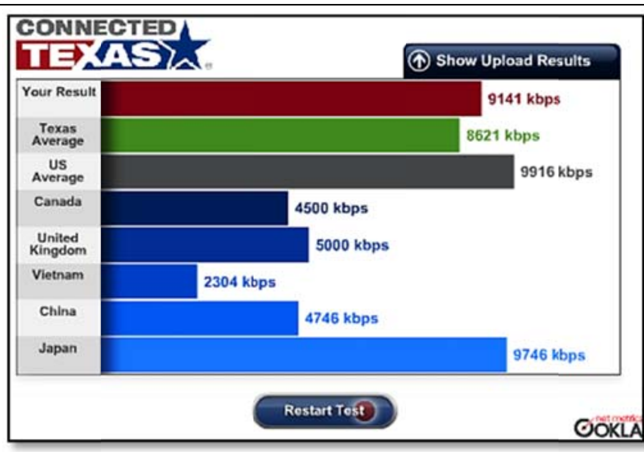


Testing Techniques

Possible TVRO reference points were pre-selected and entered into Microsoft *Streets & Trips* software and CN Engineers drove through each thoroughfare to determine the existence (or lack thereof) of CATV plant and visually identify the end of line (termination points). As distribution components and assets of Telecom Cable were identified, they were recorded into *Streets & Trips* with corresponding latitude/longitude coordinates, photographs, and Wi-Fi utility tests where applicable **(Exhibit F)**.

Exhibit F: Visually Verified Telecom Cable Assets





Last Result:
Download Speed: **9141** kbps (1142.6 KB/sec transfer rate)
Upload Speed: **5898** kbps (737.3 KB/sec transfer rate)
Latency: **38** ms
Tuesday, May 08, 2012 10:28:53 AM

Visual identification of the headends found in Oyster Creek, Weston Lakes, and Corrigan were simple to identify. Connected Nation engineers spoke with residents at City Hall in Oyster Creek and Corrigan, as well as the Weston Lakes Community Office to verify provider's presence in all three areas. The end of line (termination points) was identified by driving each street within the possible service area, while noting assets as previously mentioned, in tandem with creation of final service area map. The images demonstrate that CN staff was able to obtain visuals to assist with coverage estimation. The depictions are just a sample observed throughout the audit route **(Exhibits G & H).**

Exhibit G: TVRO, Headend Identification

Oyster Creek Headend Tower & TVRO

Weston Lakes Headend Tower & TVRO

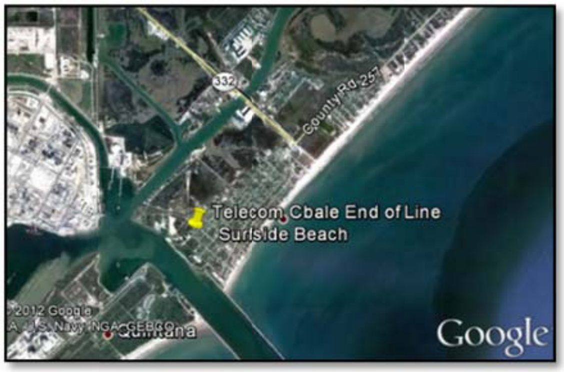
Corrigan TVRO

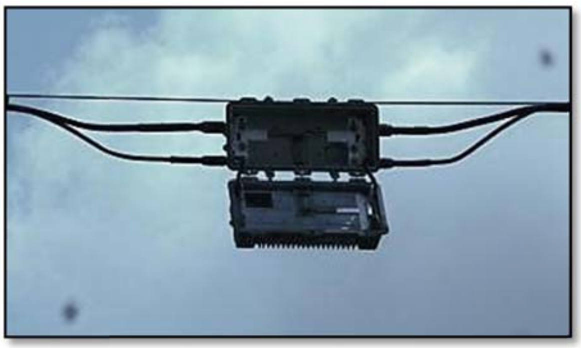
Corrigan TVRO (2)

Exhibit H: Cable Components and Asset Locations

Termination Point, Oyster Creek (Surfside)

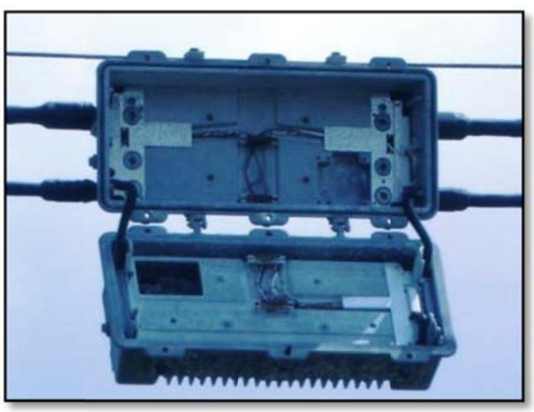
End of Line, Oyster Creek





Cable Amplifier, Oyster Creek

Cable Amplifier, Oyster Creek



Cable Amplifier, Oyster Creek

Cable Equipment, Corrigan

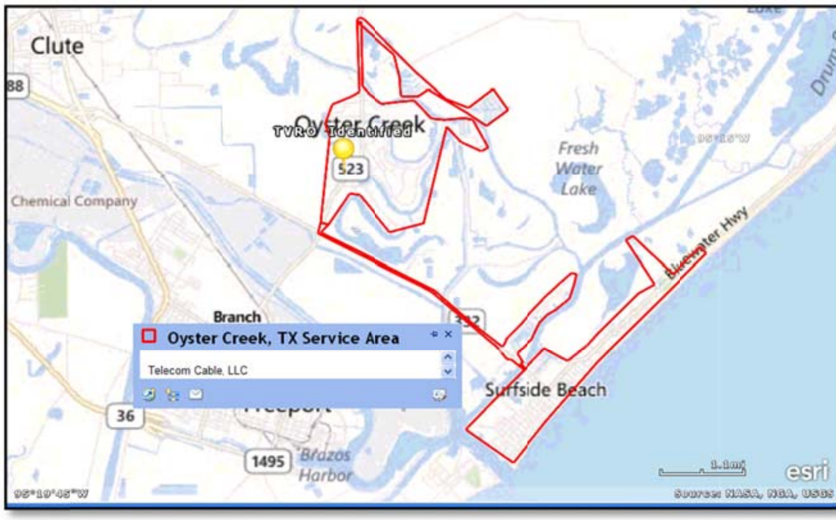
Results and Submission for October 2012

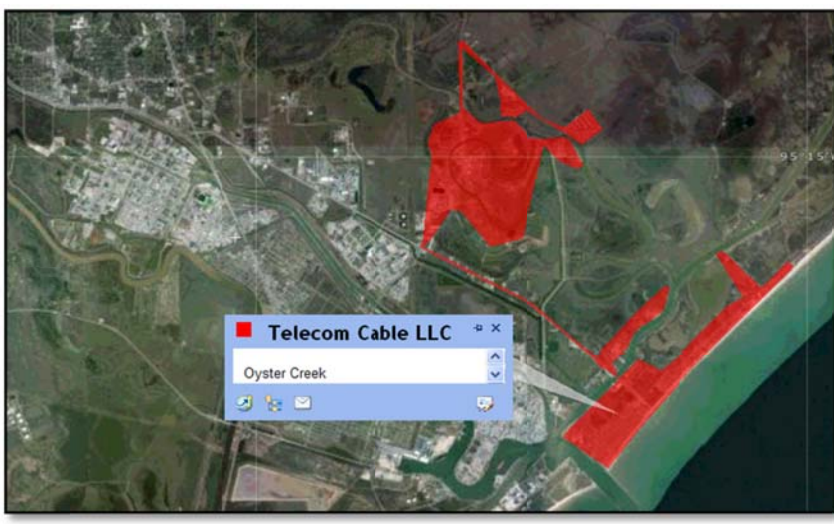
As a result of the collection of publicly available information, hands-on, and the on-the-ground validation efforts, Connected Nation is submitting this document in support of its coverage estimation for the cable modem broadband service area of Telecom Cable, LLC. In lieu of the valuable information gleaned from provider participation in the SBI mapping initiative, Connected Nation set out to obtain an exact replica of the provider's service area which qualifies as a fair and precise substitute in this instance.

Exhibit H (H1, H2, and H3) (below) depicts the estimated coverage areas for Telecom Cable, LLC, based upon the results of data gathered through publically available sources, visual drive testing, and confirmation techniques.

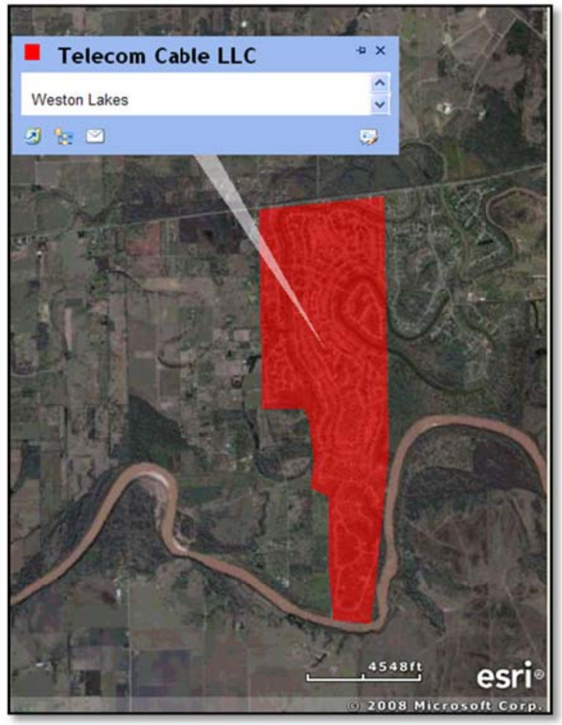
Exhibit H: Validation Results

H1: Oyster Creek Coverage Estimation

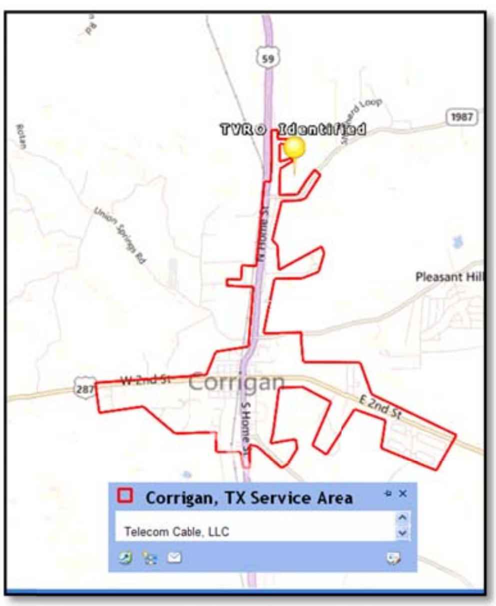


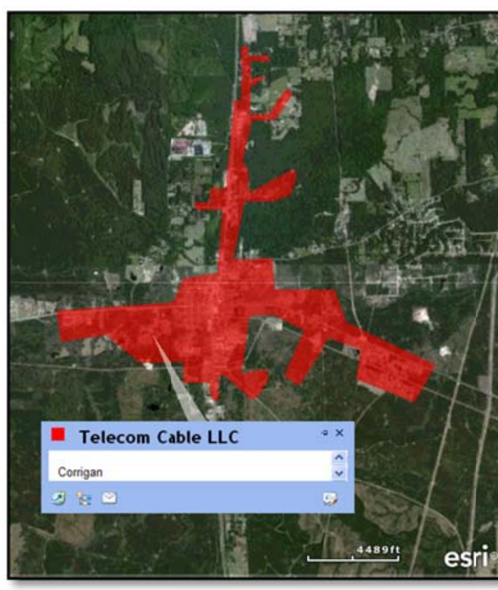


H2: Weston Lakes Coverage Estimation



H3: Corrigan Coverage Estimation





THESPECNET, INC.

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the SBI mapping initiative.

The following narrative provides detail regarding the recent data collection activities related to TheSPECnet, Inc., a wireless Internet service provider (WISP), located in Weimar, Texas, with a primary service area of Colorado County. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 15 instances of communication via telephone and e-mail sessions since September 19, 2011, through August 15, 2012. Two communication sessions over the telephone were completed with the owner of the company describing the project goals and data requirements, with the first occurrence on September 22, 2011, and the second on June 22, 2012. With each contact session the owner indicated the project would be taken into consideration and discussed with his partner. All other communication sessions received no response.

The Issue

TheSPECnet, Inc., by its lack of responsiveness since June 22, 2012, has predicated its unwillingness to participate in the Connected Texas broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN began building a file based on research information and, as time progressed, enriched the file with information obtained through the public domain. For example, CN reviewed the provider's website (http://www.thespecnet.com) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded no FRN for the company by business name or last name of owner. Also, to support field validation, the FCC Universal Licensing System (ULS) was researched to identify any licenses the provider may hold which could possibly enhance locating active access points for the service area. This process yielded no license associations for the company.

Exhibit A: Service Plans

HOME PAGE | INFO | CUSTOMER CENTER | NEW CUSTOMERS | CONTACT US | FAQ

TheSPECnet, Inc.
Sales@thespecnet.com
Service@thespecnet.com
979-732-6307

Pricing

Our Basic service with a 1.5 mbps cap is $50.00 + tax. The tax is $1.69.

Additional 1.5 mbps with a 3.0 mbps cap is an additional $20.00 per month. $50.00 + $20.00 or $70.00 for 3.0 mbps.

Installation is $250.00. This includes everything needed to get you up and running, with NO CONTRACT and no extras.

We can also break the $250.00 installation into 3 or 4 payments to lessen the burden of the installation charge. Some payment is required at installation time. We require some buy in from you.

Exhibit B: Service Area

http://www.thespecnet.com/Areas_of_Coverage.html

Areas of Coverage

Areas of Coverage (Tower Locations)

Please note, we reach out as far as 10 miles from some of these towers listed below. Our reach is dependant on tree lines, etc. We need a clear line of sight from our tower to the radio on your roof.

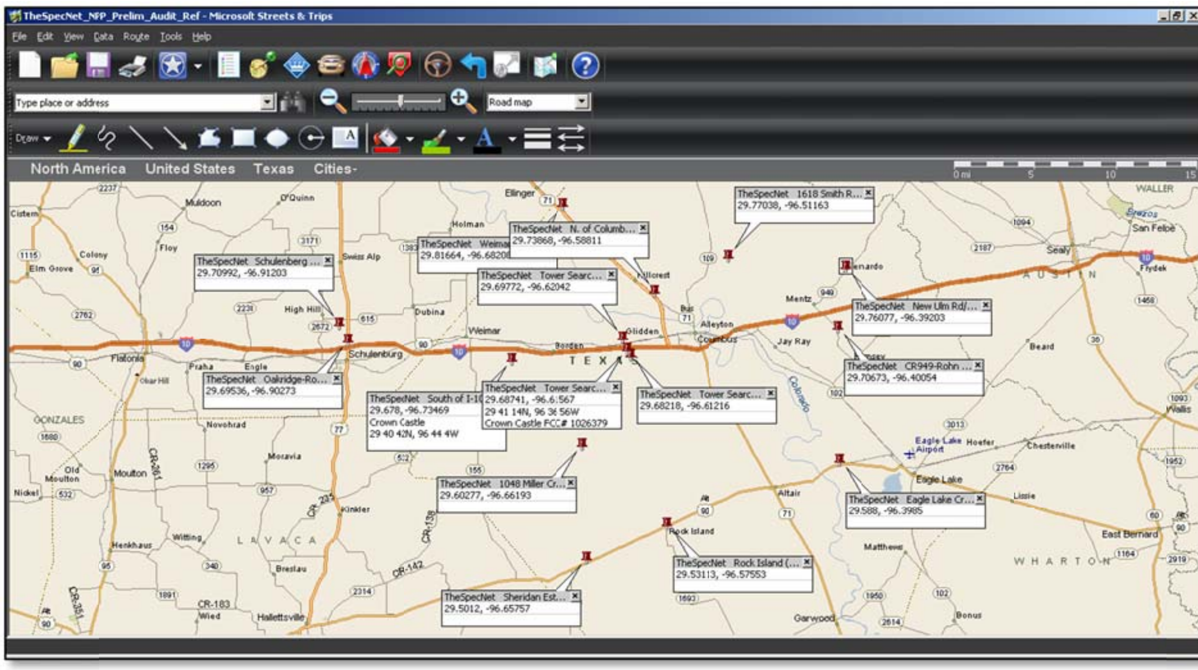
1. 2434 Tower - This tower is a Crown Castle commercial tower 492 ft. located on 2434 and Dee Allen. We are 320 ft. or 3/4 of the way up this tower
2. Oakridge Tower - This is a private road tower 100 ft.
3. Sheridan Tower - This is a private tower 90 ft. located on the south side of Lake Sherian in Sheridan Estates.
4. Rock Island Tower - This is a Rohn G25 private 100 ft. tower. This tower is very close to the water tower in Rock Island.
5. Daley Salvage Tower - This is a 200 Ft. Private Rohn G25.
5. Dr. Neal Tower - This is a Rohn G25 private 100 ft. tower located on Dr. Neal Dr. Close to the Falls.
6. Fayetteville Tower - This is a 195 ft. Rohn G24 private tower that covers Fayetteville with a reach of 8-10 miles.
7. CR 949 Tower - This is a private 90 ft. Rohn G24 located 1.5 miles on CR 949.
8. Jones Tower - This is a private 190 ft. Rohn G25 located north of Columbus 2-3 miles and west of Hwy 71, This tower will allow us to offload users on the 2434 tower. Traffic and user management.
9. Weimar Tower - This is a 490 ft. Crown Castle commercial tower located South of I 10 and East on CR 220. This tower will allow us to go head to head with wired/DSL customers in Wiemar and also provide us with better coverage in the Weimar area. This tower also allows us to hop (Backhaul) to the Schulenberg tower so we can provide services in Schulenberg.
10. Bernardo/949 tower is operational.
11. Weimar Tower - This is a 400 ft. tower owned by Crown Castle. We now provide service from this tower.

12 Eagle Lake - We are live in Eagle Lake with state of the art hardware and software solutions. We are a fully routed network which is a big deal
If you have HighuesNet, Wildblue or ELC or any other broadband Internet solution give us a chance, and if your not 100% satisfied with us, you can simply FIRE us, simple as that. Run our service side by site with your present broadband carrier and give us a chance to prove ourselves.
Want to do on line banking do it with us, want to VPN in to your work, do it with us, you can do most everything with ius because we have made a large capitol investment with both hardware and software. We are not penny wise and dollar foolish, this is one of the reasons we do not have you sign a contact.
P.S. This is a 400 ft. commercial tower

Preliminary Identification of Provider's Coverage Area

Connected Nation extracted TheSPECnet, Inc. service area locations from its website. Information that identified a tower management company (such as Crown Cast on number 1 – Areas of Coverage) were searched (through the FCC ASR database) to identify such commercial tower structures within the given area. The website service area descriptions were utilized as a search point criteria to assist in utilizing a Google Earth street level view to identify structures that may be serving as access points for TheSPECnet, Inc.'s network. Fifteen preliminary validation points were then established (**Exhibit C)** by utilizing the process. All 15 locations were entered into Microsoft *Streets & Trips* mapping application to develop a route for the validation process.

Exhibit C: Validation Points for AP Structures

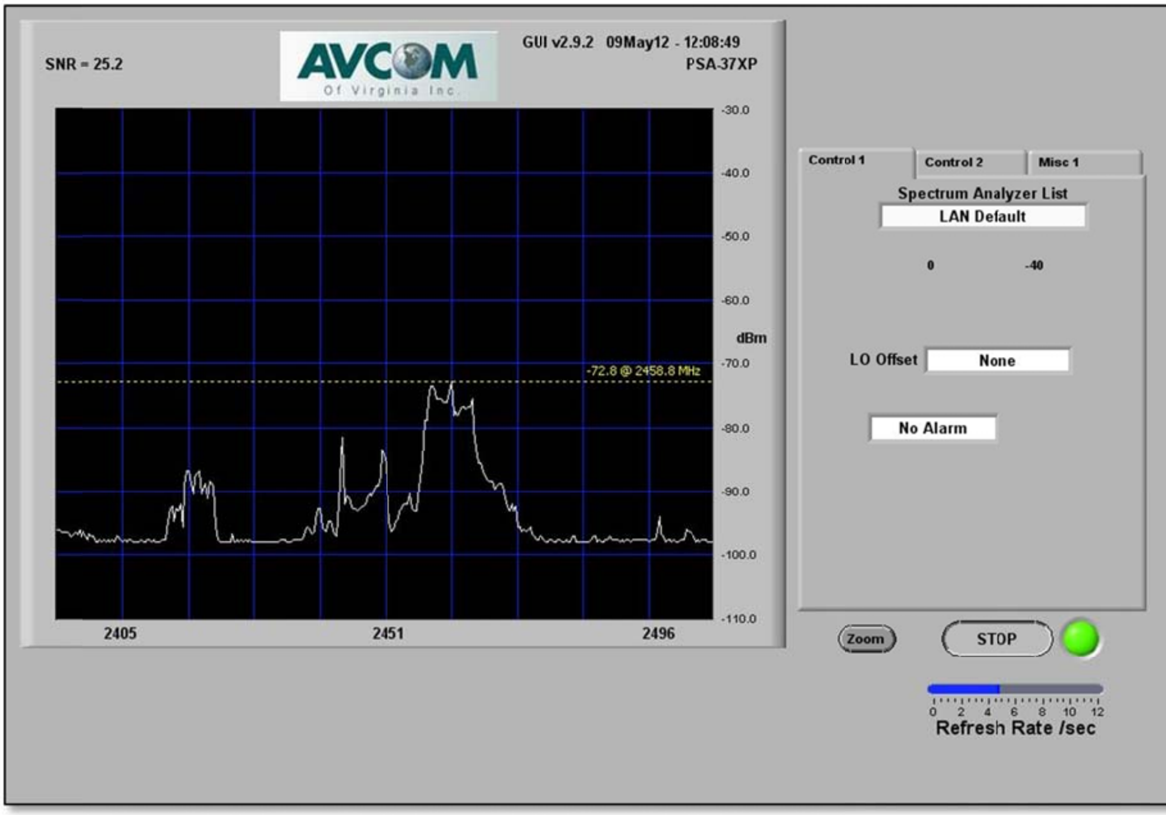


Testing Techniques

Connected Nation staff developed a site validation route based on information obtained from TheSPECnet, Inc.'s website "Area of Coverage" page. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit D)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored); and photographs were taken of the access points.

Exhibit D: Field Data for TheSPECnet, Inc. Daley Salvage Area

Provider	Location	Latitude	Longitude	Frequency Availability				Structure	Approximate Antenna Height	Notes
				900MHz	2.4GHz	3.65GHz	5.0GHz			
TheSpecNet	Daley Salvage	29 46 13N	96 30 42W		X			Rohn Guyed	180ft.	Actual AP location identified. 3 sectors-120 degree.
TheSpecNet	1618 Smith Rau Columbus, TX 78934-Search	29.770378	-96.511631							Used provider website description with preliminary Google Earth search.



<u>Results and Submission for October 2012</u>

Of the 15 locations visited during the validation point route, 12 access points were identified **(Exhibit E)** and relative information was logged into TheSPECnet, Inc. field validation notes file **(Exhibit F)**. The field (and the publicly available) data was transferred to the Connected Nation provider information file. A composite propagation study was completed based on the field data **(Exhibit G)**. Both documents were forwarded to TheSPECnet, Inc. and they were advised that the information will be submitted to Connected Texas and the NTIA broadband mapping project for processing. The provider was asked to respond, within 48 hours, if there were discrepancies of the estimated coverage area, but no response was received.

Exhibit E: Access Points Confirmations

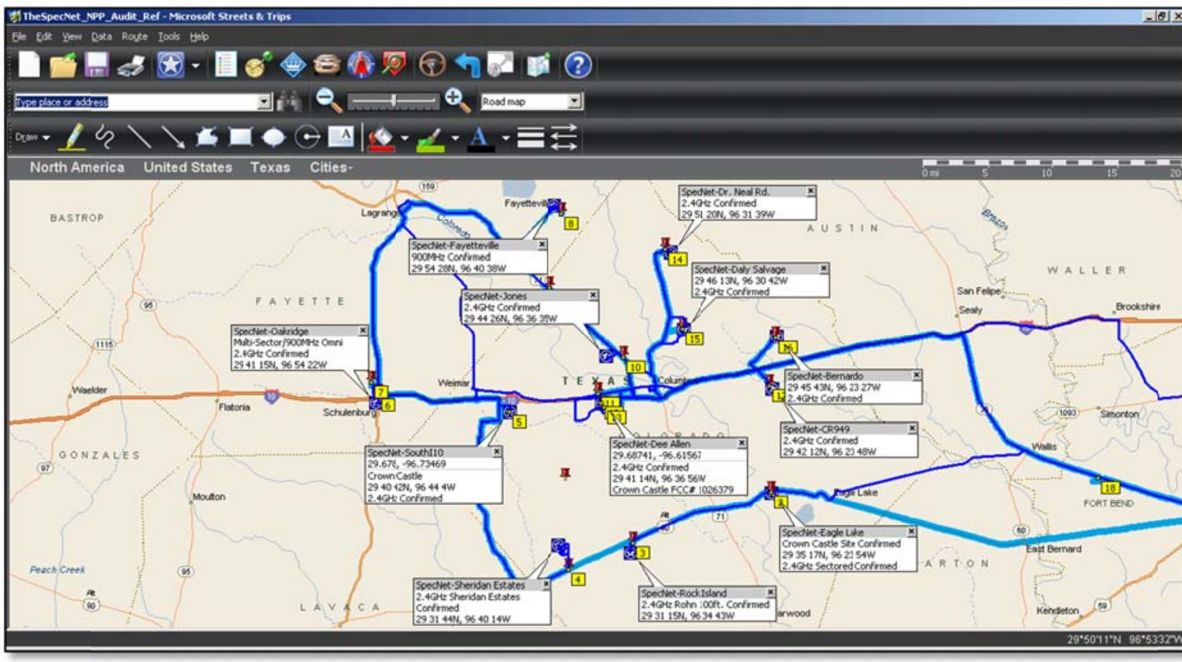
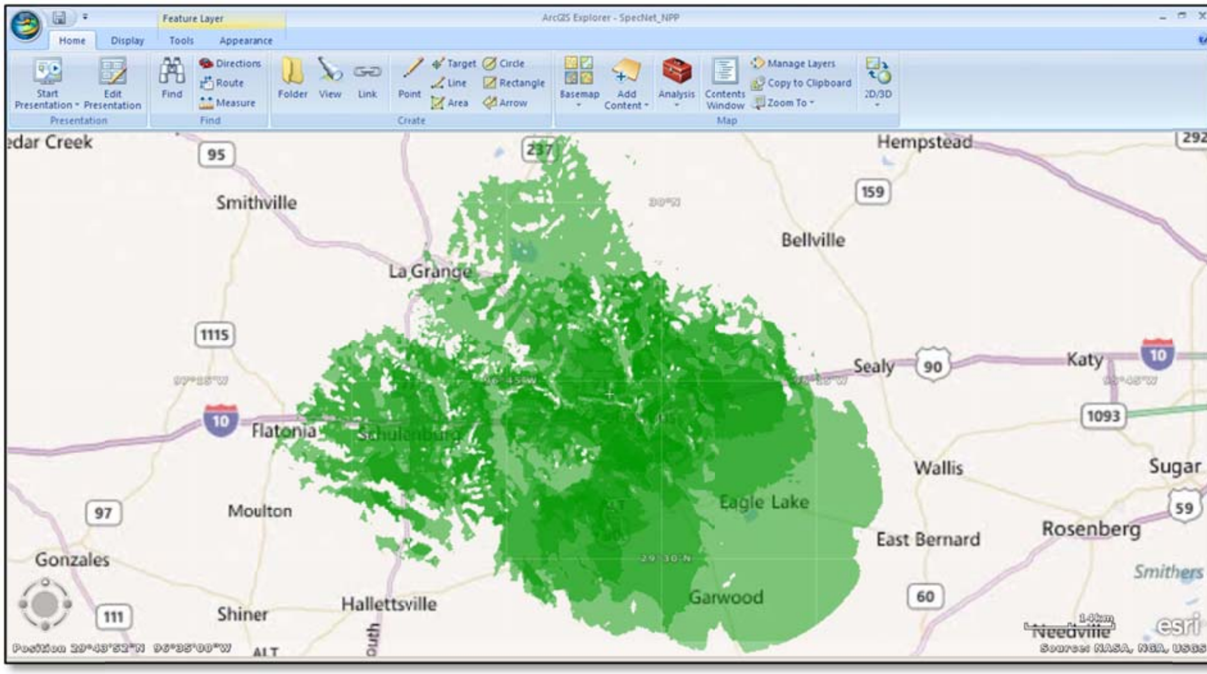


Exhibit F: Field Validation Notes

Location	Latitude	Longitude	Frequency		Structure	Approximate Antenna Height	Notes
			900MHz	2.4GHz			
TheSpecNet	29 41 14N	96 36 56W		X	Comm Tower	320ft.	Actual AP location identified. Crown Castle site. FCC# 1026379; 3 sectors.
TheSpecNet	29.687406	-96.615675					Used provider website description with preliminary Google Earth search.
TheSpecNet	29.682178	-96.612164					Used provider website description with preliminary Google Earth search.
TheSpecNet	29.697722	-96.620417					Used provider website description with preliminary Google Earth search.
TheSpecNet	29 41 15N	96 54 22W	X	X	Rohn Res Guye	100ft.	Actual AP location identified. Sectored antennas-120 degree. Omni
TheSpecNet	29.695358	-96.902733					Used provider website description with preliminary Google Earth search.
TheSpecNet	29 31 44N	96 40 14W		X	Rohn Res Guye	90ft.	Actual AP location idebtified. Omni antenna.
TheSpecNet	29.501200	-96.657572					Used provider website description with preliminary Google Earth search.
TheSpecNet	29 31 15N	96 34 43W		X	Rohn Res Guye	100ft.	Actual AP location identified. 3 sectors-120 degree.
TheSpecNet	29.531133	-96.575528					Used provider website description with preliminary Google Earth search.
TheSpecNet	29 46 13N	96 30 42W		X	Rohn Guyed	180ft.	Actual AP location identified. 3 sectors-120 degree.
TheSpecNet	29.770378	-96.511631					Used provider website description with preliminary Google Earth search.
TheSpecNet	29 51 20N	96 31 39W		X	Rohn Res Guye	100ft.	Actual AP location identified. 3 sectors-120 degree.
TheSpecNet	29.859347	-96.534339					Used provider website description with preliminary Google Earth search.
TheSpecNet	29 54 28N	96 40 38W	X		Rohn Guyed	195ft.	Actual AP location identified. 3 sectors-120 degree.
TheSpecNet	29.898350	-96.667117					Used provider website description with preliminary Google Earth search.
TheSpecNet	29 44 26N	96 36 35W		X	Rohn Guyed	190ft.	Actual AP location identified. 3 sectors-120 degree.
TheSpecNet	29.738675	-96.588111					Used provider website description with preliminary Google Earth search.
TheSpecNet	29 40 42N	96 44 4W		X	Comm Tower	300ft.	Actual AP location identified. 3 sectors-120 degree. Crown Castle FCC# 1051634
TheSpecNet							
TheSpecNet	**29.678000**	**-96.734694**					Used provider website description with preliminary Google Earth search.
TheSpecNet	29 42 12N	96 23 48W		X	Rohn Res Guye	90ft.	Actual AP location identified. 3 sectors-120 degree.
TheSpecNet	29.706940	-96.400520					Used provider website description with preliminary Google Earth search.
TheSpecNet	29 45 43N	96 23 27W		X	Rohn Guyed	80ft.	Actual AP location identified. Omni.
TheSpecNet	29.760767	-96.392028					Used provider website description with preliminary Google Earth search.
TheSpecNet	29.816639	-96.682083					Did not identify the infrastrucure as called out with the provider's website description.
TheSpecNet	29 35 17N	96 23 54W		X	Comm Tower	320ft.	Actual AP location identified. 3 sectors-120 degree. Crown Castle FCC# 1058294
TheSpecNet	**29.588000**	**-96.398500**					Used provider website description with preliminary Google Earth search.

Exhibit G: TheSPECnet, Inc. Composite Coverage



VRFUTURENET

As part of its ongoing broadband mapping efforts, Connected Nation (CN) has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying last-mile broadband provider, regardless of whether the provider has chosen to support and participate in the SBI mapping initiative.

The following narrative provides detail regarding the recent data collection and site verification activities related to VRFuturenet, a wireless Internet service provider (WISP) , located in Fort Worth, Texas with a service area in Tarrant, Parker, Wise, Palo Pinto, and Erath counties. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation and site verification techniques that support the underlying data.

Background

CN staff members have continued trying to obtain the participation of the provider with 35 instances of communication via telephone and e-mail sessions since September 10, 2009, through September 2, 2012. Only one communication reply was received from a company representative on November 9, 2009, requesting that a CN staff member resend the participation documents (mapping program description, provider information file, and non-disclosure agreement). Since November 9, 2009, the provider has been non-responsive to all outreach activity. Additionally, a CN staff member visited VRFuturenet office on June 8, 2012, to discuss the broadband mapping project in person with staff. A company representative stated they see no benefit to the participation of the mapping project and the company's position will not change.

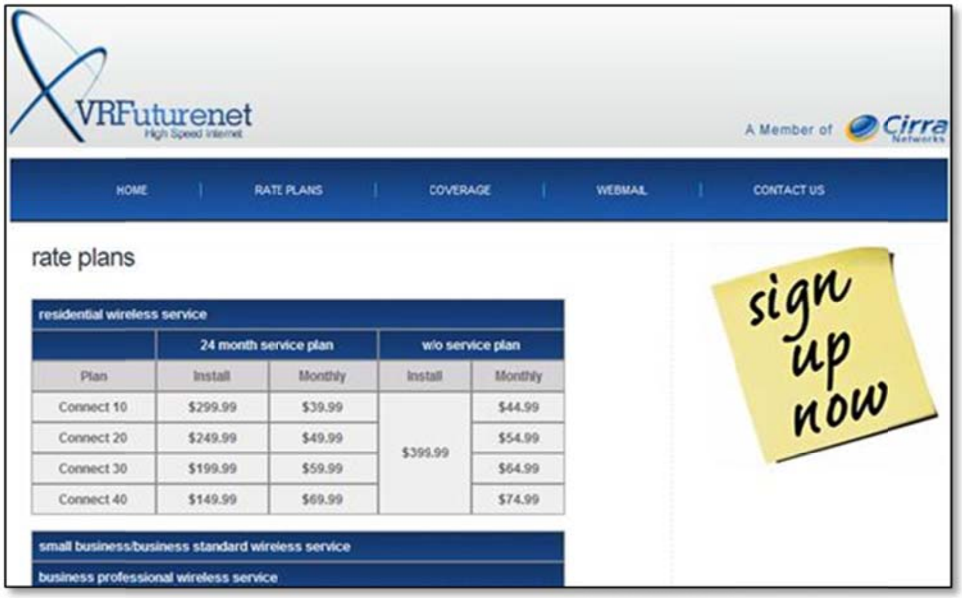
The Issue

VRFuturenet, by its lack of responsiveness and cooperation since September 10, 2009, has predicated its unwillingness to participate in the Connected Texas broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN has built a file based on research information and, as time progressed, enriched the file with information obtained through the public domain and from on-the-ground data collection and site verification activities. For example, CN reviewed the provider's website (www.vrfuturenet.com) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded an FRN of 0018547935 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was cross-referenced against the FCC Universal Licensing System (ULS) database to identify any licenses the provider may hold. This process yielded license for Station WQKD375 **(Exhibit D)**, Radio Service: NN 3650-3700 MHz with 0 unique locations.

Exhibit A: Service Plans



residential wireless service				
	24 month service plan		w/o service plan	
Plan	Install	Monthly	Install	Monthly
Connect 10	$299.99	$39.99	$399.99	$44.99
Connect 20	$249.99	$49.99		$54.99
Connect 30	$199.99	$59.99		$64.99
Connect 40	$149.99	$69.99		$74.99

Plans speed offerings per phone call into customer service:

Connect 10_512/256Kbps
Connect 20_1Mbps/384Kbps
Connect 30_1.5Mbps/512Kbps
Connect 40_2Mbps/768Kbps

Exhibit B: Service Area

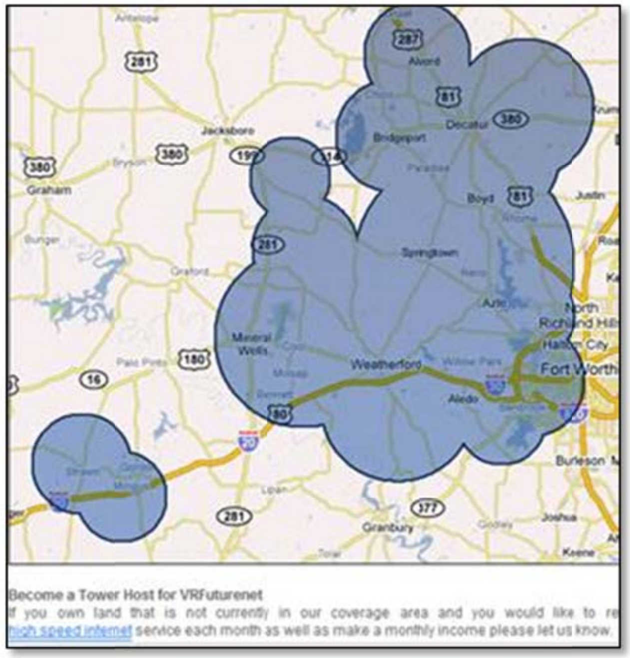
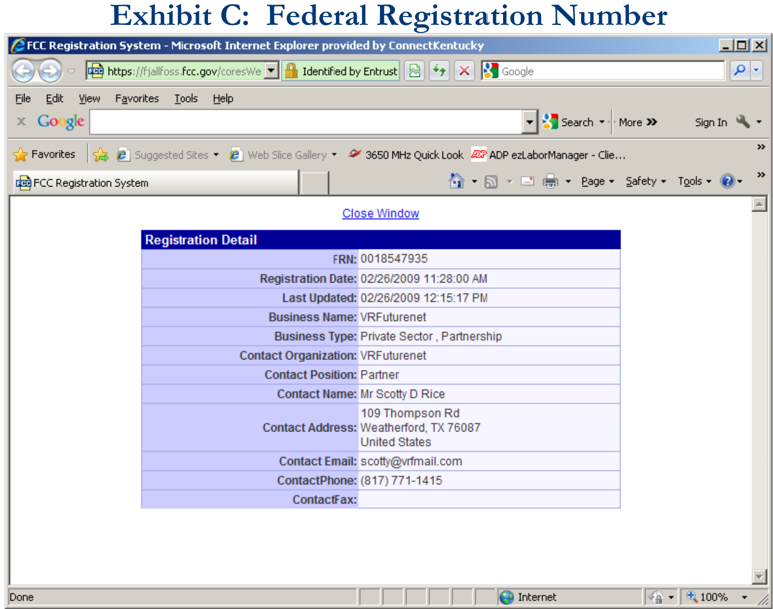
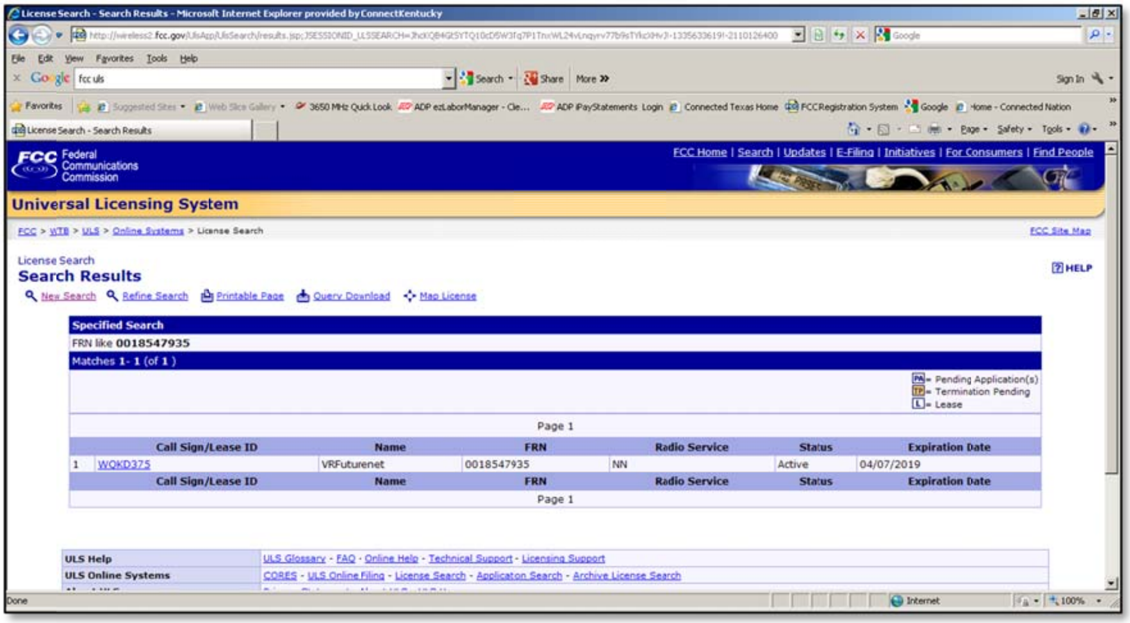


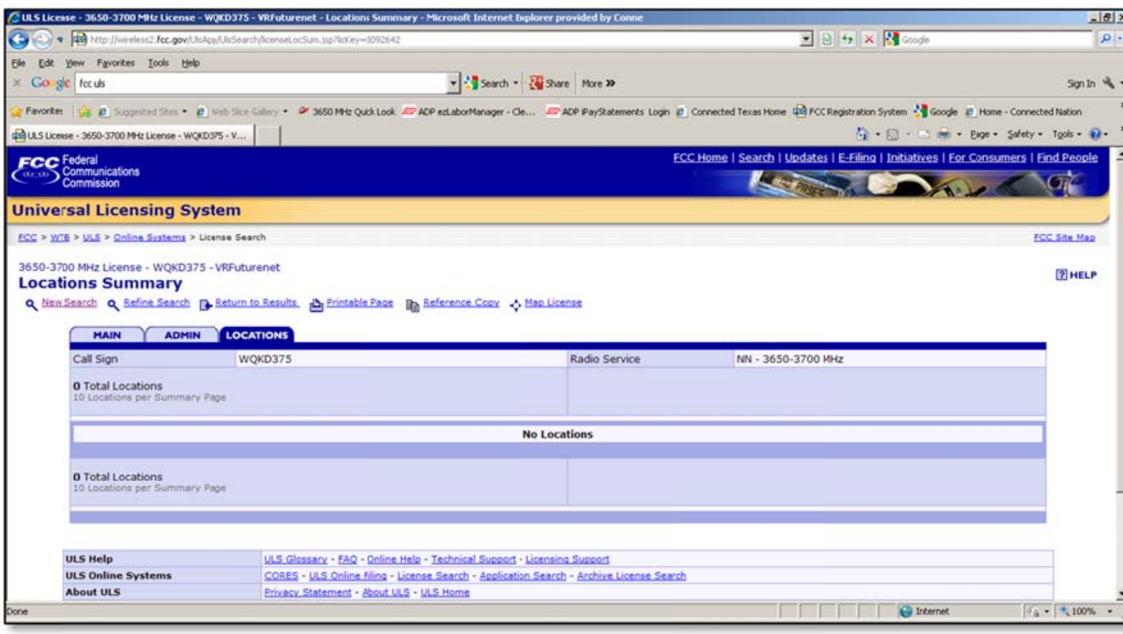
Exhibit C: Federal Registration Number



Registration Detail	
FRN:	0018547935
Registration Date:	02/26/2009 11:28:00 AM
Last Updated:	02/26/2009 12:15:17 PM
Business Name:	VRFuturenet
Business Type:	Private Sector , Partnership
Contact Organization:	VRFuturenet
Contact Position:	Partner
Contact Name:	Mr Scotty D Rice
Contact Address:	109 Thompson Rd Weatherford, TX 76087 United States
Contact Email:	scotty@vrfmail.com
ContactPhone:	(817) 771-1415
ContactFax:	

Exhibit D: WQKD375 License Reference





Preliminary Identification of Provider's Coverage Area

Connected Nation extracted the VRFuturenet's service area map from the provider's website. The website service area was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .1 mile (528 ft.) to establish a minimum search criterion of a potential wireless access point. The provider's service area depiction is represented by a composite of concentric circles as shown in Exhibit B. Estimated center points were established measuring from the outer radius of the circles as shown in Exhibit E. Using the approximated center points, the zoom function with the Google Earth application was utilized to identify structures that could possibly be serving as wireless transmit sites and/or access points. The information was logged and used as a reference for the field validation exercise necessary to conduct site verification or to locate and isolate transmit sites. Fourteen (14) locations were entered into Microsoft *Streets & Trips* mapping application **(Exhibit F)** to develop a route for the validation process. Also, the area is heavily served by other WISPs; therefore, all participating providers' "reported" access points were entered into Microsoft *Streets & Trips* to serve as a differentiator against potential VRFuturenet access points.

Exhibit E: Google Earth - Provider's Service Area Image Overlay

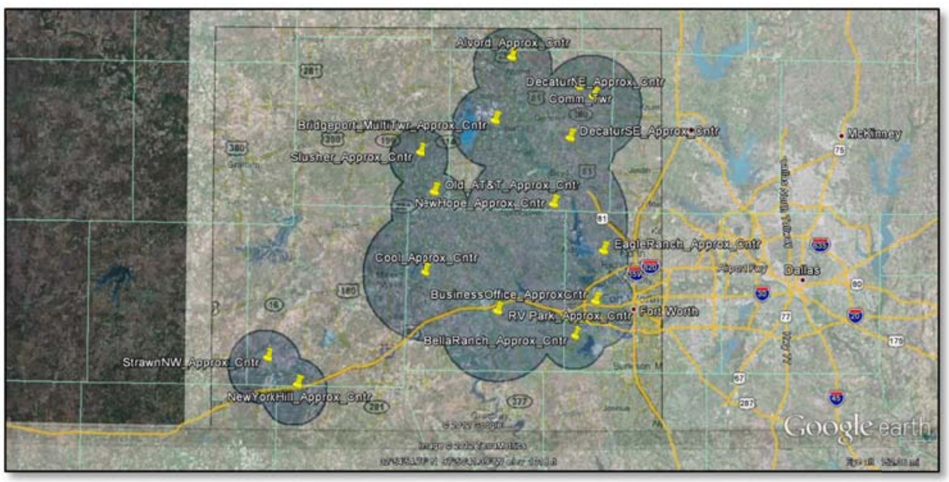
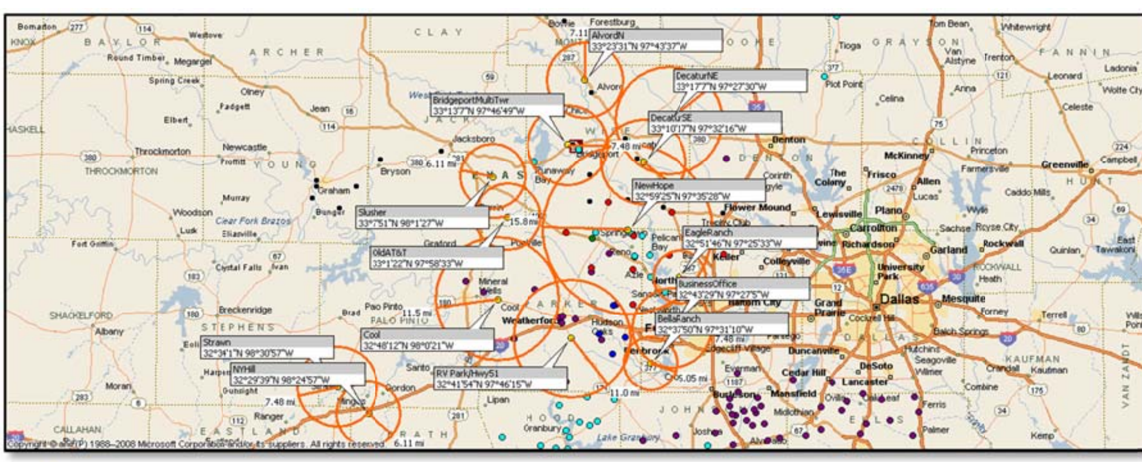


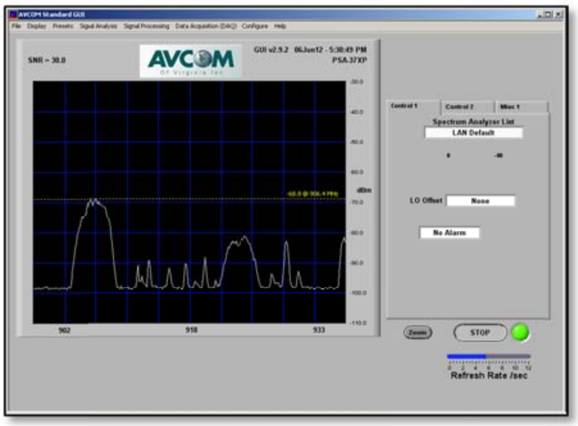
Exhibit F: Validation Points for AP Structures

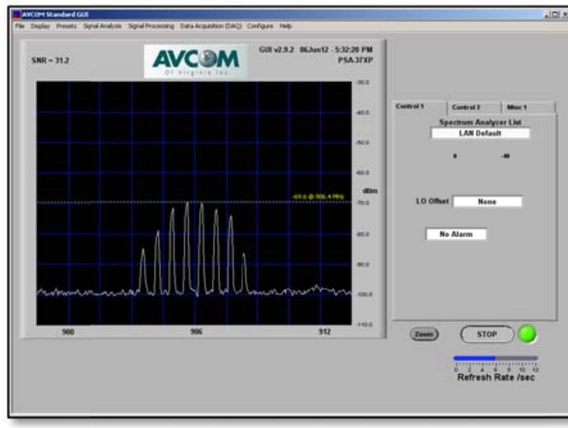


Testing Techniques

Connected Nation staff developed a site validation route based on data established with the Google Earth image overlay and publicly available data. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored) and photographs were taken of the access points.

Exhibit G: Field Data for VRFuturenet Hwy 51 Site - 900 MHz Location





Provider	Location	Latitude	Longitude	Frequency Availability				Structure	Approximate Antenna Height	Notes
				900MHz	2.4GHz	3.65GHz	5.0GHz			
VRFuturenet	VRF_Hwy51	32 39 49N	97 48 0W	X				Rohn	190 ft.	Sectored 900MHz with mutiple backhaul antennas. Private property.
VRFuturenet	RVPark/Hwy51 Center Point	32°41'54"N	97°46'15"W							Google Earth View-no structure observed in immediate area.

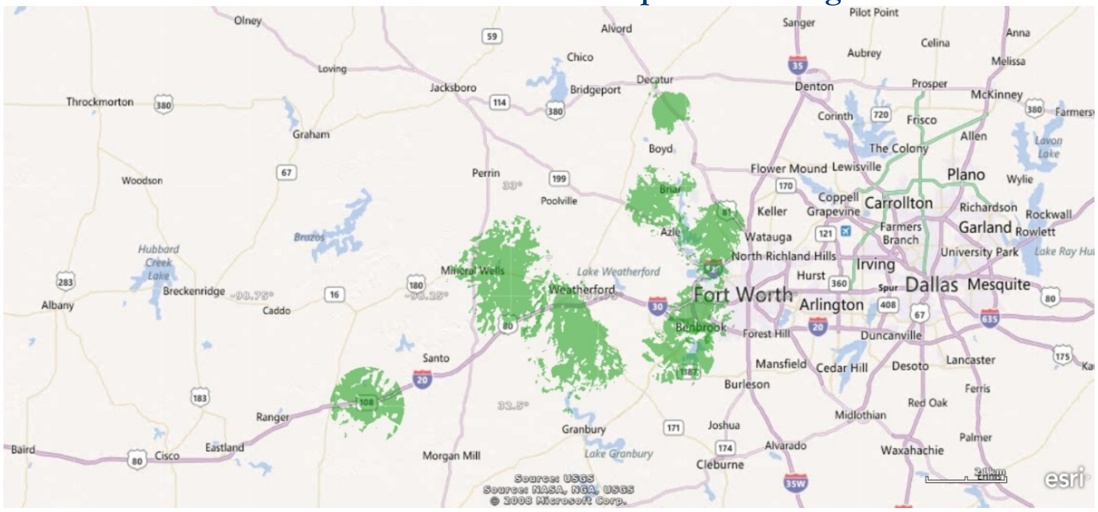
<u>Results and Submission for October 2012</u>

Of the 14 locations visited during the validation point and site verification route, 8 access points were positively identified and relative information was logged into the VRFuturenet field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the Connected Nation Provider Information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to VRFuturenet and the provider was advised that the information would be submitted to Connected Texas and to the NTIA unless a response was received within 48 hours pointing out necessary edits, decommissioned tower sites, or other potential discrepancies of the estimated coverage area. No such response was received from VRFuturenet. Connected Nation staff will continue outreach to engage voluntary participation. In the interim the area will be revisited by Connected Nation engineering staff to obtain additional data to encompass the full extent of the publicly available coverage as identified on VRFuturenet's website.

Exhibit H: Field Validation Notes

Location	Latitude	Longitude	Frequency			Structure	Approximate Antenna Height	Notes
			900Mhz	2.4GHz	5GHz			
VRF_NY Hill	32 29 55N	98 24 38W		X		Rohn on Bldg	120 ft.	SSID identified on channel 1; identified structure in distance (private property) via RF analysis with directional antenna.
NYHill Center Point	32°29'39"N	98°24'57"W						Google Earth View-no structure observed in immediate area.
VRF_Cool	32 47 35N	98 0 56W		X		Rohn	140 ft.	Omni antenna. SSID channel 4. Private property.
Cool Center Point	32°48'12"N	98°0'21"W						Google Earth View-no structure observed in immediate area.
VRF_Hwy51	32 39 49N	97 48 0W	X			Rohn	190 ft.	Sectored 900MHz with mutiple backhaul antennas. Private property.
RVPark/Hwy51 Center Point	32°41'54"N	97°46'15"W						Google Earth View-no structure observed in immediate area.
VRF_Bella Ranch	32 37 50N	97 31 10W		X				SSID identified on channel 9; assumed 120 ft. structure for propagation purpose. Could not get a fix on a tower due to unsafe conditions on highway.
Bella Ranch Center Point	32°37'50"N	97°31'10"W						Google Earth View-no structure observed in immediate area.
VRF_Bus Office	32 43 29N	97 27 5W		X		Rohn on Bldg	70 ft.	Omni antenna. VRFuturenet business/customer service office.
BusinessOffice Center point	32°43'29"N	97°27'5"W						Google Earth View-Rohn structure on roof.
VRF_Eagle Ranch	32 52 44N	97 25 34W		X		Water Tower	150 ft.	Omni antenna.
Eagle Ranch Center Point	32°51'46"N	97°25'33"W						Google Earth View-multiple structures observed in the area.
VRF_Decatur SE	33 10 7N	97 32 48W			X	Free Standing	130 ft.	Sectored antennas. 5.6GHz
Decatur SE Center point	33°10'17"N	97°32'16"W						Google Earth View-towers distant from center point.
VRF_New Hope	32 58 23N	97 32 48W		X		Water Tank (tri pod mnt)	60 ft.	Sectored antennas.
New Hope Center point	32°59'25"N	97°35'28"W						Google Earth View-no structure observed in immediate area.
								No RF or structure association for VRFuturenet identified.
Old AT&T Center Point	33°1'22"N	97°58'33"W						Google Earth View-old AT&T microwave tower structure.
								No RF or structure association for VRFuturenet identified.
Slusher Center Point	33°7'51"N	98°1'27"W						Google Earth View-no structure observed in immediate area.
								No RF or structure association for VRFuturenet identified; Identified Digital Passage in proximity.
Bridgeport Center Point	33°13'7"N	97°46'49"W						Google Earth View-multiple towers in the area.
								No RF or structure association for VRFuturenet identified; Identified Digital Passage in proximity.
Alvord N Center Point	33°23'31"N	97°43'37"W						Google Earth View-no structure observed in immediate area.
								No RF or structure association for VRFuturenet identified. Identified Digital Passage in immediate area.
Decatur NE Center Point	33°17'7"N	97°27'30"W						Google Earth View-communications tower.
								No RF or structure association for VRFuturenet identified.
Strawn Center Point	32°34'1"N	98°30'57"W						Google Earth View-no structure observed in immediate area.

Exhibit I: VRFuturenet Composite Coverage



ZULU INTERNET, INC.

As part of its ongoing broadband mapping efforts, Connected Nation has developed a series of processes with the goal of submitting mapping data to NTIA for every known and qualifying broadband provider, regardless of whether the provider has chosen to support and participate in the SBI program.

The following narrative provides detail regarding the recent data collection and coverage estimation activities related to Zulu Internet, Inc., a wireless Internet service provider (WISP), located in Paris, Texas, with a service area within Fannin and Lamar counties. The narrative will include information regarding how and where CN obtained publicly available data and the on-the-ground validation techniques that support the underlying data.

October 2012 Submission Commentary

Connected Nation created this coverage estimation document during the April 2012 submission period as a result of the ongoing non-participatory status of the provider. In addition to the 14 instances of e-mail and/or telephone communication leading up to the April 2012 submission period (as previously reported), CN made 4 additional attempts to contact the provider during this mapping cycle. On August 12, 2012, the estimated coverage map **(Exhibit I)** which was produced during the April 2012 submission cycle was forwarded to the provider requesting review and comments. As of August 27, 2012, no replies were received from the provider.

CN closely monitored the provider's website to identify any changes in the coverage area or maximum advertised speeds but did not locate evidence of any recent changes. To that end, CN is resubmitting this coverage estimation narrative, substantially in its original format, and will continue to monitor the provider's website as well as ensure ongoing outreach until either the expiration of the SBI grant or until such time as the provider voluntarily contributes data.

Background

CN staff members have continued trying to obtain the participation of the provider with 18 instances of communication via telephone and e-mail sessions from May 26, 2011, through August 27, 2012. The owner of the company was non-responsive to all telephone and e-mail outreach activity. Additionally, a CN staff member attempted to arrange an office meeting with the owner of Zulu Internet, Inc. to discuss the project firsthand and assist with gathering data for the access points. There were no return replies to the requested meeting.

The Issue

Zulu Internet, Inc., by its lack of responsiveness since May 26, 2011, has predicated its unwillingness to participate in the Connected Texas broadband mapping initiative.

Identification of Provider's Service Plans, Service Area, Legal Name, d.b.a., FRN, and Licensing

CN has built a file based on research information and, as time progressed, enriched the file with information obtained through the public domain and on-the-ground verification activities. For example, CN reviewed the provider's website (http://www.zuluinternet.com/index.html) to determine the residential service plans **(Exhibit A)** and the service area **(Exhibit B)** of the provider's wireless network. A search for a Federal Registration Number (FRN) on the FCC **CO**mmission **RE**gistration **S**ystem (CORES) system yielded the following FRNs of 0021125265 and 0021129457 **(Exhibit C)** with contact information relative to the owner of the company. Also, to support field validation of access points, the FRN was referenced against the FCC Universal Licensing System (ULS) to identify any spectrum authorizations that may be held by the provider that could supplement the dataset of estimated coverage by isolating and identifying active wireless access points for the service area. This process yielded license WQOR870, under FRN 0021125265 **(Exhibit D)**, Radio Service: NN-3650-3700 MHz with 0 active locations.

Exhibit A: Service Plans

Zulu Internet

(877) 903-2777 Toll-Free

Residential High-Speed Wireless Internet

Speed	Basic J-Pole Installation & Equipment	Monthly Fee
1 Mbps	$250.00	$39.95
3 Mbps	$250.00	$59.95
6 Mbps	$250.00	$79.95
	Add-On Options (not available separately)	**Cost**
	Equipment Insurance	$4.95/month
	Wireless Router	$35.00
	50' Pole	$150.00

Business High-Speed Wireless Internet

Exhibit B: Service Area

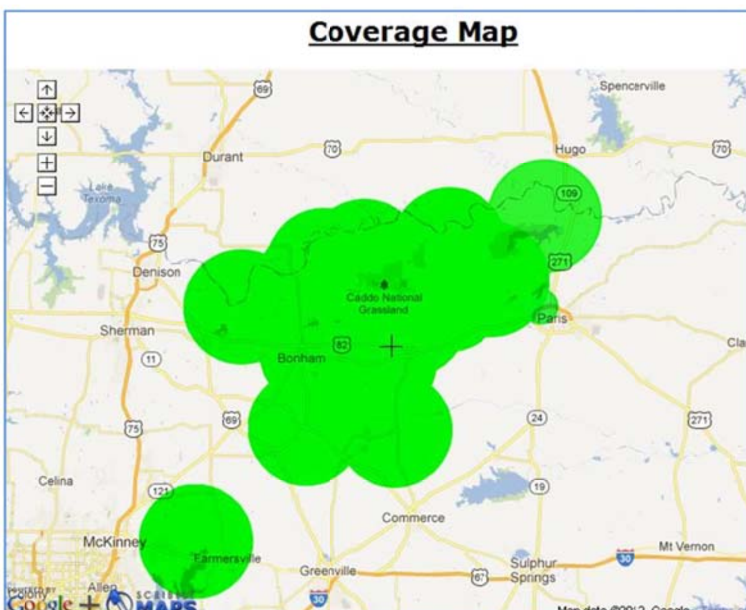


Exhibit C: Federal Registration Numbers

Registration Detail	
FRN:	0021125265
Registration Date:	08/31/2011 11:54:00 PM
Last Updated:	02/08/2012 04:12:34 PM
Business Name:	Zulu Internet Inc
Business Type:	Private Sector , Corporation
Contact Organization:	
Contact Position:	General Manager
Contact Name:	Mr John N Harms
Contact Address:	2500 FM 79 STE3 Paris, TX 75460 United States
Contact Email:	
ContactPhone:	(903) 739-2777
ContactFax:	

Registration Detail	
FRN:	0021129457
Registration Date:	09/02/2011 03:34:00 PM
Last Updated:	
Business Name:	Zulu Internet Inc
Business Type:	Private Sector , Corporation
Contact Organization:	Zulu Internet Inc
Contact Position:	Director
Contact Name:	Mr John N Harms
Contact Address:	2500 Farm Road 79 Ste3 Paris, TX 75460 United States
Contact Email:	john@zuluinternet.com
ContactPhone:	(903) 739-2777
ContactFax:	(903) 739-2023

Exhibit D: WQOR870 License Reference

Specified Search						
FRN like **0021125265**						
Matches 1- 1 (of 1)						
PA = Pending Application(s); TP = Termination Pending; L = Lease						
Page 1						
	Call Sign/Lease ID	Name	FRN	Radio Service	Status	Expiration Date
1	WQOR870	Zulu Internet Inc	0021125265	NN	Active	01/11/2022

Call Sign	WQOR870	Radio Service	NN - 3650-3700 MHz
0 Total Locations 10 Locations per Summary Page			
No Locations			
0 Total Locations 10 Locations per Summary Page			

Preliminary Identification of Provider's Coverage Area

CN extracted the Zulu Internet, Inc. service area map directly from the provider's website. Information from that website was utilized to create a Google Earth image overlay **(Exhibit E).** The image overlay was positioned to match the Google Earth base map's roadways, county boundaries, and water bodies. The degree of accuracy of the image overlay was maintained at less than .1 mile (528 ft.) to establish a minimum search criteria of a given wireless access point. The provider's service area depiction is represented by polygons as shown in Exhibit B. Using the Google Earth overlay each location was examined via an aerial zoom and street level observation to identify possible wireless access point structures at the center points of the polygons. This process provided a means of establishing coordinates for 17 validation points to identify structures with operational equipment. All 17 locations were entered into the Microsoft *Streets & Trips* mapping application **(Exhibit F)** to develop a route for the validation process.

Exhibit E: Google Earth: Provider's Service Area Image Overlay

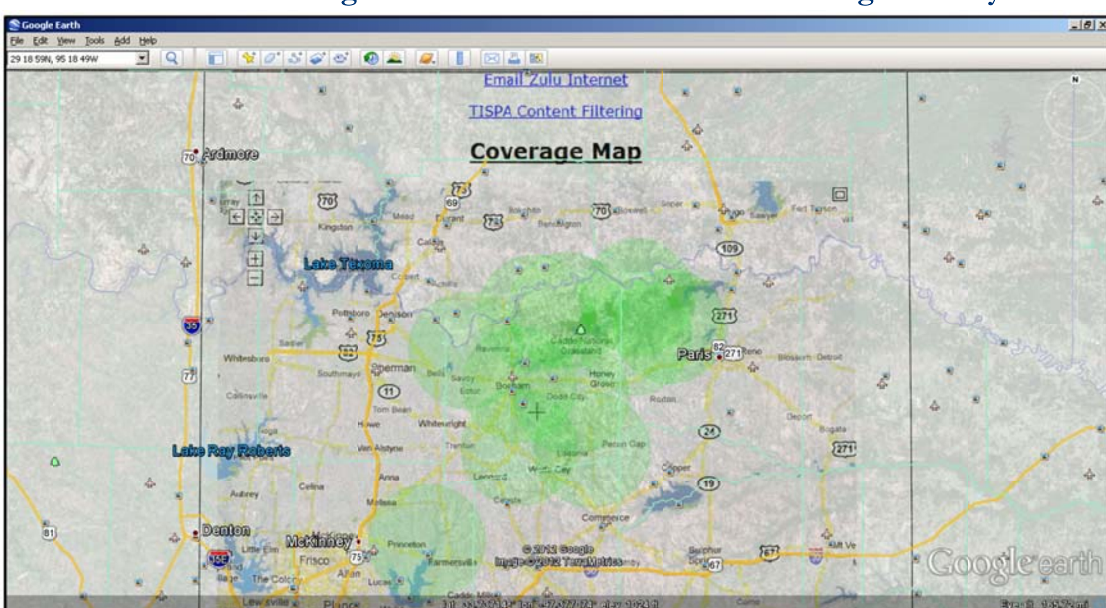
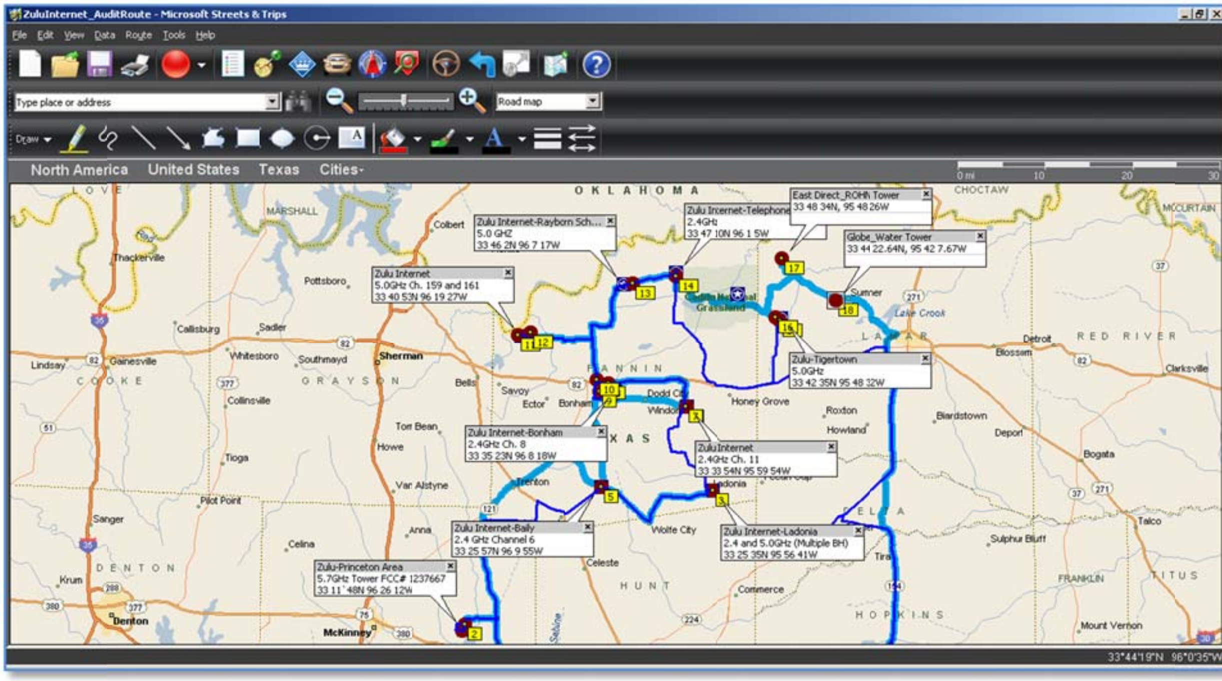


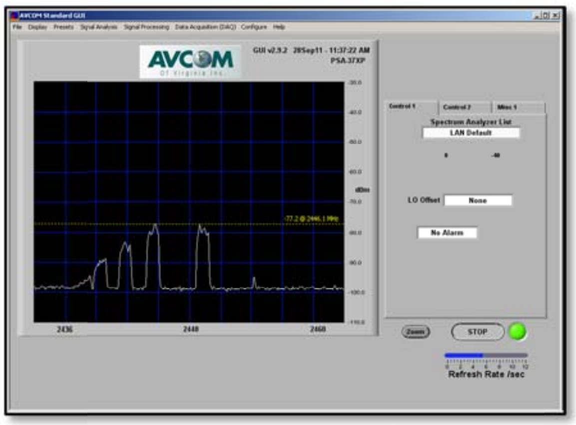
Exhibit F: Validation Points for AP Structures

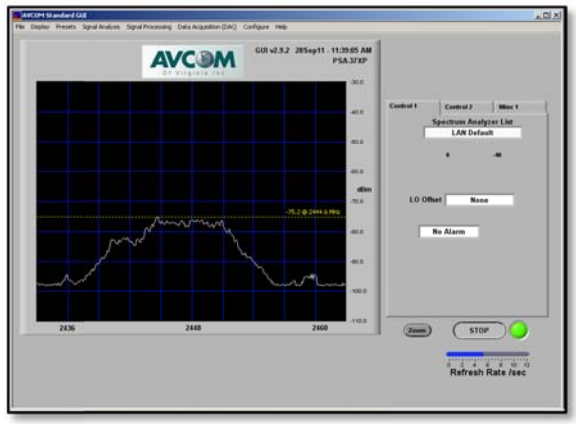


Testing Techniques

CN staff developed a data collection and site validation route based on information derived from the Google Earth image overlay of Zulu Internet's publicly available coverage on its website. The CN wireless engineer was equipped with an AVCOM PSA-37XP analyzer with RF detection from 1 MHz to 6 GHz and an array of antennas tuned specifically for the 900 MHz, 2.4 GHz, 3.65 GHz, and 5 GHz frequency bands **(Exhibit G)**. Each validation point was scrutinized for frequency of operation. A screen image of the operating frequency (or frequencies) was captured; general notes were recorded for each location-approximate antenna height, frequency of operation, antenna type (omnidirectional or sectored), and photographs were taken of the access points.

Exhibit G: Field Data for Zulu Internet, Inc.'s Access Point/ Backhaul Hub Location





Provider	Location	Latitude	Longitude	Frequency Availability				Structure	Approximate Antenna Height	Notes
				900MHz	2.4GHz	3.65GHz	5.0GHz			
	Ladonia Rohn Tower	33 25 35.96N	95 56 41.38W		X			Guyed Rohn	160ft.	Actual AP location identified. Serving AP with multiple BH.
ZuluInternet	Ladonia	33 25 35.96N	95 56 48.35W							GE-identified water tower structure.
										RF snapshot and site photos on file.

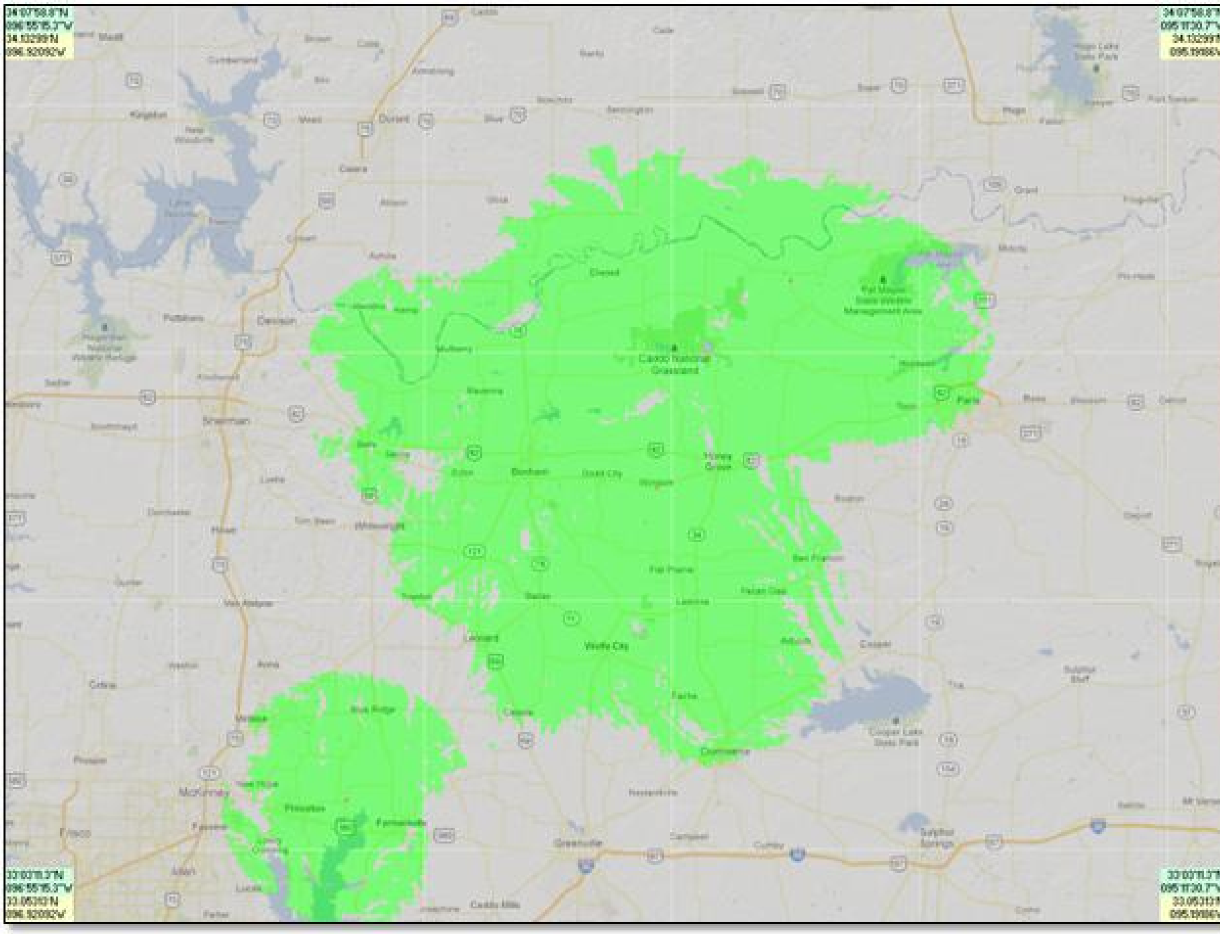
Results and Submission for October 2012

Of the 17 locations previously visited during the coverage estimation and validation point route, 11 access points were identified and relative information was logged into the Zulu Internet, Inc. field validation notes file **(Exhibit H)**. The field and the publicly available data were transferred to the CN Provider Information file. A composite propagation study was completed based on the field data **(Exhibit I)**. Both documents were forwarded to Zulu Internet, Inc. as courtesy copies and the provider was advised that the estimated coverage information would be submitted to Connected Texas and to the NTIA unless the provider notified CN, within 48 hours, of discrepancies of the estimated coverage. The provider did not respond to CN and, as of this date, CN believes the information to be an accurate estimation of the service area of Zulu Internet, Inc.

Exhibit H: Field Validation Notes

Location	Latitude	Longitude			Structure	Approximate Antenna Height	Notes
			2.4GHz	5.0GHz			
Ladonia Rohn Tower	33 25 35.96N	95 56 41.38W	X		Guyed Rohn	160ft.	Actual AP location identified. Serving AP with multiple BH.
Ladonia	33 25 35.96N	95 56 48.35W					GE-identified water tower structure.
							RF snapshot and site photos on file.
Bailey Rohn Tower	33 25 57.45N	96 9 54.15	X		Guyed Rohn	120ft.	Actual AP location identified.
Bailey_Center Point	33 25 56.11N	96 9 56.94W					RF snapshot and site photos on file.
Bailey_Rohn Tower	33 25 57.66N	96 9 54.24W					GE-identified ROHN tower structure.
Telephone Rohn Tower	33 47 10N	96 1 5W	X		Guyed Rohn	160ft.	Actual AP location identified.
Telephone_Rohn Tower	33 46 46.82N	96 1 6.74W					GE-identified ROHN tower structure.
							RF snapshot and site photos on file.
Ivanhoe Comm Tower	33 46 2.05N	96 7 12.63W		5.7GHz	Comm Tower	110ft.	Actual AP location identified; tower FCC Reg# 1272885
FM273/CR2245_Rayburn Schools	33 46 4.21N	96 6 13.42W					GE-identified 2 tower structures in the area.
							RF snapshot and site photos on file.
Ravenna Rohn Tower	33 40 54.18N	96 19 26.58W		5.7GHz	Guyed Rohn	160ft.	Actual AP location identified.
FM 1753_Texas Industries_Center Point	33 40 57.02N	96 19 58.78W					GE-no identifiable structures.
FM 1753_Roving Point	33 41 15.97N	96 18 28.02W					RF snapshot and site photos on file.
Bonham Rohn Tower	33 35 23N	96 8 18W	X		Guyed Rohn	160ft.	AP location estimated; no close proximity access; private property.
							RF snapshot and site photos on file.
Bonham_Water Tower	33 36 33.67N	96 10 30.84W					GE-identified water tower.
Bonham_Center Point	33 36 11.66N	96 9 8.85W					GE-near a Golf Club.
Bonham_Roving Point	33 35 23.28N	96 10 8.18W					
Princeton Comm Tower	33 11 47.8N	96 26 14.3W		5.7GHz	Comm Tower	180ft.	Actual AP location identified; tower FCC Reg# 1237667
Princeton_Center Point	33 11 37.88N	96 26 22.95W					GE-no identifiable structures.
Princeton_Roving Point	33 12 18.16N	96 26 3.84W					RF snapshot and site photos on file.
Windom Water Tower	33 33 54.61N	95 59 54.27W	X		Water Tower	150ft.	Actual AP location identified.
							RF snapshot and site photos on file.
Windom_Water Tower	33 33 54.61N	95 59 54.22W					GE-identified water tower structure.
Windom_Silo	33 33 54.59N	95 59 56.64W					GE-identified Silo structure.
FM38_CR35300 Rohn Tower	33 42 32.38N	95 48 35.91W		5.7GHz	Rohn Tower	160ft.	Actual AP location identified.
							RF snapshot and site photos on file.
FM 38_CR35300_Center Point	33 42 22.03N	95 48 40.73W					GE-no identifiable structures.
FM 38_Silo	33 42 43.50N	95 49 15.80W					GE-identified Silo structure.
Globe_Water Tower	33 44 22.64N	95 42 7.67W		5.7GHz	Water Tower	150ft.	Identified AP structure during provider area validations and broadband inquiries.
							RF snapshot and site photos on file.
East Direct_ROHN Tower	33 48 34N	95 48 26W		5.2GHz	ROHN-Guide	160ft.	Identified AP structure during provider area validations and broadband inquiries.
							RF snapshot and site photos on file.

Exhibit I: Zulu Internet, Inc. Composite Coverage



Appendix B: Broadband Provider Log

Broadband Provider Log

Complete	275
Non-Responsive/Refused	27
In Progress	3
Count of Datasets by Status	**305**
Total Unique Providers Represented	**198**

Provider Name	**Platform**	**Status**	**NDA Execution Date**	**Notes**
Speed of Light Broadband, Inc.	Fixed Wireless	Approval for Update Not Received - Data Still Submitted	11/3/2009	[AUG-29-12 Sarah Finne] Change: Network expansion (provider added 2 new towers to existing coverage).
Alenco Communications, Inc.	DSL	Data Added to Statewide Inventory	11/17/2009	[AUG-13-12 Sarah Finne] Change and Correction: Provider upgraded infrastructure and can now offer tier 5 download speeds in areas previously reported as tier 3, and Donie exchange should have been reported as FTTH only (therefore, this area has been removed from DSL coverage).
AT&T Communications of Texas, Inc.	DSL	Data Added to Statewide Inventory	12/16/2009	[AUG-30-12 Sarah Finne] Change/Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
AT&T Communications of Texas, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[AUG-22-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Big Bend Telephone Company, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/10/2010	[SEP-02-12 Sarah Finne] Change: Network expansion (provider added 12 new towers to existing coverage).
Burcham Solutions, LLC	Fixed Wireless	Data Added to Statewide Inventory	8/2/2012	[SEP-03-12 Sarah Finne] Correction: Burcham Solutions was previously non-responsive but provided data this round.
Cap Rock Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	3/4/2010	[AUG-31-12 Sarah Finne] Change: Network expansion (provider added an additional 3 remote terminals).
Central Texas Telephone Investments, LP	Fixed Wireless	Data Added to Statewide Inventory	4/22/2010	[AUG-30-12 Sarah Finne] Change: Network expansion (provider added 11 new towers to existing coverage).
CenturyLink	DSL	Data Added to Statewide Inventory	12/4/2009	[AUG-28-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Charter Communications, Inc.	Cable	Data Added to Statewide Inventory	12/15/2009	[AUG-29-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Cobridge Communications, LLC	Cable	Data Added to Statewide Inventory		[SEP-17-12 Ashley Hitt] Change: Fidelity acquired some of the former Cobridge service areas in early 2012; as of June 2012, the former Cobridge areas have been rebranded as Fidelity.
Coleman County Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	3/10/2010	[AUG-31-12 Sarah Finne] Change: Network expansion (provider added one new remote terminal).
Colorado Valley Telephone Cooperative, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/9/2010	[AUG-29-12 Sarah Finne] Change: Network expansion (provider added a tower to existing coverage).
Comcast Cable Communications, LLC	Cable	Data Added to Statewide Inventory	12/7/2009	[AUG-29-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Cumby Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	3/5/2010	[AUG-30-12 Sarah Finne] Change: Network expansion.
Digital Passage, Inc.	Fixed Wireless	Data Added to Statewide Inventory		[AUG-30-12 Sarah Finne] Correction: Digital Passage was previously non-responsive but provided data this round.
Digitex.com	Fixed Wireless	Data Added to Statewide Inventory	5/25/2010	[SEP-05-12 Sarah Finne] Change and Correction: Provider installed new towers, and propagations were recreated for existing towers to more accurately portray provider footprint.
East Texas DSL	Fixed Wireless	Data Added to Statewide Inventory	5/25/2010	[AUG-29-12 Sarah Finne] Change: Network expansion (provider installed an additional fixed wireless tower).
Eastex Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	6/20/2011	[AUG-31-12 Sarah Finne] Change and Correction: Provider decommissioned some DSLAMs, added some new ones, and corrected the coordinates of some others.
Eastland Internet Inc	Fixed Wireless	Data Added to Statewide Inventory		[AUG-29-12 Sarah Finne] Correction: TXOL was previously non-responsive but provided data this round.

ERF Wireless	Fixed Wireless	Data Added to Statewide Inventory		[AUG-30-12 Sarah Finne] Change: Several towers were decommissioned and/or sold to other WISPs. New propagations were created to better represent current ERF service area.
Gtek Communications	Fixed Wireless	Data Added to Statewide Inventory	5/24/2010	[AUG-29-12 Sarah Finne] Change: Network expansion (provider added 4 fixed wireless towers to existing coverage).
Guadalupe Valley Communications Systems	DSL	Data Added to Statewide Inventory	11/23/2009	[SEP-07-12 Sarah Finne] Change: Network expansion.
Guadalupe Valley Communications Systems	Fiber	Data Added to Statewide Inventory	11/23/2009	[SEP-06-12 Sarah Finne] Change: Network expansion.
GVEC.net	Fixed Wireless	Data Added to Statewide Inventory	2/25/2010	[AUG-30-12 Sarah Finne] Change: Network expansion (provider added 3 new towers to existing coverage).
Hometown Computing	Fixed Wireless	Data Added to Statewide Inventory		[JUL-10-12 Amanda Bentley] Correction: Hometown Computing was previously non-responsive but provided data this round.
JAB Wireless, Inc.	Fixed Wireless	Data Added to Statewide Inventory	6/14/2010	[JUL-10-12 Dwayne Goodman] Change: JAB Wireless, Inc. acquired KeyOn Communications' assets and is now operating KeyOn's old fixed wireless towers.
James Cable LLC	Cable	Data Added to Statewide Inventory	1/11/2010	[AUG-31-12 Sarah Finne] Change: Provider decommissioned area south of Possum Kingdom Lake and increased the maximum download speeds in some areas to tier 6.
Leap Wireless International, Inc.	Mobile Wireless	Data Added to Statewide Inventory	4/6/2010	[AUG-13-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
LVWifi.com	Fixed Wireless	Data Added to Statewide Inventory		[AUG-27-12 Sarah Finne] Correction: Initial submission of provider's coverage, but they were in service previously.
MegaPath Inc.	DSL	Data Added to Statewide Inventory	2/15/2010	[AUG-30-12 Sarah Finne] Correction: Provider has proven they offer residential broadband services, therefore October 2012 is the initial submission for this provider.
MetroPCS Wireless, Inc.	Mobile Wireless	Data Added to Statewide Inventory	2/10/2012	[AUG-24-12 Amanda Bentley] Change: Network expansion and provider upgraded infrastructure and can now offer tier 4 download and upload speeds.
Mexus Communications	Fixed Wireless	Data Added to Statewide Inventory		[AUG-30-12 Sarah Finne] Correction: Mexus was previously non-responsive but provided data this round.
Millennium Telcom, LLC	Fixed Wireless	Data Added to Statewide Inventory	8/26/2010	[AUG-29-12 Sarah Finne] Change: Network expansion (provider added 4 additional fixed wireless towers to their existing coverage area).
Peoples Communication, Inc.	Fixed Wireless	Data Added to Statewide Inventory	3/4/2010	[AUG-30-12 Sarah Finne] Change: Provider launched new fixed wireless services (700 MHz LTE).
Poka Lambro Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	2/15/2010	[JUL-18-12 Amanda Bentley] Change: Network expansion (new DSLAMs added); provider also can now offer speed tier 7 and 8 download speeds.
Poka Lambro Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	2/15/2010	[JUL-18-12 Amanda Bentley] Change: Network expansion.
Ridgewood Cable	Fixed Wireless	Data Added to Statewide Inventory		[SEP-05-12 Sarah Finne] Change and Correction: Provider added towers to existing coverage, and propagations were recreated for all existing towers using updated software.
Rock Solid Internet & Telephone	Fixed Wireless	Data Added to Statewide Inventory	2/14/2011	[AUG-30-12 Sarah Finne] Change: Network expansion (provider added 6 new towers to existing coverage).
Skynet Country, LLC	Fixed Wireless	Data Added to Statewide Inventory		[AUG-30-12 Sarah Finne] Change: Network expansion (provider added 6 new towers to existing coverage).
SOS Communications LLC	Fixed Wireless	Data Added to Statewide Inventory		[AUG-13-12 Sarah Finne] Correction: SOS Communications was previously non-responsive but provided data this round.
South Plains Telephone Cooperative, Inc.	Fiber	Data Added to Statewide Inventory	3/15/2010	[SEP-02-12 Sarah Finne] Change: Network expansion.
Southwest Texas Telephone Company	DSL	Data Added to Statewide Inventory	3/3/2010	[AUG-13-12 Amanda Bentley] Change: Network expansion.
Spacenet Inc.	Satellite	Data Added to Statewide Inventory		[SEP-05-12 Sarah Finne] Correction: Initial submission of provider's coverage, but they were in service previously.
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[JUL-19-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[AUG-24-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Texas CellNet, Inc.	Fixed Wireless	Data Added to Statewide Inventory	2/17/2011	[AUG-30-12 Sarah Finne] Change and/or Correction: Provider submitted entirely new dataset, with more precise coordinates, for the October 2012 submission.

Time Warner Cable LLC	Cable	Data Added to Statewide Inventory	12/21/2009	[AUG-29-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
United States Cellular Corporation	Mobile Wireless	Data Added to Statewide Inventory	2/15/2011	[AUG-13-12 Sarah Finne] Change: Provider submitted additional data with increased speed offerings.
Verizon Southwest, Inc.	DSL	Data Added to Statewide Inventory	12/14/2009	[AUG-28-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Verizon Southwest, Inc.	Fiber	Data Added to Statewide Inventory	12/14/2009	[AUG-28-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
Verizon Southwest, Inc.	Mobile Wireless	Data Added to Statewide Inventory	12/14/2009	[JUL-19-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
ViaSat, Inc.	Satellite	Data Added to Statewide Inventory	1/8/2010	[AUG-15-12 Sarah Finne] Change and/or Correction: Possible service expansion or corrections to previous dataset; entirely new dataset provided for October 2012 submission.
WEHCo Video, Inc.	Cable	Data Added to Statewide Inventory		[JUL-17-12 Amanda Bentley] Change: Network expansion.
West Texas Rural Telephone Cooperative, Inc.	DSL	Data Added to Statewide Inventory	3/31/2010	[AUG-30-12 Sarah Finne] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds in Friona and Bovina. Rural telephone area now upgraded to qualify as broadband, with download speeds of 6M, therefore network expansion since last submission.
XIT Telecommunications & Technology, Ltd.	DSL	Data Added to Statewide Inventory	3/2/2010	[AUG-07-12 Amanda Bentley] Change: 6 DSLAM locations were removed due to network being upgraded to FTTH.
XIT Telecommunications & Technology, Ltd.	Fiber	Data Added to Statewide Inventory	3/2/2010	[JUL-24-12 Amanda Bentley] Change: Network expansion.
Alenco Communications, Inc.	Backhaul	Backhaul Provider Only Processing Complete	11/17/2009	
Burcham Solutions, LLC	Backhaul	Backhaul Provider Only Processing Complete	8/2/2012	
Conterra Ultra Broadband, LLC	Backhaul	Backhaul Provider Only Processing Complete		
MegaPath Inc.	Backhaul	Backhaul Provider Only Processing Complete	2/15/2010	
Verizon Southwest, Inc.	Backhaul	Backhaul Provider Only Processing Complete	12/14/2009	
Alenco Communications, Inc.	Fiber	Speed Only Update; Data Processing Complete	11/17/2009	[AUG-13-12 Sarah Finne] Change: Provider upgraded infrastructure and can now offer tier 4 download speeds in the exchange that was previously submitted as tier 3.
Baja Broadband Holding Company	Cable	Speed Only Update; Data Processing Complete		[SEP-10-12 Sarah Finne] Change: Provider upgraded infrastructure and can now offer tier 10 download and tier 7 upload speeds in all four TX markets.
Colorado Valley Telephone Cooperative, Inc.	DSL	Speed Only Update; Data Processing Complete	3/9/2010	[AUG-29-12 Sarah Finne] Change: Provider upgraded infrastructure and can now offer tier 5 download speeds.
Our-Town Internet Services, LLC	Fixed Wireless	Speed Only Update; Data Processing Complete	3/31/2010	[AUG-29-12 Sarah Finne] Change: Provider upgraded infrastructure and can now offer tier 6 download speeds.
Valley Telephone Cooperative, Inc.	DSL	Speed Only Update; Data Processing Complete	11/24/2009	[AUG-13-12 Sarah Finne] Change: Provider upgraded infrastructure and can now offer tier 5 download speeds.
West Texas Rural Telephone Cooperative, Inc.	Cable	Speed Only Update; Data Processing Complete	3/31/2010	[AUG-31-12 Sarah Finne] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds.
West Texas Rural Telephone Cooperative, Inc.	Fiber	Speed Only Update; Data Processing Complete	3/31/2010	[AUG-31-12 Sarah Finne] Change: Provider upgraded infrastructure and can now offer tier 7 download speeds.
CKS Wireless, Inc.	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
East Texas Broadband	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
GoZoe Wireless, LLP	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
Zulu Internet, Inc.	Fixed Wireless	No Update-Estimated Coverage Submitted for Non-Participating Provider		
AMA TechTel	Fixed Wireless	Updated-Estimated Coverage Submitted for Non-Participating Provider		[SEP-11-12 Sarah Finne] Change: Updated-Estimated Coverage Submitted for Non-Participating Provider. Five new towers, found during field audit, added to existing estimated coverage.
Broadwaves	Fixed Wireless	Updated-Estimated Coverage Submitted for Non-Participating Provider		[SEP-11-12 Sarah Finne] Change: Updated-Estimated Coverage Submitted for Non-Participating Provider. New propagations created to conform with provider's new website depiction.
Anvil Communications	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[AUG-29-12 Sarah Finne] Correction: Estimated coverage submitted for non-participating provider.
East Texas Cable	Cable	Estimated Coverage Submitted for Non-Participating Provider		[AUG-13-12 Sarah Finne] Correction: Estimated coverage submitted for non-participating provider.

NDemand, Inc.	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[AUG-13-12 Sarah Finne] Correction: Estimated coverage submitted for non-participating provider.
Skynet Communications	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[AUG-13-12 Sarah Finne] Correction: Estimated coverage submitted for non-participating provider.
Starnet Online Systems	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[SEPT-07-12 Sarah Finne] Correction: Estimated coverage submitted for non-participating provider.
Telecom Cable, LLC	Cable	Estimated Coverage Submitted for Non-Participating Provider		[AUG-13-12 Sarah Finne] Correction: Estimated coverage submitted for non-participating provider.
TheSPECnet, Inc.	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[AUG-27-12 Sarah Finne] Correction: Estimated Coverage Submitted for Non-Participating Provider.
VRFuturenet	Fixed Wireless	Estimated Coverage Submitted for Non-Participating Provider		[AUG-13-12 Sarah Finne] Correction: Estimated coverage submitted for non-participating provider.
Aledo Broadband	Backhaul	No Update to Provide	3/26/2010	
Aledo Broadband	Fixed Wireless	No Update to Provide	3/26/2010	
Alenco Communications, Inc.	Fixed Wireless	No Update to Provide	11/17/2009	
Allegiance Communications	Cable	No Update to Provide	2/4/2010	
Alpheus Communications, L.P.	Backhaul	No Update to Provide		
Argon Technologies	Fixed Wireless	No Update to Provide		
AT&T Communications of Texas, Inc.	Backhaul	No Update to Provide	12/16/2009	
AwesomeNet, Inc.	Fixed Wireless	No Update to Provide		
Basin 2 Way Radio, Inc.	Fixed Wireless	No Update to Provide	4/14/2010	
Bee Creek Communications	Fixed Wireless	No Update to Provide	5/21/2010	
Big Bend Telephone Company, Inc.	Backhaul	No Update to Provide	3/10/2010	
Big Bend Telephone Company, Inc.	DSL	No Update to Provide	3/10/2010	
Big Bend Telephone Company, Inc.	Fiber	No Update to Provide	3/10/2010	
Big Bend Telephone Company, Inc.	Satellite	No Update to Provide	3/10/2010	
Border to Border Communications, Inc.	DSL	No Update to Provide	2/20/2012	
Border to Border Communications, Inc.	Fiber	No Update to Provide	2/20/2012	
Border to Border Communications, Inc.	Fixed Wireless	No Update to Provide	2/20/2012	
Brazoria Telephone Company	Cable	No Update to Provide	6/17/2010	
Brazoria Telephone Company	DSL	No Update to Provide	6/17/2010	
Broadband Data Services of Texas, LLC	Fixed Wireless	No Update to Provide	4/29/2010	
Broadcomm.US	Fixed Wireless	No Update to Provide	3/9/2011	
Buffalo Cable TV	Cable	No Update to Provide		
Cable ONE Inc.	Cable	No Update to Provide	12/7/2009	
Cameron Telephone Company, LLC	Backhaul	No Update to Provide	3/18/2010	
Cameron Telephone Company, LLC	DSL	No Update to Provide	3/18/2010	
Cap Rock Telephone Cooperative, Inc.	Backhaul	No Update to Provide	3/4/2010	
Cap Rock Telephone Cooperative, Inc.	Fiber	No Update to Provide	3/4/2010	
Cap Rock Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	3/4/2010	
Celltex Networks, LLC	Fixed Wireless	No Update to Provide		
Central Texas Cable Partners, Inc.	Cable	No Update to Provide	2/22/2010	
Central Texas Telephone Cooperative, Inc.	DSL	No Update to Provide	3/2/2010	
Central Texas Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	3/2/2010	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
CenturyLink	Backhaul	No Update to Provide	12/4/2009	
Clearwire Corporation	Fixed Wireless	No Update to Provide	3/3/2010	
Clearwire Corporation	Mobile Wireless	No Update to Provide	3/3/2010	
Coleman County Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	3/10/2010	
Community Telephone Company, Inc.	Backhaul	No Update to Provide	3/10/2010	
Community Telephone Company, Inc.	DSL	No Update to Provide	3/10/2010	
Connextions Telcom	DSL	No Update to Provide	3/2/2011	
Connextions Telcom	Fiber	No Update to Provide	3/2/2011	
Consolidated Communications	DSL	No Update to Provide	11/30/2009	
Consolidated Communications	Fiber	No Update to Provide	11/30/2009	
Cumby Telephone Cooperative, Inc.	DSL	No Update to Provide	3/5/2010	
Dell Telephone Cooperative, Inc.	Backhaul	No Update to Provide	4/6/2010	
Dell Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	4/6/2010	
DigiComm Enterprises, LLC	Fixed Wireless	No Update to Provide	6/15/2010	
Digitex.com	Backhaul	No Update to Provide	5/25/2010	
East Texas WiFi	Fixed Wireless	No Update to Provide		
Electra Telephone Company	DSL	No Update to Provide	11/24/2009	
ENMR Telephone Cooperative, Inc.	Backhaul	No Update to Provide	4/22/2010	
ENMR Telephone Cooperative, Inc.	DSL	No Update to Provide	4/22/2010	
ENMR Telephone Cooperative, Inc.	Fiber	No Update to Provide	4/22/2010	
ETAN Industries	Cable	No Update to Provide		
ETEX Communications, LP	Backhaul	No Update to Provide	2/25/2010	
ETEX Communications, LP	DSL	No Update to Provide	2/25/2010	
ETEX Communications, LP	Fiber	No Update to Provide	2/25/2010	
ETS Cablevision Co., Inc.	Cable	No Update to Provide	10/30/2009	
ETS Cablevision Co., Inc.	Fiber	No Update to Provide	10/30/2009	
Farm to Market Broadband LP	Fixed Wireless	No Update to Provide	4/16/2010	
Five Area Telephone Cooperative, Inc.	DSL	No Update to Provide	3/8/2010	
Five Area Telephone Cooperative, Inc.	Fiber	No Update to Provide	3/8/2010	
Ganado Telephone Company, Inc.	DSL	No Update to Provide	11/16/2009	
GEUS	Cable	No Update to Provide		
Gilmer Cable Television Company, Inc.	Cable	No Update to Provide	6/18/2010	
Gower Computer Support, Inc.	Fixed Wireless	No Update to Provide	2/14/2011	
Grande Communications Networks LLC	Cable	No Update to Provide	3/31/2010	
Grayson CableRocket, LLC	Cable	No Update to Provide	6/15/2010	
Gtek Communications	Backhaul	No Update to Provide	5/24/2010	
Guadalupe Valley Communications Systems	Cable	No Update to Provide	11/23/2009	
GVEC.net	Backhaul	No Update to Provide	2/25/2010	
Helmsco, Inc.	Fixed Wireless	No Update to Provide	2/15/2010	
Hill Country Telephone Cooperative, Inc.	Backhaul	No Update to Provide	3/9/2011	
Hill Country Telephone Cooperative, Inc.	DSL	No Update to Provide	3/9/2011	
Hill Country Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	3/9/2011	
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010	

IGN-LPG Enterprises LLC	Fixed Wireless	No Update to Provide	2/17/2011	
Industry Telephone Company	DSL	No Update to Provide	11/6/2009	
James Cable LLC	Fixed Wireless	No Update to Provide	1/11/2010	
La Ward Telephone Exchange, Inc.	DSL	No Update to Provide	11/16/2009	
Lake Livingston Telephone Company, Inc.	DSL	No Update to Provide	11/20/2009	
Livingston Telephone Company, Inc.	Backhaul	No Update to Provide	2/25/2010	
Livingston Telephone Company, Inc.	DSL	No Update to Provide	2/25/2010	
Maverick Internet	Backhaul	No Update to Provide	6/4/2010	
Maverick Internet	Fixed Wireless	No Update to Provide	6/4/2010	
McDonald Group	Cable	No Update to Provide	3/5/2010	
Mid-Plains Rural Tel. Co-op. Inc.	Backhaul	No Update to Provide	3/5/2010	
Mid-Plains Rural Tel. Co-op. Inc.	DSL	No Update to Provide	3/5/2010	
Mid-Plains Rural Tel. Co-op. Inc.	Fiber	No Update to Provide	3/5/2010	
Millennium Telcom, LLC	Cable	No Update to Provide	8/26/2010	
Millennium Telcom, LLC	DSL	No Update to Provide	8/26/2010	
Millennium Telcom, LLC	Fiber	No Update to Provide	8/26/2010	
NetWest Online, Inc.	Fixed Wireless	No Update to Provide	2/23/2010	
Neu Ventures, Inc.	Backhaul	No Update to Provide	6/17/2010	
Neu Ventures, Inc.	Cable	No Update to Provide	6/17/2010	
Neu Ventures, Inc.	Fixed Wireless	No Update to Provide	6/17/2010	
Nextlink Wireless, Inc.	Backhaul	No Update to Provide	2/12/2010	
Nortex Communications	Backhaul	No Update to Provide	2/12/2010	
Nortex Communications	Cable	No Update to Provide	2/12/2010	
Nortex Communications	DSL	No Update to Provide	2/12/2010	
Nortex Communications	Fiber	No Update to Provide	2/12/2010	
Nortex Communications	Fixed Wireless	No Update to Provide	2/12/2010	
North Texas Cellular, Inc.	DSL	No Update to Provide	3/22/2010	
North Texas Telephone Company	DSL	No Update to Provide	11/30/2009	
NTS Communications	DSL	No Update to Provide		
Panhandle Telephone Cooperative, Inc.	Backhaul	No Update to Provide	12/7/2009	
Panhandle Telephone Cooperative, Inc.	Cable	No Update to Provide	12/7/2009	
Panhandle Telephone Cooperative, Inc.	DSL	No Update to Provide	12/7/2009	
Panhandle Telephone Cooperative, Inc.	Fiber	No Update to Provide	12/7/2009	
Panhandle Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	12/7/2009	
Panhandle Telephone Cooperative, Inc.	Mobile Wireless	No Update to Provide	12/7/2009	
Pathwayz Communications, Inc.	DSL	No Update to Provide	12/9/2011	
Pathwayz Communications, Inc.	Fixed Wireless	No Update to Provide	12/9/2011	
Peoples Communication, Inc.	Backhaul	No Update to Provide	3/4/2010	
Peoples Communication, Inc.	DSL	No Update to Provide	3/4/2010	
Poka Lambro Telephone Cooperative, Inc.	Backhaul	No Update to Provide	2/15/2010	
Poka Lambro Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	2/15/2010	
Promptwireless, LLP	Fixed Wireless	No Update to Provide	4/27/2010	
Pulsestream Internet Services, LLC	Backhaul	No Update to Provide	6/2/2011	
RB3, LLC	Cable	No Update to Provide	10/23/2009	
RB3, LLC	Fixed Wireless	No Update to Provide	10/23/2009	
Rioplex Wireless LTD	Fixed Wireless	No Update to Provide	3/3/2010	
Riviera Telephone Company, Inc.	Backhaul	No Update to Provide	3/11/2010	
Riviera Telephone Company, Inc.	DSL	No Update to Provide	3/11/2010	
RodZoo Wireless	Fixed Wireless	No Update to Provide		
Santa Rosa Telephone Cooperative, Inc.	Backhaul	No Update to Provide	3/9/2010	
Santa Rosa Telephone Cooperative, Inc.	DSL	No Update to Provide	3/9/2010	
Santa Rosa Telephone Cooperative, Inc.	Fiber	No Update to Provide	3/9/2010	
Santa Rosa Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	3/9/2010	
South Plains Telephone Cooperative, Inc.	Backhaul	No Update to Provide	3/15/2010	
South Plains Telephone Cooperative, Inc.	DSL	No Update to Provide	3/15/2010	
Southwest Arkansas Telephone Cooperative, Inc.	Backhaul	No Update to Provide	1/19/2010	
Southwest Arkansas Telephone Cooperative, Inc.	DSL	No Update to Provide	1/19/2010	
Southwest Texas Telephone Company	Backhaul	No Update to Provide	3/3/2010	
Southwest Texas Telephone Company	Fiber	No Update to Provide	3/3/2010	
Southwest Texas Telephone Company	Fixed Wireless	No Update to Provide	3/3/2010	
Sprint Nextel Corporation	Backhaul	No Update to Provide	1/14/2010	
Stelera Wireless, LLC	Mobile Wireless	No Update to Provide		
T-Mobile USA, Inc.	Backhaul	No Update to Provide	1/8/2010	
Tatum Telephone Company	DSL	No Update to Provide	11/24/2009	
Taylor Telephone Cooperative, Inc.	Backhaul	No Update to Provide	3/11/2010	
Taylor Telephone Cooperative, Inc.	DSL	No Update to Provide	3/11/2010	
Taylor Telephone Cooperative, Inc.	Fiber	No Update to Provide	3/11/2010	
Texas Broadband, Inc.	Fixed Wireless	No Update to Provide	5/12/2010	
Texas Wireless Internet	Fixed Wireless	No Update to Provide	5/14/2010	
Texhoma Wireless, L.L.C.	Fixed Wireless	No Update to Provide	3/8/2011	
Time Warner Cable LLC	Backhaul	No Update to Provide	12/21/2009	
Totelcom Communications, LLC	DSL	No Update to Provide	11/30/2009	
Totelcom Communications, LLC	Fixed Wireless	No Update to Provide	11/30/2009	
tw telecom of texas, llc	Backhaul	No Update to Provide	3/10/2010	
Valley Telephone Cooperative, Inc.	Backhaul	No Update to Provide	11/24/2009	
Valley Telephone Cooperative, Inc.	Fiber	No Update to Provide	11/24/2009	
Valley Telephone Cooperative, Inc.	Fixed Wireless	No Update to Provide	11/24/2009	
Versalink Enterprises, LLC	Cable	No Update to Provide	5/11/2010	
Web Fire Communications	DSL	No Update to Provide		
Wes-Tex Telecommunications, Ltd.	Backhaul	No Update to Provide	3/1/2010	
Wes-Tex Telecommunications, Ltd.	Cable	No Update to Provide	3/1/2010	
Wes-Tex Telecommunications, Ltd.	DSL	No Update to Provide	3/1/2010	
Wes-Tex Telecommunications, Ltd.	Fixed Wireless	No Update to Provide	3/1/2010	
West Texas Rural Telephone Cooperative, Inc.	Backhaul	No Update to Provide	3/31/2010	
Wharton County Electric Cooperative, Inc.	Backhaul	No Update to Provide	4/15/2010	
Wharton County Electric Cooperative, Inc.	Fixed Wireless	No Update to Provide	4/15/2010	
Wireless Internet Corp	Fixed Wireless	No Update to Provide	11/11/2011	
XO Communications, LLC	Backhaul	No Update to Provide	2/12/2010	
Zeecon Wireless Internet, LLC	Fixed Wireless	No Update to Provide		
AirBand Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data	3/29/2010	
Basin Broadband, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	3/23/2010	
Blossom Telephone Company, Inc.	DSL	No Update Provided - Use Last Submission Data	3/26/2010	
Cequel Communications	Backhaul	No Update Provided - Use Last Submission Data	12/15/2009	
Cequel Communications	Cable	No Update Provided - Use Last Submission Data	12/15/2009	

Charter Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data	12/15/2009	
Cogent Communications, Inc.	Backhaul	No Update Provided - Use Last Submission Data		
CTX Unwired	Fixed Wireless	No Update Provided - Use Last Submission Data	2/14/2011	
Dell Telephone Cooperative, Inc.	DSL	No Update Provided - Use Last Submission Data	4/6/2010	
Dell Telephone Cooperative, Inc.	Fiber	No Update Provided - Use Last Submission Data	4/6/2010	
ECTISP, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data		
Enet Internet Services, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data		
Greasy Bend Ventures, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	8/16/2010	
Level 3 Communications, LLC	Backhaul	No Update Provided - Use Last Submission Data	12/14/2009	
North Texas Broadband, LLC	Cable	No Update Provided - Use Last Submission Data	3/1/2010	
Northland Communications	Cable	No Update Provided - Use Last Submission Data	8/19/2010	
NTS Communications	Fiber	No Update Provided - Use Last Submission Data		
SmartBurst, LLC	Fixed Wireless	No Update Provided - Use Last Submission Data	8/4/2010	
Smithville System	Fixed Wireless	No Update Provided - Use Last Submission Data	6/17/2010	
TGN Cable	Cable	No Update Provided - Use Last Submission Data	5/20/2010	
Tier One Converged Networks, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	3/24/2010	
TISD, Inc.	Fixed Wireless	No Update Provided - Use Last Submission Data	4/19/2010	
Windjammer Communications LLC	Cable	No Update Provided - Use Last Submission Data	11/16/2009	
Windstream Communications	Backhaul	No Update Provided - Use Last Submission Data	1/19/2010	
Windstream Communications	DSL	No Update Provided - Use Last Submission Data	1/19/2010	
Zayo Bandwidth, LLC	Backhaul	No Update Provided - Use Last Submission Data		
Zito Midwest, LLC	Cable	No Update Provided - Use Last Submission Data	2/17/2011	
South Texas Internet	Fixed Wireless	Solicited Initial Data		
WesTex Connect Internet	Fixed Wireless	Solicited Initial Data		
Windstream Communications	DSL	Solicited Initial Data	1/19/2010	
281 Communications, Inc.	Fixed Wireless	Refused to Participate		[AUG-07-12 Dwayne Goodman] Provider has requested not to be contacted anymore in regard to the Connected Texas mapping project.
Buford Media Group	Cable	Refused to Participate		[JUN-28-12 Daryl Coffey] A company representative stated that the provider would not be submitting data at this time.
Gecko Inter.net	Fixed Wireless	Refused to Participate		[JUL-31-12 Dwayne Goodman] An e-mail was received from a company representative declining to participate.
Hill Country Networks	Fixed Wireless	Refused to Participate		[AUG-07-12 Daryl Coffey] A company representative said that he will not provide us with tower information.
Reliance Globalcom Services, Inc.	Backhaul	Refused to Participate		[JUN-08-12 Wes Kerr] a company representative responded "no thank you" when asked if they would be participating this round.
Western Broadband	Fixed Wireless	Refused to Participate		[AUG-09-12 Dwayne Goodman] Owner of the company conveyed no interest in participating in the broadband mapping project.
Americatel Corporation	Backhaul	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 3 contact attempts were made this period.
Centrovision	Cable	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 5 contact attempts were made this period.
CIT - Campbell Information Technology	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 contact attempts were made this period.
Cybercom Corporation	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 5 contact attempts were made this period.
Fiberlight LLC	Backhaul	Non-Responsive to Multiple Attempts	4/20/2010	In addition to numerous contact attempts made during past mapping submission periods, 3 contact attempts were made this period.
FiberTower Corporation	Backhaul	Non-Responsive to Multiple Attempts		4 contact attempts were made this period between May 2, 2012 and August 7, 2012.
Harris Broadband L.P.	Fiber	Non-Responsive to Multiple Attempts	5/7/2012	6 contact attempts were made this period between May 7, 2012 and August 9, 2012.
I20 Access	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during the last mapping submission period, 2 contact attempts were made this period.
Internet America Wireless Internet Access	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 contact attempts were made this period.
Local Choice Internet	Fixed Wireless	Non-Responsive to Multiple Attempts		7 contact attempts were made this period between July 6, 2012 and August 14, 2012.
LSCWeb.Com	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 3 contact attempts were made this period.
Medicine Park Telephone Company	Backhaul	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 3 contact attempts were made this period.
New Source Broadband	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during the last mapping submission period, 4 contact attempts were made this period.
Phoenix Broadband, LLC	Fixed Wireless	Non-Responsive to Multiple Attempts		6 contact attempts were made this period between July 3, 2012 and August 14, 2012.

Phonoscope Enterprises Group, LLC	Backhaul	Non-Responsive to Multiple Attempts	5/20/2010	In addition to numerous contact attempts made during past mapping submission periods, 4 contact attempts were made this period.
Sterling Cable	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 contact attempts were made this period.
Sterling Cable	Cable	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 contact attempts were made this period.
Terral Telephone Company	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 4 contact attempts were made this period.
Texas Communications	Fixed Wireless	Non-Responsive to Multiple Attempts		In addition to numerous contact attempts made during past mapping submission periods, 6 contact attempts were made this period.
VOWNet	Fixed Wireless	Non-Responsive to Multiple Attempts		11 contact attempts were made this period between May 25, 2012 and August 14, 2012.
Indian Creek Internet Services	Fixed Wireless	Slated Field Audit for Estimated Coverage Analysis		

THE STATE OF UTAH
BROADBAND PROJECT

The State of Utah Broadband Project
State Broadband Data and Development
(SBDD) Grant Program
October 1, 2012

Data and Mapping Methodology

Data Submission Methodology Update (Round 6, June 2012)

The Utah Broadband Project communicated with 43 of 44 previously identified broadband providers that offer services within Utah. Of the 44, 29 providers updated their data, 12 confirmed no updates this round, 2 didn’t meet the deadline to send us updates, and no correspondence, in response to repeated email and telephone attempts, was returned by the remaining provider, HNS License Sub.

This round, the Utah Broadband Project invited broadband providers to submit designated commercial service. We used the NTIA Data Model Guidelines to determine when to mark census blocks and road segments service with an end user category of “Governmental, Small Business, Medium, or Large Enterprise”.

In addition to the 44 broadband providers, we identified 7 new providers this round to the project. Three providers are WISPS- TKS, Rapidwave, and Txox. Two providers are satellite providers that the NTIA asked us to reach out to- Starband and Skycaster, We didn’t hear back from either. The last three are business only providers that we are including for the first time this round and using the ENDUSERCAT field to distinguish them from residential providers. The business only providers new this round are Zayo and Syringa. Of the 7 new providers, data was received data from only TKS and Rapidwave before the deadline. We expect data for the next submission round from Txox, Zayo, and Syringa. Utah now has a total of 51 broadband providers.

Utah Community Anchor Institutions (CAIs): Numerous records have been removed to eliminate duplicates stemming from overlap between datasets such as Schools, Libraries, the Utah Education Network (UEN), the State of Utah’s Wide Area Network (WAN) etc. In all over 840 records have been removed from the original 4080 records. The library records’ CAIID field was updated to contain both the “FSSCKEY” and “FSCSSEQ” values. Also many school and school district records CAIID field have been populated with their “NCES” codes. Previously submitted records with no associated point geometry have been removed or have had the correct geometry assigned to them. For many records the broadband speeds and Technology of Transmission have been populated and updated. Where possible, address record values have been normalized. All CAI records now have the “Full Census Block ID” codes.

All data was edited to match the 2012 TIGER Census Utah State Boundary. This change mainly affected satellite provider’s coverage areas.

Update October 18, 2012: Due to issues discovered during validation and verification, Frontier Communication's data was not updated this round. We are currently working with the provider to determine a process to map their service area most accurately and this issue will be resolved by the Spring 2013 data submission.

Map Disclaimer

Broadband service availability and characteristics are depicted as derived from data assembled by the Utah Broadband Project. Data sources include biannual broadband service provider submissions and publicly available sources. Data has been modified, where necessary, to meet broadband mapping standards set by the National Telecommunications and Information Administration (NTIA).

Broadband service availability is displayed per NTIA specifications which include technology and speed categories and the generalization of non-wireless service availability information to either U.S. Census blocks (where smaller than 2 sq. miles) or road segments.

Speeds shown are the 'maximum advertised' for the geographic features depicted, and must exceed 0.768 Mbps download and 0.2 Mbps upload (NTIA minimum definition of broadband) to be included. Actual speeds may vary within and along census blocks and roads due to the granularity and currency of the data, technological limitations, and service plan limitations. Users of this data and associated map visualizations are encouraged to inquire directly to providers for current service availability and speed.

All information presented on the Utah's interactive broadband map is for general reference purposes only and may contain errors and omissions. The State of Utah makes no warranty with respect to information available, express or implied, including but not limited to the fitness for use for a particular purpose.

The Utah Broadband Project welcomes comments: broadband@utah.gov.

Map Data Description

All broadband mapping data either is sourced directly from a broadband provider, or from working directly with a provider. Utah has 100% participation from the 51 providers identified to date.

Wireless broadband internet data is mapped using coverage area footprints derived from analyzing antennae location, signal strength and terrain. Wireline broadband internet data is mapped using 2010 census blocks for blocks less than two square miles in area, and road segments in cases of larger census blocks.

Once a provider's broadband coverage is initially mapped, data updates take several forms including GIS files, written descriptions, provider created maps, and verbal and written discussions.

Community Anchor Institution locations are mapped using supporting resources from Utah's State Geographic Information Database (SGID). Broadband Internet subscription information comes from a variety of sources including the Utah Education Network, the State of Utah Department of Technology Services, and the Utah Telehealth Network.

Confidential data not shown on the map is also collected by the Project, and submitted to the NTIA. This information includes middle and last mile broadband infrastructure points.

Validation

The Project's data submission is compliant with the December 2011 SBDD Data Transfer Model and the State Broadband Data and Development NOFA. All broadband data that does not agree with the allowable values and ranges in the Data Transfer Model is studied and adjusted to agree with the data model or noted as exceptions as appropriate.

Another important part of data validation is the project's data intake and processing flow. In summary, our data flow consists of:

- Initial evaluation of data submission and initial documentation.
    - Recordation what was submitted by provider.
    - Verification that the data update is usable.
- Make data submission updates and put the data in the NTIA data model.
- Detailed evaluation and documentation.
    - Document details of the data and the data processing steps.
    - Review the provider's changes from previous submissions for consistency between what is in the data and what discussions have been made with providers.
- Create data feedback for provider to review.

Aerial photography, address location services, census block geometry, and road segment geometry used for broadband service mapping and for quality control of the broadband data are from public domain resources in the SGID.

Verification

All Broadband data received by the project is reviewed for overall verification. Besides our initial verification, other sample verification methods are listed below.

- The project maintains archives and documentation of a given provider's data over time, and changes are noted and verified as to their plausibility. All data related interaction with a provider since the project began in June 2010 is also documented. This provider submission history is periodically referred to in order to guide correspondence needs and special handling of the submission data.
- For each provider's geographical extent, examination of areas that are not served or are underserved is completed and discussed with the provider for accuracy.
- Every time the project receives updates from a broadband provider, data feedback is sent to the provider for them to verify that the data or updates have been prepared accurately. The biggest source of feedback for providers is being able to interact one on one with their specific data on the Utah Broadband Interactive Map. Providers can do this on their own or with the project during a scheduled conference.
- Local telecom territories are used to verify reported DSL coverage areas.

- Wireless Drive Test: In July 2011, the Utah Broadband Project contracted with Isotrope LLC, a Massachusetts-based company, to perform a drive test to assess wireless broadband services and capabilities throughout the state. The drive test data, collected by traversing over 6000 miles of the state , provides a snapshot in time of mobile broadband speeds, signal strength and technologies. After being collected, the drive test data was used to assess broadband provider data and was used in verification discussions with wireless providers. It was also provided to all wireless providers for their own use.
- Prior to July 2011, commercial wireless data such as the American Roamer data was used to verify reported wireless coverage areas.
- In order to map the wireless data more accurately, whenever possible the project mapping team has worked with providers to acquire wireless coverage areas based on signal propagation modeling. If a provider does not have the capacity to submit a propagated coverage area, the project encourages providers to provide tower locations and antenna locations and specifications to the project mapping team that are then used for a viewshed to create a propagated coverage area.

Additional Utah Broadband Maps and Data Resources

The Utah Broadband Project maintains additional maps beyond the online interactive map. These are available on request and include maps of broadband coverage availability, best available speed, and highest order technology in Utah. The project is also willing to work on other specific mapping requests.

About the State Level Broadband Map

The Utah Broadband Interactive Map was developed and is hosted by the Utah Automated Geographic Reference Center (AGRC) utilizing data complied by the Project from broadband providers and public sources, including Utah's State Geographic Information Database (SGID) which is utilized extensively for locating addresses, locating geographic places, and displaying background maps.

Goals

- The map attempts to provide consumers, community leaders, and broadband providers with a comprehensive map-based view of non-confidential data complied by the Utah Broadband Project.
- The map is also meant to be used by policy makers or policy maker supporters, such as the Utah Broadband Advisory Council.
- The map serves as a basis of discussion with Broadband Providers to verify accuracy of data.
- The data on the map is used in our twice yearly submission to the NTIA.

Commonwealth of Virginia

Virginia Center for Innovative Technology

Virginia Information Technologies Agency
Virginia Geographic Information Network

Virginia Tech
Center for Geospatial Information Technology

NTIA STATE BROADBAND DATA DEVELOPMENT
ROUND 6 - Fall 2012 SUBMISSION

Summary of Virginia Submission

The Virginia Center for Innovative Technology (CIT) was designated by the Governor of Virginia as the primary point of contact for all Commonwealth of Virginia participation in the National Broadband Mapping Project. The CIT worked in conjunction with the Virginia Information Technologies Agency's (VITA) Virginia Geographic Information Network (VGIN) to review, process, normalize and submit the information outlined in the National Telecommunications and Information Administration's (NTIA) Notice of Funding Availability (NOFA) establishing a Virginia iteration of the National Broadband Map.

The fall 2012 submission to the NTIA includes data from 56 broadband service providers with unique federal identifications delivered in various formats ranging from GIS shape files to text files detailing broadband availability. To provide a complete snapshot of broadband availability in Virginia, the spring 2011 submission data was carried forward for several remaining broadband providers while some carry over providers were reworked for the 2010 census block request.

A summary of the Fall 2012 submission data includes:

Address point data	0
Census Block polygons provided with coverage information	397868
Street Segments provided with availability information	64787
Wireless polygons with coverage	27
Middle Mile points with availability information	596
Community Anchor Institution points with availability information	4075

All broadband providers participating provided advertised speed information for wireless polygons, census block, road centerline segment, or addresses.

There are a total of 174 broadband providers that have been identified through various sources within the Commonwealth of Virginia as of April 1, 2012. There are 68 providers who are participating in the national program and 106 who have not responded to a call for data. Virginia has an on-going effort to contact the providers who have not responded to offer any assistance needed for them to participate.

As of the fall 2012 NTIA SBDD submission, Virginia has elected to no longer submit addresses as point data. All address data has been geocoded to the VA road centerline locater and road segments were then selected by location and loaded to the NTIA data model. This change in processing procedure creates a redistribution of the total record counts by feature class.

Virginia Broadband Data Verification and Validation

Verification Techniques

In the fall of 2010, the Virginia broadband mapping team subcontracted with Apex-CoVantage to provide the following one-time broadband data verification techniques using standardized questionnaires for the Commonwealth of Virginia:

- Telephone interviews
- Field (door to door) interviews
- Direct mailings
- Drive Testing
- GPS data collection at field interview sites

A total of 2,421 surveys were conducted, with 616 in-person and 1,805 by telephone.

Validation Methods

Using the NTIA definitions for served/under-served/unserved combined with Census demographics and Virginia broadband availability data, the Virginia Tech mapping team produced an estimated Broadband “serve-ability” Census Block map for Virginia. From this the Apex team then identified a geographically stratified (rural/urban) statistically significant sample size for which to apply the above data verification techniques.

Results

The effort resulted in the following findings:

- Surveys confirming Wireline Provider access: 97.3%
- Surveys confirming Wireless Provider Access: 99.7%
- Surveys confirming Internet Service Provider: 91.1%

In addition, the survey questionnaires confirmed valuable location information (lat/long & address) along with details about internet service provider and demographic information.

Percentages as of April 1, 2012.

Base Map Data

VGIN maintains statewide imagery, road centerline, and address point feature classes. a VGIN also maintains a series of statewide base map data sets, or partnerships with commercial entities which allow the granularity of data necessary to support the National

Broadband Mapping Project. The following Virginia and Federal data sets are used in SBDD data processing.

Road Centerlines (RCL) – VGIN maintains a statewide road centerline feature class that is updated quarterly using locality centerline submissions. This road centerline database contains address range information when it is provided by the locality. The RCL database is used to generate a geocoding service which is an interpolated point along a centerline that is fed into the Virginia statewide composite geocoding web service.

TIGER 2010 Census Blocks – 2010 Census geometry that is available to the broadband mapping project for location and presentation of broadband data.

Selection Set Feature Classes

Before any provider information was processed, a geodatabase of selection set feature classes was created and individual feature classes were created for use in the fall 2012 data submission. In order to support the processing of broadband data based on select by location, feature classes were set up into a selection feature database which allowed subsets of provider information to be joined spatially or by attributes and schema to be used seamlessly from the processing environment to the transfer data model. Each feature class of interest was an import of the most recent iteration the NTIA SBDD data model schema (June 2012). Features from Virginia base map data were ETL'd using appropriate field mapping. The following are layers used in the Selection Set geodatabase:

Road Centerlines - Virginia RCL data has address ranges in the form of four fields; from left, to left, from right, & to right. Two fields were added in the VA State RCL output for address high and low and calculated based on several selection queries. A blank schema feature class of the roads was added and the field V_LEID (VA RCL unique ID) was added to the feature class. This customized statewide data set from the Virginia RCL Quarter 2 of 2011 was then loaded to a selection set feature class which cloned the schema of the NTIA SBDD model feature class called BB_Service_RoadSegment. Unique IDs from the VA centerline were loaded to the selection set road centerline feature class. All Broadband related fields (DBA, FRN, TransTech, etc.) assumed default values of the NITA data model and were <Null> or blank.

2010 Census Blocks Less than 2 Square miles - A field in a staging feature class for the 2010 TIGER census blocks called SQ_MI_VA_LAMBERT was added to the selection set feature class and was created in the NAD_1983_Virginia_Lambert (Meters) projection and calculated to the WGS_84 data set. This process was used in Square Mile QC. All blocks greater than two square miles were removed from this feature to ensure all joined data sets would yield a match from a provider spreadsheet to a block in the selection feature class and the match would be less than two square miles only. 2010 Tiger blocks were loaded into the NTIA model directly using the schema of the NTIA SBDD data model for the feature class BB_Service_CensusBlock. GEOID values in the 2010 data were mapped to the FIPS values in the NTIA schema and other related block data was matched with its appropriate field name. Broadband related fields assumed default values of the NTIA data model.

Broadband Provider Processing Environment

To support the processing of broadband provider information separately, a broadband provider specific staging geodatabase was created. Each broadband provider participating in the fall 2012 NTIA submission had its own geodatabase and data was processed completely independent of all other broadband providers, allowing providers to move through the process at different rates. This procedure also allowed the correction of any data problems specific to broadband providers without affecting the entire submission database.

A naming convention for each selection set feature class was used and called "NTIA_" and the feature class type. "NTIA_Roads" were loaded to the transfer data model feature class BB_Service_RoadSegment, "NTIA_Census_Blocks" were loaded to the transfer data model BB_Service_CensusBlock feature class, and depending on provider category "NTIA_Wireless" was loaded to the transfer data model BB_Service_Wireless. Once the broadband provider data was processed to a point in its native feature class in the staging geodatabase which fully conformed to the NTIA specifications, it was included in the Virginia submission for quality control and subsequent delivery.

Generalized Broadband provider Data Processing

Broadband provider processing was accomplished using selection set feature classes and the appropriate geometry. Data was reported in many different categories and each of these reporting formats was handled differently. While there were other NTIA SBDD data sets that were provided differently from providers (pricing, speed by region), they were considered separate use cases than base layer data since the output of these secondary data sets was not primarily geospatial. The following are GIS data layers reported in the SBDD data model.

Wireless Service Area Polygon Reporting – Service Area Polygons were reported by Wireless Broadband providers and required little processing to be included in the NTIA SBDD data model. Typical inclusion processes included attribute validation and use of the ESRI Simple Data Loader or Copy and Paste.

Census Block Reporting – Broadband providers reporting broadband availability on a census block basis submitted it in list form a majority of the time. These lists came in the form of spreadsheets and text files. These lists were normalized into spreadsheets and then imported into a provider staging geodatabase table. An attribute join using the full census block ID was completed to the Selection Set census block feature class. Census blocks less than 2 square miles were exported to a separate feature class to use in processing address and/or road centerline data also sent by the provider.

Address Reporting – Some providers reported data in census blocks less than two square miles but also included customer addresses for blocks greater than two square miles.

The majority of wireline providers reporting broadband availability on a service address basis submitted data which DID NOT differentiate where their addresses fell within blocks less than or greater than two square miles. In order to convert the provider's data to the NTIA spatial parameters of block and centerline differentiation, all lists were converted to spreadsheets and were incorporated into the SBDD submission in a two tiered approach using the NTIA and VGIN's understanding of broadband coverage:

1) Geocoded to VGIN's address point locator, then blocks less than two square miles were selected where a geocoded point fell within.

2) Addresses that did not achieve a result from the address point geocode or were outside of blocks less than two square miles were re-geocoded to VGIN's Road Centerline locator and point results were spatially joined to the selection set RCL data providing a centerline feature output. Addresses were first geocoded against the statewide address point database.

Road Segment Address Reporting – Broadband providers reporting broadband availability using road address ranges submitted the data in a non-spatial list in a majority of cases, although several providers did send in TIGER lines or VA RCL data. These lists were normalized into a series of spreadsheets when processing the individual provider. The data was either used in joining to census features by Tiger Line ID (TLID) and then selecting by location from the selection set RCL data or used raw in geospatial format and selected.

Community Anchor Institutions –
Virginia's CAI data has additional attribution beyond the NTIA data model due to the source of the VA data set. VGIN and Virginia Tech both house CAI data although the record counts for tables are not identical. The master VGIN geospatial feature class is used in submission to the SBDD project while changes from Virginia Tech are generally conflated.

Virginia Tech held speed tests in 2009 and this information was applied to the NTIA SBDD transfer data models of the past. With the inclusion of attribute values for subscriber upload and subscriber download speeds with the most recent NTIA model for the Spring

2012 submission, Virginia Tech provided VGIN with an export of its most recent database to include speed testing held in 2011 in the SBDD Transfer Data model CAI feature class. Included were a subset of features based on CAI category and were not the entire CAI feature class so features in the VT data were then applied to the VGIN submission feature class.

In order to apply changes from the Virginia Tech update to the VGIN NTIA submission data, the VGIN CAI point feature classes as well as the VT point feature class update were imported into a staging file Geodatabase. The VT update was buffered 5 feet and output to a buffer feature class which included the same attribution as the point feature class. The point was spatially joined to the buffer feature class and values were calculated within the point data to include updates to speeds and transmission technologies where captured by VT. Of the total features, approximately 100 features did not fall within the buffers and were not spatially joined. These values were either features which the VT feature class contained and the VGIN feature class did not, or the geometry locations were different for the same feature. These remaining buffered features were exported to a separate feature class to use in manually adding changes to the VGIN point data. For each feature not available in the VGIN CAI features, the data was copied from the Virginia Tech data and placed in the VGIN CAI feature class. For each feature that were in both databases but spatial location was different, the ESRI ArcGIS Attribute Transfer functionality was used to conflate speed values.

In order to represent the data with 2010 census geography as requested by the NTIA for the Fall 2011 SBDD submission, data was then spatially joined to the 2010 census block data and output in the working Geodatabase feature class. The resulting feature class was calculated for the full FIPS ID and this was loaded to the transfer data model in the NTIA SBDD format.

Middle Mile – The majority of providers do not send middle mile data. When it is received it is converted into a geodatabase table in the broadband provider's staging geodatabase. An add XY function was performed in ArcMap and XY events were exported as a new feature class. Inside the provider's staging geodatabase, the NTIA SBDD data model feature class named BB_ConnectionPoint_MiddleMile was imported and renamed NTIA_middle_mile. Data was either loaded to this feature class and all appropriate fields were calculated based on the XY event in order to load data spatially or if only a handful of points were provided the data was manually edited in an edit session.

Pricing - If nominal weighted subscriber speed was available from a broadband provider, the data was placed into an excel spreadsheet for the spring 2012 submission which followed the format of requested text output information from NTIA. It was then output to a requested tab delimited text file for the release. All providers who had previously sent in pricing data but had not submitted an update for the spring 2012 release were carried over into the spring 2012 pricing spreadsheet.

Speed based on CMA/MSA/RSA - If speed was available by cellular market area or MSA/RSA and provided to CIT and VGIN, this information was placed into a newly created SDE feature class which tracked the most current speed from a provider. If the provider was a new or updated submission, the feature class was updated with the most recent speed data. All archive speed data was located and custom areas of interest were added as polygons in this feature class.

Processing QC, Batch Calculation, & Loading

While some provider data imported directly, where information for 2010 census geography was needed (Census Blocks, Middle Mile, Address Points) the feature of interest was imported and processed differently depending on the type of geography stored. Not all providers submitted census blocks to the NTIA but those who did were validated with a field in the selection set census block layer which contained square mileage calculated on the VA Custom Lambert projection.

For data reported as service addresses, several fields were required that could be calculated in batch. The FULLFIPSID was calculated to the address points by spatially joining points to the census blocks. Latitude and Longitude were calculated in ArcCatalog using the calculate geometry function.

Only a few broadband providers who participated in the fall 2012 NTIA submittal provided Middle mile data. Resultantly, the processing and aggregation of a middle mile data set was done outside of standard broadband provider data processing.

Address Points, Road Centerlines, Census blocks, and Wireless Service polygons were processed as broadband provider data was received although middle mile information was a post processing step. To create middle mile event data, the broadband providers that provided the information to CIT and VGIN generally included latitude and longitude of the facility and these values were used in ArcGIS with the add XY function. After points were brought into ArcGIS, data was exported into a separate feature class and values were calculated based on information the broadband provider provided.

Specific Broadband Provider Processing Methodology

The following Broadband Providers submitted data for the fall 2012 NTIA submission. It is assumed that the participating Broadband providers provided entire coverage as opposed to update only data sets unless otherwise noted. Included are the methods used in updating the Virginia Broadband map data:

Broadband Provider	FCC Registration Number
AT&T Wireless	0004979233
BIT Communications	0002031698
CenturyLink	0018626853
Charter Communications, Inc.	0017179383
Cogent Communications Group	0019066034
Comcast	0004441663
Covad Communications Company	0003753753
Cox Communications	0001524461
Cricket Communications, Inc.	0002963528
Highland Telephone Cooperative	0004318846
Mid-Atlantic Broadband Cooperative	0019765304
Northern Neck Wireless Internet Services, LLC	0017338054
Nelson County	0002033850
NTELOS Inc.	0005849518
NTELOS (Richmond 20 MHz LLC)	0001656180
NTELOS (Virginia PCS Alliance, L.C.)	0002051720
NTELOS (West Virginia PCS Alliance, L.C.)	0002049328
NTELOS Telephone Inc.	0002073138
NTELOS Network Inc.	0003742442
Roanoke and Botetourt Telephone Company	0003775244
R&B Network Inc.	0003775301
RCN	0003735016
Shentel Cable Company	0018024075
Shentel Service Company	0013393988
Sidera Networks	0006254403
Skyline Telephone Membership Corporation	0001952555
Sprint Nextel Corporation	0003774593
Starband Communications Inc.	0005087457
Suddenlink Communications	0014848808
T-Mobile	0006945950
TDS Telecom (Amelia Telephone Corporation)	0002073526
TDS Telecom (New Castle Telephone Company)	0003767399
TDS Telecom (Virginia Telephone Company)	0002058261
Time Warner Cable	0013430244
Verizon Wireline	0002073203
Verizon Wireless	0003290673
VSAT Systems, LLC. (Skycasters)	0001875615
XO Communications	0006275945

AT&T Mobility, LLC

AT&T wireless provided geospatial data in the form of three polygon shape files. No Middle mile data was included as no updates had occurred, so the spring 2012 submission was carried over to the fall 2012 NTIA data model.

Inside the shapefiles (3G, 4G, and LTE) provided by AT&T were over 2300 polygon records with no meaningful attribution, and gridded for internal use. Each shape file was copied for editing into a staging database and all were attributed appropriately. The 4G and LTE polygons were then merged into a single record due to having identical attribution. The records were then loaded into the VGIN NTIA transfer data model.

Provider Name:	AT&T Mobility, LLC
DBA Name:	AT&T Mobility, LLC
FRN:	0004979233
Transmission Technology	80
Wireless Polygons:	2
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	1
Community Anchor Institutions reported:	0

BIT Communications

BIT Communications provided a hand drawn map overlay over a street map. A matching polygon shapefile was created to create the overlay drawing in ArcMap. Using the select by location tool, the road segments within the overlay that had broadband data where selected and exported into a shapefile. This shapefile was then edited and loaded to the NTIA Transfer data model.

Provider Name:	Buggs Island Telephone Cooperative
DBA Name:	BIT Communications
FRN:	0002031698
VA Data Category:	1
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	1
Middle Mile features:	0
Community Anchor Institutions reported:	0

CenturyLink

CenturyLink provided geospatial data in the form of road centerlines and census blocks and reported to CIT that the census Geography was in 2011. Middle mile and subscriber weighted speed were not included this round and were carried over from the most recent data submission into the speed SDE layer and pricing spreadsheet.

Census blocks less than two square miles were joined to the Selection Set Census block data using the FULLFIPSID. The joined block data was output to new features, and attribution corrected as needed, and then the records were appended to the Transfer data model.

In order to provide the Road Centerline data in Virginia's geometry (VBMP RCL Quarter 2, 2011), the road lines provided by Century Link were used in a select by location analysis. The Virginia Road Centerline Selection set was selected if the lines provided by CenturyLink were within 100 feet and then exported to a new feature class. This was done on a unique attribution grouping basis, such that each exported record set could be calculated identically – and then all were remerged together. This iteration of the roads was loaded into the NTIA transfer data model.

Provider Name:	CenturyTel, Inc.
DBA Name:	CenturyLink
FRN:	0018626853
VA Data Category:	1
Wireless Polygons:	0
2012 Census Blocks <2 Square miles:	30269
Address Point features:	0
Road Centerline features:	22716
Middle Mile features:	1
Community Anchor Institutions reported:	0

Charter

Charter provided Geospatial data in the form of road centerlines and 2010 census blocks (< 2 square mile) for two different transmission types, as well as middle mile data. All were in a shape file format. No new subscriber-weighted nominal speed data was sent therefore that data was carried over from the fall 2011 submittal.

There were no changes to the middle mile data from the last submission and the data was carried over to the October NTIA data model.

The census block shp file contained only a portion of the attributes needed to meet the NTIA standards. A select by location was performed using the census block feature class in the VA Selection Set and all identical polygons matching the census blocks from Charter were exported to a shape file. All attributes were populated in the exported shape file and then loaded into the VGIN NTIA transfer data model.

In order to provide the Road Centerline data in Virginia's geometry (VBMP RCL Quarter 1, 2012) and eliminate the bulk of ancillary roads from TIGER lines, the road lines provided by Charter were used in a select by location analysis. A select by location was performed using the road centerline feature class in the VA Selection Set to select road lines that were within 2 meters of the lines submitted by Charter. The selected data was then exported to a shape file and the NTIA attributes were populated before loading into the VGIN NTIA transfer data model.

Provider Name:	Charter Communications, Inc.
DBA Name:	Charter Communications, Inc.
FRN:	0017179383
Transmission Technology	40,41
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	6526
Address Point features:	0
Road Centerline features:	238
Middle Mile features:	3
Community Anchor Institutions reported:	

Comcast

Comcast provided census block and address number spreadsheets. Speed data was provided by region in a spreadsheet and the values inside were checked against the SDE Speed by region polygon feature class. A staging file geodatabase was created for this provider and the census block spreadsheet information was imported as a table.

The spreadsheet for blocks less than two miles was imported to the staging database and joined to the census block feature class in the VGIN VA Selection Set. The joined data was then exported to a new feature class. The features in this new layer were selected by location to the SDE speed feature class in order to apply maximum down and upload speeds which were reported in the speed spreadsheet.

Address level data was geocoded to the VGIN Road Centerline address locator. Point results were then spatially joined to the selection set Road Centerline features in order to obtain a centerline feature class geometry. Select by location was performed to the SDE speed feature class in order to apply speed information to the resulting centerline features. Additional fields were populated.

To date, middle mile features or community anchor institution data has not been provided by Comcast.

Provider Name:	Comcast Cable Communications, LLC
DBA Name:	Comcast
FRN:	0004441663
Transmission Technology	40, 41
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	52,852
Address Point features:	0
Road Centerline features:	6,070
Middle Mile features:	0

Community Anchor Institutions reported: 0

Covad Communications Company

Covad provided Census Blocks, Address ranges, Middle Mile, subscriber pricing, and speed by region as text files. This data was normalized to spreadsheets. A staging geodatabase was created and the spreadsheets were imported as feature class tables. The pricing information was added directly from the imported spreadsheet to the provider aggregate pricing spreadsheet while the Middle mile and speed data were checked and no updates were necessary to make in the Middle mile point and Speed polygon feature classes so values were carried over from the fall 2012 submission.

Covad provided different transmission technology speeds within the same geometric features so the output product need was stacked geometry. In order to geographically represent the data this way, for Census Block and Address Segment data, transmission type was selected and a separate geodatabase table was exported for each. There were 3 tables for Census Blocks created; 10, 20, & 30. There were 3 tables for address ranges created; 10, 20, & 30. Each of these were joined to the appropriate feature class individually, exported as a separate feature class, and then loaded to a single feature class per geometry.

The census block text file contained varying transmission technologies. It was checked against the spring 2012 submission and changes were present in the blocks for Transmission Technology of 10. Since it was assumed there could potentially be changes for all three types, all blocks were reprocessed for fall 2012. Three output tables created for each Covad Transmission Technology Type and each table was individually joined to the selection set census block layer to verify record number counts. The joins all were successful, signifying that the data was indeed in 2010 geography so they were exported to a separate feature class per table. The three feature classes were populated based on table attributes and were then loaded to the NITA transfer data model.

Address Ranges were checked against the spring 2012 submission and records were identical. Since this information was the same, the centerlines were exported from the spring submission to the Covad staging database and then loaded to the fall 2012 Transfer Data Model.

Provider Name:	DIECA Communications, Inc.
DBA Name:	Covad Communications Company
FRN:	0003753753
Transmission Technology	10, 20 , 30
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	124,923
Address Point features:	0
Road Centerline features:	1,243
Middle Mile features:	6
Community Anchor Institutions reported:	0

Cox

Cox provided census block, address number, middle mile, and speed text files that were converted into spreadsheets. Speed data was provided by region in a spreadsheet and the values inside were checked against the VA SDE Speed by region polygon feature class. A staging file geodatabase was created for this provider and the census block spreadsheet information was imported as a table.

The spreadsheet for blocks less than two miles was imported to the staging database and joined to the census block feature class in the VGIN VA Selection Set. The joined data was then exported to a new feature class. The features in this new layer were selected by location to the SDE speed feature class in order to apply maximum down and upload speeds which were reported in the speed spreadsheet.

Address level data was geocoded to the VGIN Road Centerline address locator. Point results were then spatially joined to the selection set Road Centerline features in order to obtain a centerline feature class geometry. Select by location was performed to the SDE speed feature class in order to apply speed information to the resulting centerline features. Additional fields were populated.

Middle mile features were checked against the spring 2012 NTIA SBDD submission and not apparent changes were noticed. The point information was reused.

Provider Name:	CoxCom Inc.
DBA Name:	Cox Communications
FRN:	0001524461
Transmission Technology	40
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	28,329
Address Point features:	0
Road Centerline features:	1,079
Middle Mile features:	4
Community Anchor Institutions reported:	0

Cricket

Cricket provided Geospatial data in the form of a coverage area shape file. The coverage foot print had changed from the last submittal. The shape file was copied and pasted into the VGIN NTIA Transfer data model BB_Service_Wireless feature class and attributes were populated as listed in the source data.

Provider Name:	Leap Wireless International, Inc.
DBA Name:	Cricket Communications, Inc.
FRN:	0002963528

Transmission Technology	80
Wireless Polygons:	1
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	0
Community Anchor Institutions reported:	0

Highland Telephone Cooperative

Highland Telephone provided a document stating they had no changes to their service area but their maximum advertized download speeds have increased. The Highland data from the last submittal was edited and carried over to the VGIN Transfer data model.

Provider Name:	Highland Telephone Cooperative
DBA Name:	Highland Telephone Cooperative
FRN:	0004318846
Transmission Technology	10
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	150
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	2
Community Anchor Institutions reported:	0

HughesNet

HughesNet is a satellite provider and sent data in the form of census blocks. When previewing the data and joining the data to Virginia's statewide block feature class, all blocks were added to the join. This signified that Hughes covers the entire Commonwealth of Virginia. Since this was the cases, the Virginia boundary was copied and provided as the geospatial footprint. Attributes for Provider Name, DBA, FRN, transmission technology, and advertised speeds were included in a communication e-mail. Spectrum was assumed Satellite due to Transmission Technology type. A staging database was created and used, data was then loaded into the NTIA transfer database.

Provider Name:	Hughes Network Systems, LLC
DBA Name:	HughesNet
FRN:	0012369286
Transmission Technology	60
Wireless Polygons:	1
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	0
Community Anchor Institutions reported:	0

Lumos

Lumos (Formerly NTELOS Wireline) provided an update of spreadsheets for census blocks less than two square miles and customer addresses for blocks greater than two square miles. For each geography type, a spreadsheet was available for their DSL and Fiber product locations. The data in the blocks less than two square miles had a latitude and longitude field (XY) so this was used in finding a location for both transmission technology types. Blocks from the selection set feature class were selected by location from the centroid of the point for each transmission technology type and the attribute information was processed to the individual block feature.

The addresses in blocks greater than two square miles were geocoded against the VGIN Road Centerline address locator. These points were spatially joined to the selection road centerline feature and output to a new feature class for both DSL and Fiber tables. Attributes were available from the spatial join in the newly created centerline feature classes.

All Census Block and Road Centerline feature classes were loaded into the transfer data model. Middle Mile was not reported for the fall 2012 submission so the last received middle mile point information was updated for Lumos (formerly NTELOS Wireline) in the provider's staging database and loaded to the transfer data model.

Provider Name:	Lumos
DBA Name:	Lumos Telephone, Inc.
FRN:	0002073138
Transmission Technology	10, 50
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	2,164
Address Point features:	0
Road Centerline features:	421
Middle Mile features:	2
Community Anchor Institutions reported:	0

Provider Name:	Lumos
DBA Name:	Lumos Networks Inc.
FRN:	0003742442
Transmission Technology	10, 50
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	1,209
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	50
Community Anchor Institutions reported:	0

Provider Name:	Lumos
DBA Name:	Lumos Telephone of Botetourt, Inc.
FRN:	0003775244
Transmission Technology	10, 50

Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	578
Address Point features:	0
Road Centerline features:	273
Middle Mile features:	14
Community Anchor Institutions reported:	0

Mediacom

Mediacom submitted address data in a spreadsheet. The address data was scrubbed and geocoded. The matched and tied records were overlaid on 2010 census blocks for review. All address points except one fell inside census blocks less than two. Census blocks less than 2 square miles that contained address points were exported to a new feature class in the Mediacom staging database. The NTIA census block attributes were populated from the provider's data. The address point that fell outside blocks less than two square miles was used to select the corresponding road segment. The road segment attributes were then populated from the provider's data and exported to a new feature class.

The Mediacom Census Block and Road Segment feature classes were then loaded to the VGIN Transfer data model.

Provider Name:	Mediacom Southeast LLC
DBA Name:	Mediacom
FRN:	0004036778
Transmission Technology	41
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	7
Address Point features:	0
Road Centerline features:	1
Middle Mile features:	0
Community Anchor Institutions reported:	0

MetroCast Communications

MetroCast provided census tracts in the form of a spreadsheet where they claim they can provide service. Since the tracts were not Geospatial, the data was selected from 2010 TIGER census tract features and then imported into MetroCast's staging geodatabase. Census blocks in the selection set feature class were selected by location where a selection set census block centroid was within a MetroCast census tract. All census block polygons were exported to a feature class for loading.

Road centerlines from the selection set feature class were used in select by centroid to the MetroCast census tract feature class. Features that fell within the polygon area were extracted to a separate staging feature class within the provider staging database and the staging centerline features were selected by the polygons. Any centerline that fell outside the census block features were kept and exported a new feature class used for loading to the transfer data model.

The census block and centerline feature classes used for loading were then edited and calculated appropriately for the attributes submitted by the provider. After all features were updated, both data sets were loaded into the NTIA Transfer Data Model.

Provider Name:	Gans Communications, LP
DBA Name:	MetroCast Communications
FRN:	0018547471
Transmission Technology	40
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	11,649
Address Point features:	0
Road Centerline features:	1,530
Middle Mile features:	0
Community Anchor Institutions reported:	0

Nelson County

The County of Nelson is a new backbone provider who submitted geospatial middle mile data in the form of a shape file. A provider staging geodatabase was created to edit and format the middle mile attributes for loading into the VGIN NTIA transfer data model.

Provider Name:	County of Nelson
DBA Name:	County of Nelson
FRN:	0002033850
Transmission Technology	50
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	4
Community Anchor Institutions reported:	0

Northern Neck Wi-Fi

Northern Neck Wireless was contacted regarding the creation of a propagation model for their coverage area. Previous submissions have been in the form of address level data even though they are a wireless provider. The spring 2011 address level data was geocoded and points buffered to create polygons of limited accuracy.

Northern Neck provided the required tower and antenna data for creating a propagation model but because of time constraints we are unable to submit the new data at this time. The carryover polygon information from spring 2011 was loaded into the transfer data model as well.

Provider Name:	Northern Neck Wireless Internet Services, LLC
DBA Name:	Northern Neck Wireless Internet Services, LLC
FRN:	0017338054
Transmission Technology	70
Wireless Polygons:	2
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	0
Community Anchor Institutions reported:	0

nTelos Wireless

NTelos Wireless provided four separate polygons within a shape file. These four separate polygons were merged into one polygon layer to show an aggregate image of nTelos' Wireless coverage. A provider staging geodatabase was created. The polygons were then copied and pasted into the VGIN NTIA transfer data model and normalized to match the formatting requirements. The file was loaded to the VGIN NTIA transfer data model.

Provider Name:	NTELOS, Inc.
DBA Name:	NTELOS
FRN:	0005849518
Transmission Technology	80
Wireless Polygons:	1
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	0
Community Anchor Institutions reported:	0

Provider Name:	Richmond 20MHz, LLC
DBA Name:	NTELOS
FRN:	0001656180
Transmission Technology	80
Wireless Polygons:	1
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	0
Community Anchor Institutions reported:	0

Provider Name:	Virginia PCS Alliance, L.C.
DBA Name:	NTELOS
FRN:	0002051720
Transmission Technology	80
Wireless Polygons:	1
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	0
Community Anchor Institutions reported:	0

Provider Name:	West Virginia PCS Alliance, L.C.
DBA Name:	NTELOS
FRN:	0002049328
Transmission Technology	80
Wireless Polygons:	1
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	0
Community Anchor Institutions reported:	0

RCN Telecom Services LLC

RCN provided a spreadsheet of address availability and middle mile points for the spring 2012 submission. A provider staging geodatabase was created and both files were imported as tables for normalization. The Address availability import table was geocoded and matched records were kept, while unmatched and tied results were exported to a separate table in the geodatabase. It was determined that all matched address points were within census blocks less than two square miles. A spatial selection of the census blocks containing the address points was performed and NTIA attributes were populated from the providers address data. The census block feature class was then loaded into the VGIN NTIA Transfer data model.

The middle mile data provided this round was reviewed and had not changed from the spring 2012 submittal so the spring 2012 data was loaded into the VGIN Carry Over data model.

Provider Name:	Starpower Communications LLC
DBA Name:	RCN Telecom Services LLC
FRN:	0003735016
Transmission Technology	40, 41
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	142
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	2
Community Anchor Institutions reported:	0

Scott County Telephone Cooperative (SCTC)

SCTC provided an update for the fall 2012 release as a polygon coverage area to signify where their Fiber and DSL technology information is located. The polygon data was in several feature classes and was imported and worked into a single feature class which represented both technologies. It was confirmed by SCTC that the tech types did not overlap and also that the provider did not have middle mile information to provide to NTIA.

Census blocks in the selection set feature class were selected by location where a selection set census block centroid was within a SCTC polygon feature based on Transmission Technology type. All census block polygons were exported to a feature class for loading; the feature class contained both DSL and Fiber optic.

Road centerlines from the selection set feature class were used in select by centroid to the SCTC polygon feature class. Features that fell within the polygon areas were extracted to a separate staging feature class within the provider staging database and the staging centerline features were selected by the polygons and calculated by Transmission Technology. Any centerline that fell outside the centroid of a census block feature was kept and exported to a new feature class used in loading to the transfer data model.

The census block and centerline feature classes used for loading were then edited and calculated appropriately for speed information based on Transmission Technology types. After all features were updated, both data sets were loaded into the NTIA Transfer Data Model.

Provider Name:	Scott County Telephone Cooperative
DBA Name:	SCTC
FRN:	0002069862
Transmission Technology	10, 50
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	2,963
Address Point features:	0
Road Centerline features:	832
Middle Mile features:	0
Community Anchor Institutions reported:	0

Sidera Networks LLC

Sidera provided a spreadsheet for middle mile data. Sidera Networks is a backbone provider.

The middle mile excel file was imported into the provider staging database and geocoded with a 100% match rate. The GIS file was scrubbed to add and populate fields as required by the NTIA data model. The feature class was then loaded into the Transfer Data Model.

Provider Name:	Sidera Networks LLC f/n/a RCN New York Communications LLC
DBA Name:	Sidera Networks
FRN:	0006254403
Transmission Technology	50
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	0
Address Point features:	0

Road Centerline features:	0
Middle Mile features:	9
Community Anchor Institutions reported:	0

Skyline Telephone Membership Corporation

Skyline Telephone submitted data for the first time this round in the form of an address spreadsheet. This provider is located in a rural area on the border with North Carolina and the majority of their customers and all middle mile infrastructure is located in North Carolina. Less than twenty customers are served in Virginia.

The address table was imported into a staging database and overlaid with census blocks less than two square miles. All of the address points were within census blocks less than two square miles. A selection of the census blocks containing the address points was performed and NTIA attributes were populated from the providers address data. The census block feature class was then loaded into the VGIN NTIA Transfer data model.

Provider Name:	Skyline Telephone Membership Corporation
DBA Name:	Skyline Telephone Membership Corporation
FRN:	0001952555
Transmission Technology	10, 50
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	19
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	0
Community Anchor Institutions reported:	0

Sprint

Sprint provided Geospatial data in the form of a coverage area shape file and middle mile data was included in a text file.

The GIS shape file was loaded into the provider staging geodatabase and compared to the spring 2012 submission to review for changes. The area footprint was different so the attributes were scrubbed to match the NTIA reporting format. The data was then loaded into the VGIN NTIA transfer data model. Middle mile information had not changed from the last round so it was loaded to the VGIN NTIA transfer data model.

Provider Name:	Sprint Nextel Corporation
DBA Name:	Sprint
FRN:	0003774593
Transmission Technology	80
Wireless Polygons:	2
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0

Middle Mile features:	2
Community Anchor Institutions reported:	0

StarBand Communications Inc.

StarBand Communications Inc. provided geospatial data in a single coverage area shape file for the state of Virginia. A state of Virginia polygon was copied and formatted to the NTIA attribute schema and attributes were populated from the file submitted by the provider.

Provider Name:	StarBand Communications Inc.
DBA Name:	StarBand Communications Inc.
FRN:	0005087457
Transmission Technology	60
Wireless Polygons:	1
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	0
Community Anchor Institutions reported:	0

Suddenlink Communications

Suddenlink submitted data for the first time in the form of address and census block spreadsheets. Address level data was geocoded to the VGIN Road Centerline address locator. Point results were then spatially joined to the selection set Road Centerline features in order to obtain a centerline feature class geometry. The roads were then exported to a new feature class and then loaded to the VGIN Transfer data model.

The census block table was joined to the Census Block feature class in the VGIN Selection geodatabase and the Suddenlink records were exported to a new feature class. Attributes were populated from the census block spreadsheet and the data was loaded to the VGIN Transfer data model.

Provider Name:	Cebridge Acquisition LLC
DBA Name:	Suddenlink Communications
FRN:	0014848808
Transmission Technology	40, 41
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	387
Address Point features:	0
Road Centerline features:	154
Middle Mile features:	0
Community Anchor Institutions reported:	0

T-Mobile

T-mobile provided geospatial data in the form of three coverage area shape files. In the supporting documentation, T-mobile explained attribute values for each polygon feature class. Middle mile and subscriber-weighted nominal speed data was included in tabular format.

The shapefiles provided by T-mobile were named UMTS, HSPA21, & HSPA42 and inside each shapefile were several thousand records with every single record in each feature class containing identical attribution. The data appeared to be gridded for internal use. The three shp files were imported into the provider's staging geodatabase. The polygons were merged into a single coverage polygon in the individual staging feature class and then each was copied and pasted into the VGIN NTIA transfer data model. Attributes were populated to match supporting documentation provided by T-mobile.

The middle mile and subscriber-weighted nominal speed data was unchanged from the last submittal.

Provider Name:	T-Mobile USA, Inc.
DBA Name:	T-Mobile
FRN:	0006945950
Transmission Technology	80
Wireless Polygons:	3
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	1
Community Anchor Institutions reported:	0

TDS Telecom

TDS Telecom provided geospatial data as well as source data of availability by csv files. The provider submitted data consisted of addresses and middle mile feature classes. A provider staging database was created to review each feature class. Due to inconsistencies between their address point locations and VGINs own address data, the source csv files were used in their entirety in compiling this dataset. The data was imported into the staging database for geocoding and all matched records were translated into VGIN road segments by an attribute join from the road name – and the spatial intersection to Census blocks < 2 square miles was used to retain the final delivery of road segments and Census blocks, respectively. All attributes were applied and reviewed for completeness and the census block and road segment based feature classes were loaded into the VGIN NTIA transfer data model.

Comparison of the middle mile data to the spring 2012 release, revealed no changes so values were carried over from the fall data set.

Provider Name:	Amelia Telephone Corporation
DBA Name:	TDS Telecom
FRN:	0002073526
Transmission Technology	10, 50
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	490
Address Point features:	0
Road Centerline features:	208
Middle Mile features:	1
Community Anchor Institutions reported:	0

Provider Name:	New Castle Telephone Company
DBA Name:	TDS Telecom
FRN:	0003767399
Transmission Technology	10
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	308
Address Point features:	0
Road Centerline features:	246
Middle Mile features:	1
Community Anchor Institutions reported:	0

Provider Name:	Virginia Telephone Company
DBA Name:	TDS Telecom
FRN:	0002058261
Transmission Technology	10, 50
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	138
Address Point features:	0
Road Centerline features:	126
Middle Mile features:	1
Community Anchor Institutions reported:	0

Time Warner Cable (TWC)

TWC provided Geospatial data in the form of road centerlines and 2010 census blocks < 2 square miles. The provider also included a document stating that no middle mile data had changed; and, subscriber- weighted nominal speed would be sent as soon as it was available.

The TWC data included only one transmission technology type for the fall 2012 submission. Working in the provider staging database, census blocks < 2 square miles were joined to the Selection Set Census block data using the FIPS number text fields. The joined block data was output to a new feature class. Fields were calculated in the selection set export to match Time Warner fields and then the feature class was loaded into the NTIA transfer data model.

In order to provide the road centerline data in Virginia's geometry, the road lines provided by Time Warner were used in a select by location analysis. The Virginia Road Centerline Selection set was selected if the lines provided by Time Warner were within 5 meters and then exported to a new feature class. The values for all road segments by Time Warner were the same (Max Advertised Down =9, Max Advertised Up = 5) so values from the selection road centerline set were manually calculated to match the provided roads. This iteration of the roads was loaded into the NTIA transfer data model.

Provider Name:	Time Warner Cable, LLC
DBA Name:	Time Warner Cable
FRN:	0013430244
Transmission Technology	40
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	3,361
Address Point features:	0
Road Centerline features:	1,798
Middle Mile features:	0
Community Anchor Institutions reported:	0

Verizon Wireless

Verizon Wireless provided two service area coverage shape files and sent the associated broadband attributes in an email. No middle mile carry over or subscriber-weighted nominal speed data was submitted. Each shape file contained a different footprint, one of Verizon's 4G LTE area and the second of their 3G area.

The shape files were imported into a staging database. A merge was performed in each file as each contained multiple polygons with identical attributes resulting in a single polygon for 3G and one for 4G. Fields were created in the 4G shape file to match the NTIA BB_Service_Wireless feature class document. The 4G shape file and the 3G Shapefile were then loaded to the VGIN NTIA transfer database.

Attributes were populated in the VGIN NTIA transfer database using the email attribute information with each of the 3G records having a different spectrum. The final geometry was three stacked polygons for the 3G coverage area and one polygon for the 4G area.

Provider Name:	Cellco Partnership and its Affiliated Entities
DBA Name:	Verizon Wireless
FRN:	0003290673
Transmission Technology	80
Wireless Polygons:	4
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	0
Community Anchor Institutions reported:	0

Verizon Wireline

Verizon Wireline provided text files for census block availability, address range availability with TLID. No Middle Mile information was supplied, and was carried over from the previous submission. The text files were exported to dbf and respectively joined to Census Blocks (by full FIPS) or to TIGER lines (by TLID). This was done as a separate process by a selection of each Technology type – this approach was used, as in previous deliveries, to ensure features with multiple Technology types were appropriately duplicated in the resulting data. The joins were exported to new feature classes and values were calculated based on joined features, and then remerged into a single feature class to complete the process. Blocks were then verified for appropriate square mileage (per the source projection), and the TIGER joins were output to new feature classes and they were used in a select by location analysis against the VGIN street segments. The blocks less than two square miles and (selection based) conflated road segments falling outside blocks less than two square miles were then loaded to the NTIA transfer data model.

Provider Name:	Verizon Virginia Inc.
DBA Name:	Verizon Virginia Inc.
FRN:	0002073203
Transmission Technology	10, 50
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	111,199
Address Point features:	0
Road Centerline features:	15,403
Middle Mile features:	12
Community Anchor Institutions reported:	0

ViaSat

ViaSat Communications Inc. is a satellite provider and sent Geospatial data in the form of a coverage area shape file to represent its coverage of their Exede 12 product. A staging geodatabase was created to calculate attributes for polygons that were included and excluded by this provider.

There are several areas of the Commonwealth of Virginia that are not covered by Excede 12 yet are covered with the Exede 5 product so a separate polygon of the entire state was added to the providers staging data. Attributes for all pertinent features were populated to match the original shape file as well as additional fields needed in the NTIA database which were not present. The data was then loaded to the NTIA Transfer data model.

Provider Name:	ViaSat Communications Inc.
DBA Name:	ViaSat Inc.
FRN:	0007843766

Transmission Technology	60
Wireless Polygons:	1
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	0
Community Anchor Institutions reported:	0

VSAT Systems, LLC.

VSAT Systems, LLC. (DBA: Skycasters) provided geospatial data in a single coverage area shapefile for the state of Virginia. A state of Virginia polygon was copied and applied to the data. The attributes from the file were edited to match the data submitted by the provider.

Provider Name:	VSAT Systems, LLC.
DBA Name:	Skycasters
FRN:	0001875615
Transmission Technology	60
Wireless Polygons:	1
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	0
Middle Mile features:	0
Community Anchor Institutions reported:	0

XO Communications

XO Communications last submitted data in the spring of 2010 in the form of a census block spreadsheet. The provider was recently contacted to confirm the status of their data and found no changes and additions had been made in the intervening years.

The data was reviewed and it was discovered that one census block was greater than 2 square miles. XO provided an address for the customer within that census block. The address was geocoded to the VGIN RCL locator to select a road segment. The selected road segment was spatially joined to the road feature class in the VGIN Selection data model and then exported to a separate feature class. Road attributes were populated and the data was loaded to the VGIN Transfer data model.

The census blocks from the 2010 submittal were imported to the staging database and the census block greater than 2 square miles was deleted. The census block data was then loaded to the VGIN Transfer data model.

Provider Name:	XO Communications LLC
DBA Name:	XO Communications Services Inc

FRN:	0006275945
Transmission Technology	10, 20, 30
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	1206
Address Point features:	0
Road Centerline features:	1
Middle Mile features:	0
Community Anchor Institutions reported:	0

Carryover Providers from Spring 2012

Many providers did not submit updates for the Fall 2012 so their data from the Spring 2012 SBDD transfer model was carried over. A new staging geodatabase was created which represented providers who did not send updates and the schema matched the transfer data model. Providers who did not submit an update were selected by FRN from the Spring 2012 NTIA SBDD submittal.

Several providers that did not send updates for the Fall 2012 submission were reworked to meet the NTIA data model definition of broadband availability. They were reprocessed for data accuracy purposes.

The following broadband providers are participants in the VA SBDD project but did not indicate having updates:

Broadband Provider	FCC Registration Number
BVU OptiNet	0006823991
Buggs Island Telephone Cooperative	0002031698
Citizens Cablevision Inc.	0009485343
Citizens Telephone Cooperative	0004381422
FairPoint Communications	0002071116
Level 3 Communications	0003723822
Mid Atlantic Broadband Cooperative	0019765304
Nelson Cable	0000900287
New Hope Telephone Cooperative	0002071579
Nextlink Wireless	0014286934
Roadstar Internet, Inc.	0013445358
Shentel Service Company	0013393988
Shentel Cable Company	0018024075
Sunset Digital Communications	0000826322
The Wired Road	0020153854
Virginia Mountain Micro	0018713800
XO Communications	0006275945

The following broadband providers were reprocessed to match the NTIA data model:

BVU

BVU data was provided to Virginia before the NTIA deliveries but was carried over and used in the spring 2012 SBDD submission. After a quick review of BVU's data, it appeared the data was customer addresses only. The addresses were geocoded against the VGIN Address point locator and point results were used to extract census blocks. Blocks where an address fell within were selected and exported as a new feature class for loading to the NTIA data model.

All addresses outside of the blocks were then selected as well as unmatched addresses were then exported as a non-spatial table and re-geocoded to the VGIN Road Centerline address locator. These points were spatially joined to the selection road centerline feature and output to a new feature class.

Both the census block and road centerline feature classes were updated with BVU's information and then loaded into the transfer data model.

Provider Name:	BVU
DBA Name:	OptiNet
FRN:	0006823991
Transmission Technology	50
VA Data Category:	6
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	869
Address Point features:	0
Road Centerline features:	190
Middle Mile features:	0
Community Anchor Institutions reported:	0

Citizens

Citizens data was provided to Virginia before the NTIA SBDD project to include it's two FRN/provider name companies for DSL and cable and was carried forward and used in NTIA submissions due to its data type. The original Citizens submission was customer address information only along with a spreadsheet which showed speeds in relation to an access point using distance. For the first NTIA submission, a polygon data set was created which showed based on a buffer distance from the access point, the potential speeds a customer would receive based on address point location. This buffer polygon data was used in associating speed information to the data using the NTIA speed tiers. To date, Citizens has not submitted any additional updates to the NTIA project to include blocks less than two square miles or addresses / ranges outside of two square miles. Citizens has also not provided middle mile information.

The address spreadsheets for each FRN were geocoded against the VGIN Address point locator and point results were used to extract census blocks. Blocks where an address fell inside of were selected and exported as new feature classes for each FRN to be used in loading to the NTIA data model.

All addresses outside of the blocks for both spreadsheets were then selected as well as unmatched addresses were then exported as a non-spatial table and re-geocoded to the VGIN Road Centerline address locator. These points were spatially joined to the selection road centerline feature and output to a new feature class.

Both the census block and road centerline feature classes were updated with Citizens speed information based on the buffer polygon feature class in a select by location where the centerline or block feature's centroid fell within a buffer polygon. Information for Advertised and Typical download and upload speeds were used based location and were calculated within the staging database. The processed information was then loaded to the transfer data model.

Provider Name:	Citizens Cablevision, Inc.
DBA Name:	Citizens
FRN:	0009485343
Transmission Technology	41
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	120
Address Point features:	0
Road Centerline features:	61
Middle Mile features:	0
Community Anchor Institutions reported:	0

Provider Name:	Citizens Telephone Cooperative
DBA Name:	Citizens
FRN:	0004381422
Transmission Technology	10
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	703
Address Point features:	0
Road Centerline features:	441
Middle Mile features:	0
Community Anchor Institutions reported:	0

FairPoint Communications

FairPoint Communications' data was provided to Virginia for the first round submission in the Spring 2010 to the NTIA. After a quick review of the data, it appeared the data was customer addresses only. The addresses were geocoded against the VGIN Address point locator and point results were used to extract census blocks. Blocks where an address fell inside were selected and exported as a new feature class for loading to the NTIA data model.

All addresses outside of the blocks were then selected as well as unmatched addresses were then exported as a non-spatial table and were re-geocoded to the VGIN Road Centerline address locator. These points were spatially joined to the selection road centerline feature and output to a new feature class. Centerlines were removed where they fell within blocks less than two square miles (caused by unmatched data in the Address Point geocode).

Both the census block and road centerline feature classes were updated with BVU's information and then loaded into the transfer data model.

Provider Name:	Peoples Mutual Telephone Company
DBA Name:	FairPoint Communications
FRN:	0002071116
Transmission Technology	10
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	860
Address Point features:	0
Road Centerline features:	88
Middle Mile features:	0
Community Anchor Institutions reported:	0

Mid-Atlantic Broadband Cooperative (MBC)

MBC is a backbone provider and has 3 stimulus grants for build-out projects. They submitted middle mile data in a spreadsheet in the spring of 2012 which was processed and submitted in that round.

No data was received for this round so the data was carried over from the spring submittal and loaded to the VGIN Transfer data model.

Provider Name:	Mid-Atlantic Broadband Cooperative
DBA Name:	MBC
FRN:	0019765304
Transmission Technology	
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	0
Address Point features:	0
Road Centerline features:	
Middle Mile features:	22
Community Anchor Institutions reported:	0

Nelson Cable, Inc.

Nelson Cable provided Virginia a list of census blocks for the first NTIA data submission as well as addresses. These blocks were evaluated when NTIA requested the 2000 census blocks be converted to 2010 blocks. Address Points and centerlines were provided in archive releases.

The original block data was kept but for the Fall 2012 processing, gaps were filled in with the 2010 selection set census block data. Where addresses and Road Centerlines were available for blocks greater than two square miles in past NTIA SBDD releases, only centerlines were selected from the selection set Road centerline data for the Fall 2012 data.

Both Census Block and Road Centerline features were calculated for this provider using the last submission speed information and were loaded to the Transfer data model.

Provider Name:	Wintergreen Community CableVision
DBA Name:	Nelson Cable, Inc.
FRN:	0002071579
Transmission Technology	41
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	108
Address Point features:	0
Road Centerline features:	197
Middle Mile features:	0
Community Anchor Institutions reported:	0

New Hope Telephone Company

New Hope Telephone Company originally provided Virginia address range information for spring 2012. The address range information did not include segmentation based on TIGER streets or the VGIN RCL data set so there were many GIS features used to represent one record in the range information. Data was manually selected from the VGIN RCL to include all segments covered within the ranges that New Hope telephone cooperative service area could potentially cover. This data was provided to NTIA for several releases.

After evaluating the submitted centerline data, there were many census blocks less than two square miles which lay underneath the segmentation. A new Staging database was created for the Fall 2012 NTIA SBDD submission for New Hope Telephone Cooperative. Census blocks were selected where the carried over centerline data was within distance of 1 feet and of those selected, blocks were removed where a centerline was on the edge of a line. The final block selection was exported as a feature class and used for loading to the NTIA transfer data model. For the polygon edges, roads which were on boundaries were then selected from the centerlines. This was exported a new feature class used to load to the NTIA transfer model.

Both Census Block and Road Centerline features were calculated for this provider using the last submission speed information and were loaded to the Transfer data model.

Provider Name:	New Hope Telephone Cooperative
DBA Name:	New Hope Telephone Cooperative
FRN:	0002071579
Transmission Technology	10
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	985
Address Point features:	0
Road Centerline features:	31
Middle Mile features:	0
Community Anchor Institutions reported:	0

Level 3 Communications

Level 3 data was provided to Virginia for the Spring of 2011 submission. Their data was address level information as well as middle mile points so in order to reprocess the data for the Fall of 2012 release, a staging database was created and the addresses were geocoded against the VGIN Address point locator. Point results were used to extract census blocks. Blocks where a geocoded address result was located inside it were selected and exported as a new feature class for loading to the NTIA data model.

All addresses outside of the blocks as well as unmatched addresses were selected, exported to a new table, and were then re-geocoded to the VGIN Road Centerline address locator. The resulting points were spatially joined to the selection road centerline feature and output to a new feature class. Roads that were within distance of 1 foot to census blocks were removed from the reporting feature class and blocks were added to the census block feature class instead of the lines.

Both the census block and road centerline feature classes were updated with Level 3's information and then loaded into the transfer data model. Middle Mile points were carried over from the Spring 2012 submission and also loaded to the transfer data model.

Provider Name:	Level 3 Communications, LLC
DBA Name:	Level 3 Communications, LLC
FRN:	0006823991
Transmission Technology	50
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	560
Address Point features:	0
Road Centerline features:	10
Middle Mile features:	436
Community Anchor Institutions reported:	0

Sunset Digital Communications Inc

Sunset Digital was a first time provider for the fall 2011 SBDD submission and provided Geospatial data in the form of road centerlines and census blocks. The provider reported to CIT that the census Geography was in 2010 and VGIN provided them a road centerline data set for usage in reporting. Middle mile was included this round as text files although there may be potential to receive future middle mile submissions in a geospatial format. A new personal geodatabase was created to represent the staging of this provider for the fall 2011 release. Selection Set Feature Classes for Street Centerlines and Census blocks were used.

Census blocks less than two square miles were joined to the Selection Set Census block data using the FULLFIPSID text. Inspecting the join, all features seemed to successfully pass through, signifying that the provider did in fact submit data in 2010 geometry. The joined block data was output to new features. Since the data associated to the blocks were named similarly to the NITA model data, they were calculated in the selection set export and then into the NTIA transfer data model directly.

Sunset Digital provided road centerline segments to CIT and VGIN in the Virginia Road Centerline geometry. The submission data included the VA unique ID for road segments. The V_LEID was joined to the selection set road centerline data V_LEID and only matching records were used. After records were verified, a 100% match rate between the two data sets was achieved. Road centerlines were then output to a staging feature class and then calculated. The staging feature class was then loaded to the transfer data model.

Sunset Digital did not provide and new data for the Fall 2012 submission so the census block, road and middle mile data from the previous submission was loaded to the VGIN Transfer database.

Provider Name:	Sunset Digital Communications Inc.
DBA Name:	Sunset Digital Communications Inc.
FRN:	0000826322
Transmission Technology	50
VA Data Category:	1
Wireless Polygons:	0
2010 Census Blocks <2 Square miles:	1522
Address Point features:	0
Road Centerline features:	778
Middle Mile features:	20
Community Anchor Institutions reported:	0

Post Processing Validation and Quality Control

The data included in the NTIA SBDD data model was quality controlled using the topology included in the model as well as the python script provided by NTIA. The topology was validated using ESRI ArcGIS Topology validation tools within ArcCatalog and no errors were reported.

The spring 2012 SBDD data submission was also quality controlled using the latest python script made available by NTIA on March 23, 2012. The script produced both warnings and failures and the data was scrubbed to correct as many as possible. A few items were noted and skipped due to inconsistencies in the NTIA GP check model as described in the March 23, 2012 conference call for all SBDD states with NTIA. The final run of the script resulted in speed tier warnings and failures which have been documented in detail in the READ ME_NTIA_SPRING_2012_SCRIPT_ERROS included in the data submittal.

US Virgin Islands Broadband Mapping Project

Product Release White Paper

Contact Name Manager:	Kevin Hughes
Contact Phone Number:	340-715-8581 ext 2231
Contact E-mail:	khughes@vingn.com
Submitted By:	Kristin Rousseau
Contact E-mail:	kris.rousseau@broadmap.com

Product Specification:	Fall 2012 NTIA Data Model
Product/Process:	NTIA—October 1, 2012 Data Deliverable
Dataset Submission QC:	NTIA—SBDD_CheckSubmission.py

Table of Contents

OVERVIEW

This white paper highlights the **Submission Summary** for this deliverable, as well as describes the **Data Gathering**, **Data Integration**, **Data Validation and Verification** and **Quality Control** processes used to create the Broadband Mapping Project's October 1st, 2012 data submission. To support varying levels of technical and program knowledge, both a **high-level summary** and a **detailed process review** are supplied.

SUBMISSION SUMMARY

PROVIDER DETAILS

PROVIDER PARTICIPATION

- Provider Participation Statistics Summary

Summary	Count
Total Providers Researched/Contacted	11
Total Valid Broadband Providers	8
Business-only/New Researching Providers	0
Non-Responsive Providers	0
Non-Cooperative Providers	0
Number of Providers – Represented in Data Submission	8
Number of Providers - Supplied Updates for this Submission	2
Number of Providers - Confirmed No Updates	6

- New Providers Since Last Data Submission
  - No new provider coverage areas added
  - Completed provider transfer to new vendor, including complete NDA execution with all providers

- Existing Providers – No Updates
  - HughesNet (DirectWay)
  - Starband Communications Inc/ Spacenet

- Providers Included
  - AT&T Mobility
  - Broadband VI
  - Choice Communications
  - HughesNet (DirectWay)
  - SmartNet
  - Sprint
  - Starband Communications Inc/Spacenet
  - Innovative PowerNet

- Non-Responsive Providers
  - None

- Non-Cooperative Providers
  - None

COVERAGE AREA CHANGES

- Provider Projection Issue
  - Sprint
    - The data supplied by Sprint is projected incorrectly nationwide. We have noticed the impact mainly in the Virgin Islands coverage.
    - To improve the layout of the footprint, we utilized the previous data submitted for alignment comparisons, updated all attribution, and included the additional census blocks to reflect the expansion they communicated for this round.
    - Sprint has been called and e-mailed, without response as of yet. We will continue to outreach to them to gather data in the correct projection and update the broadband map.

- Coverage Footprint Reductions/Map Refinement - Resulting from Validation (Provider Portal)

  - **Coverage Footprint Expansion –**
    - AT&T expanded their TT-80 coverage footprint

  - **Attribution Changes –**
    - Broadband VI increased their speeds for this round

SERVICE OVERVIEW

- For this data submission a service overview has not been included. We are continuing to work closely with the service providers to update their average weighted nominal speeds (AWNS) to ensure a comprehensive Service Overview layer in the next data submission.

DATA CORRECTIONS

- There were no data corrections required for provider coverage in this data submission

COMMUNITY ANCHOR INSTITUTION (CAI) DETIALS

OVERALL STATISTICS

Community Anchor Institution - Categories	Overall Count	CAIID Counts	Transmission Technology	Advertised Speed Down	Advertised Speed Up
Category 1 - School K through 12	82	36	33	33	33
Category 2 - Library	8	6	0	0	0
Category 3 - Medical/Healthcare	20	0	2	2	2
Category 4 - Public Safety	42	0	3	3	3
Category 5 - Universities/Colleges	4	2	3	3	3
Category 6 - Other: Government	133	0	21	21	21
Category 7 - Other: Non-Government	37	0	0	0	0
Total	**326**	**44**	**61**	**61**	**61**

CAI CHANGES

- The CAI changes consisted of the following:
  - Added 1 new CAI, under the Medical/Healthcare category, for this data submission

- The CAI inventory was review again against the database mentioned below for the following categories: Category 1: K-12 Schools, Category 2: Libraries and Category 5: Colleges
  These databases are as follows:

  - For K-12 institutions (CAI type 1) please add the NCES ID CCD ID value found here: **http://nces.ed.gov/ccd/bat/**

  - For Higher Education (CAI type 5) please add the NCES IPEDS ID value found here: **http://nces.ed.gov/ipeds/datacenter/**

  - For Libraries (CAI type 2) please. Combine (do not add) “FSCSKey” and “FSCs_SEQ” from the “puout08av2000” file and place them here: **http://harvester.census.gov/imls/data/pls/index.asp** (FYI the LIBID is your state’s unique ID for libraries)

SUBMISSION RECEIPT

SUBMISSION RECEIPT RESULTS

- Attached are the results from the NTIA data submission receipt quality script.

VI_2012_9_21.txt

- Error Report
  - There were no items targeted as failures or warnings in the submission receipt

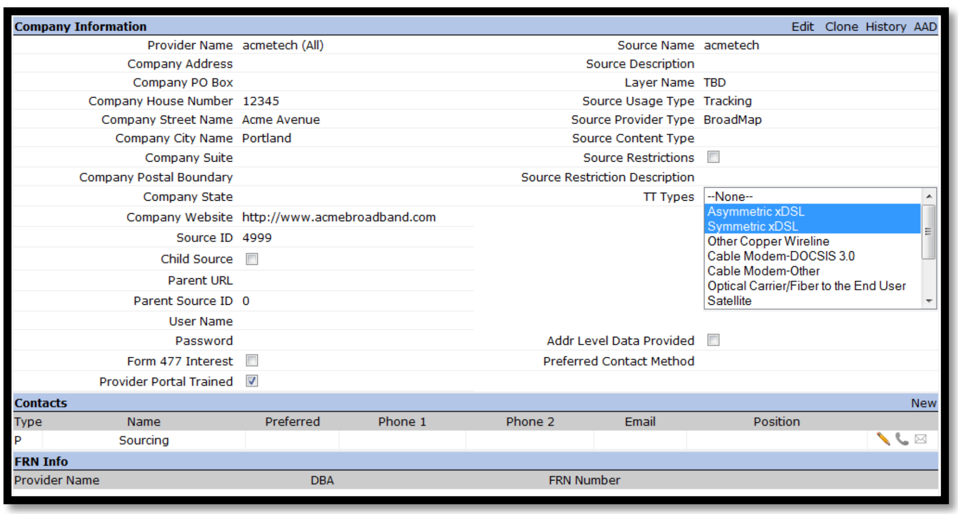
HIGH-LEVEL SUMMARY

DATA GATHERING

BROADBAND SERVICE AREAS, MIDDLE MILE AGGREGATION POINTS AND BROADBAND SERVICE OVERVIEW

The collection of Broadband Service Areas, Middle Mile Aggregation Points and Broadband Service Overview information is handled through the following Provider Outreach Process:

- Build and maintain an inventory of Broadband providers through currently known providers and research.
- The inventory and everyday interaction with providers is tracked using the Provider Catalog (PCat). Below are some examples of the web application, which has a shared access between our team and mapping partner (BroadMap).



Company Information — Edit Clone History AAD

Provider Name	acmetech (All)	Source Name	acmetech
Company Address		Source Description	
Company PO Box		Layer Name	TBD
Company House Number	12345	Source Usage Type	Tracking
Company Street Name	Acme Avenue	Source Provider Type	BroadMap
Company City Name	Portland	Source Content Type	
Company Suite		Source Restrictions	☐
Company Postal Boundary		Source Restriction Description	
Company State		TT Types	--None--, Asymmetric xDSL, Symmetric xDSL, Other Copper Wireline, Cable Modem-DOCSIS 3.0, Cable Modem-Other, Optical Carrier/Fiber to the End User, Satellite
Company Website	http://www.acmebroadband.com		
Source ID	4999		
Child Source	☐		
Parent URL			
Parent Source ID	0		
User Name			
Password		Addr Level Data Provided	☐
Form 477 Interest	☐	Preferred Contact Method	
Provider Portal Trained	☑		

Contacts — New

Type	Name	Preferred	Phone 1	Phone 2	Email	Position
P	Sourcing					

FRN Info

Provider Name	DBA	FRN Number

Confidence			New
TT Type	Confidence	Last Modified	Comment

Status Tracking

Non Facilities Based Provider	☐		
Business Only Provider	☐		
Reseller	☐	Non Responsive Provider	☐
NDA Review - Internal	☐	Non Cooperative Provider	☐
NDA Review - External	☐	Source Closed	☐

Service Provider Details

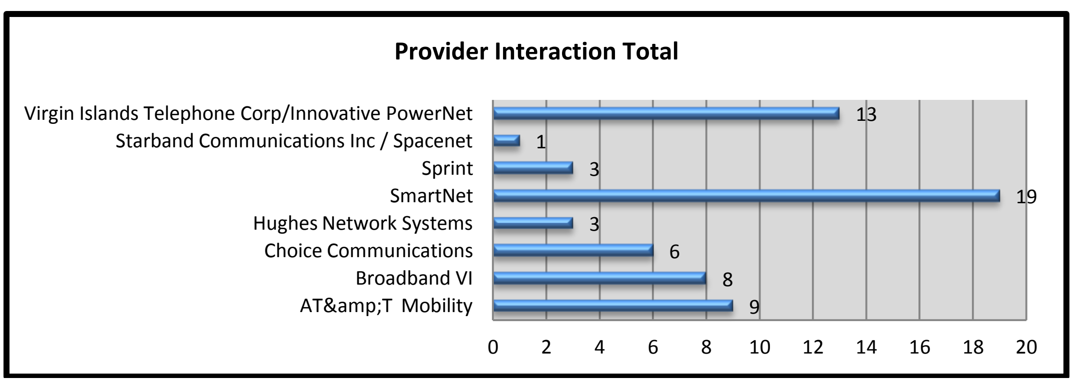
BroadMapper	--None--	BroadMap Status	Unassigned
Initial State Outreach Date		Initial Contact Vehicle	
Provider Origin		Member Association	
		Initial State Outreach	☐
		NDA Status	--None--
		NDA Not Required	☐
Provider Packet Exchanged	☐	NDA Requested	☐
Provider Packet Info Sent		NDA Exchanged	☐
Provider Meeting Status	--None--	NDA Exchange Date	
Technical Meeting Requested	☐	NDA Signed	☐
Technical Meeting Scheduled	☐	NDA Signed Date	
Number of Subscribers			
		Date Loaded	
		Source Closed Date	

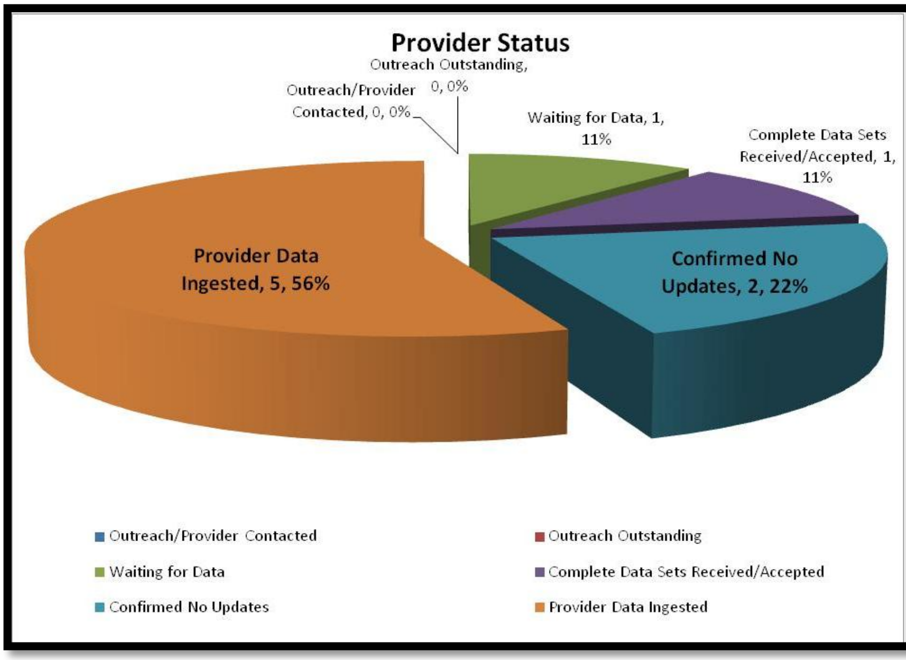
BDIA Delivery 0412			Edit
Status	--None--	Provider Data Reviewed	☐
Outreach Date		Provider Data Reviewed Date	
Initial Response		FootPrint	
Meeting Date		MiddleMile	
No Update Date		Subscriber	
Waiting For Data Date		Provider Login	☐
Data Received Date		Provider Login Date	
Data Accepted Date			
Source Ingested		Source Ingested Date	

Additional Data

Notes			
Next Steps			
Inactive	☐	Owner	briordan
Created By	briordan 2011-06-13 12:06:35	Last Modified By	krousseau 2012-03-16 13:41:58

In order to encourage participation throughout the life of the program, we feel it's important to foster relationships with the providers and encourage a collaborative team effort between all parties for each data submission. The chart below represents that interaction count with each provider.





- Update provider material that describes the data requirements and logistics for data transfer.
- Update Non-Disclosure Agreement (NDA) for use in the project, where applicable.
- Maintain multiple protocols for the provider to submit data, including Secure File Transfer Protocol (SFTP) technology when desired.
- Conduct one-on-one informational discussions with each provider to communicate the following:
    - Requirements of this project;
    - Broadband data required to support the product data model;
    - Submission protocols available;
    - Capability to validate how the supplied data is aggregated.
- Download/receive provider data.
- Establish a repeatable process with provider. Maintain provider communication, transaction and data handling records throughout the project (dates contacted, data received, etc.).

COMMUNITY ANCHOR INSTITUTION (CAI)

The collection of CAI information is handled through the following CAI Collection Process:

- Collect and maintain inventory of CAIs through currently known CAIs, data mining, and research.
- Maintain web-based CAI portal for institutions to add or confirm attribution, location and enter broadband-specific information.
- Upload web-based data to Core Database for standardization.
- Perform internal cleansing, such as removing duplicate records, identifying gaps in broadband attribution and verifying category.
- Geocode CAI locations.
- Translate Core Database data to deliverable-ready format.
- Continue engagement with non-responsive institutions.

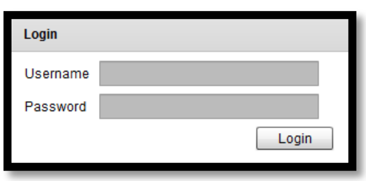
DATA INTEGRATION PROCESS

The data integration and processing mechanisms currently used allows for multiple types of inputs and result in a standardized output that meets the NTIA deliverable requirements. This flexible process supports data model changes and project-requested enhancements.

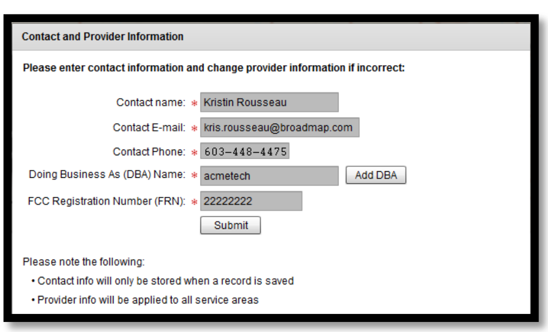
- Receive inputs from providers via submission protocols; upload into Sourcing Database and catalog with provider information.
- Review provider-supplied data for completeness and for potential discrepancies that require resolution prior to processing and flag as necessary.
- Categorize input into data-type category (addresses, block lists, paper maps, etc.).
- Standardize input based on data type within Staging Database.
- Create Compact Polygons (CP)—(internal methodology for generating area-based feature for coverage in Staging Database).
- Apply broadband attribution to CP; apply metadata to CP.
- Perform quality analysis of the CP against the source supplied to identify any completeness or accuracy issues.
- Request additional information from the provider if elements of coverage are missing or contain discrepancies. This is a second manual quality check to ensure data is complete.
    - Process coverage area to build the required NTIA data model layers.

With the deployment of the Provider Portal this round, the data collection and later validation process was streamlined allowing both activities to occur within a secure web application. The majority of the providers used this methodology as it supplies them with more visibility into how their data is being represented and gives them knowledge and ownership of their coverage representation. Below are some bullet points and supporting screen shots on how the portal is used.

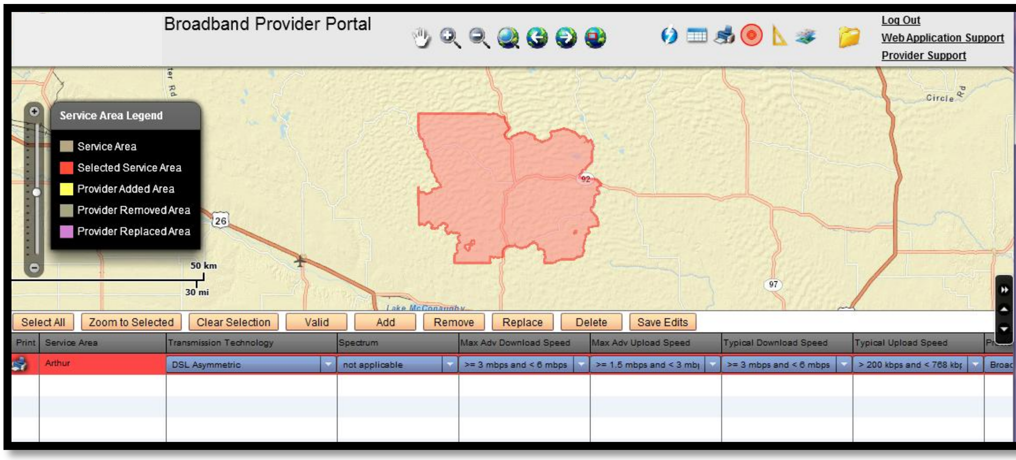
- Each provider is assigned credentials with a strong password to ensure security measures are taken into consideration



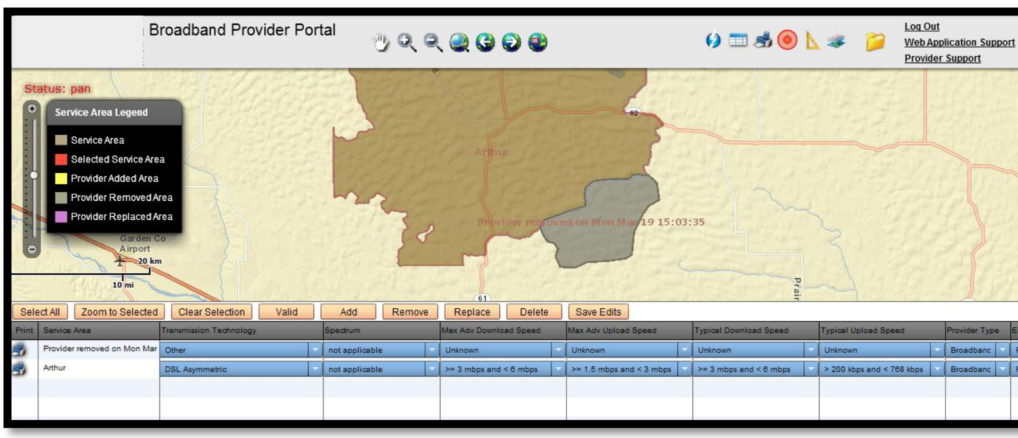
- Collection and confirmation our contact, as well as the company's DBA Name and FRN accuracy



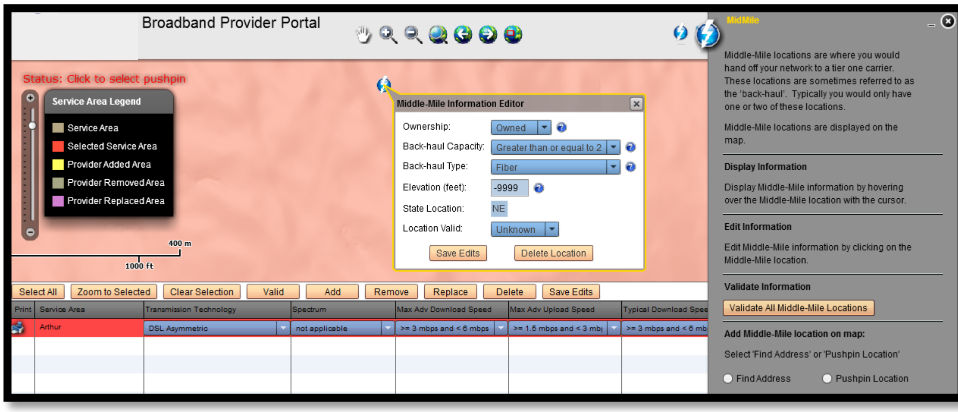
- Capability to review and request changes to the coverage footprint

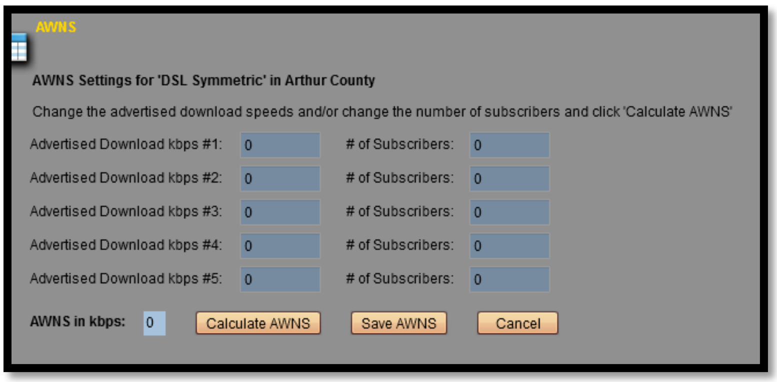


- The provider can Add/Remove portions, or all, of the footprint requesting that their footprint be increased or refined.

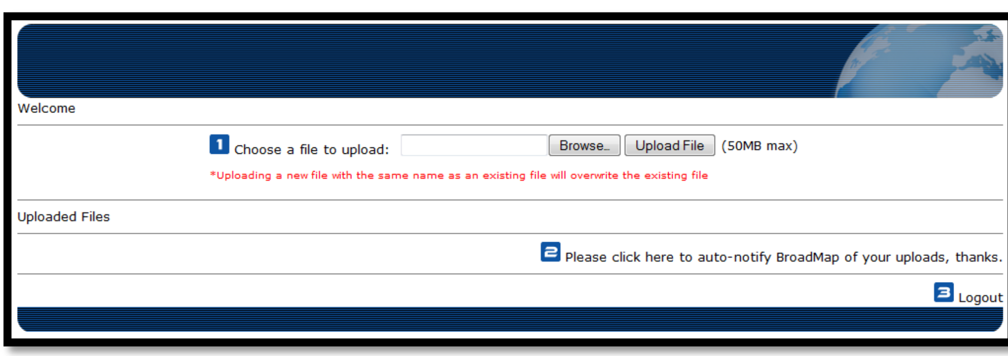


- Middle Mile and Average Weight Nominal Speed (AWNS) collection and validation





- File upload functionality to support providers that would prefer a shapefile, spreadsheet, PDF, KMZ/KML file be used to reflect changes for the data round



- Once the provider has review completed changes to their coverage, middle mile and AWNS, then can validate them all by signing off that everything is accurate.

DATA VALIDATION AND VERIFICATION

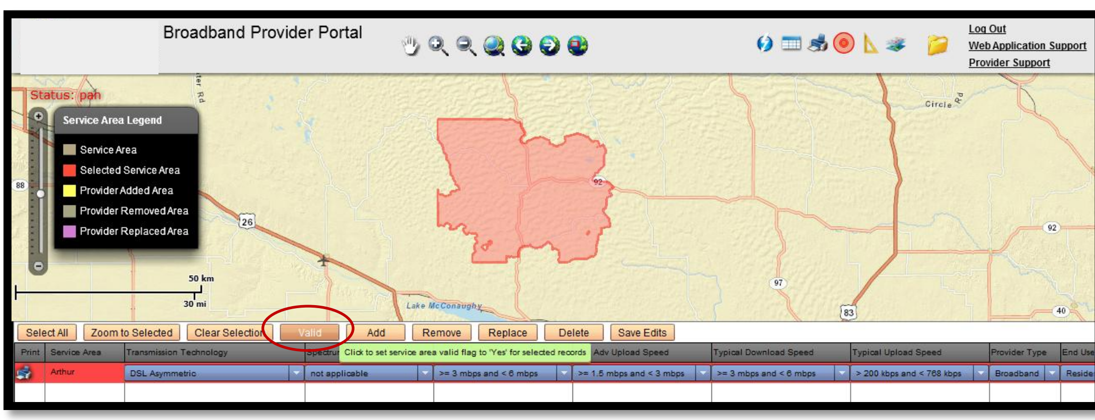
Following the creation of the product, process steps within Data Validation and Verification occur. To ensure the data collected and processed is as accurate and comprehensive as possible, provider validation and internal verification activities are employed. After the initial mapping of providers' coverage areas and serviceability claims, additional reviews are performed using the methods described in the subsections below in order of action (**Broadband Provider Validation**, **SME Verification, Public Verification, Third-Party Data Verification and Confidence Values**).

BROADBAND PROVIDER VALIDATION—PROVIDER PORTAL APPLICATION

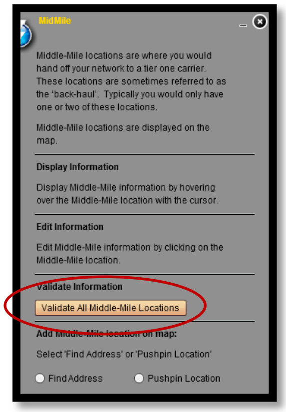
Providers are trained on and requested to use a secure interactive web application to review their current coverage area(s) and supporting broadband attribution and validate their data or submit change requests to update their data. All provider change requests go through the **Data Integration Process** and are reviewed with the provider to complete validation.

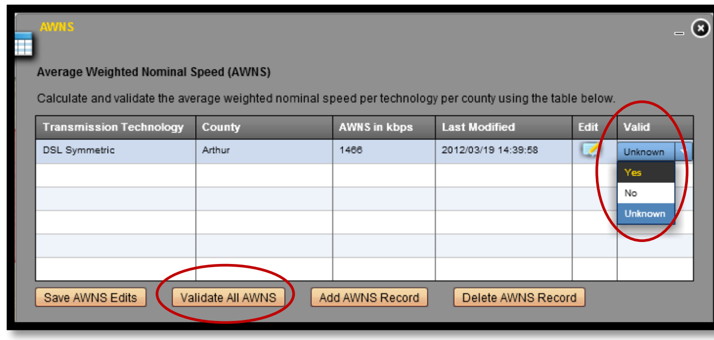
With the latest released of the Provider Portal, validation on the coverage area, middle mile and average could be completed individually. Validation examples are as follows:

- Coverage validation can be done on one record/footprint at a time or by selecting footprints and selecting the 'Valid' button. The provider could also print off or download their coverage for their own tracking purposes.



- Middle Mile & AWNS Validation





All validation results are tracked internally through our Validation Table, which also improves the overall **Confidence Value** as mentioned below.

CROWD SOURCING

The broadband interactive map has been released to the public, which includes functionality to collect feedback on the provider's coverage areas, as well as running a speed test. The feedback and speed results have been collected and reviewed prior to our outreach for this data submission. All discrepancies were reviewed with the providers to identify if any map refinement is required.

The public website can be viewed at the following hyperlink:

https://usvi.broadmap.com/PublicMap/

THIRD-PARTY DATA VERIFICATION

Since this was the first data submission to NTIA from the new vendor, focus continued to be placed on implementing an improved process methodology and integrating provider's coverage areas into a new internal model. This included ensuring all providers had fully executed NDAs and a chance to validate their data prior to submission.

We also review this data submission against the previous two data submissions to ensure all changes were expected and within the NTIA data model requirements.

We are currently in the process of reviewing 3rd party data to extend our verification efforts.

CONFIDENCE VALUES

All verification, validation and manual quality review results are tracked by provider/technology type and stored and maintained within a **Validation table**. A confidence value is assigned, based on internal assessments of the collected information, to highlight the provider coverage areas and/or attributions that would benefit from further investigation and/or enhancements.

With the continued efforts on provider validation, 3rd party verification and the release of the public interactive map with feedback collection functionality, the confidence values will be utilized further to identify specific areas in need of attention. We're currently at the initial stages of this initiative, but will have a more complete picture in time for the subsequent data submissions, as we will use the lower values to identify areas where further testing or provider interaction is required.

QUALITY CONTROL

Following collection, processing and analysis of the provider and CAI data, the product is checked manually and algorithmically against the NTIA data model. Some of the items included within these checks are:

- Format correctness;
- Table and field structure;
- Valid values, including default values, where applicable;
- Geographic extent and topology errors.

Prior to data submission, another quality control script supplied by NTIA is run. This script, SBDD_CheckSubmission.py, creates an output in text form that is required to be submitted along with the final deliverable. All errors must come up clean, unless otherwise specified by NTIA.

DETAILED PROCESS REVIEW

To review the detailed process, please review the attached object:

BMap_ProcessDetails_2012_10_01.docx

Project History: Vermont's Broadband Mapping Initiative (BMI) is a collaborative broadband data collection and verification effort involving partners from the public, private and academic sectors participating as the Vermont Broadband Mapping Team. The BMI is supported by grant funds provided under the National Telecommunications and Information Administration's (NTIA) State Broadband Data and Development Program (SBDD).

In November 2009 the Vermont Broadband Mapping Team (BMT) initiated the creation and development of a comprehensive and verified geographic inventory of broadband service availability in the State of Vermont. Landline and wireless services (fixed and mobile) were mapped using information from the providers and other sources. The broadband mapping information collected and verified through this effort is supporting the broadband development objectives identified in the RUS Broadband Initiatives Program (BIP) and NTIA's Broadband Technology Opportunities Program (BTOP) in Vermont. Most importantly, the geographic inventory will further refine our understanding of the location of "unserved" and "underserved" areas in the state, thereby supporting targeted future investments in these areas.

The BMT includes the following organizations: Vermont Department of Public Service, the Vermont Telecommunications Authority, the Center for Rural Studies at the University of Vermont, Vermont's Enhanced 9-1-1 Board and the Vermont Center for Geographic Information. The BMT is also supported by private sector contractors.

Summary of Deliverables: The BMT's broadband data submission (October 1st, 2012) includes broadband information as of June 30th, 2012 (VT_SBDD_20121001.ZIP). The data complies with the NTIA NOFA requirements and SBDD data model (FGDB) specifications as of 6/30/2012. A detailed description of each dataset is available in the ./metadata folder included with the deliverable package.

Listed of Providers Contacted: The BMT reached out to the following list of providers for the 6/30/2012 update.

List of all Companies Contacted by BMT for 6/30/2012		
Doing Business As	**FCC FRN**	**Provided Data?**
AT&T Mobility	0004979233	Y
Burlington Telecom	0010480093	No Updates
Charter Communications Inc.	0017179383	Y
Cloud Alliance	0018600445	Y
Comcast	0003768165	Y
Duncan Cable	0016391716	No Updates
EC Fiber	9999	Y
FairPoint Communications	0003723202	Y
FairPoint Vermont	0017551359	Y

List of all Companies Contacted by BMT for 6/30/2012		
Doing Business As	**FCC FRN**	**Provided Data?**
Franklin Telephone Company, Inc.	0004356952	No Updates
GlobalNet	0018331173	No Updates
Great Auk Wireless, LLC	0017383332	Y
Green Mountain Access	0004956652	Y
Hughes Network Systems LLC	0018483073	No Updates
Jeffersonville Cable TV	0003755600	No Broadband Service
Kingdom Connection	0017631540	No Updates
Level 3 Communications	0003723822	No Updates
NCIC	9999	No Broadband Service
North Branch Networks	0018206391	Y
North Country Communications	0019521087	No Updates
One Communications	0015337702	Refuse
PC One Cable	9999	No Broadband Service
SegTel	0006204630	No Updates
Shoreham Telephone Company	0004380200	Y
Smuggler's Notch Water Company	0007320963	No Updates
Southern Vermont Broadband Cooperative	9999	No Updates
Southern Vermont Cable Company	0003770351	Y
Sovernet Communications	0015120850	No Updates
Sprint Nextel	0003774593	Y
Starband	0005087457	No Updates
Stowe Cablevision	0003755766	Y
TDS Telecom	0004948105	Y
TelJet	0017834540	No Updates
T-Mobile	0006945950	No Broadband Service
Topsham Communications	0016569485	No Updates
Topsham Telephone Company	0016569485	No Updates
Trans-Video Cable	0003770401	Y
U.S. Cellular	0004372322	No Updates
Verizon Business	0010856284	No Broadband Service
Verizon Wireless	0003290673	Y
Vermont Telephone Company	0003646213	No Updates
Waitsfield Cable	0004956652	No Broadband Service
WaveComm	0003665080	Y

List of all Companies Contacted by BMT for 6/30/2012		
Doing Business As	**FCC FRN**	**Provided Data?**
WildBlue Communications	0007843766	No Updates
WirelessVT Solutions	9999	No Updates

Data Development Methodology: A variety of data source and data collection methods were used to identify the characteristics and geographic extent of broadband service in Vermont. Here is a quick breakdown

- **Cable:** Mapped to street/street-segment level
- **DSL:** Mapped as polygons (usually Exchange areas) or address points (list of addresses submitted by provider).
- **Fiber Optic:** Mapped as address points (list of address submitted by provider)
- **Fixed Wireless (WISP):** Mapped as polygons (propagation maps prepared by independent contractor using data provided by WISPs)
- **Mobile Wireless:** Mapped as polygons (data submitted by provider)
- **Satellite:** Mapped as polygons (data submitted by provider). Providers of satellite-based broadband services claimed that they covered the entire state.

The cable, DSL, fiber optic, and fixed wireless (WISP) layers were "intersected" with Vermont's E911 address point layer to determine broadband availability at the address-level. This information was then intersected with Vermont's 2010 Census Block layer to calculate availability at the block level. The October 1st, 2012 deliverable includes Census block-level data for Census Blocks less than or equal to 2 sq miles, and address level data for Census blocks greater than 2 sq miles.

Mobile wireless and satellite-based broadband polygons were submitted by providers to VCGI. They were formatted to match NTIA specification, but otherwise forwarded as-is.

Vermont's broadband providers submitted data which was used to populate a table listing maximum advertised and typical speeds by Metropolitan Statistical & Rural Service Areas (Cellular Market Areas). This information was used to populate the speed information contained in the submitted broadband, including speed information at the census block level. In numerous cases providers did not submit typical speed information.

The initial list of Community Anchor Institutions (CAIs) was derived from existing data sources including the VT Critical Facilities Database and Public Libraries Survey from the Institute of Museum and Library Services. Community Anchor Institutions include schools, libraries, medical facilities, public safety facilities, universities and colleges, and other community facilities such as town halls/offices. An email and hard-copy mailing was sent to every institution in the list. They were asked to fill out an online survey. Follow-up emails and phone calls were made to increase the response rate. The data delivered to the NTIA includes all CAIs, but only includes broadband information for a subset. Additional broadband institutions will be added as their information becomes available.

Data Review: No formal confidence interval for provider data submissions has been established. Vermont is waiting for clarification from the NTIA on this. However, each provider submitted dataset is evaluated against a minimum standard or expectation of quality. If the data submission is identified by the VT Dept of Public Service as not credible based upon their experience, it is not included in the inventory. If a provider creates a data submission that cannot be parsed or, resolved, we contact the provider to try and work out a method of submission that can be used. Vermont had 100% participation from all 38 broadband providers for the 6/30/2012 data submission. However, many of these did not have any updates to report.

Feedback Loops: Each broadband provider that supplies broadband service data in some manner to the VT broadband data inventory is given the option to view a final version of their data submission as it will be represented in the NTIA delivery. However, very few providers have asked for a copy of the final version of their data submission for review. Some smaller providers have asked for, and received, a hardcopy map or digital map graphic (PDF) of their coverage area. All of the providers that requested to see what was being submitted to NTIA representing their coverage area received either a copy of the data, a hardcopy map or digital map graphic in accordance with their preference.

Data Verification Methodology: The BMT used two primary data verification methods: 1) a phone survey conducted by the UVM Center for Rural Studies (CRS) to verify the broadband maps, and 2) wireless-drive testing to evaluate mobile wireless propagation maps submitted by providers.

Conclusion: Vermont's Broadband Mapping Team is pleased to deliver a robust broadband availability inventory to the NTIA. We are confident that it meets the specifications outlined in the NTIA SBDD NOFA. The broadband data and maps will help Vermonters refine their understanding of "un-served" and "underserved" areas of the state, thereby supporting targeted future investments in these areas.

Washington Broadband Mapping

Data Submission Methodology Report

October 1, 2012

SANBORN

320 Miller Avenue
Suite 80
Ann Arbor MI 48103

Department of Commerce
Innovation is in our nature.

1011 Plum Street SE
PO Box 42525
Olympia, WA 98504-2525

Data Submission Report (October 1, 2012)

Table of Contents

1 Introduction

This report is submitted along with the sixth data submission for the Washington Broadband Mapping Project. This submission includes all data collected so far per the requirements of the National Telecommunications and Information Administration (NTIA) State Broadband Data and Development Grant Program (Docket No. 0660-ZA29) Notice of Funds Availability (NOFA) and formal and informal clarifications to it. Specifically, it includes broadband data collected from broadband providers and community anchor institutions data compiled from various sources for the State of WA. The State of WA has retained a mapping contractor, The Sanborn Map Company to perform the work related to the Mapping Grant for this project. Data from the previous submission is now publicly accessible via the WA Broadband Program (http://wabroadbandmapping.org/).

This document is a supplement to the five previous reports submitted with previous data submissions on May 1, 2010, October 1, 2010, April 1, 2011, October 1, 2011, and April 1, 2012 respectively. Therefore, it builds on the documents provided with those submissions. Rather than repeat the contents of the previous report, this document makes incremental updates on various topics where changes have been made in the methodology or reiterates the methodology used. Please refer to the previous documents for further details.

2 Overall Project Status

2.1 DATA COLLECTION

This section details data collection related to NTIA deliverables which include broadband data and community anchor institution data.

2.1.1 Broadband Data

For this submission, Sanborn started data collection efforts on July 3rd, 2012 by sending out data update requests and technical data specifications. These were sent to a large list of companies which were compiled from multiple lists (FCC 477 list (dated June 30, 2011), a list provided by the Washington UTC, Wireless Internet Service Providers Association (WISPA)) and from any providers that were identified through other sources such as web research, planning meetings, State outreach, etc. Sanborn also uploaded the final data for each provider in NTIA format from the previous submission on the Sanborn Provider Portal. The providers were encouraged to use the provider portal and update their information on it.

We followed the same contact and follow-up protocols as the previous submissions. In brief, this involved following up with already participating providers after sending them a letter requesting data updates. For newly identified providers, we contacted them three additional times and offered any/all support to make this as easy as possible. We provided a due date for submission but worked with providers who needed more time. If providers did not submit updated data and did not respond to our efforts to contact them, we reused their existing data.

The following are some of the important changes or no changes:

1. We continued to request all providers to provide us their speed information in mbps rather than as a speed tier. We did this in order to better validate the data, analyze served/underserved, and identify the breakdowns in speeds within a given tier. For this submission, 53% of the participating providers in WA have given us their speed in mbps rather than speed tier.

2. Like the previous submission, we also requested fixed wireless providers to provide us appropriate information to do propagation analysis. We had more success with this in the current submission. For those WISP providers that provided us the data to accomplish propagation, we used Radio Mobile to do propagation analysis and iterated with the providers until the parameters were suitably selected to get appropriate output. Propagation analysis results were provided to the providers for review through our provider portal and google kmz file formats to ensure validation. In WA, we were able conduct propagation analysis for 5 providers (Benton Rural, Cascade Networks, Columbia Energy, Infinity

Internet and Skynet Broadband) and collect propagation results from Link Technology for 2 providers (CresComm and Douglas PUD)

3. We continue to not collect data from resellers.

4. Due to our NDA restrictions, last mile infrastructure points, if submitted by providers, are not being submitted to NTIA.

5. We continue to submit data for satellites in this submission based on NTIA clarifications. We were able to add an additional satellite provider, identified by NTIA (Skycaster) in this submission.

6. Due to NDA restrictions, address points are not included in this submission to NTIA for any commercial provider.

7. Some providers did not submit middle mile elevation or backhaul capacity, particularly when they asked us to reuse previous submission data. Wherever possible, we went back to providers to obtain that information, but it is not available for every record. In this submission, we have improved the elevation of middle mile data substantially. Some providers were providing elevation above sea level – we were able to work with the largest of these providers to resolve the issues and will continue to work on improving this over the next submission.

8. If a cable based wireline provider provides both DOCSIS 2.0 and DOCSIS 3.0 service to the same area, the block or road was listed only once with a technology code of 40.

9. Providers were only willing to indicate on a general level if they served business, residential or both, so we did not get any providers that broke down the type of service by block. Only if the provider stated they only serve business to business customers did we fill in the "category of end user" with a code of 2, otherwise this field was left blank. There are five providers in WA who are identified as serving business customers only. These are:

    1) Capacity Provisioning, Inc.
    2) Integra Telecom of WA
    3) Level 3 Communications, LLC
    4) TW Telecom of WA, LLC
    5) XO Communications, LLC

10. This submission is being made based on the NTIA data model as of 08/09/12 provided by NTIA on the SBDD site.

    We have added five new providers in this submission:

    1) Infinity Internet (fixed wireless)
    2) Iron Goat Networks (fixed wireless)
    3) Skycasters (satellite)

4) SkyNet (fixed wireless)
5) WindWireless (fixed wireless)

In this submission:

1) We have contacted a total of 289 providers in WA of which 45 providers were contacted for the first time.
2) We have identified 111 potential providers, of which 86 are participating in this map to date and 25 have refused to participate. In addition, 28 providers have not responded to our efforts to contact them and we are not sure whether any of these providers are actual providers or not. A list of the non-responders, resellers and non-providers is provided at the end of the document and all of these potential broadband providers were contacted. Even if some providers were identified as non-providers or resellers in previous submissions, we continue sending out data request letters to these providers in case their status has changed in any way.
3) 37% of the providers submitted new or updated data whereas for the remaining providers, we reused data from their previous submissions. This is in contrast to 47% providers submitting new or updated data during the previous submission.
4) We do not report areas of service for providers that have refused to participate or have not responded to our requests for data. In some cases program office staff are aware of approximate service areas for non-participating providers, but to date we have reported only areas that meet our validation criteria. If estimated service areas are desired we would collaborate with other states and NTIA to develop and disclose a workable methodology.

During this submission period, we had the following changes in providers:

1) OrbitComm has been removed from the data as they informed us that they are a reseller.
2) 360 Networks was bought by Zayo Group
3) Wildblue changed its name to Viasat

2.1.2 Community Anchor Institutions Data

The community anchor institutions data continues to be crowd-sourced through the online data gathering application created by the Sanborn Team. Following discussions with NTIA on ways to improve the CAI IDs via email and guidance on what datasets to use for IDs, we have incorporated IDs for libraries and schools where possible. The numbers of community anchor institutions that have responded so far is provided below – please note that due to removal of duplicates and data cleanup, the numbers have decreased marginally in some cases.

The data model from NTIA needs some changes in the CAI feature class where only TransTech = "All Other" is related to the domain but no other subtyped TransTech is related to the domain. Hence the values are displayed as Y, N, or U for most of the records for BBService field but is being spelled out as Yes, No, and Unknown for all records where TransTech = "All Other".

Category	Name	Total	Total with Broadband Information in Submission 6
1	School - K through 12	2295	1769
2	Library	350	350
3	Medical/healthcare	131	50
4	Public Safety	1705	105
5	University, college, other post-secondary	219	179
6	Other community support - government	343	32
7	Other community support - nongovernmental	344	11

2.2 DATA PROCESSING

We started with the following base data:

Census Blocks:

For this submission, Census 2010 data was utilized. The data was set up as follows:

- Block size (AREA) is calculated combining the 2010 land area (ALAND) and water area (AWATER)
- AREA is converted from square meters to square miles to calculate square mileage (SMI).
- If the SMI of a block is less than or equal to 2, then the less than or equal to 2 square mile indicator (LE2SMI) is set to true.

Road Segments:

2010 Tiger Line IDs (TLID) were used for data processing for this submission. The data was set up as follows:

- The GT2SMI (Greater Than 2 Square Mile) indicator is set to True when:
  - The 2010 road segment <u>is completely within</u> a block that is NOT less than 2 square miles
- Only minimum and maximum address ranges and a single zip code for each road segment is maintained.

All data received went through the following processing steps:

1. **Triage:** All new data were quickly reviewed to understand what was received, and in what format. We also made sure we had all the required components for NTIA's data model, such as their FRN and advertised speed information. We also screened for any known issues that we might have seen before (such as Excel 2003 spreadsheets that cut off at 32k row).
2. **Ingest:** At this time the data is actually brought into our systems. Each provider is set up with a unique file geodatabase to store their information. Record counts of what was received are logged so that we can validate that we did not drop anything in processing.
3. **Data Processing:** In this step, the data goes through a number of ETL routines to convert the raw proprietary information into a format similar to the NTIA format. The exact routine utilized depends on how the data is received.
   1) When a wireline provider submits a service boundary, we select all the blocks and roads inside that shape.
   2) If a wireline provider submits a customer address list, the points are geocoded, and then the appropriate block or road segment is selected.

3) If a wireline provider submits block and road information using Census data, we just make sure everything is formatted to the appropriate specifications.
4) If the wireline provider submits any type of road or line data that does not directly correlate to the TIGER data set, we convert the lines to TIGER by selecting the road centroid and spatially selecting the closest segment in our data set. If the road is in a block less than 2 square miles, then the block is selected. Some manual cleanup is also applied to make sure we do not accidentally drop any road segments that should have been processed.
5) Wireless provider data is formatted to ensure that there are no overlapping polygons with the technology type and spectrum. In addition the data is cropped to the state boundary.
6) After each round of processing, we make sure that we only keep unique records. A unique record is defined as having a unique combination of FRN, Block/Road ID, and technology type. If there are multiple records with different speeds, but all else is equal, than we select the maximum of the advertised speeds.

4. **QC Review:** All data are then sent to a different analyst to perform a thorough quality control review on the processed data set. Record counts are compared to what was submitted. The QC staff also make sure the ETL scripts and routines populated all of the right fields.
5. **QA Review:** Data is then sent to another team for Quality Assurance Review. In this step the data is not only double checked against what was originally submitted, but it is also brought up inside standardized ArcMap templates that allow us to make sure our results make sense. This often involves comparing the new data set with prior submissions, as well as looking for any possible technology or speed anomalies and verifying against third-party datasets (as discussed in more details in the next section).
6. **Provider Review:** Processed data is all posted to a customized web-mapping tool we commonly refer to as the Provider Portal. All providers were notified once their data was available on the site, and most were given five business days (with the exception of a couple who were provided three business days) to review the data and respond. In this site, providers can log on and visually see their processed data in a map format. It also allows them to overlay their raw data to help them validate that we did indeed process things correctly. The provider portal also has a suite of markup tools that will allow the providers to edit their data, including adding or removing service areas, and making changes to the data attributes.
7. **Comment Processing:** All comments and feedback received from the provider portal is then reviewed and applied to the processed data set. This updated data set goes back through our QA and QC processes, and if time allows, back out to the Provider Portal, for the provider to review and sign off.
8. **Data Append:** After all of the individual data sets are processed and approved, we run an append process which merges all of the individual provider data sets into one geodatabase. This is also the point where our

team will do any final transformations to get our working data model into the latest NTIA publishing format.

9. **Submission Comparison Check:** Starting with this submission an additional check was added to our quality review process. An application was written that compares the individual provider's unique data that is stored in their unique file to that which is stored in our final appended file and the NTIA submission data. Any variation in each of these data files in thoroughly investigated and resolved. This was done to assure no data loss or data transformation issues. We also compare the submission 5 dataset to the submission 6 dataset, review any variations and assure that the changes found can be documented as being requested by the provider.
10. **Final QA/QC:** A series of quality checks are run on the final appended data sets to ensure it is ready for submission to NTIA. We also run the latest version of the NTIA receipt tool at this time. If any issues are flagged as failing they are reviewed and corrected. All warnings are also reviewed and either corrected or documented in the attached document which explains that we have validated this data and it should be accepted. Any last issues are corrected.
11. **Submission to NTIA.**

2.2.1 Submission 6: NTIA Submission Data Model Schema Changes

The latest data model released was released on August 8, 2012 was very similar to the previous data model. No substantive changes were noted and changes related to allowable speed and technology of transmission combinations. Most of these combinations have exceptions to them and hence were not being completely disallowed by NTIA.

2.3 DATA VALIDATION

Sanborn has continued to perform the same validation on the data as the previous four submissions (details in previous reports and a summarized version provided below). Some minor updates to the validation process are discussed below. We also publish our validation methodology online at http://wabroadbandmapping.org/MapValidation.aspx

1) QC of the data at various steps – this includes when data is received (triage), when it is processed through the various processing steps discussed above, etc.
2) Spatial checks against public and commercial datasets

   a. For WA, we continued to use the following datasets for validation:
      i. Exchange Boundaries: for DSL boundaries
      ii. MediaPrints: for Cable and Fiber boundaries
   b. We did not use speedtest.net speed data that we used previously for validation as we had our own speed test data that was more current and pertinent.
3) Speedtest data and other data collection for verification
   a. We continue to use speedtest data collected through our interactive map and community anchor data crowd-sourced for validation purposes.
   b. For this submission, we added an additional dataset to check against – FCC speed test data. We geocoded the data, used the IP to reverse engineer the provider name and used it to check speeds where possible.
   c. We also incorporated any feedback we received through the interactive map – this included feedback such as incorrect speeds, incorrect boundaries, missing provider or areas of no service, etc.
4) Verification by providers – processed data are uploaded on our Provider Portal for providers to review both the outcome of data processing and any issues that we found in the third-party and crowd-sourced validation. Issues pertaining to a particular provider are highlighted and shown in the portal for those providers only. Issues that are global and cannot be assigned to a particular provider are shown to all providers (e.g. there are no providers in this area, or we tried to get service here and heard x from A provider, y from B provider, etc.). Previously, we were highlighting these issues through a letter but in this submission, we have integrated the feedback through the Provided Portal. We make additional calls to providers who have issues. Planning workshops and local validation – we have looked into any issues that the State Planning team has identified and brought to our attention.

2.4 UNIVERSE OF CONTACTED PROVIDERS/NON-PROVIDERS

We have identified 111 potential providers, of which 86 are participating in this map to date and 25 have refused to participate. In addition, 28 providers have not responded to our efforts to contact them and we are not sure whether any of these providers are actual providers or not. A list of the non-responders, resellers and non-providers is provided at the end of the document and all of these potential broadband providers were contacted. Even if some providers were identified as non-providers or resellers in previous submissions, we continue sending out data request letters to these providers in case their status has changed in any way.

2.4.1 Non-providers

Advanced Tel, Inc.

Americom Technologies, Inc.
Axcess Internet
Beaver Creek Telephone Company dba Timberline Tele
Bell South Long Distance, Inc.
Big River Telephone Company, LLC
Bluebird Wireless Broadband Services, LLC
Cbeyond Communications, LLC
CCS, LLC
CIMCO Communications, Inc.
Clear Talk
Convergia, Inc.
Cordia Communications Corp.
CTC Communications Corp.
CTG3/Bandwidth Builders
DigitalBridge Communications Corp.
Eastern Sub-RSA Limited Partnership
Eltopia Communications, LLC
Enhanced Communications Network, Inc.
Enventis Telecom Inc.
Extenet Systems, Inc.
First Communications, LLC
Harbor Communications, LLC
Horizon Telecom, Inc.
IDT America, Corp
Infotelecom Holdings, LLC
Inland Long Distance Company
Lightspeed Networks, Inc.
Matrix Telecom, Inc.
Maverick Wireless
McLeod USA Telecomm (PAETEC)
Navigator Telecommunications, LLC
Netlogic, Inc.
NextG Networks of California
North County Communications Corporation
North Olympic Penninsula Data Centers
Pac-West Telecomm, Inc.
Plexicomm, LLC
Public Communications Services, Inc.
PUD - Asotin
PUD - Clark
PUD - Cowlitz
PUD - Ferry
PUD - Jefferson
PUD - Kittitas
PUD - Klickitat
PUD - Mason #1
PUD - Skamania
PUD - Snohomish
PUD - Stevens
PUD - Thurston
PUD - Wahkiakum

PUD - Whatcom
Qnect
Queenanne.net
Skyline Telecom
Smart Choice Communications, LLC
Stat Network Solutions
Syniverse Technologies, Inc.
T2 Technologies
Tcast Communications, Inc.
Telecom Pacific
Touchtone Communications, Inc.
TransNational Communications International, Inc.
University Corporation for Advanced Internet
Virtual Networking Services, Inc.
Voicecom Telecommunications, LLC
Wanned Technologies, Inc.
Washington RSA No 8 Limited Partnership
YMAX Communications Corp.
Zayo Bandwidth Northwest, Inc.
Zayo Enterprise Networks

2.4.2 Resellers

Access One, Inc.
Access Point, Inc.
ACN Communication Services, Inc.
Airespring, Inc.
Alliance Group Services, Inc.
Amerion
Birch Communications
Blue Mountain Internet's HyperSpeed Internet
Broadcore, Inc.
Broadview Networks Holdings, Inc
BullsEye Telcom, Inc
Cincinnati Bell Any Distance, Inc.
Computers 5, Inc. d/b/a LocalTel
Digizip.com, Inc.
Ernest Communications, Inc.
Galaxynet Wireless
Genext
Global Crossing
GlobalCom, Inc.
Highland Internet Services
J & N Cable Systems, Inc.
Liberty Bell Telecom LLC dba DISH Network Phone &
Light Tower Fiber Long Island LLC
LightEdge Solutions, Inc.
Metropolitan Telecommunications Holding Company
NetRiver
New Edge Network, Inc.
Norlight, Inc.

OlyPen
One World Telecommunications
OpenAccess
OrbitCom, Inc.
Reallinx, Inc.
Reliance Globalcom Services, Inc.
Silver Star Telecom Washington LLC
Telekenex, Inc
Threshold Communications, Inc.
United Telecom, Inc.

2.4.3 Non-Responders/Difficulty Contacting

Abba Communications
ALEC, Inc.
Bellevue, City of
Cortland Communications /Seattle DSL
DONOBi
Envision Technologies
Global Telecom and Technology Americas, Inc.
Greenfly Networks, Inc
Guiness Communications Inc.
Internet Expressway
MultiMeg
Orcas Online, Inc.
Peninsula Telecom of Washington, LLC
Primus Telecommunications, Inc
PUD - Benton
RapidWiFi
Saddle Mountain Wireless
Telebyte NW
Telovations, Inc.
Towerstream, Inc.
WCI Cable, Inc.
WDT World Discount Telecommunications Co., Inc.
Webbworks
Westgate Communications LLC
Windjammer Communications, LLC
Winfield Wireless
World Communications, Inc
X2Comm, Inc.

2.4.4 Not-Participating

Accel Net Inc.
Black Rock Cable
Cactus International, Inc.
CSS Communications
DAVIS COMMUNICATIONS, INC.
eVolve Business Solutions LLC/Cincinnati Bell Inc

iFiber Communications
Interstate Telecommunications, Inc.
LS Networks
Master Mind Productions, Inc
Meriplex Communications, Ltd.
NCI Datacom
NextWave Wireless Inc./WCS Wireless License Subsid
Noel Communications Inc.
noWYR
Pend Oreille Valley Network, Inc.
PUD - Kitsap
PUD - Lewis
Rabbit Meadows Technology, LLC
RioNetworks /UIDC Telecom
Spectrum Networks
Spectrum Online Services
Symplified Technologies,LLC
Thunderbird Broadband
TV Association of Republic

State Broadband Initiative Mapping Methodology

For the State of Wisconsin
Revised September 30, 2012

CostQuest Associates

LinkAMERICA Alliance

Contents

Overview

This document provides an overview of how the sixth required data set was collected and processed for the State Broadband Initiative (SBI) in the state of Wisconsin.

This submission builds upon prior efforts to increase in state broadband mapping and planning capacity. Although each state has taken a slightly different path to building in house capacity, this cross-state partnership helps the LinkAMERICA team focus on comparable outcomes across the four states, where appropriate and support each state based upon the State's elected transition path. Our intent is not to make the states look and be the same, rather it is to leverage economies of scope and scale among the business processes while at the same time pursuing the longer term goal of transitioning sustainable program leadership to the respective states.

As our team completes the third year of the SBI program, more work has shifted to in state partners. Much of this work focuses upon the capacity building, planning and technical assistance components of the program. One immediate result of this is that in some of our states in-State partners have taken direct responsibility for the survey, validation and development of Community Anchor Institution information. The methods by which CAI data were developed are included as Appendix One. During this third program year we also anticipate at least one in State partner taking over the state web presence, both in terms of content and hosting. We also have States hiring in dedicated resources to support the program.

As expected, this document rests heavily on the prior drafts but has also been updated and expanded.

Significant changes include additions covering:

1. Trends in provider inputs
2. Modification to internal provider tracking
3. Increases in the amount of WISP coverage using propagation estimates
4. Requested changes based upon NTIA guidance
    a. Review of submitted speed with respect to NTIA supplied frequency table
    b. Review of NTIA speed guidelines and provider documentation
    c. Inclusion of Provider Universe Table (Appendix 4)
    d. Expansion of verification methods summary table
5. Transition planning with respect to capacity building within the State for Broadband map development (even while the technical data development components of the program continue to rest with CostQuest and the LinkAMERICA Alliance).

Treatment of the following subjects has been expanded:

1. Verification and validation
2. Data production methods

3. Provider advertised speed and coverage validation

As anticipated, the SBI program continues to mature and evolve. Technical leadership and strong program office guidance has been appreciated. We continue to focus resources on establishing stable business processes to track submissions, verify received and processed data, test for temporal stability and provide reporting deliverables consistent with NTIA expectations.

In our view, the mapping deliverable reflects (1) a good faith effort, which results in a reasoned response to the NOFA, Technical Appendix A, as well as supplementary program office guidance and modifications offered in phone calls, emails, and webinars, (2) a stable foundation for improvement and prioritization of both NTIA and state needs and interests , (3) a valid data processing model to support online mapping, consumer feedback, provider verification and reporting, and finally, (4) a valid use of the evolving data transfer model and its intrinsic validation methods. More importantly, the resulting data and online coverage maps that follow from this work are providing good input and context for the Broadband planning teams working across the states we have the pleasure to serve.

We also note that the mapping deliverable is increasingly important to state policy makers as each of the states we work with continues to assess the policy ecosystem that supports the advancement of broadband access and adoption.

We close this methodology document with 4 appendices. Appendix 1 refers to efforts related to Community Anchor Institutions. Appendix 2 describes data collection challenges. This section describes some of the open issues, challenges and questions we are exploring. Our hope is to receive clarification and counsel from NTIA in how best to confront some of these issues, which are likely common across states. Appendix 3 describes the confidentiality framework explained by NTIA. Appendix 4 details the provider universe, those providers found to be non-NOFA compliant and those providing data.

Purpose of This Manual

This technical document was developed to provide transparency in our data production process.

Our goal is to illustrate a thoughtful process designed to meet the intent of the submission. Our hope is that we have developed a process that is reasonable, with respect to the data it deals with, as well as flexible enough to change with evolving NTIA requirements and lessons learned from the Broadband mapping community.

Data Sources

Developing the Provider List

Broadband provider lists for all states were developed from the following sources:

- Prior comparable mapping/research efforts
- State lists of regulated telecommunications, cable and wireless service providers
- State and national industry organizations (i.e. cable associations, wireless service provider organizations, telecommunications associations)
- FCC Form 477 respondents
- Third party data sources such as Warren Media, Media Prints, American Roamer Coverage Right, GeoResults Wirecenter Boundaries.
- Independent web searches
- Interviews with key state staff members and important community influencers

As one would expect in a dynamic marketplace, provider identification is an ongoing and important component of our work. Mergers and acquisitions, the use of multiple regional DBAs, the lack of any universal identity management attribute, and the generally complex parent-subsidiary structure of many telecommunications companies, make provider identification and tracking very challenging. Because of this dynamic environment, the Provider list is reviewed on an on-going basis and changes are made as necessary to ensure that the list remains current.

At the start of each round, email and telephone contact is made to all known providers. This time consuming, but necessary, process ensures that the list of contact persons remains current, and that providers are aware of data request changes and deadlines associated with each round. Where necessary, we execute new NDAs with providers. We maintain this communication with providers throughout the Data Collection period, providing multiple paths and opportunities for participation in the program. Providers that respond too late to be included in the final dataset are flagged for inclusion in the next submission. Unresolved data concerns are also flagged and tracked so that we can begin working on a plan for resolution prior to the next data collection round.

As contact is made in each round, we qualify each provider by asking a series of questions regarding the type of service and speeds offered. If the provider does not meet the minimum specifications for a

Broadband provider (as defined in the NOFA) we make a note of the change in status.[1] Providers remain on our list and are included in program communications so that in the event that their service is upgraded or expanded their status can be updated accordingly.

Provider Outreach

To meet the program's aggressive deadlines and participation goals, LinkAMERICA believes it is critical to maintain rapport with providers. To do this we reach out to providers with regular project communications, including a program newsletter and links to the various State mapping websites. In several states we have participated in trade association and policy summits.

As described above, individual e-mails and/or telephone calls are made to all providers explaining the status of the program and requesting their continued support. In some instances we've also had the opportunity to support providers in their BTOP / BIP applications. Through these collective outreach initiatives, and our engagement with various industry associations, we continue to enjoy a healthy and appropriate relationship with Broadband service providers.

NDA

To provide protection for all parties involved, LinkAMERICA continues to honor the terms of our NDA. If providers did not execute the NDA in previous rounds they were offered the opportunity to do so in this collection round. New providers were of course also supplied with a copy of the NDA.

To facilitate the execution of NDA's, LinkAMERICA continues to use the DocuSign online document management solution. This system allows providers to review and digitally sign the NDA in a legally binding manner, and has been instrumental in achieving rapid approval and execution of NDAs with the majority of providers. In some cases, NDA's were individually negotiated to address specific provider concerns. In all cases, minimum standards established by the NOFA are honored. In other cases, providers chose to submit data without executing an NDA.

Provider Survey

Since five prior rounds of data collection have been completed, the LinkAMERICA team has a solid base of coverage and speed information with which to begin Round 6. This allowed us to provide flexible response options to participating providers. One option allowed them to review check maps of their coverage and speed data – submitting only corrections and additions to the existing dataset. (For provider convenience the check maps were created in both PDF and Google Earth (.KMZ) formats.) The second option was to allow submittal of completely new datasets, either in tabular form or in multiple other digital formats. For those without CAD or GIS systems, we continued to allow the submittal of printed/scanned maps and other written materials.

---

[1] As with other Grantees, we struggle with appropriate and consistent classification for service providers who opportunistically provision Broadband services. In this submission we continue to bring them into the analysis as a provider type "other". As the inclusion of this category isn't our primary goal, we are working to process data as we can. We are similarly categorizing and retaining reseller information. Appendix 4 illustrates the categorization of non Broadband providers within our provider tracking and verification systems.

Survey Methods

Once again, we used a secure digital survey process (via our provider portal websites) to collect and display information for providers. The Round 6 survey process was designed to accommodate both new and returning providers, and the different types of information they would be submitting. The following is a summary of the process encountered by each group:

New providers: New providers were routed directly to our standard survey where they were provided with templates for uploading data in tabular NTIA-compliant formats. As in previous rounds, if providers could not supply information in the requested format, alternatives were offered. These alternatives included uploading service-area boundary maps, exchange area maps, CAD drawings or customer address lists. From that information, the LinkAMERICA team developed a geographic representation of coverage and was able to build coverage features for each provider.

Returning providers: For Round 6 we continued to work with participating providers to improve their datasets. Check maps continue to be a useful tool to show providers how their area would be displayed on the resulting interactive state map and to get constructive feedback regarding corrections and changes that need to be made to their coverage and speed data. Generating these customized documents in each round is an extremely time consuming verification process, but it allows us to close many of the gaps that might have otherwise persisted.

Follow Up

After the release of the Round 6 survey in early July 2012, LinkAMERICA launched an extensive effort to encourage responses. Every known provider was contacted at least twice during the months of July and August. The initial data submission deadline was set for mid-August, but we continued to accept "straggler" submissions into September.

No Response Policy

As mentioned above, every effort was made to contact each provider who appeared on our initial list. However, if no current information could be found on the company (i.e. no website, no valid phone number, and no contact person identified) they were removed from the list of "known providers". We believe the vast majority of those we were unable to reach were providers who have simply ceased to exist[2]. If we verify that a company is a broadband provider still doing business and are not able to get a response to our request for data, we make note of that in our datapackag.xls, and continue to reach out to encourage participation.

Summary

In summary, an intensive 45-60 day provider outreach and data collection process is initiated at the beginning of each round. In Round 6, given the data vintage of June 30, 2012, we began this process in June and the last submissions were accepted in September, 2012.

While we continue to successfully engage the majority of providers in each round, the amount of manpower required to solicit complete and timely responses should not be underestimated. This process is one of the most costly and complex within the entire SBI program.

[2]The list of known providers and important submission statistics are contained in the datapackage.xls file.

Third Party Data Used

We acquired the following commercial/restricted use data products:

- American Roamer, Coverage Right Advanced Services (tabular). This data served two purposes. The first was to verify the provider list and help find Broadband service providers not on other lists. The second was to verify the reasonableness of the Broadband service provider's submission.
- GeoResults Wirecenter Boundaries. This data was used in the verification of 'telephone' Broadband provider data. Where a public domain exchange boundary wasn't available, the boundary was used for coverage containment tests.
- Media Prints Cable boundaries. This data was used in the verification of Cable/HFC Broadband provider data. It was used to research valid providers and discover if that provider was offering Internet service. FCC 477 restricted use data were analyzed to find valid providers within a given area.
- Proprietary Provider Serving Areas. Since the first survey, a number of providers have supplied their engineering, serving area and/or franchise boundaries. We have maintained and enhanced these proprietary data sources.

We have included third party data sources which touch on each of the three major technologies analyzed within the SBI program. Each of these data sources tie back to a public domain data source, which provides a cross-verification mechanism for the commercial data product.

Although there are a large number of third party licensed data sources available, we remain conservative in our acquisition plans. From our limited analysis we are concerned about the ability to cross-verify additional third party licensed sources against public domain data. Further, we are unsure of how we may be able to integrate another data provider's view of valid Broadband providers within the definitions used by the NOFA (e.g. Are they using an FRN/DBA identity view or a marketing view? Can the provider supply in a 7-10 day window? Are they facilities based or not?). This leads us back to a statement we made in a 'lessons learned' Webinar (April 2010) about exploring a consortia to lower the cost of data acquisition and allow multiple entities to peer review the quality and methodologies behind licensed data products.[3]

Beyond these commercial data sources, we used a number of public domain sources. These included:

Geographic Data Files

- US Census TIGER data[4]

Sources that helped isolate providers, identity management or provider service areas

- NECA Tariff 4
- State produced exchange boundaries
- Carrier produced wirecenter boundaries (sometimes proprietary to provider)

---

[3] We also suggested forming a technical standards committee and a consistent system for confidence reporting.
[4] Census data were derived from < http://www.census.gov/cgi-bin/geo/shapefiles2010/main>, Census 2010 files. Roads were derived from the county faces and edges file downloaded at the same location and tiled for a full state.

- FCC Coals reports (321/325)
- FCC FRN API lookup tool
- FCC/FAA Antenna Registration System
- FCC FRN Lookup Tool (plain text search)
- USAC High Cost FCC Filing Appendices

Sources that helped isolate anchor institutions

- USAC Grant lookup tool
- USAC High-Cost FCC Filing Appendices
- HRSA data warehouse
- NCES data lookup
- State managed lists of schools (K-12), post-secondary institutions and libraries
- List of museums, conventions, and visitors bureaus from www.onlineatlas.us
- In state relationships to key stake holders.

Finally, challenges exist when dealing with the inevitable conflicts between provider-submitted data and third party sources (public or commercial). There is no guarantee third party sources are more accurate or timely than the providers' own reports. Indeed, some third party sources are based upon different standards than those specified in the NOFA, perhaps making them less reliable than information collected directly from providers. At the very minimum, provider data has a lineage and temporal status that we can identify. A concern we have with increasing use of third party data is that we have no way to verify its quality or development methodology. Particularly in rural areas we are concerned about what third party data may reflect based upon what we assume to be a small sample of information.

In other words, we may hit a wall in which we can't determine how the commercial source derived its coverage conclusion. To us this means that third party data sources are beneficial, but represent a supplementary view, not an authoritative one, of the NOFA defined Broadband market.

In short, we have chosen to use provider data as the baseline. We will challenge provider reports when third party data shows major anomalies, when submitted data conflict with prior submissions or when a consistent volume of consumer feedback points to a potential error.

Confidentiality and the Use of Licensed Materials

As a mapping vendor, we are reliant upon the cooperation of Broadband service providers. In large part, what underlies this cooperation is trust that we will not violate the proprietary and confidential nature of the data provided to us.

We are thankful for the confidentiality clarification that NTIA shared with us (included as Appendix 3). We use this as a guiding document to help us communicate with providers about what information NTIA considers to be confidential. Our suggestion is that NTIA publish this, or something comparable, to ensure a consistent interpretation of the NOFA and how it guides NDAs.

As some providers are non-responsive to requests for information, or lack resources necessary to put data into NTIA compliant formats, we have fallen back to the use of commercial data sources in several places.

For incumbent telephone providers we have used commercial wirecenter boundary products to filter Census Blocks and segments that are clearly out of their exchange areas. For cable providers we will use an estimate based upon Census Designated Places within MediaPrints named areas.

Public Engagement: Crowd Sourcing, Surveys and Social Media

Crowd sourcing (i.e., an intentional and carefully designed effort to tap into the collective intelligence of the public at large to expand our knowledge base) continues to be an important element of our data collection and validation process. An expanding use of social media is also an important strategy in our efforts to promote the state programs overall and engage more citizens in the work at hand. In addition to the various opportunities the public has to provide input via the online service coverage maps and the related 'Broadband story' process, our crowd sourcing efforts are grounded in a time tested telephone survey approach focused on the consumer market. In addition, we continue to advance our process to include certain initiatives centered in two social media outlets – Facebook and Twitter. These initiatives are discussed below.

Consumer Surveys

Working under contract for the state of Alabama in 2009, our initial consumer survey was performed before the NTIA SBI grant was in place. Subsequent consumer surveys funded by the SBI grant were hosted in 2010 for the states of Idaho, Wisconsin and Wyoming and then again in 2011 for Alabama (as noted below). These surveys will be repeated after two years to establish and evaluate trends. These primarily telephone based surveys include two distinct and carefully scripted tracks: one for Internet users and one for non-users. The telephone survey approach allows us to reach the non-Internet user group as well as the current Internet user. A secondary online approach is also used to augment input from current Internet users. In the most recent Alabama survey we added a third tier to our approach as we equipped local field survey teams with an iPad-based survey tool and targeted their time to reaching the younger market. For non-users, the surveys help determine why they don't have or don't use Broadband. For current Broadband users, the survey helps determine the nature of their Broadband access and how they use that connectivity in their daily lives. In addition to our state-specific surveys a nation-wide survey was also hosted to provide a broader view of consumer views for comparison purposes. State-specific surveys are, where possible, framed to match the state's regional Broadband planning structure (e.g., the updated consumer survey in Alabama was designed to produce results relevant to the state's twelve Broadband planning regions).

The resulting data is helpful on a number of fronts in the SBI's mission to advance the access and adoption to Broadband. Survey data provides an important, albeit broad, gauge for assessing coverage information obtained by providers. For example, areas with widely available coverage (according to provider information), but lower consumer subscription levels (according to survey results), or perhaps where survey results suggest Broadband is not available, can be examined in more detail. Survey results

are also very important to the broadband planning (and capacity building) components of the SBI program in that they help inform and formulate Broadband advancement priorities. Survey results also help inform Broadband policy discussions on both the local and state levels. Finally, survey results provide important information to the service provider community regarding market demand and specific Internet use in specific communities (i.e., regions).

Our ongoing consumer survey process adheres to a consistent process. For example, consistent with prior practice the 2011 Alabama survey was launched in June 2011 with a test number of survey calls to confirm (and adjust as needed) the structure of the survey and the underlying survey process. Our surveys typically run for three to four months. All telephone surveys are completely random beginning with the acquisition of a list of state-specific, randomly selected landline telephone numbers. Mobile phones are not typically included in the surveys. Upon evaluation of the survey statistics, auxiliary surveys are executed to ensure appropriate representation is achieved on both demographic and geographic fronts. For example and as noted above, the recent Alabama survey was augmented with a field effort to ensure the younger demographic (i.e., age 18 – 25) was adequately represented. This secondary step is required because of the continued migration (by younger markets) to non-landline based communications. This younger market is also surveyed by reaching out through social media outlets (primarily Facebook and Twitter) to encourage their participation in an online survey process.

As noted above, our telephone survey process is augmented by providing online access to the survey. Participation in the online survey is promoted on all of our state-specific public web sites and selected social media.

As a final relevant point with respect to the consumer survey process the length of the survey is noteworthy. By survey standards, these tend to be long surveys. The surveys typically average just over fifteen minutes. While this clearly contributes to the number of survey call attempts that were required to reach the level of statistical validity, it is not insurmountable.

Social Media

The phenomenon of social media is widely documented and yet still emerging as an effective access point for public engagement. We continue to explore appropriate ways to use a variety of social media venues in our SBI efforts. All of our efforts are informed by and consistent with relevant state statues and guidelines. Different states have different perspectives on if and how the state will participate in the use of social media. Some state requirements are well defined and some are still being formed. Where appropriate, we use LinkedIn, Facebook and Twitter to support our work. A central focus is on promoting awareness of the program and seeking to expand engagement. In some situations we find that sub-program initiatives (e.g., regional planning teams) are making very effective use of Facebook to help inform and engage citizens impacted by the SBI program. As noted above, we are able to promote additional input on the consumer surveys through a social media outreach program aimed at our younger market segments.

In addition, we continue to evaluate how Facebook and Twitter can be used to drive public input on two important crowd sourced issues: online speed tests and input on map accuracy. Based on data obtained

through our web site traffic monitoring process and readily available social media tracking processes, results are promising.

Capacity Building and Transitioning to State Partners

A fundamental goal of LinkAMERICA has always been to transfer knowledge and capacity to our in-State partners.

Within each State, transition planning and responsibility for specific activities is on a slightly different timeline. Much of this is driven by resource availability and partner identification within the State. For example we began transitioning the responsibility for Community Anchor Institution data to the State of Alabama in Round 3, starting with the use of interns to validate Community Anchor Institution data. In Round 4 the state's responsibility expanded to include collection of all CAI data, and in Round 5 the effort culminated with Alabama assuming responsibility for the CAI submission. LinkAMERICA supported this process with detailed transition documents and technical support.

Alabama plans to continue the transition process though the end of year 3 assuming more responsibility for the interactive State maps and website. In Idaho the SBI Framework Coordinator took on the responsibility of reaching out to CAIs in round 5. In round six the outreach became more relationship based and face to face. Other States are looking more towards program year 4 and/or the in-State hire of a Broadband Coordinator as the initiation point to support their transition efforts. Broadband Coordinators were brought on board in both Idaho and Wyoming in year three. An open position was recently filled in Wisconsin. Alabama has had a broadband coordinator in place for nearly two years.

Data Sharing With Other States

Where possible, LinkAMERICA works to share data with other state mapping entities. This data exchange tends to take two routes.

First for wireless providers if we find a fair amount of coverage that crossess into an adjacent state, we will ask the provider's permission to convey this information to the neighboring states. If the permission is received, we send the data to the mapping agency.

Second, in circumstances where we receive a speed that is outside of the technology speed 'norms' and this provider offers service in another state we try to check with other covered states to find out if the service is comparably marketed.

Trends in Submitted Data

Overall we note several important trends in this data submission. The list below represents general trends and not a scientific survey.

We note the following trends:

The coverage of advertised speeds is increasingly important. More and more providers are specifically concerned about where the submitted NTIA footprint shows available of 4 x 1 Mbps or 6 x 1 Mbps service.

Large national providers are beginning to submit block level speed information. In round 6 AT&T submitted block level coverage and speed. Other national Wireline providers, such as Frontier improved their submission based upon the completion of system conversion of acquired properties.

xDSL speeds are increasing. More and more xDSL is likely ADSL 2+, VDSL, shortened loops, pair bonded or some combination of these. As we talk to providers who trigger speed/technology tripwires, we receive more and more feedback about the presence of these new technologies to enable speeds comparable with DOCSIS systems.

DOCSIS 3 is becoming the norm. Most cable systems are becoming DOCSIS 3.0. Over time we are seeing the DOCSIS 2.0 areas diminish. In some DOCSIS 3 areas there tend to be pockets of non DOCSIS 3 in predominant DOCSIS 3.0 markets.

There seems to be an increase in acquisitions among fixed wireless providers. A large consolidation with respect to T6/Digis/Skybeam/JAB has changed the provider landscape in several of our states. As much of the system consolidation has not yet taken place our coverage remains largely in tact but we anticipate changes in the next submission.

Fixed wireless providers are offering broadband services approaching 1 Gbps. This is occurring both in terms of licensed and unlicensed spectrum. Part of this is driven by where a provider has fiber or high capacity wireless backhaul but we are receiving more and more information from providers and radio manufacturers specific to very high speed wireless services. Although the service can be deployed within the 7-10 day NOFA window, these higher speed services tend to be purchased by high capacity customers. It may be worth reconsidering the speed norms in this category as well as adding a field in the datatable to indicate when a speed value is geared toward a specific end-user class.

There is less and less of a distinction between fixed wireless and mobile wireless. As firms market LTE and/or WiMax as home DSL alternatives we are a bit unsure how these two classes are to be established-what is the operating distinction between Transtech 80 (mobile licensed) and Transtech 71 (fixed licensed) when both are used as in in-home Broadband service?

Satellite providers are advertising broadband services exceeding the speed ranges in the data model. Further the spectrum used isn't available in the NTIA data model.

We continue to see a number of national Broadband providers who do not show broadband coverage within pockets of otherwise covered areas. In the figure below, the orange represents Census blocks which are NOFA broadband covered. The transparent areas have no NOFA broadband coverage from the same provider.

Figure 1--Uncovered pockets within urban, covered areas

This coverage drop-out appears to be happening in urban Census blocks typically with schools, shopping malls, universities and large businesses. We don't know what his is happening, but it could be an impact of the NOFA restriction on 7-10 provisioning. This is a noticeable artifact in the data and does challenge the notion of some who see NOFA compliant Broadband coverage as a uniform surface across an area.

Data Production Process

To support our objective of transitioning the data development process to our State partners, we continue to model, refine and document our data production process. We find this to be a very beneficial step for two purposes.

First, it helps us understand why (and if) a task is being done, and if it is being done efficiently. Much of this program started so quickly that it was difficult to plan logical integration and hand off points among the various workgroups. Further, we are currently in the process of consolidating much of the process data (check-ins, check-outs, metadata) and we can use this process model to efficiently plan cohesive information architecture.

Second, our process documentation and modeling helps explain why resources are being consumed in a particular way. This helps our State partners plan for in-sourcing specific tasks as their time and

budgetary constraints allow. It also helps our LinkAMERICA team better plan and cross-train members to deal with the work surge that occurs 30-45 days prior to submission.

Finally, documenting and modeling our process helps us to take advantage of increasing specialization and proficiency with certain types of data and management responsibilities. In submission 3, we had identified data “czars” responsible for check-in and check-out of data. That data czar helped to bridge the gap among receipt functions, provider feedback, production and DBA. In round 5 the data czar was also tasked with alerting on speed/technology tripwires. This individual was responsible for taking the initial review of each submission and determining if an NTIA speed/technology warning would be triggered.

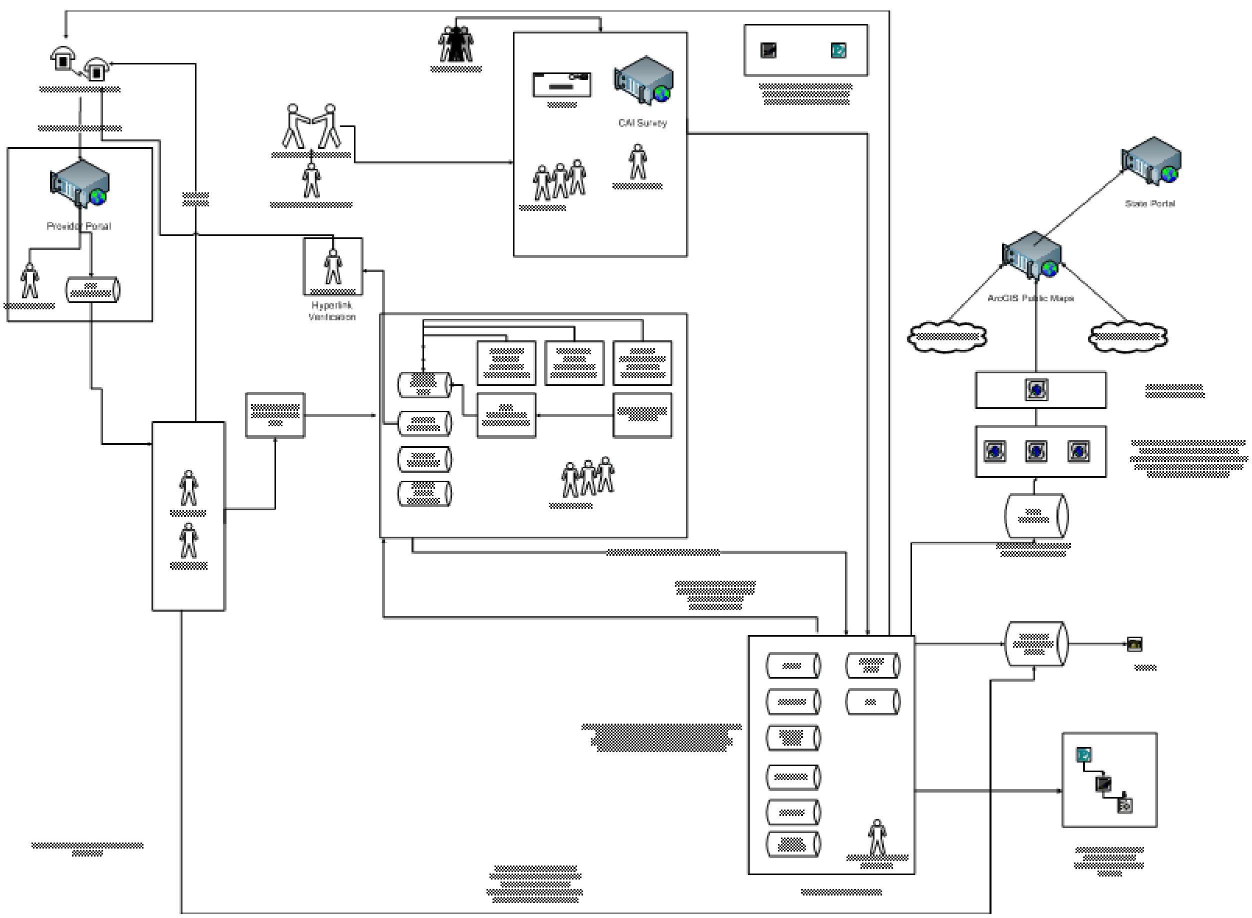


Figure 2—SBI Data Development Business Process Diagram

Provider Tracking In the Cloud

Prior to initiating the Round 5 survey, LinkAMERICA transitioned in house provider tracking systems to a Cloud based application, TrackVia.

The movement away from desktop solutions was based upon several factors. First, the architecture these systems were designed under no longer met the program realities. For example, deliverables like

Datapackage.xls were not contemplated when the original provider tracking system was developed. Second, the ability to share data across multiple geographic areas and organizations was becoming increasingly important as the program evolves and responsibility moves to in-State partners. Third, portions of this data need to securely transition back to State resources who may or may not be able to support a specific IT infrastructure. These factors combined to make the Cloud applications a valuable alternative.

As with any IT transition, the process has not been without challenges. Nonetheless the investment in time and resources has proven to be effective and worthwhile. We anticipate further movement away from desktop oriented architecture to a more open, Cloud type solution.

Data Production Methods

As raw data were received from the provider community, attention turned to normalizing the disparate submission formats[5]. The team considered each submission with respect to the following criteria. These criteria are important because they perform the basis for our verification and quality assurance process. In other words, we have to appropriately scale our data verification efforts to match the scale or ambiguity of the following:

- Locational certainty
- Speed certainty
- Temporal certainty
- Provider and network ownership certainty

The team's goal was NOT to quantify a particular degree of precision with respect to any of these criteria. Rather, we are working to attribute the above "certainty attributes" to each submission, and will continue to implement quality assurance and verification mechanisms that are resource-appropriate for each.

Deriving Broadband Coverage Information

Broadband Coverage[6] was normalized into four formats:

1. Coverage in Census Blocks (2010) of 2.00 or less square miles
2. Covered Street Segments (2010) in Census Blocks greater than 2 square miles[7]
3. Address Level Coverage (point data)
4. Wireless Service Areas (SHP file format)

---

[5] In line with NTIA Best Practices we continue to request and receive a large number of data input formats. This ranges from tabular Block lists to hand drawn maps.

[6] Speed, Anchor institutions and Middle Mile facilities are discussed in later sections.

[7] To help clarify issues relating to Census block area and vintages in use, our team published a technical paper to the Grantee workspace. Because we were unsure if this standard should be implemented uniformly, this document was never distributed to the provider community.

With each submission, the team went through a series of steps to normalize and categorize the data. Since data arrived in many different formats, and at many levels of granularity, the following normalization procedures were used:

- Determining the nature of service being provisioned (who is providing service and what technologies are in use)
- Planning an attack strategy for the submission –understanding the data and assigning team members to various tasks
- Alert provider relations staff if the received data trigger an NTIA speed/coverage tripwire.
- Geo-referencing the data; QA the geo-referenced data
- Geoprocessing the geo-referenced response
- Segregating the submission into the correct NOFA-compliant submission formats.
- Apply appropriate source metadata[8]

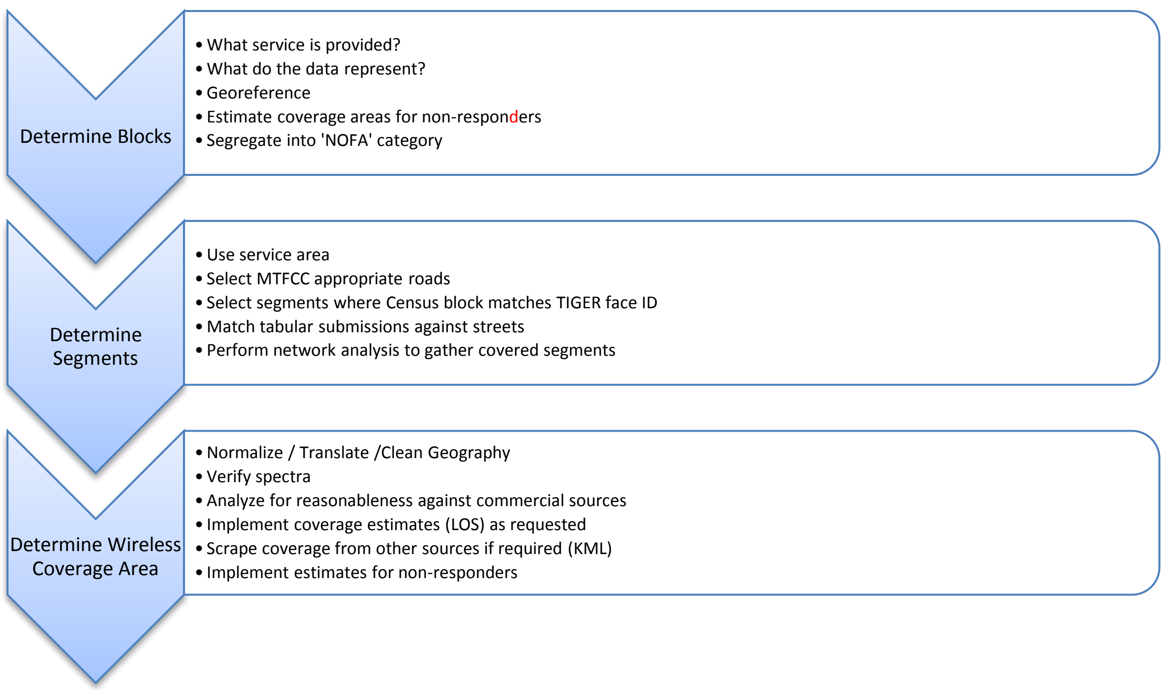


Figure 3-Components of Broadband Coverage Process

Impact of Program Change

There were several important program changes that impacted how Broadband coverage was developed and submitted to NTIA in Round 6.

[8] When our team logs a submission into the staging database we record at least two attributes. One records the method used to derive the coverage, the other records the method by which speed was attributed to that object. Other attributes carried to NTIA carry source meta values as well.

Speed Examination

Given recent concerns about the depiction of speed and what that mapped speed represents, LinkAMERICA invests considerable time requesting detailed information on speed which appeared to be beyond normal speeds for a given Technology of Transmission given the NTIA supplied frequency tables.

Based upon these conversations we learned

A) For incumbent telephone providers; the speeds beyond the normal xDSL range represent significantly shortened copper loops, as well as upgrading DSLAMs and modems to support ADSL2+ or VDSL.

B) For cable providers the intermixing of DOCSIS 3.0 and non 3.0 systems in a market area is typical and sometimes reflects a circumstance where segments of plant cannot be upgraded to DOCSIS 3.0. This variance can be at a level below the Census block. In these cases the maximum advertised speeds remain to represent the market area but the plant variance is typical. We also have one 'cable' provider who is delivering DOCSIS 2.0 over fiber plant.

C)There exists a fundamental disconnect between some providers reporting a service qualified speed--the maximum speed available at a structure versus other providers submitting their maximum speed at the market (MSA/RSA level). Both submission paths are available to providers but the likelihood of providing a speed incompatible with a technology is much greater for providers submitting market level speed.

D)Fixed wireless provides are using new radio technology to quickly deploy services which rival and sometimes exceed those of wireline service providers. These speeds are being advertised, sometimes on public facing websites as well as using direct field sales staff to target specific high demand customers. These services are actively marketed but they challenge the data model in that the speed is marketed and available within 7-10 days of request but the nature of the fixed wireless submission forces attribution of this speed within a potentially large geographic area.

E) There exists a minority of providers who submit a theoretical speed that is unmatched by their web advertising. In these cases we request clarification from the provider on the inconsistency. Our experience has been that providers will modify the speed to be consistent with their marketing and advertising.

F) The maximum advertised speed offered is not always clear. Sometimes the speed is described in advertisements in terms of a combination of video and data. Other times it is data not video. Some providers allow a customer to select how much bandwidth they want to allocate to their data stream versus video stream. In other words the bandwidth available to a household is constant but how it gets allocated among the data versus video becomes a customer or service directed choice. This makes getting Maximum Advertised Downstream speed very difficult because it is not just a product of the broadband network which we are mapping but also the customer's selected service package.

Provider Definitions

Within our provider verification process we work to derive a state level provider match against third party data sources. As discussed in the early pages of this manual, there is no guarantee that a third

party data source is any more accurate than submitted data, nor does it necessarily reflect the provider ecosystem specified in the NOFA, Technical Appendix A. We devote significant resources to matching our submitted data against outside data sources. In many cases this becomes a judgment call trying to match provider names across systems. It is a difficult and somewhat arbitrary process. Nonetheless we do believe it has value because it forces a re-examination of who we believe is an appropriate provider within a non-NOFA context[9].

The use of a provider match system, as well as the webinar comments (3/17/11)[10] directing grantees to estimate, wherever possible, non-participating providers have made us back away from one of our fundamental assumptions in data collection. As discussed in prior versions of this manual, we had developed a certain "hold-out" class of data when a provider's data wasn't of sufficient quality to verify, or we were unable to put it into the data model (e.g. address points submitted for fixed wireless). In submission four, much of this hold-out data was included[11]. In some cases this involved using simple polygons to capture a wireless ISPs serving area. Other times, if we are confident in the coverage, but can get little clarification on the submitted speeds or frequencies, we release the coverage and note in our internal metadata the source issues with the other attributes.

In the weeks leading to submission 5 we received a request from NTIA to clarify the presence of unusual shaped wireless polygons. Our interpretation of this was a request for information relating to the source of these data which do not appear as propagated coverage. Although the 'unusual shapes request' represents a very small portion of the submitted data, it begs an important question about the expectations with respect to wireless coverage patterns. We look forward to working with NTIA to address these issues in a fair way across States and providers. We would not want to create a coverage dichotomy where advertised coverage was disallowed from the NTIA submission because of an expectation about how advertised coverage should appear. One concern we have when we develop a coverage estimate which differs from a providers advertised coverage pattern, which should we submit?

Finally, we use the provider type classification of 'other' to bring specific aspects of certain provider's data into our submission. There still seems to be confusion on how to handle provider types where a provider offers multiple paths to provision Broadband for typically business customers. Rather than waiting for certainty on the answer, we bring the provider in and list them as provider Type "other". Our sense is provider Type "other" will continue to expand in subsequent submissions.

Clearly one challenge is the data, but an equally significant challenge is appropriate messaging around this "other" provider type category. We do not want to leave consumers with the impression that they

---

[9] We have requested from NTIA information on how provider matching is done within their QA process; beyond the relatively short whitepaper posted with the national map <http://www.broadbandmap.gov/blog/wp-content/uploads/2011/02/DataComparison_Methodology2.pdf>, we have not received any more detailed information on how providers are cross verified between submitted and third party sources at the national level. Our understanding is licensing concerns are holding the release of this information.

[10] Clarifying comments from Akins Lawl indicate the Program Office does not want Satellite providers estimated if the provider is non-responsive to data requests (email 9/12/12).

[11] We continue to process older submission data looking for information and methods by which we can estimate coverage information. This will be an ongoing process.

can get a high capacity fiber or microwave link despite the fact that the hospital next to them or in a nearby Census block can get this service.

After the April 2011 Grantee conference, LinkAMERICA submitted a paper describing our provider classification system[12]. It is our feeling that understanding the type of provider is essential to appropriate verification methods.

Coverage Geoprocessing Methods

The next section discusses how data were georeferenced and geoprocessed given a particular submission format. We have yet to find a particular method that works across all submissions. Rather we tend to tailor our geoprocessing to meet the specifics of the service provider and data submitted.

In most cases, in Round 6 we were not provided with street segment geographic objects for Blocks greater than two square miles (large Blocks). This necessitated subsidiary geoprocessing. As stated before, our first goal was to derive block level coverage. Then, for Blocks greater than 2.00 square miles, we moved to a segment gathering processing. The segment process will be described in the last section.[13]

Block Level Coverage Derivation Using Service Point Data

A number of providers submitted point level customer data.

In some cases the submissions themselves were not internally consistent. For example, in the image below, unprojected points are shown, while the Census block polygon to which the points are supposed to "belong" is highlighted. In this case, one of the following scenarios has occurred: block attribution is wrong, the points are not in the location to which they are attributed, or different block shapes were used than what is assumed.

[12] https://sbdd-granteeworkspace.pbworks.com/w/file/42309493/provider%20ClassificationFINAL.docx

[13] As has been discussed previously, we note inconsistency in how providers are supplying information at the block and segment level. Beyond the temporal differences, we see that providers are computing area differently, as well as including or excluding water areas. This provides an inconsistent measure across providers for the 2.00 sq mile cut off. Our preference would be to provide guidance to service providers within our states, but our concern is that we will inconsistently message this with grantees in other states. We would appreciate consistent guidance from FCC/NTIA on this topic.

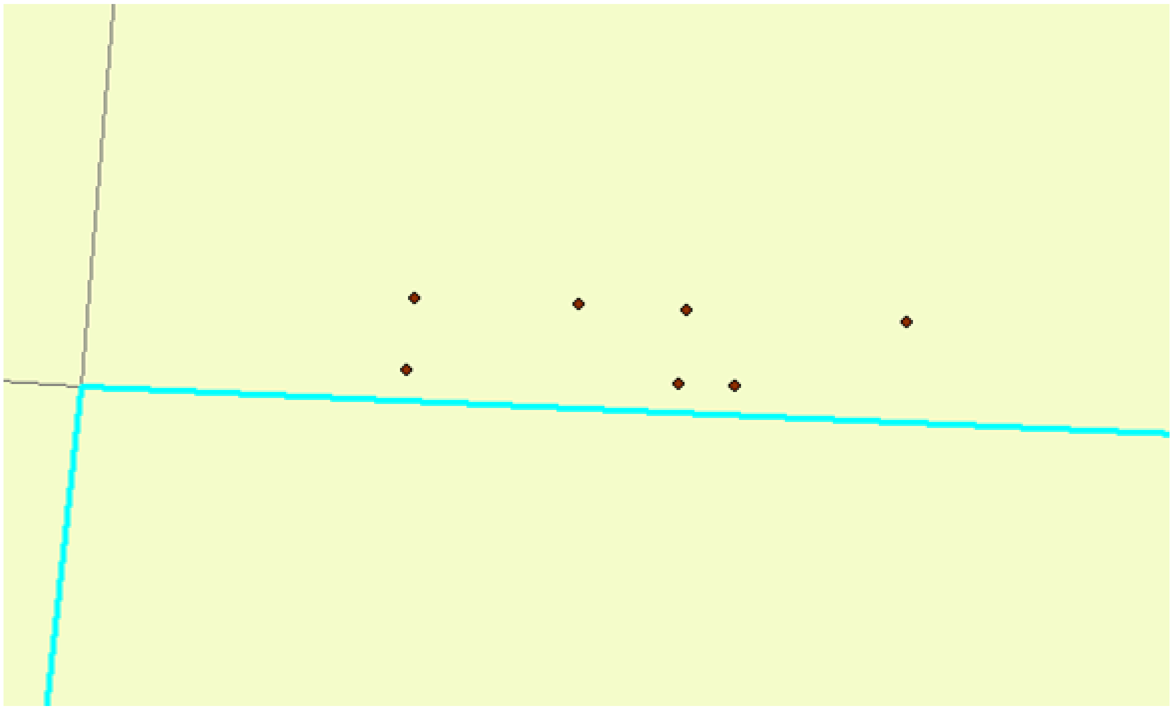


Figure 4-Internal inconsistency in submitted data

In other circumstances, we found that inconsistent geocoding standards may produce misleading results. The next image shows point level data, and the Blocks are colored based upon the counts of points intersecting Blocks. The challenge this presents is that if geocoding was performed on a different dataset than the block boundaries (the road traces are not coincident with block boundaries) and/or geocoding was done without an offset, it becomes problematic to assign coverage to a Census block based upon only the point locations.

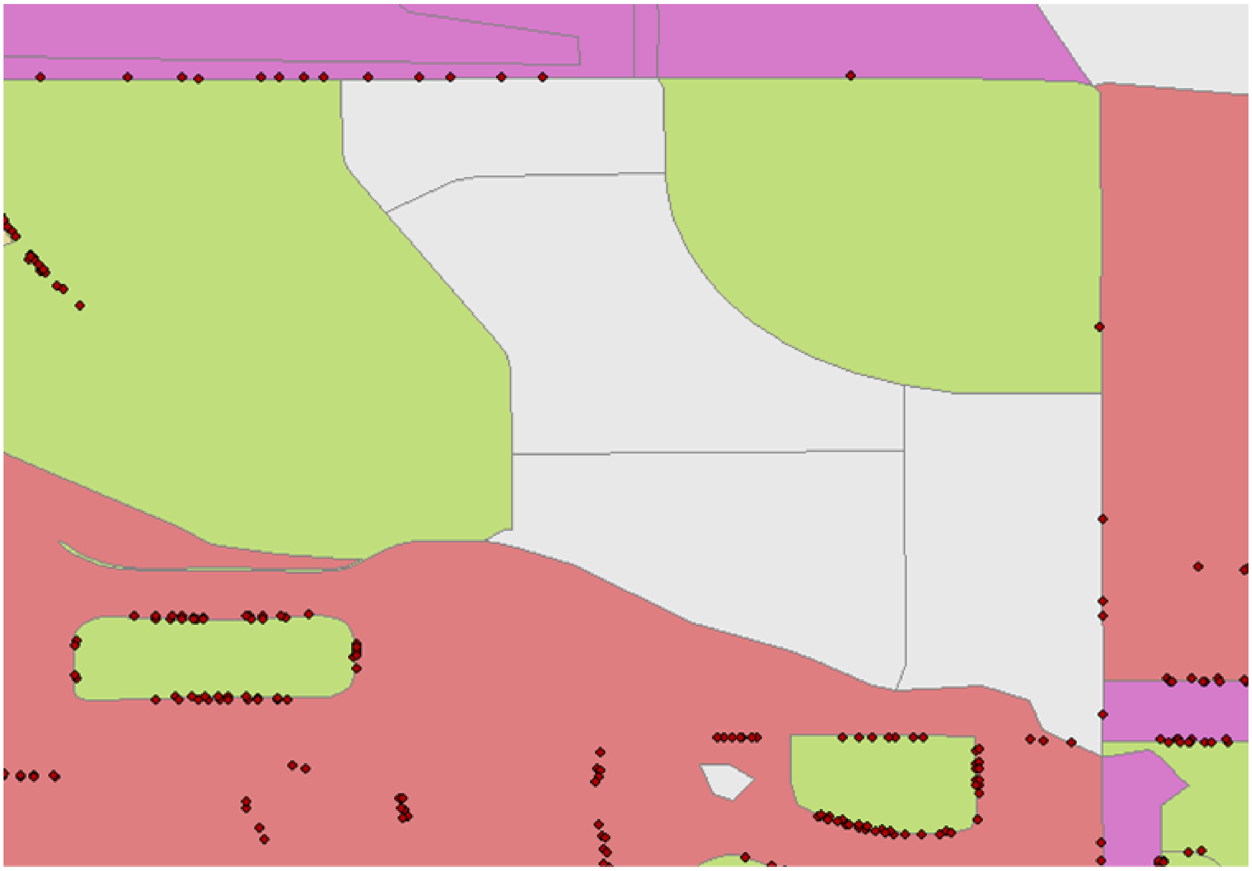


Figure 5-Block Coverage

For this reason, where we were provided address point data and asked to generate covered Census blocks, we elected to use a 200-foot buffer to select Census Blocks that intersect our points.

We also see a number of providers submit customer data and facility data. Their intent is to allow us to have two primary sources from which to derive the most accurate coverage. In these cases we tend to look for clusters of customers in areas where we see no facility based coverage.

With respect to deriving Block level speed from sub-Block data, we have instituted a business rule where the predominant speed in a Block is the speed we attribute to the Block.

Block Level Coverage Derivation Using Customer Facing Plant Level Point Data

In other circumstances, providers submitted point level plant data. From what we could gather, these points tended to be customer-dedicated terminals. Typically, these providers were high speed Broadband producers—which may somewhat strain the definition of Broadband as other providers supplying comparable services specifically disclaimed the ability to provide high-capacity Broadband services in the required 7-10 day interval. In these plant point data submissions, we had similar concerns to the point level customer data, but two factors tended to make us use a more conservative intersection buffer. First, we tended to have far fewer points to work from, so our concern was grabbing too many covered Blocks as the Blocks tended to be much smaller in these urban areas.

Second, these plant points tended to be dedicated to distinct customers, but it was difficult to know which element of the customer's campus to attach coverage to.

In the case of the image below, given a small shift to the left, it would be easily possible to gather 1 to 3 Census Blocks from this point. Although orthoimagery is helpful in a circumstance such as this, it is still indeterminate.

Thus, in the circumstance of plant level point data, we used a 100-foot intersection buffer.

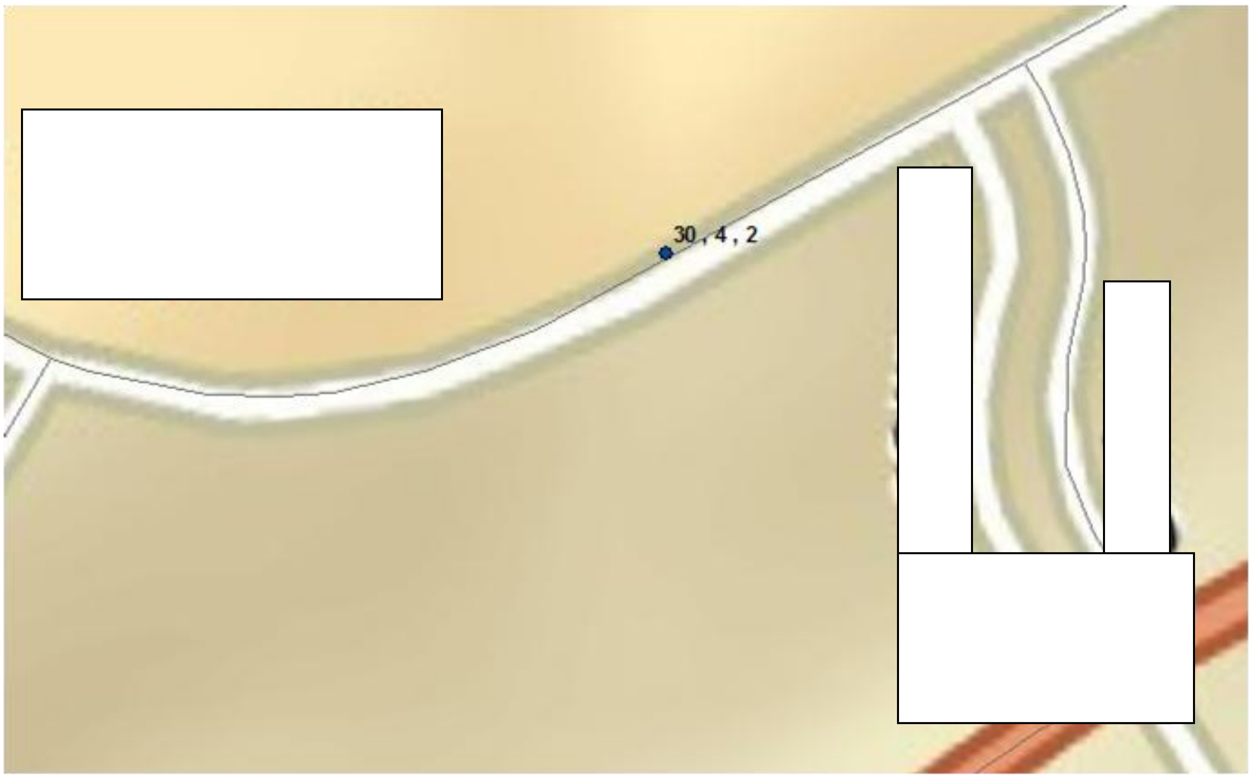


Figure 6-Plant Point level data

Coverage Derivation Using Linear Facilities Data

A number of providers submitted facilities data. We handled this data in different ways depending upon what we believed the facility data represented.

Most telecommunications networks are divided into two components. Feeder - supplies higher capacity nodes (eg. DSLAMs, Fiber Nodes). Distribution - usually supplies customer premises (NIDs, Pedestals, Taps, ONTs). Where we could discern what facilities we were provided, we used different methods.

The next image demonstrates a geo-referenced CAD image as given to us by a service provider. Note the light and dark green shading. We would infer that the lighter segments represent distribution and the dark green represents the feeder network.

In the case of a combined strand map, we used a relatively tight buffer of 200 feet to gather covered Census Blocks. Our intersection tolerance is based upon an assumption that our data likely represent a

situation comparable to customer point level submission in that we have most of the network footprint captured.

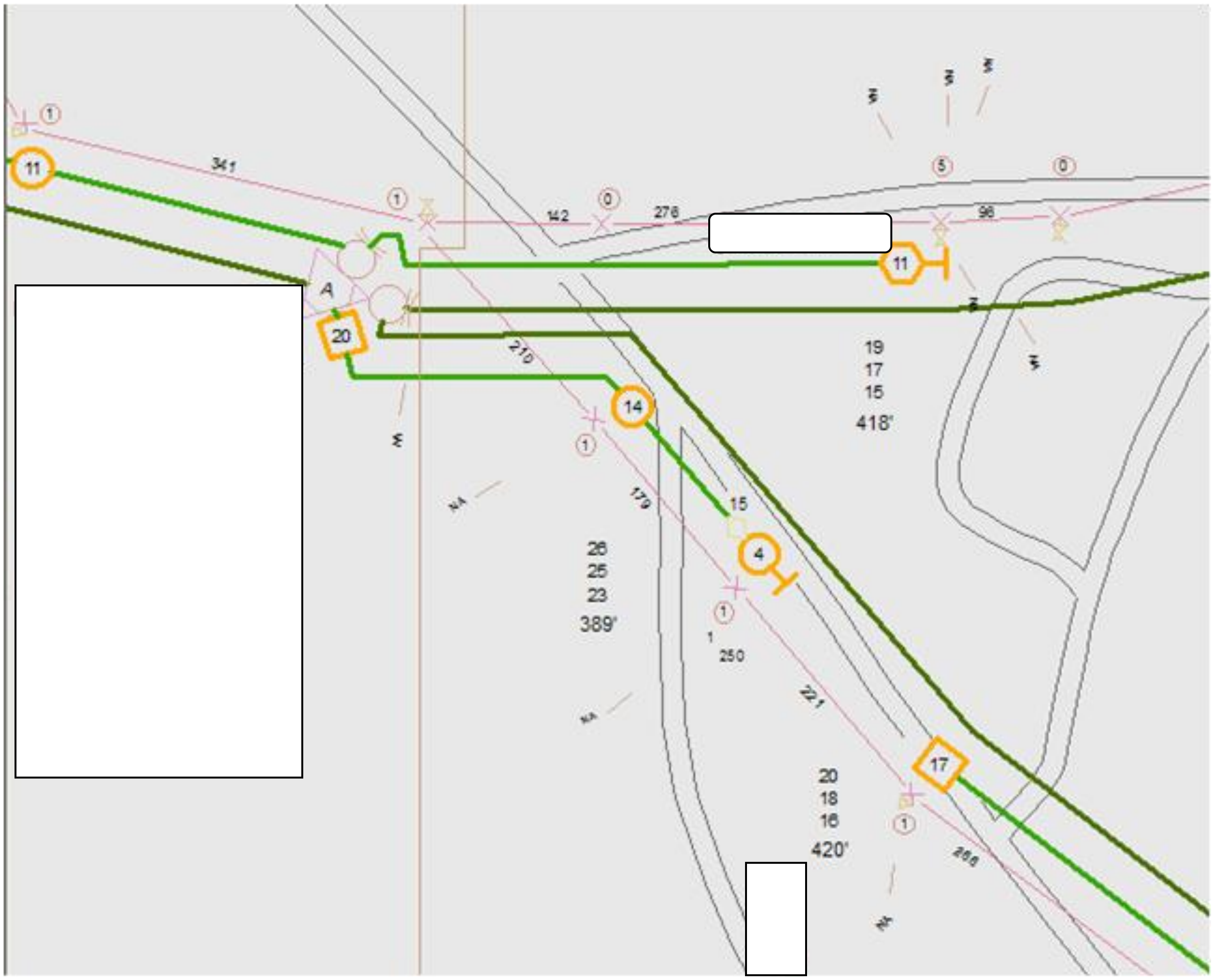


Figure 7-Georeferenced CAD information supplied by Broadband provider

In other circumstances, we were provided engineering information that we inferred to be feeder only. This inference was typically based upon the presence of fiber optic equipment only. In these cases, we used a more generous 2,000 meter Census block intersection. The 2,000 meter criteria was based upon an informal survey of population in proximity to the geo-referenced strand data, but it could be varied based upon a more complete survey.

Coverage Derivation Using Covered Street Segment Data

In some cases we were provided with covered street segment data. Covered segments tended to come from two sources.

In some circumstances, providers gave us CAD data, which was not drawn in a projected manner. This is relatively common for older engineering data derived from hand drawn records. This meant that our

team geo-registered the image into an approximate position. In this case, the boundary streets were selected, and an enclosing polygon was derived. The intersection of this polygon and the Blocks within became the geoprocessing method to derive Blocks.

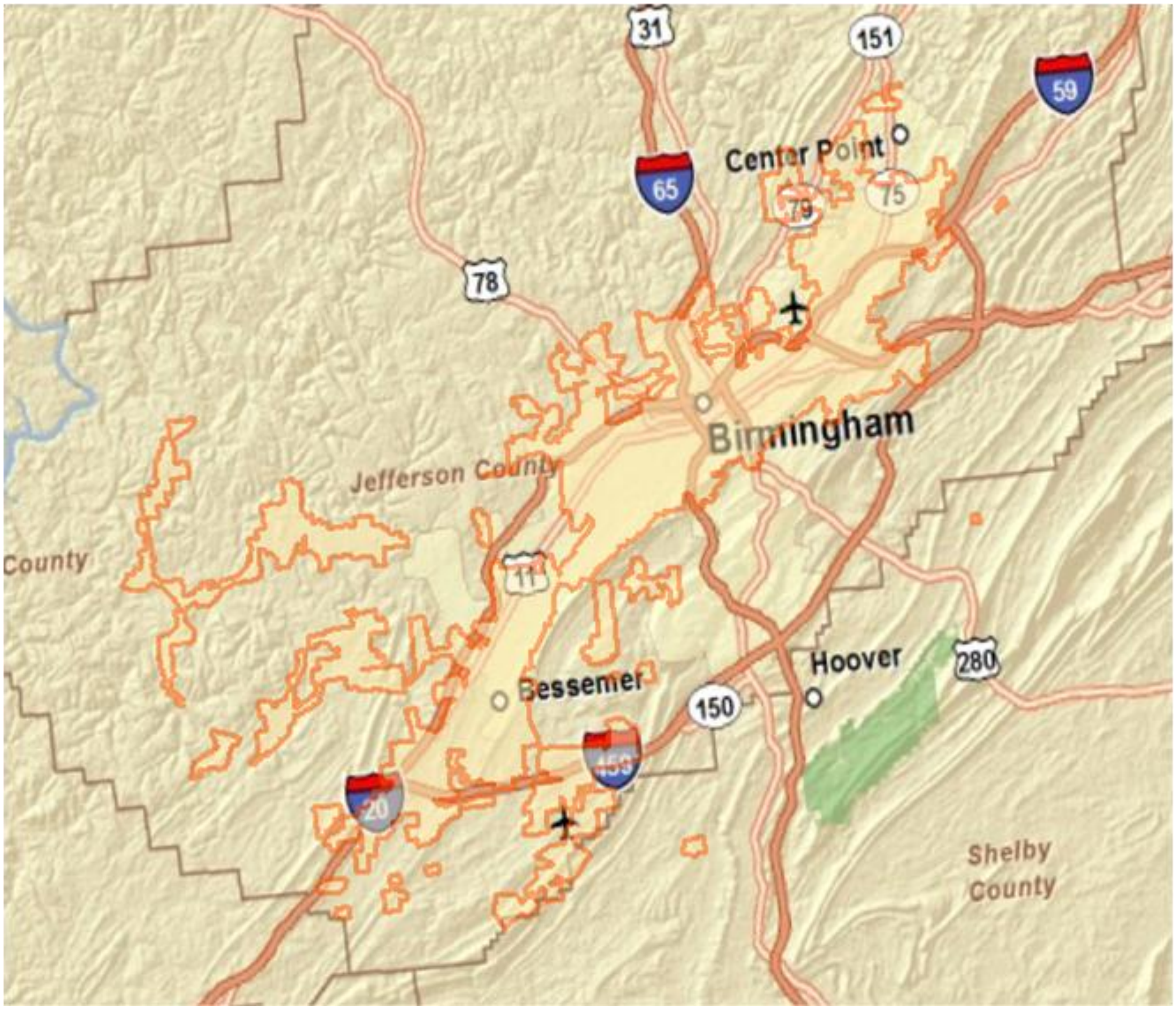


Figure 8-Coverage derived from street segments

In a second circumstance, street segment data was developed during coverage estimation. Handling the estimated data is discussed below.

Coverage Derivation Using Serving Area Point Submission Data

In other cases we worked with providers to derive service areas based upon point plant data. In these cases we were given a serving node and an appropriate road length service boundary. There is an important distinction from the plant data discussed above. In this specific case, the data submitted was a node that served many locations--such as a Central Office or DSLAM. This is contrasted with the earlier example in which the point represents a node serving only a few customers.

When trying to derive coverage from Central Office or DSLAM nodes, the team used ESRI Network Analyst to derive covered road segments honoring these road engineering parameters.

The figure below shows street level coverage derived from Central Office and remote DSLAM point data.

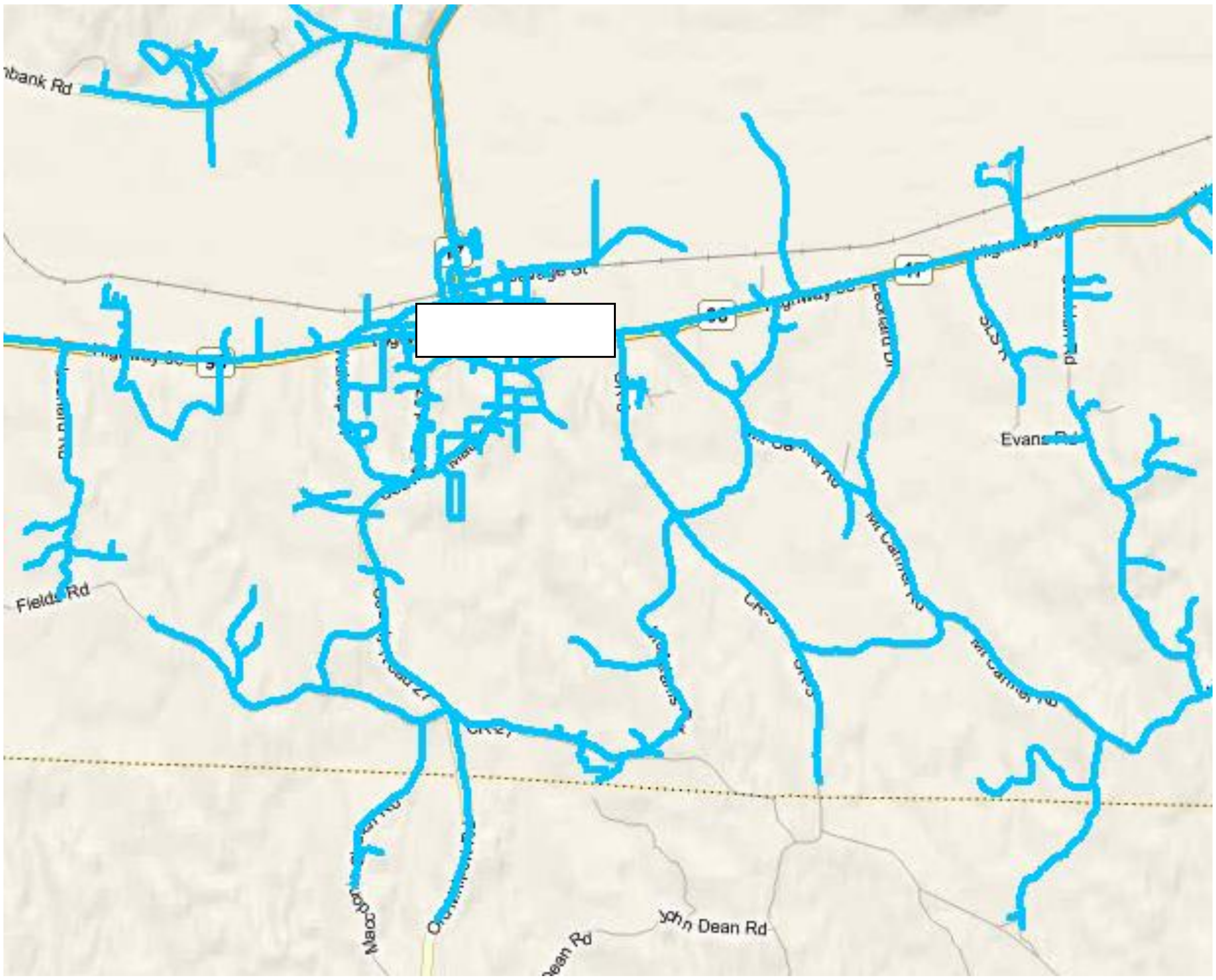


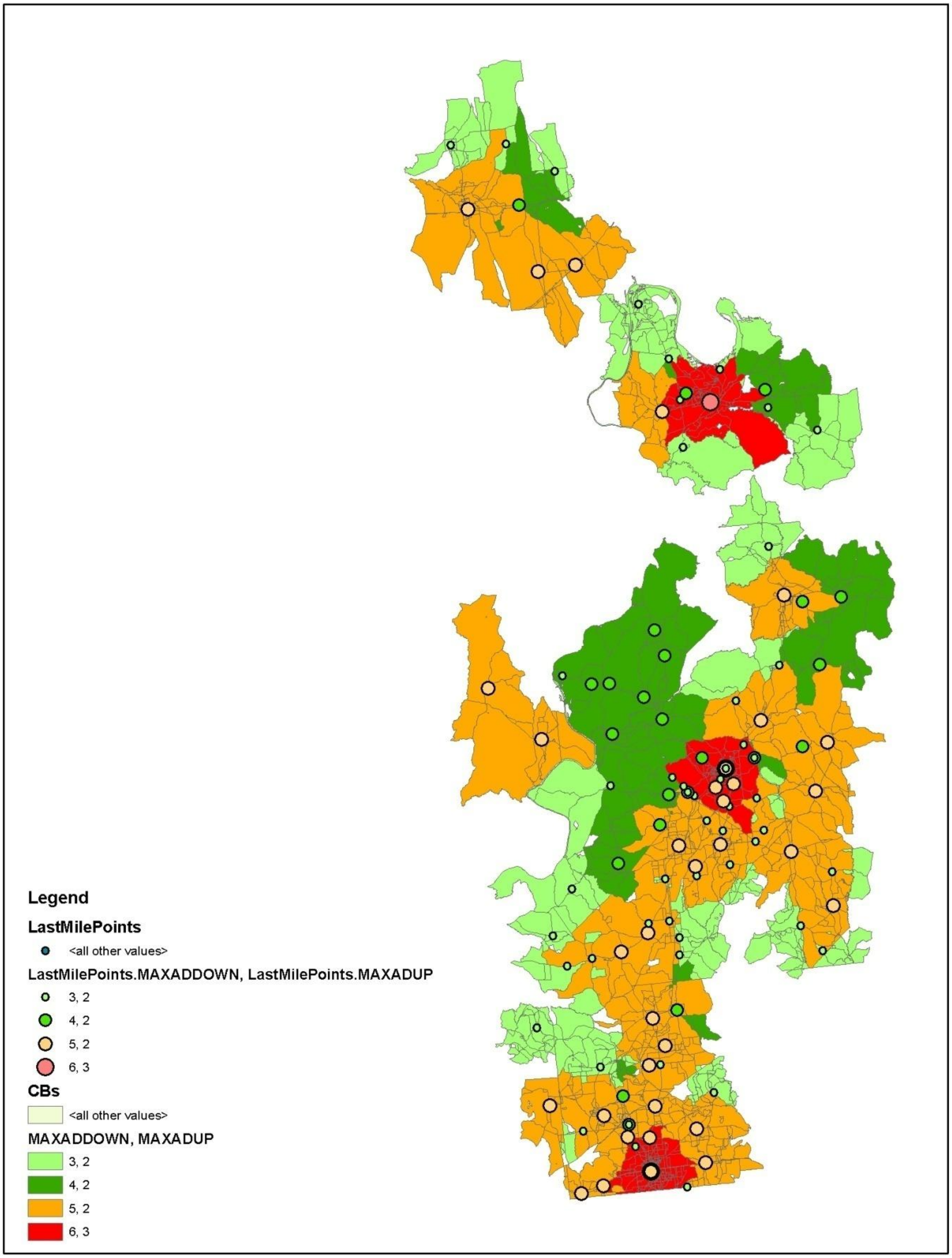
Figure 9-Coverage derived through road paths

In response to Provider feedback we revised this process to include a larger variety of TIGER road types. In Round 1, unimproved roads were not used. In the current submission -- particularly to improve estimates in areas bordering parks and public lands -- a wider class of TIGER roads was used.[14]

The segment level coverage is easily extendable to derivations of Census block level speed. The figure below shows the attributions of block level speed based upon the Maximum Advertised Speed available from a DSLAM. Although the methodology isn't perfect, it does provide insight into the value of granular infrastructure data.

[14]Only TIGER features of MTFCC type S1100 and S1200 were excluded from use.

Over time we have seen an increase in the number of providers submitting this type of data for our use. Our sense is some providers find plant level data easier to generate and are satisfied with the results of derived coverage.


Legend
LastMilePoints
<all other values>
LastMilePoints.MAXADDOWN, LastMilePoints.MAXADUP
3, 2
4, 2
5, 2
6, 3
CBs
<all other values>
MAXADDOWN, MAXADUP
3, 2
4, 2
5, 2
6, 3

Coverage Derivation Using Polygon/Polyline Serving Areas

Broadband service providers sometimes submitted coverage in terms of served areas. This was either in direct geospatial formats, CAD files, or paper maps. The image below reflects a carrier's service area. Within that service area, there are variations in technology of transmission and served speeds. When polygons with speed data and technology of transmission were available, we used a spatial intersection to gather covered Census Blocks. In many cases, using covered Census Blocks resulted in a loss of the speed variation (sometimes the speed variation was at a level smaller than a Block and did not get picked up within a spatial query).

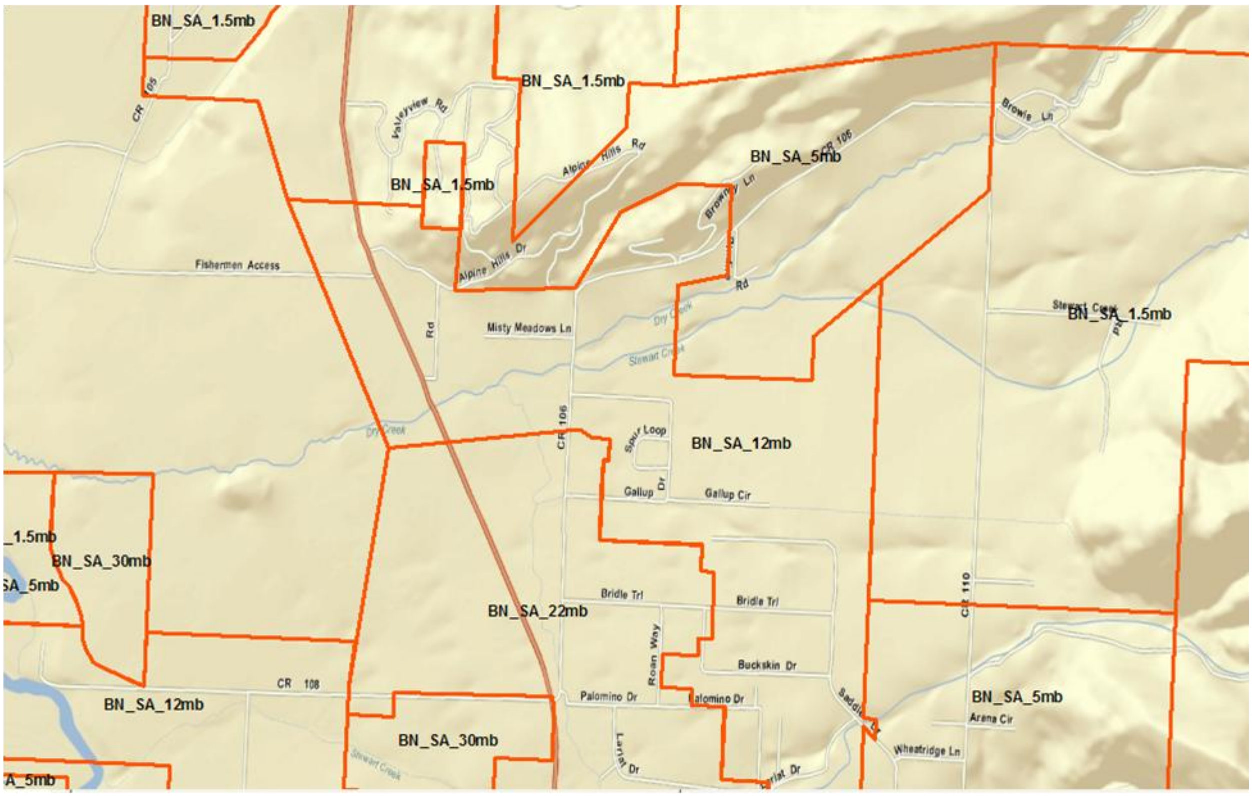


Figure 10-Coverage derived through serving area polygons

Although we cannot directly solve the loss of speed granularity due to Block shapes, we honor a business rule wherein we always select Blocks from the highest speed areas first, and then allow the lower speeds to select from the remaining Blocks. This is an arbitrary rule, but our feeling was that it should be a consistent selection, rather than an unordered selection.

Street Segment Derivation, Large Blocks

For those calculated Blocks greater than 2.00 square miles (large Blocks), we provided coverage in terms of covered street segments and corresponding geography.

With respect to segments we had four sources of data:

1. Covered large Blocks
2. Tabular street segments and address ranges for large Blocks

3. Geographic segments either with street attributes or without
4. Service area boundaries

A few providers only provided a list of covered large Blocks without corresponding segment information beneath the block. This provided the choice of either selecting all segments in the block, or none. Because we had little information from which to make the selection, we elected to be conservative and did NOT pass any covered segments to NTIA from this submission format.

Some Broadband providers submitted covered street names and street ranges. In these cases we performed a manual analysis trying to link to specific segment names and address ranges within covered Blocks. Sometimes this was a simple process because a provider used a TIGER derived street database. In other cases we could not determine the source of the provider's street data. Street and Address matching tended to yield a relatively good result (typically between 30% and 100% of possible segments in the Block), but was very time consuming. Where yield rates were low, our result was a shredded

segment coverage pattern, like the image shown below.[15]

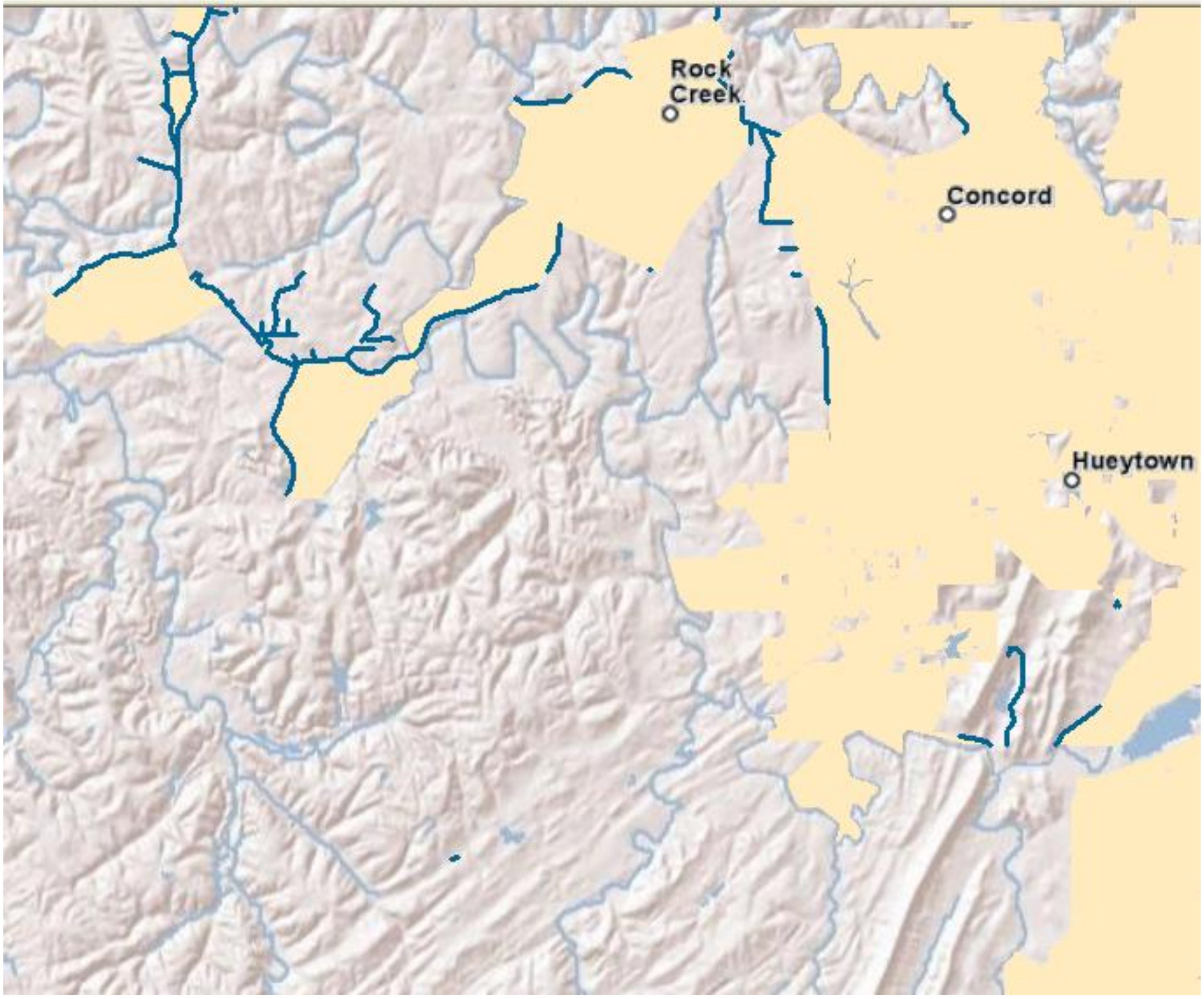


Figure 11-Blue road segments adjacent to peach covered small Blocks

A number of providers submitted geographic objects. In this case, our manual process was directed toward a conflation of data sources. The goal was to take provider submitted segments and put these segments in terms of our TIGER 2010 basemap. Although there is a trade-off in the accuracy using non-provider submitted segments, we felt it was more important to have a license-free road set that would edgematch our Block features, the TIGER state boundary and remain consistent with the block size standards we used for other providers. This is important for the appearance of the online maps, as well as potential verification work where we are attempting to judge a feature based upon its attachment to a covered small Census block. The figure below shows street segment input data.

[15] We continue to hear providers expressing concern that our request for either a geographic object or TIGER Line ID is beyond the scope of the NOFA clarification. Therefore, they cannot supply additional information to us.

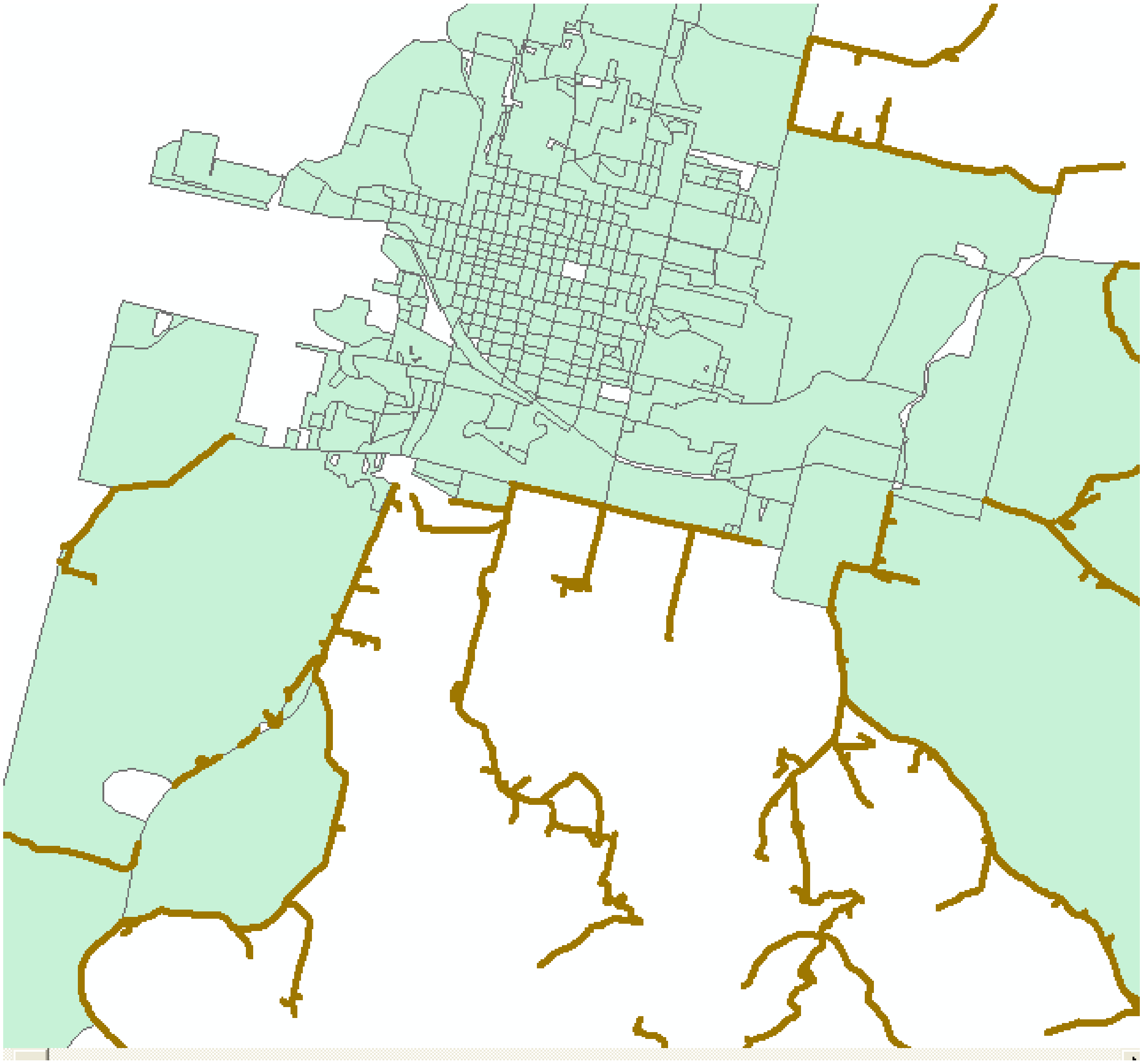


Figure 12-provider Submitted Street Segment Objects. The segments don't edge match the Blocks nor are they continuous.

The figure following demonstrates the same area after the conflation process. Blue segments are the conflated TIGER roads which will be passed to NTIA.

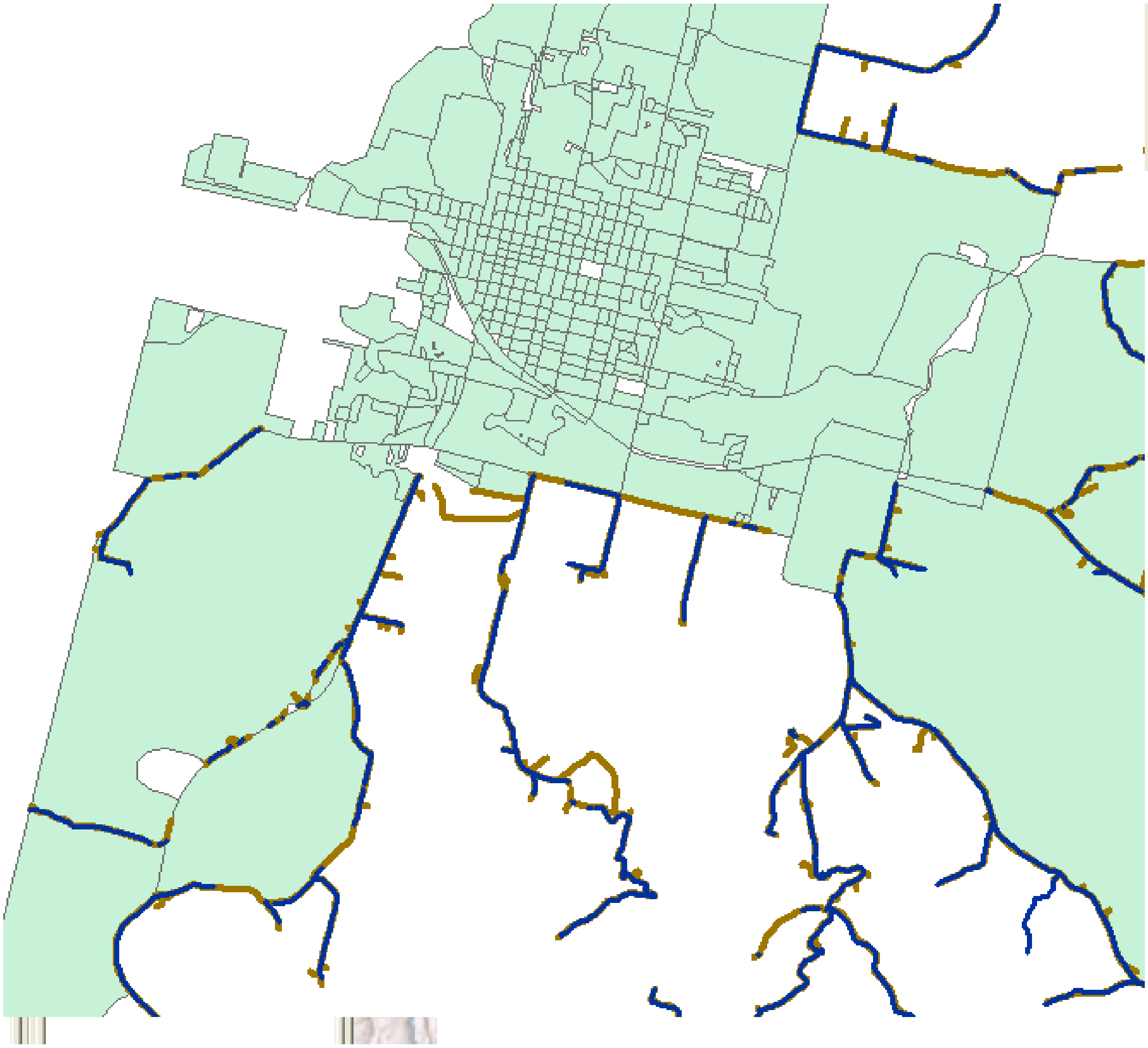


Figure 13-provider submitted segments in gold, selected TIGER in blue—Conflation result; in many cases what was a continuous segment is made discontinuous because even with a distance buffer the TIGER segment doesn't always intersect the provider segment

The final segment process was used when we were supplied with a Broadband covered area polygon. In this case, we found the segments within covered areas and eliminated those segments inside of Blocks less than or equal to 2.00 square miles.

Because there was more control over the format of the inputs (we knew we had a boundary and were working with TIGER segments), this was an automated process that followed this general format:

- Select large covered Blocks by provider ID (from updated Large Block table)
- Select TIGER 2010 road segments (MTFCC like 'S%') that face (CB = CBLeft2010 or CB = CBRight2010) covered large Blocks for provider

- Select segments as distinct records, max speed with corresponding technology, join in feature names, export selected records to temporary DBMS table
- Join TIGER roads feature class to temporary table on TLID
- Select covered segments (Python script)
- Select service area polygons for provider
- Clip selected facing segments with selected service area
- Export clipped segments to staging feature class, keyed by providerID

In this figure, orange represents covered small Blocks; black lines are covered segments in large Census Blocks (light blue). The service area boundary is shown in grey. Based upon feedback from providers, we have elected to clip segments at the end of a coverage boundary.[16]

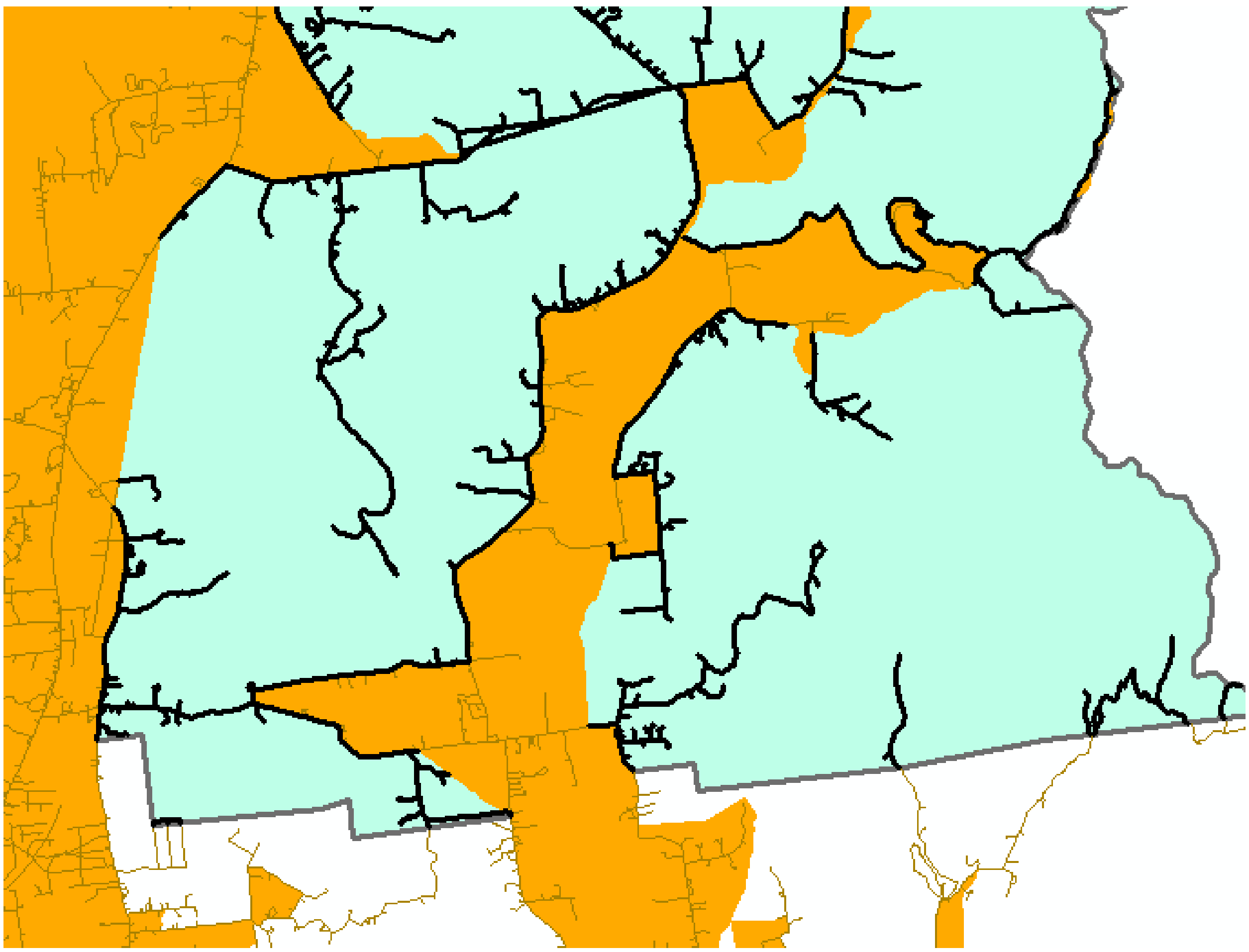


Figure 14-Output of the Segment Process

Wireless Coverage Process

In general, most providers of mobile Broadband submitted coverage information in a NOFA-compliant format. Other than attributions for spectrum and speed, little was done to this coverage.[17]

---

[16] An outcome not discussed here is how to handle address ranges on segments. As NTIA has asked for a Min and Max on the segment, deriving theses values for clipped segments is very problematic. Also the prevalence of alphabetic characters in addresses makes the min/max selections very arbitrary. We are grateful that addresses are nullable data elements.

Per Program Office direction, LinkAMERICA followed up with wireless providers where we determined that submitted data did not edgematch TIGER 2010 state boundaries. For the most part providers were unable to submit coverage data that edgedmatched as requested. In this case, we left the submitted data alone and did not perform any adjustments.

LinkAMERICA continues to make aggressive efforts to bring additional WISP coverage into the NTIA dataset. For the most part, our outreach was with providers who were unable to supply sufficiently granular data in the past or those that could only submit wireless address points which is no longer a valid submission format.

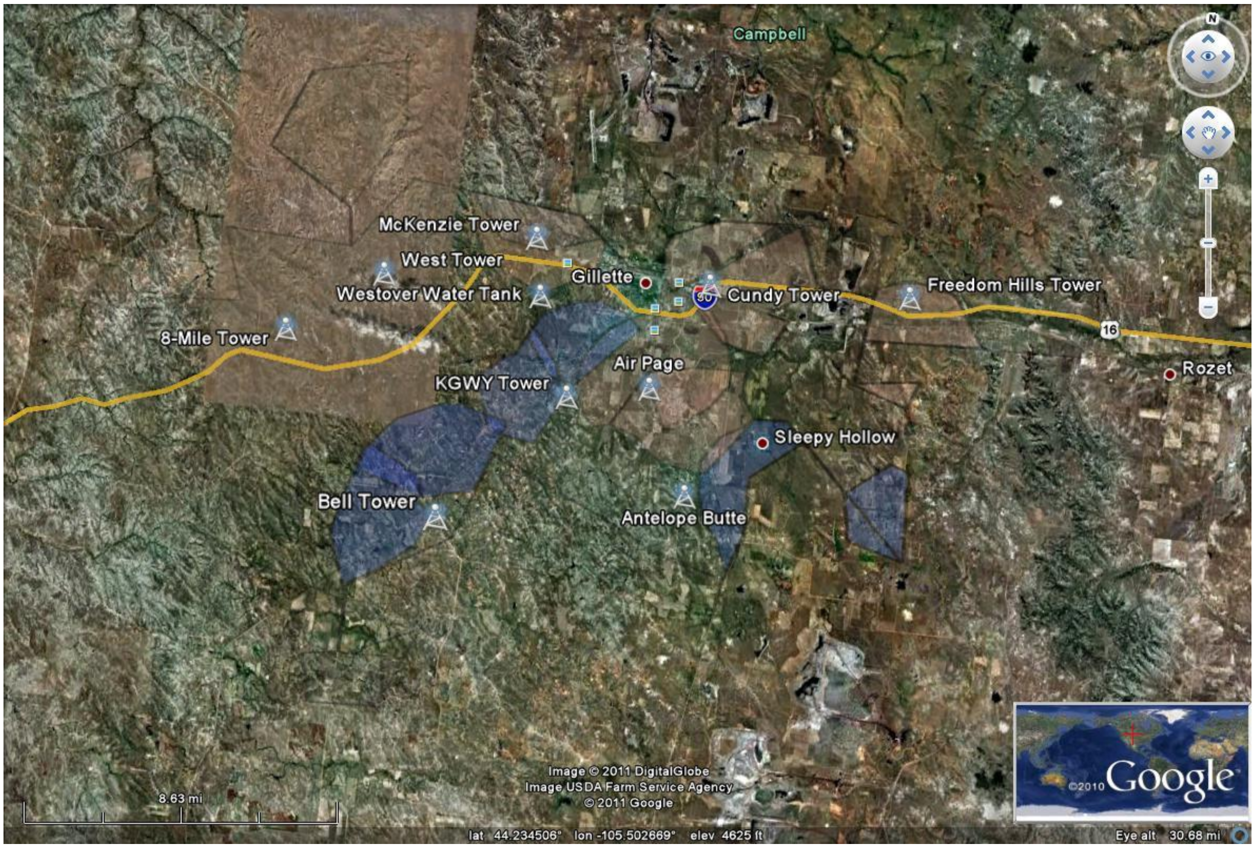
In Round 6 fixed wireless providers generally either supplied coverage information or infrastructure from which coverage estimates could be derived. Many allowed us to use their tower locations, antenna heights and direction/spread of coverage to derive a line of sight coverage estimate. In our experience, this is a conservative and reasonable derivation of coverage.

Some wireless providers submitted RF propagation studies. When this was done, there was a request that the signal strength be removed from coverage data. The request was honored. We note that some providers are very careful in that their coverage is an estimate of the probability of receiving an upstream link to their network. It is not intended as a depiction of any particular speed availability.

Other fixed providers were able to supply us with hand drawn maps or polygons/polylines drawn in Google Earth format. In these cases we did our best to georeference and verify the coverage areas with the WISP.

When we received coverage information in KML format, like the image below, we accepted the data as it was presented to us as the submitted coverage patterns were used in the provider advertising.

[17] Some polygon data did exceed the node count threshold. In these cases, data was rasterized to 100m cells and then converted back to polygons. The polygons were dissolved to multi-part geometry. This addressed the node count concern.



As the image above shows, in some cases we were provided hand-drawn coverage, as well as infrastructure. Instead of estimating their coverage using a line of sight or RF study, we elected to stick with the provider's supplied information. Our decision was guided by two primary factors:

If the provider is advertising using this coverage they must have specific confidence in its accuracy.
If the provider can supply coverage, as well as infrastructure that reasonably supports the coverage, there is a very high likelihood in the accuracy of the information.

The downside, of course, is the polygon shown on the map may not represent our notion of how wireless coverage should appear.

In general we note several interesting trends in the wireless data. First, we can be successful in increasing the amount of WISP coverage when we aggressively pursue WISPs. This means we have to be willing to accept data on their terms and convey it into SBI formats. Some of our WISP submissions have taken over 12 hours to normalize into SBI formats. Second, we have to accept that some WISPs will not be able to supply FRNs. Third, there appears to be some variation on how the NOFA coverage definition is met. In other words, there seems to be a disparity on the necessary link budget necessary (e.g. -80 dB, -98 db, -120 dB, etc) to provide the appropriate quality of service for data services to be provided at a location/inside a location.. Fourth it was very difficult getting providers to identify spectra used for

Broadband data services[18]. We are unsure if this is a competitive concern, or if the same coverage pattern is yielded for multiple frequencies. Typically, the spectra returned were those that a provider was licensed for. At this point, we have no reliable way to locally determine what set of frequencies are used to provide Broadband data services in a local area at a specific point in time.

Service Address Point Process

A handful of providers have requested that customer level, service address point data be submitted to NTIA. In these circumstances we have done minimal processing to preserve the provider's intent with this deliverable and not bias downstream NTIA use.

Our verification included checks against commercial or Public Utility/Public Service Commission exchange boundary maps. Points not contained within three miles of a boundary are not submitted to NTIA. The percentage of excluded data varies cross providers, but it tends to be under 1% of the total submission.

We retain from the provider the provided latitude and longitude, as well as Census block. For some coverage data, if a provider is unable to supply a longitude, latitude or Census block, we fill in these attributes. In those circumstances where we do not have a Census block, but we do have a longitude and latitude, we accept the given longitude and latitude and use that as the basis for our Census block assignment.

With point data we have tested for comparable geocoding success rates but do not overwrite provider information.[19] From this type of analysis we note the amount (usually little more than 10%) of addresses that seem to locate with less than street segment certainty. Deriving a thematic representation of the points on speed also illustrates some of the locational certainty issues in this point level data.

Coverage Estimation Process

Although the derivation of Broadband coverage into Census Blocks, street segments, or wireless coverage files is, in itself, a bit of an estimation process, there was an explicit estimation process required in cases where a Broadband provider either refused to participate in our survey, or provided such a threadbare submission that no carrier-based coverage information could be gleaned[20].

We typically resorted to three possible estimation paths.

---

[18] One provider responded by email, "This mapping program is to provide the coverage area for Broadband provided by a company. Not to keep a detailed account of every aspect of a companies (sic) network."

[19] We will make a second geocoding pass on locations with no longitude or latitude from provider. We typically pick up ~5% from our second geocoding pass. Typically the issue is address quality but also difficulties in geocoding in very rural areas.

[20] We report estimated submissions to NTIA as a non-responsive provider but we have data in the submission for them. This is the reason for datapackage.xls entries which are non responsive but contain submitted data.

For Cable (HFC) providers who did not provide any coverage information, we fell back to Media Prints data. Rather than using the entire Census Block Group gathered by Media Prints, we used only those Census Designated Places carrying the same or similar names to the Media Prints p_com field. Our reasoning was that Cable systems tend to be franchised on a municipal or at least administrative basis so the coverage will likely follow a governmental boundary. As a general rule, cable infrastructure is not available in the public domain[21] and what could be found was poor in quality and difficult to ascertain for validity.

For DSL providers who did not provide any coverage information, we estimated road-based coverage from their Central Offices[22]. We only used Central Offices that showed evidence of DSL or fiber-based services in the NECA 4 tariff. Road-based engineering areas were derived via ESRI Network Analyst to 18kft. These segments/boundaries were clipped to commercial wirecenter boundary edges.

For fixed wireless providers who provided no coverage information, we relied on their public websites to derive coverage maps. When these maps were available, we georeferenced them and tried to use the outer polygon boundary to represent their serving area. In other cases, when only a tower could be provided, we used a view shed analysis and estimated line of sight coverage at 10mi per tower[23]. Because much wireless propagation is driven far below the Census Block and much engineering information isn't known (frequency in use, polarization of the signal, coverage pattern of antenna(s), local terrain/land cover) this was the most complicated group to estimate.

Speed

Speed attributes are reported both at the block (typical) and higher levels (maximum advertised and subscriber weighted). We note that in many cases, providers did not supply typical or subscriber-weighted speeds. In some cases, it appears--although we cannot verify--that their maximum advertised speeds were used to populate typical speed columns.

We do have limited testing data on reported speeds, but we have been careful to not use our typical reported values with carrier-provided information. If we do not have a speed value from a provider, we report an empty value.

Several service providers claim they do not have data on typical speeds available, but estimate a 20% overhead factor between the advertised speed and what may be experienced by an end user.

We continue to request advertised speed at the block level. Nevertheless we appear to be getting speeds that do not vary over a large geographic area – leading us to believe that providers may still be submitting the maximum speed advertised in local media for the entire market. For the most part, we

[21] The team tried to use data from the FCC Coals system and 321/325 fillings but this seemed to be a bit non-uniform in quality.
[22] Central Office location was derived from GeoResults. Wirecenter boundaries also came from this commercial product.
[23] In some cases we had an approximate radius of coverage but no height. In this case we used a 50' height estimate and then clipped the coverage to the provided coverage range. We also clipped wireless coverage to honor state boundaries but did not look for providers serving coverage with out of study state facilities.

have been unsuccessful in messaging that advertised speed should not correspond to a market area, but instead, the maximum speed, which can be provided to a household—what some may describe as a 'qualified speed.'[24]

As a general rule, in circumstances where a provider supplies a range of speed attributes, we assign NTIA categories based upon the midpoint of the range. We follow this rule unless we can determine other grantees are handling the same submitted information differently.

To support NTIA program office requests, we have also modified the structure of the Service Overview table. Even if Maximum Advertised Speed is supplied at the market or county level, we push that speed down to the contained Blocks. The only records that remain in this table, will be those wireline records with either a non NULL nominal weighted speed or ARPU value.

Middle Mile

Middle Mile information was collected directly from providers via survey or interview. Middle Mile is a "chicken or egg" type of challenge in that it is possible to verify that the infrastructure exists, but extremely difficult to know what the site is doing without engineering level assistance. Although most providers submitted "something," there was a significant variance in what that "something" represented.

The purpose of this section is to record some of the comments and questions we have received about Middle Mile. We hope this provides better context for our data submission.

Within the NOFA, Middle Mile was defined as (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. (Collectively, (a) and (b) are "middle-mile and backbone interconnection points.")[25]

Given the existence of the "or" in this definition, providers submitted a variety of information. Based upon the NOFA example, several fixed wireless providers interpreted Middle Mile in terms of the connection points from their towers to their own serving backhaul location. The topology was commonly Microwave from their distribution towers to their NOC. The NOC and towers were listed as the Middle Mile points. This seems to be consistent with the first definition clause (a).

Telephone, Mobile Wireless, and Cable providers tended to remain either silent on the question, or would provide a single location in which Internet peering occurred (clause b). A number of participants explained that the NOFA was quite ambiguous with data traffic moving back and forth over both TDM

[24] As an example of a response to our request for Block level advertised speeds, we received the following comment from one anonymous provider, "This is and of itself does not require anything new of us – just states the NTIA supports efforts focused on getting that information on the CB level." It would be helpful to have broader messaging so that providers understand this new direction.

[25] From http://broadbandusa.gov/files/BroadbandMappingNOFA(FederalRegisterVersion).pdf at 54, visited March 28, 2010

and IP networks--it was unclear where the distinction should be drawn. As a general rule it seemed like many providers listed a single location where Internet Peering occurred.

A number of providers refused to answer the question on grounds of confidentiality[26]. Others would not disclose as their Middle Mile points are not owned--another company provides the physical and electronic connection to their network. In other words, the entity providing Broadband is not the entity providing Middle Mile.

Additionally, based upon the new Provider Type classification of "other," we have started to integrate points provided by Broadband service providers not meeting the NOFA definition. This includes POP locations and aggregation points for public / private networks.[27] Within a given submission there were two final attributes that tended to concern respondents. First, speed should be measured in terms of only data capacity and what exactly is "data" (e.g., can/should you segregate out voice or video), and is the relevant capacity of the physical connection, channelized to a specific virtual circuit on their network.

Finally, a number of other providers were unsure of the height above grade measure (is this their floor, the street outside, etc). We seem to have a combination of height above or below grade, as well as heights above mean sea level (AMSL).

To the extent possible in our timeframe, we verified the location of a sample of Middle Mile points. Where we could see infrastructure that appeared to be consistent in location with other provider infrastructure, we felt that the location was accurate. In some cases, the point provided seems sensible (is on a road, near other equipment), but using imagery, we couldn't find a place where this type of connection could occur. This wouldn't be unforeseen, in that Middle Mile connectivity likely takes place in a protected environment much smaller than a standard Central Office installation.

Mobile Wireless Coverage

We have received mobile wireless coverage from most mobile Broadband providers in each state. At this point we have cleaned the geometry of the data and attributed it with spectra, NTIA speed categories and FRN as required.

Where possible, provider derived coverage has been reviewed for consistency against the commercial licensed product.. To a limited extent we also use licensing locations and tower infrastructure to spot-check supplied coverage. This mode of verification remains complex, given the lack of facility-based information with mobile wireless.

---

[26] As received in email 9/30/10, "Due to security concerns and the risk of public disclosure of highly sensitive data, whether inadvertent or otherwise, ***REDACT***response to the Middle Mile and backbone interconnection request is limited to publicly available information available on {remainder not included}"

[27] As discussed in our readme.txt file, a number of middle mile points were lost in validation due to their location in adjacent state. This will cause a decrease in some providers relative to prior submission.

Finally with respect to mobile Broadband services, we note several trends.

First LinkAMERICA used the NTIA supplied frequency tables to report speeds consistent with other grantees. In circumstances where a provider supplied a range of experienced speeds, we used the portion of the range consistent with the most frequently reported Grantee value.

Second where a provider reports multiple frequency bands in use but doesn't distinguish these bands by submitted SHP file, we submit identical geometries but attribute one geometry to each submitted spectrum value.

Third we are seeing a trend toward increasing Broadband speed. As of this writing, there is not consistency across providers in how they attribute the advertised 4G speed values. In other words, for some providers 4G means advertised speed categories increase. For other providers the speed value did not change.

Fourth, we have requested providers submit SHP files that are consistent with the TIGER 2010 boundaries. For the most part, providers have not done this. As the request came late in the round six submissions our hope is this request will be honored for round 7. We have not modified the submitted data to impose the TIGER 2010 state boundary.

Verification

Data verification is an ongoing and evolving process. Clearly, with each new data submission there will be a validation process at hand and at the same time, our team continues to expand and improve the efficiency and effectiveness of our data verification routines. Consistent with the movement toward an fGDB export database and use of a data receipt script, much of our validation effort is spent in supporting the ETL processes into the required formats. In future data submissions we will continue our work to stabilize and improve the business process that normalizes provider submissions into NOFA formats and expands in more depth on the confidence analysis within the data.

Verification Methods Summary

Our overall verification standard is focused on the level at which we supply processed data to NTIA. This means that the vast majority of our verification process and resources will be focused on verifying provider identity, coverage, advertised speed and appropriate metadata for Census block's less than or equal to 2 square miles.

We believe three broad verification themes are important to consider

a) The first step of broadband service verification is a consistently applied market definition—we call this provider identity verification.

b) There is probably not a single dispositive method of verification. Rather, a number of verification approaches are needed to appropriately classify confidence in data submitted to NTIA.

c) Verification approaches tend to meld together. As an example a web survey is complimented by a phone survey but expert review and external data may be necessary to reach a final informed judgment.

The table below demonstrates the various methods used across each feature class submitted to NTIA.

	Data Types			
Verification Method	**Census Block, Road segment or, address specific service availability**	**Mobile wireless service availability**	**Middle mile infrastructure locations**	**Community anchor institutions**
Provide/Subscriber Identity Verification	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Internal data consistency check	METHOD USED	METHOD USED	METHOD USED	METHOD USED
External data consistency checks	METHOD USED	METHOD USED		
Carrier confirmation	METHOD USED	METHOD USED	METHOD USED	
Public review	METHOD USED	METHOD USED		METHOD USED
Anchor institution review				METHOD USED
Expert review	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Telephone sampling	METHOD USED			METHOD USED
Purchased Datasets	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Developed Datasets	METHOD USED			
Web-based surveys	METHOD USED	METHOD USED		METHOD USED
Field Surveys	METHOD USED	METHOD USED		METHOD USED

The following table defines each of these methods and provides a summary of why this method is used, and the value we gain from it.

	Definition	Methodology	Purpose	Benefit
Provider Verification	Provider verification is the process of assembling a broadband provider database, determining which providers are properly classified into SBI eligible providers and developing contact information.	Provider verification involves combining multiple data sources, interviewing providers and classifying the broadband provider type.	Without a consistent understanding of the provider 'market' it is impossible to appropriately classify the coverage data. It is also impossible to explain to consumers of the data why a given provider is or isn't available in the submitted data.	The main benefit of this verification process is understanding who is providing broadband services, are the broadband services NTIA compliant and how do you 'contact' this provider (Name, DBA, FRN, Holding Company)
Internal data consistency check	An internal data consistency check is a validation measure across at least two dimensions. First is the provider data consistent with prior submissions. This would be an examination of this submission relative to a prior submission. Second is this submission	Most of this validation is performed using our spatial databases and running queries that compare submissions. We also use a similar set of queries to isolate transmission of technology outliers. These would be data sets which offer speed technology combinations	The purpose of this type of validation is to understand how things change over time and why. It also helps inform us for circumstances where we have data points which appear to be outside of the norm. If these outliers are	The main value is understanding why something changes and providing an opportunity to engage with the provider to understand why there has been a change.

	consistent with the technical specifications of the service offered.	which are unusual relative to other data received across all states.	detected, they can be pursued directly with the provider.	
External data consistency checks	An external data consistency check is a measure of the provider data against external sources (not from the Provider). The distinction between internal and external isn't pure, but our typical experience has been that External checks involve the acquisition of additional data sets and a comparison across multiple sets.	External validation can be performed by verifying supplied coverage against third party data sources. An example would be to test provider claimed DSL Census blocks against a commercial source of exchange boundaries. Wireless coverage is also compared to tower locations.	We don't believe a single, exhaustive third party data set is available for validation. We do believe a combination of external datasets can be used to inform and help filter out the false positive cases from provider data. We also note that the external data appears to diminish in accuracy as the area of analysis becomes less urban.	External validation provides an external measure of data quality assessment not influenced by internal data sources. It can be one of the more effective means of isolating false positives in submitted data.
Carrier confirmation	Carrier confirmation is the process of sending processed data back to the service provider	We use two techniques to accomplish this. First a provider's data is summarized in a tabular format. This lets the	One of the more critical steps in broadband mapping is translating carrier	Carrier confirmation gives the provider information on how their data will look when submitted to NTIA. It also helps short circuit complex problems like

	to ensure that translation into NTIA formats is fair and appropriately accurate.	provider quickly verify firm information (FRNs, DBAs, counties served). We also develop two sets of check maps. One is a PDF version and the second is a Google Earth (KMZ) version. Both versions display the NTIA reported coverage and speed. A different map is developed for each technology of transmission	supplied data into NTIA formats. Providing verification deliverables to the service provider (carrier) isan important external feedback process. Several providers also ask us to repeat this process before data are submitted to NTIA so they can see what will be submitted to NTIA.	online map display problems—which tend to come from FRN issues or incorrect data entry. This process also helps to strengthen the sense of ownership and participation with providers.
Public review	Public review is the process of collecting structured feedback from the general public in a manner which can be analyzed and used to improve/validate the submitted data.	Currently we use an online map 'layer' which provides consumers the ability to feedback about the coverage and provide in depth information about their concerns. The maps are also discussed within the context of planning teams within each state. We receive	As with other crowd-source approaches the intent is to allow the general public to feedback and improve the displayed and submitted data.	The benefit is to provide feedback and also display real time the comments of the general public. As a mechanism for validation the key is to develop feedback data which is structured in way that informs the mapping process.

		feedback from these meetings.		
Anchor institution review	Anchor institution review is targeted surveys intended to better understand the Anchor Institution broadband market.	We have used three methods to verify anchor institution data. The first is a targeted series of telephone calls. The second is specifically targeted mailers. The third is direct interviews with stakeholders. Schools for example, may have someone at the state level who maintains information about broadband connectivity.	As Anchor Institutions represent a different class of coverage information as well as a very different type of end user, a focused stakeholder management, data acquisition and data review process is advantageous.	Because CAIs represent a very distinct stakeholder community, building identifiable connections between the SBI program and the anchor institution community is important. Tailoring a specific data acquisition/ data review process helps Anchor Institutions establish a reliable set of infrastructure benchmarks which they can use to fulfill their mission.
Expert review	Expert review is the process of using subject matter experts to review submitted or processed provider data.	The method of subject matter review will be dependent upon the type of data in question. In the past this has taken the form of conversing with a wireless engineer to ensure that the coverage pattern appears plausible for a given technology. It may also involve a cross check on data from a second source—	The purpose of expert review is to get a second opinion regarding some aspect of submitted or processed data. Given the large number of submission formats and innovative ways to supply broadband, it is always	The most significant benefit is to have a secondary source for back checks and verification. For the most part expert review is from an engineering or deployment resource. Expert review also helps support process transparency so there isn't a closed GIS driven process making all the decisions.

		can this type of middle mile infrastructure support the maximum advertised speeds in this area? SME validation is also helpful trying to understand ambiguous information in submissions.	helpful to have multiple sets of eyes available to reduce errors from misunderstanding.	
Telephone sampling	Telephone sampling is the process of using targeted phone calls to verify aspects of submitted or processed data.	Telephone methodology tends to be consistent across the type of data being verified. A subject location or individual is identified. The phone number for that location is identified and a call is placed. The person performing the survey asks a scripted set of questions and records the responses in a database. For example, our team produces a survey to develop and monitor access and use trends at a regional level.	The purpose of a telephone survey is to gather in depth information from a targeted respondent. We would likely use telephone survey for targeted purposes--either clarifying anchor institution data or randomly polling consumers to better understand attitudes.	The primary benefits are to develop in depth information as well as surveying a large number of respondents regarding opinions or behavior. Phone surveys tend to be more helpful to survey attitudes or to find out location specific information. Telephone sampling is used in our consumer surveys.

Purchased Datasets	See external data consistency checks.			Also note that not all external data checks must be purchased. For example Census data could be used for an external consistency check but it is freely available for download.
Web-based surveys	Web based surveys can involve three dimensions. First a web survey (a form available to be filled out on the Internet) can be used to supplement and better understand consumers. A web survey could be a compliment or a substitute for a telephone survey to target a specific demographic (a web survey can also be part of a social media campaign). Further web surveys can be used to verify provider information.	In the case where a web survey is a compliment to phone or in person, a survey,instrument is developed and then respondents are invited to complete the form. In the case where a survey is a mechanism to gather additional information from provider web sites, this could take the form of manual queries (looking for address listed in a Census block) or automated scraping where information is pulled from a website via a specific web application. We currently use both approaches depending on our goal.	The purpose in all cases is to gather additional information via the Web.	The benefits of web survey are its relatively low cost as well as the ability to gather specific information into a form that can be easily used by downstream work processes.

Field Surveys	A field survey is sending a team of skilled participants into the field to verify submitted data or sample some aspect of the environment in a given area.	Field survey methods involve assigning a field team, equipping them with data acquisition hardware, ensuring they have a consistent skill basis and recording observations. To date most of our field survey work has been in engaging CAIs into the process. We have performed limited wireless testing and infrastructure verification.	Although expensive, field surveys are sometimes the best way to verify information such as provider equipment presence or the strength of a wireless broadband signal.	The benefits to field work are significant. They can help us better understand the exact phenomenon in a particular area.

Verification Standard

Verification is a broad term, but in our definition it boils down to determining if broadband coverage is in the right place. For a given provider, the question is whether the coverage is assigned to appropriate Census Blocks, road segments or area features. Coverage verification can be further broken out into two distinct classes:

- Technology verification, which is determining if the provider is listed with a technology consistent with their marketing information.
- Speed verification, which is determining if the speed supplied for that block, road segment, point area file or market area is consistent with the technology and the marketing information received.

The final verification dimension is consumer feedback and crowd-source verification. This is a dynamic set of steps we are beginning to implement. One side of this is responding to consumer concerns. The second is using the crowd sourced data to validate provider claims and, if appropriate, update the map and the underlying data.

At this stage, our working hypothesis (confirmed by our experience) is that there will not be a single measure to indicate broadband coverage availability in a Census block or along a segment. From prior work, and examining our current provider submissions, we believe that there is too much variation below the submitted record to make a single binary yes/no indication. Rather, there will be a series of measures that combine to provide qualitative confidence (a classification scheme) in our indication of Broadband availability at the block, segment, or wireless polygon level. We believe such a qualitative classification scheme is both relevant to and supportive of NTIA interests, as well as the interests of our end-user community – that is, the states and citizens we serve through this program.

The intent of this section is to illustrate why our team is moving toward a particular verification methodology. Our team is learning as we go along, and will adjust and improve this thinking. But given our experience to date, this is our path. As stated above:

- First, coverage verification is at the level of data submitted to NTIA.
- Second, coverage verification is enhanced when there is a secondary measure of availability (such as infrastructure presence or serving area boundaries)
- Third, given the limited resources of this effort, the most important coverage verification process to implement is the erroneous dispersion of coverage. These are the "islands" of coverage isolated by significant distance from other covered areas. In other words, Broadband Internet likely doesn't exist far away from other areas with Broadband Internet access supplied by the same provider.
- Next we present several examples which illustrate the complexity of coverage verification.

The first example is taken from a gentleman who requested a map change in Alabama. His home is near the yellow dot. The darker grey Blocks are covered Census Blocks. The black lines are covered road segments. He cannot receive DSL from his incumbent provider, although his neighbors can. The incumbent carrier does have at least one structure in that block from which Broadband services can be provided; unfortunately his home is not served.

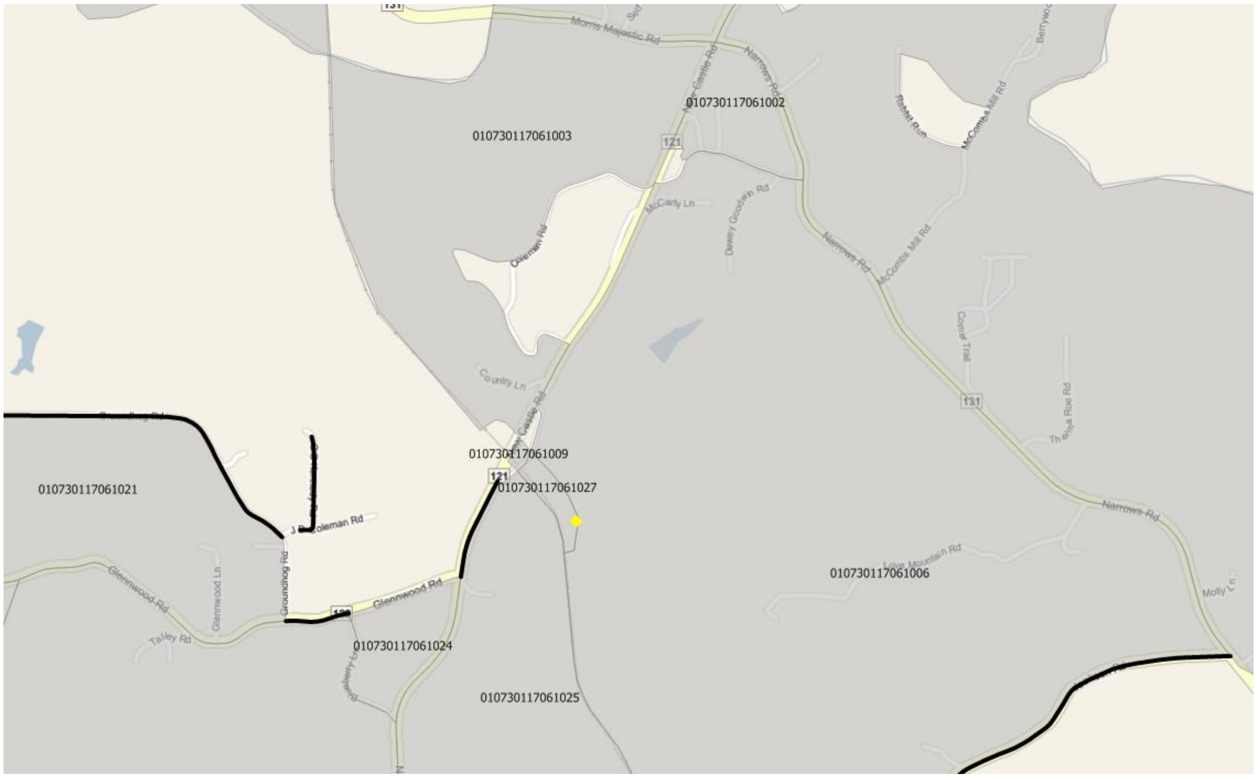


Figure 15--Sub block variation

Because the SBI program requires the depiction of coverage at the block level, the above map has been correctly generated. However, from the customer's point of view, the map is inaccurate. This requires us to explain that the maps are not intended to be a structure-level qualification, at which point some consumers question the value of the maps when seeking service information.

Beyond this type of one-off structure-level qualification, sometimes, as shown below, we have even larger gaps in provided coverage. The image here shows an "outlier" block that could be an error, or it could indicate missing Blocks along a major road that should have been filled in. In this figure, the outlier block is highlighted in turquoise.

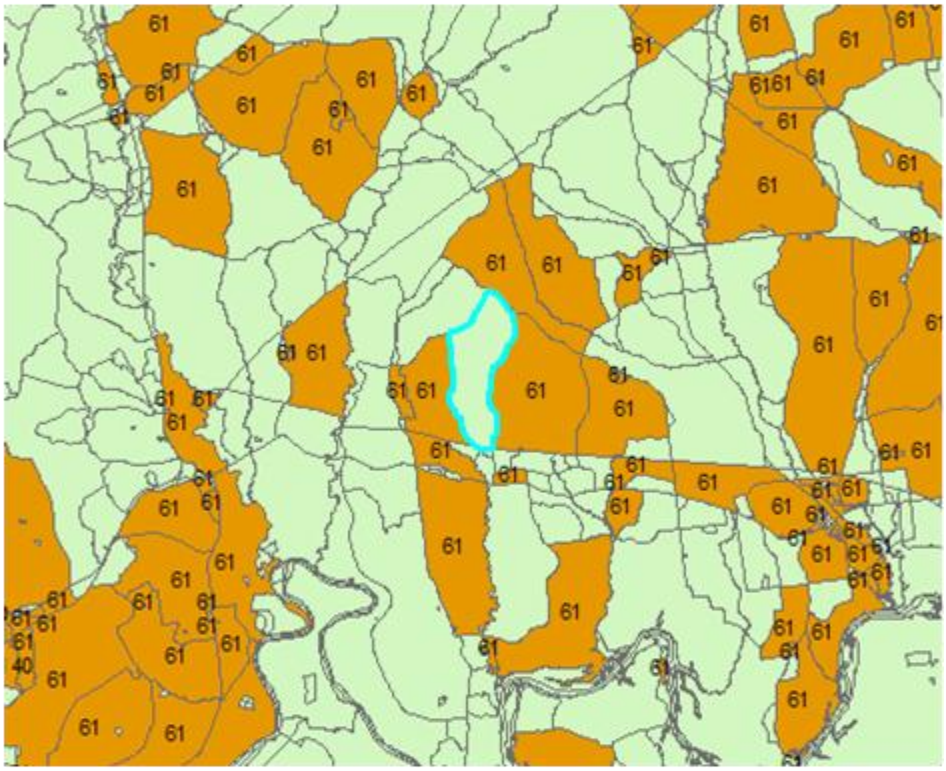


Figure 16--Dispersion in Submitted Data

In this particular case, we are faced with a different verification question. Based upon the properties of the neighbors, we believe this block should likely be covered (coverage interpolation,) but supplied data from the incumbent says otherwise.   Although we don't have information to know how much of the data submitted to us is generated, our sense is that geocoded customers or plant are used. In this case the block dispersion could be the result of a side of the street assignment rather than an availability assignment. In other words the data may speak to where is working plant rather than where could service be provided in 7 to 10 days.

The next example shows where an interpolation process could require some adjustment. The figure below shows a town level view. There are some smaller Blocks that are likely covered by interpolation logic, but we also do not want to extend coverage beyond a franchise boundary as in the areas shown in a box on the bottom of the map.

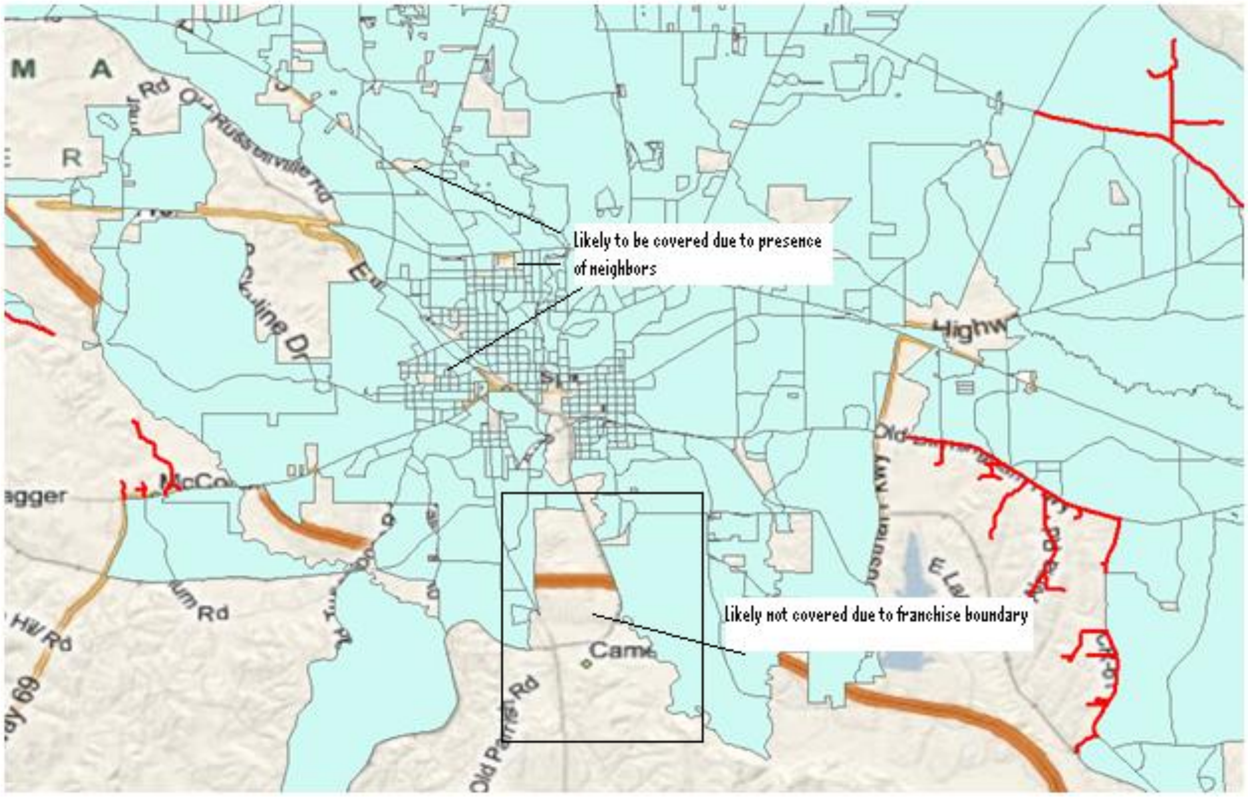


Figure 17-Where do you stop interpolating?

From what we can gather from some providers, the submitted data—data with consistently high degrees of dispersion or coverage holes—tends to come from geocoded billing records. In this paradigm, this means where there are no billing address points; service is not identified on a map. The interpolation verification question then takes on three dimensions.

First, if a provider has no customers in an area, how can we know if they would be able to provide service in a 7-10 day interval?

Second, if we use the properties of neighboring Blocks to interpolate coverage, when should we stop (e.g., at a franchise boundary, at a certain distance, etc.)?

Third, if we are comparing to a data source that examines coverage at a higher level (such as 477 Tract) do we use the Tract information to assign information block level coverage or do we use the tract coverage to filter out dispersions in coverage.

We continue to work with providers to get additional information to help us better understand and contend with this type of circumstance. However, we have not been entirely successful at getting franchise/service area boundaries that would address much of the issue.

The final map shows this dispersion problem, but to an even larger degree. This solitary large block is likely the result of a bad geocode, but we don't know, given the data that has been submitted by the provider and the "single customer in a block standard" set by the NOFA clarification.

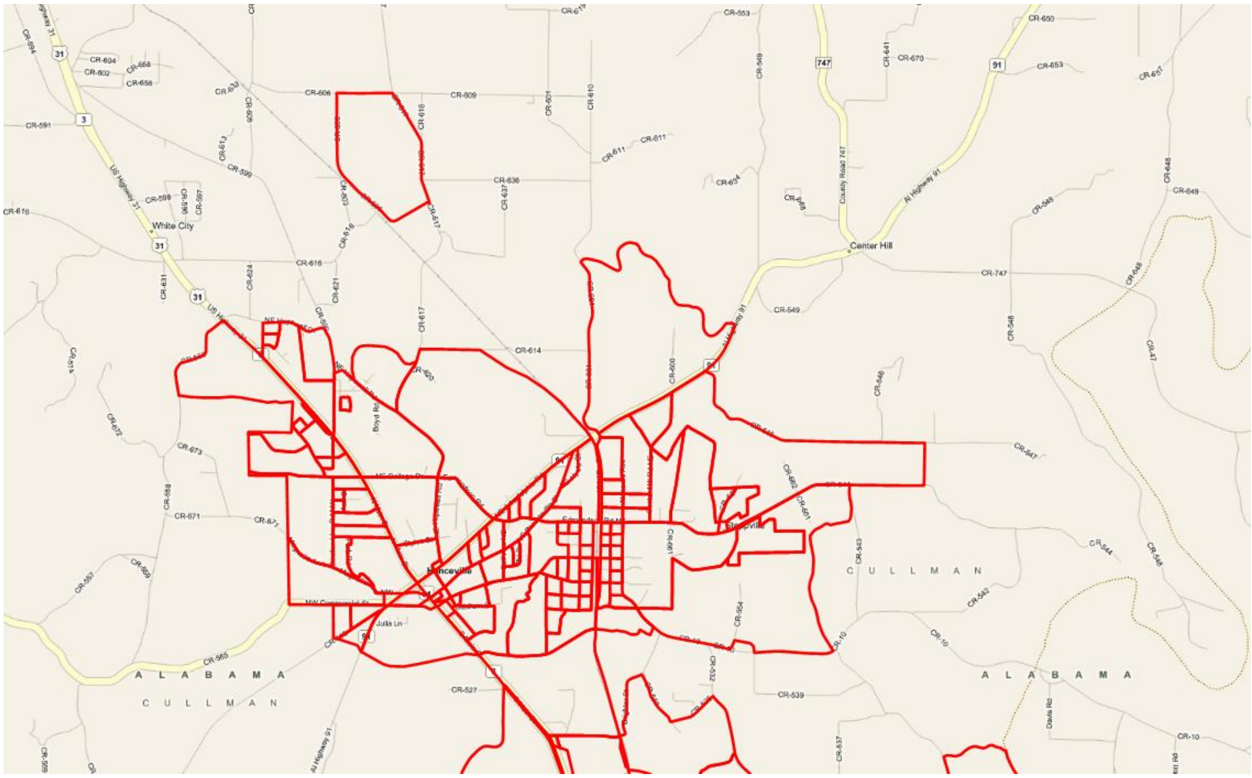


Figure 18-Dispersion in covered Blocks

Due to the fact that this situation is quite obvious in display, this type of problem is one that we are more aggressively trying to resolve. Where a single block has no neighbor offering comparable coverage and is a specified distance beyond an exchange boundary, our approach has been to filter these Blocks out. As of now, this filter is limited to incumbent xDSL providers because we have a good source of exchange boundaries.

The exchange boundary dispersion verification method breaks down when examining providers who are more likely to CLEC into neighboring territory. In the figure below, the black line represents the exchange boundary, while the continuity in the DSLAMs likely points to coverage extending along a road into another provider's territory.

Figure 19--DSL Coverage outside of exchange boundary

In sum, the variability in our source data continues to suggest that our dynamic verification process is relevant, appropriate and evolving in a manner consistent with the overall program. And, as noted above, we believe the more meaningful outcome of our verification processes will likely be a series of qualitative indicators or expressed confidence levels. Our concern, as with the development of any sort of classification process, is how rigid we should make this classification given the variation in our input data and the varied perceptions of service providers, map viewers and down-stream data consumers.

Verification Work Process

To support our dynamic multi-factor verification process, we have implemented the following steps.

Between submissions our provider relations team works to analyze our current broadband provider ecosystem and capture any changes such as acquisitions, mergers or cessation of operations. They also remain in touch with providers who have indicated when follow-up is necessary. The team confirms that the providers who submit data are NOFA compliant. Given these steps they begin a survey and awareness campaign to get data submitted for the program.

When data is received, an analyst reviews the submission and any immediate questions or concerns are sent back to the provider as quickly as possible. We have found this gatekeeping step very helpful in making sure we understand the intent of the submission.

For all providers who submitted data to us in the prior round, the provider received both a tabular data summary and mapped output[28]. Prior to releasing the “check maps” to providers, we inspected each provider’s coverage area. After this in-house review, we solicited a second level of feedback from providers and received a number of requested changes and corrections used in the development of the current dataset.

For those providers who submit only block or segment level coverage (i.e., in those cases where we have no infrastructure to test with) we test for coverage containment within known service boundaries. The intent of this validation step is to remove Blocks that are obviously erroneous.

We have also begun to perform a mechanical test against wireline providers. This is an examination to ensure that each feature submitted has some neighbor within 1 mile. We are testing this process to try to understand what the neighbor distance should be. This has proven to be a difficult process.

We also verify the submitted speeds against the typical speed ranges in the NTIA frequency tables. If we note a value outside of typical range, we ask the provider for clarification. These responses are recorded.

As mentioned in the sections above, we have implemented a check on dispersed Blocks, but we have implemented less with respect to coverage interpolation (holes in coverage). We continue to work on a

[28] For the verification of round 3 data, we submitted both PDF and KMZ (Google Earth) format check maps. Some providers prefer to work with the Google format as it supports easier modification. Others continue to submit marked up PDFs.

series of mechanical tools to assist with the inspection process but have run into challenges related to geographic basemap and timing.

As our submissions have moved online, we have also begun to benefit from crowd source feedback. In some cases this has helped us identify and fix errors in our underlying data. In other cases, as we have shared with NTIA, we have encountered some perceptual issues rooted in how the data are developed and modeled to comply with the NOFA. Depiction of uniform coverage in small Census Blocks continues to be a challenge. Despite our best efforts to explain the full block coverage requirement, we continue to receive complaints that the coverage shown on the map is not accurate for a particular location within that block.

Consumer and Provider Responses to Deliverables

Here, we segue from internal verification to external verification. We view responses to our work product as a form of validation and verification. On the one hand, this gives us the opportunity to fix mistakes and then generate QA steps to make sure that the problem does not reoccur. We also learn how to improve what we are doing or better explain what we are doing to a community not always familiar with the NOFA and program office framework. On the other hand, listening and learning from this feedback helps us better target our mapping deliverable to meet the needs of our external customers. In this second case, external feedback not only provides feedback on perceived qualities (or lack of quality) in the data, it helps us to learn if we are developing data that is truly helpful to downstream users across a wide range of usage and intent.

At this point, our external deliverables take three forms: State Broadband Maps, data transfer to NTIA used for the National Broadband Map, and text format data requested by outside parties.

Online Map Experiences

With our State maps online, we continue to harvest viewer feedback and comments. Because an online map allows someone to zoom in far below the scale of the data, a large number of comments reflect sub-Census block concerns. While important to the citizens reporting these issues and to our Broadband planning teams, this level of data is outside the scope of our core validation process, which as noted above, is focused on the level of data submitted to NTIA.

There are several other themes that our team believes are important to share. These comments are actually quite helpful because they also improve our data processes to better meet the needs of map viewers. For example, we have invested significant time in harvesting more segments from provider data. Because the appearance of segments is so important, we are putting time into ensuring a visually appropriate edge match between the roads we harvest and the Blocks/roads we will show online. On a technical level, we also believe that a good segment process will help us understand more about dispersion in the data, and what is valid versus what is not valid.

Online Display of Consumer Feedback

We have completed development of a consumer feedback layer for our online maps.

The intent of the new layer is to show viewers the feedback of other map viewers. This layer went live after the Round 4 data was posted.

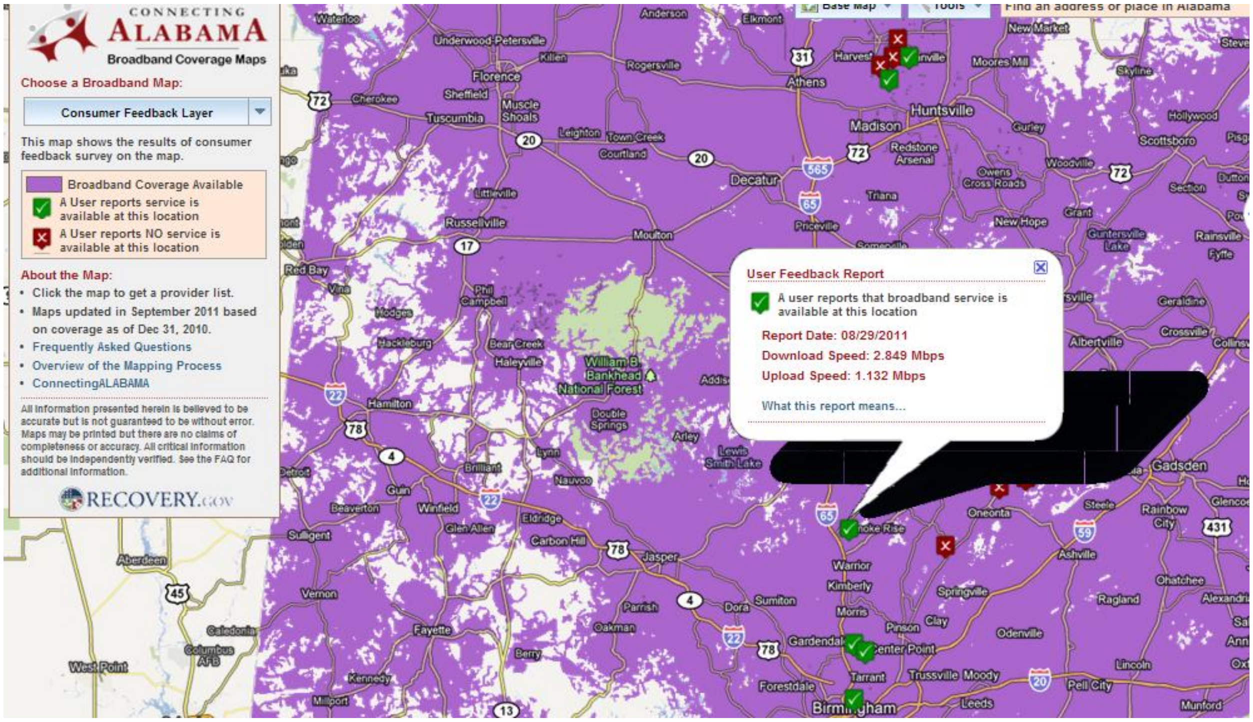
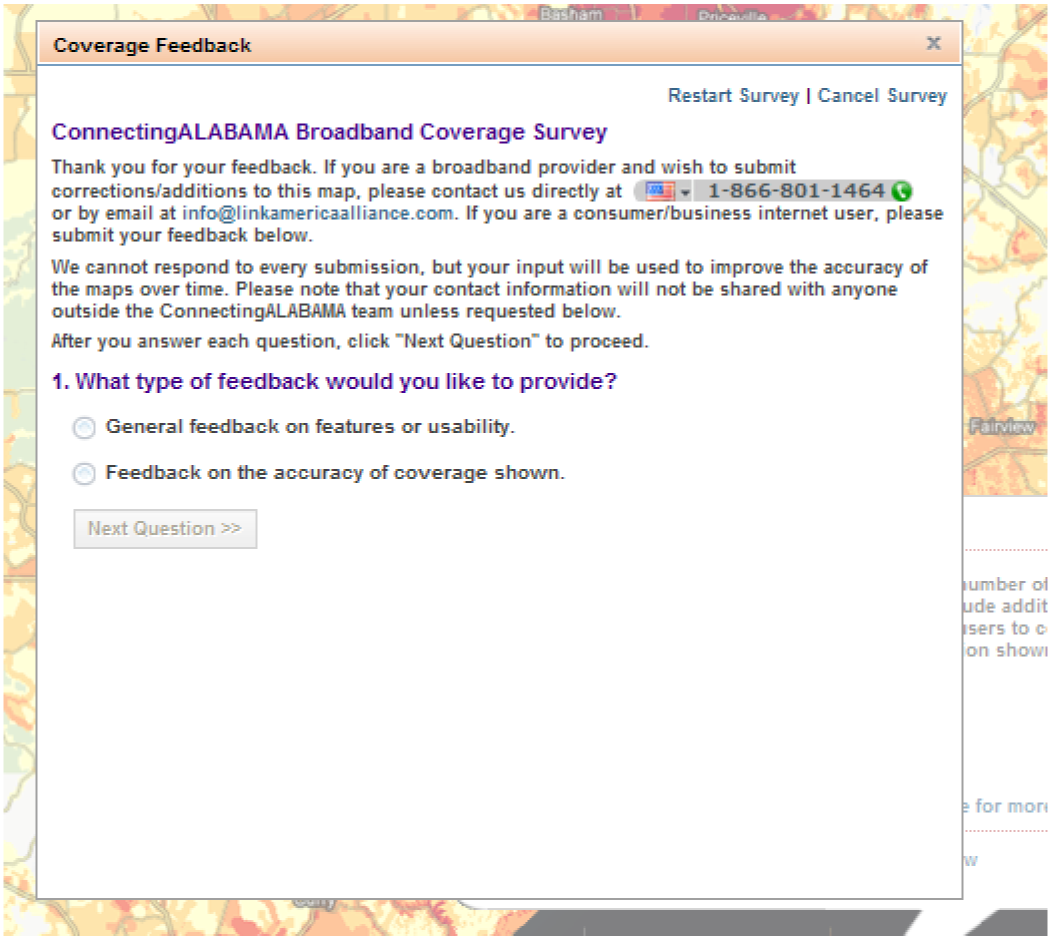


Figure 20--Consumer Feedback Layer

To gather feedback, we use a survey wizard which asks the end users to categorize their concerns. The survey went through several iterations of design and usability testing. Our experience has been unless we get a way to constrain the user feedback into manageable categories, it becomes very difficult to act upon.



As mentioned by other Grantees we struggle with how to use all of the feedback we receive. The qualified data points seem to fall below a volume in which we can infer significant modifications to the map data. Nevertheless, we believe it is important to gather structure and display the feedback to support project transparency.

Perception of Unfair Treatment Across Technologies

Several Broadband service providers have expressed strong concerns regarding how wireline services are displayed, as contrasted to how wireless coverage is displayed. This is an artifact of the SBI data model. As an example, consider the figure below.

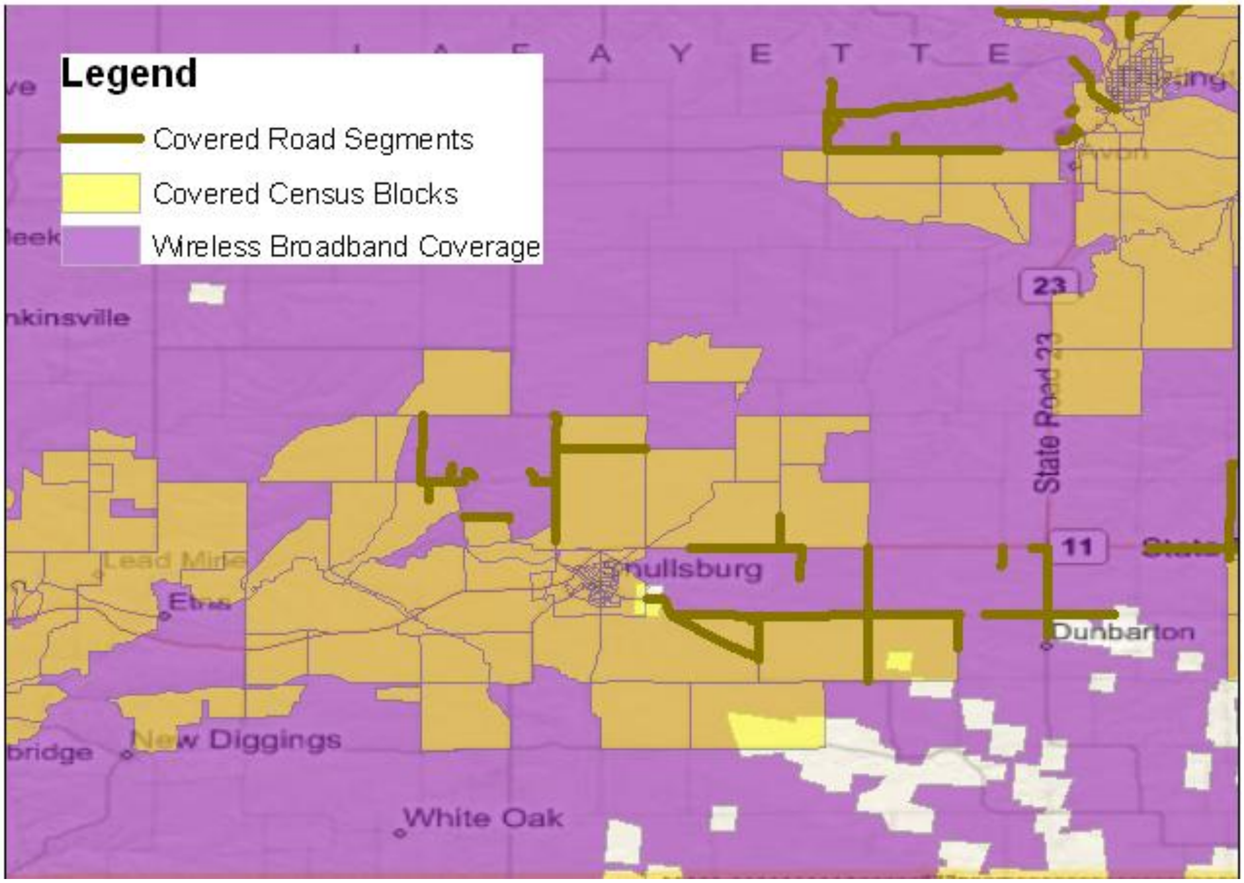


Figure 21--Multi Network Coverage portrayal

In this image, covered Census Blocks are light gold. Covered road segments are a darker gold and wireless coverage is purple. The concern seems to come down to how a wireline provider's coverage is shown in the large Census Blocks (greater than 2.0 sq mi). Some wireline providers have expressed dissatisfaction because their coverage is only tied to road geography, which leads to a visual "hole" in their coverage map. At the same time, they feel that it is unfair that the wireless provider's coverage is shown to be uniform in the same area. Put another way, if our maps show wireline in terms of Blocks and segments, why don't our maps show wireless the same way?

Loss of Geographic Granularity

Some providers particularly those who submitted facility level information are disappointed when we have to roll the derived data up to Census blocks or road segments as this changes the appearance of their service areas. This is especially important in rural areas where the larger blocks represent more of the service territory.

Perceptions of Carrier of Last Resort (COLR) Obligations

Some wireline providers have also expressed dissatisfaction because online maps limit the distance of coverage from a road segment. In our current online maps we buffer a wireline carrier's service 300' from road centerline. A number of providers have expressed that they are mandated to provide voice coverage (which Broadband will accompany) anywhere in the Exchange. There seems to be many

dimensions to this argument, but the basic concern comes down to not being able to accurately reflect the scope of their COLR obligation within the mixed block/segment view. Their ability (or lack thereof) to actually provision such services for new users within a 7-10 day period adds yet another level of complexity when attempting to fairly portray their coverage capabilities.

Intentions of Coverage Mapping

When a viewer of an online map clicks on the map (or zooms to an address), they are provided with a pop-up of service provider coverage in the area. The critical question is this: what is the area to which that pop-up window responds to? In the past, we reported back to the specific Census block, or buffered road segment intersected by the user click. As far as the map was concerned, once we move off of that road, or out of that segment, we have a new area to examine.

Our sense, given feedback received, is that our provider view should be a bit more tilted toward finding providers in a general area, rather than finding providers at a single-click location. If the goal of the map is to get someone to call a provider for service, our bias should be to include all of the potential providers in the general area, rather than giving potential customers a method to self-disqualify. That is, we want to cast a wider coverage net, rather than one too narrow. The problem with this approach is that it will create a number of false positive Broadband reports. As of this date we cannot determine if the claims of inaccurate coverage in online maps are due to the looser provider view standard or not. We keep this looser standard in place to minimize the likelihood of self-disqualifications.

Appendix One--Wisconsin

Community Anchor Institutions

In earlier submissions, the Community Anchor Institution (CAI) process was referred to in terms of a learning curve. This continues to be an appropriate metaphor. The mapping team continues to focus on data that will support and help inform policy makers and the SBI planning process. Obtaining connectivity information for CAIs continues to be a significant challenge. In general we have found that one of the primary obstacles is identifying the correct person in the CAI organization that can provide the information we seek.

In the first submission, the team gathered information on what data was available and what resources will be required to engage these categories of important institutions. In subsequent submissions we have focused our efforts on obtaining connectivity information for CAIs through direct outreach to the specific institutions as well as through central sources within the state or institution associations. In the current submission we had the following objectives:

Identify the correct person in the organizations that can provide connectivity data for the institution. For schools we focused on district level contacts.
Raise awareness of the broadband mapping program to organizations associated with the CAI categories with special emphasis to relevant local and, state government agencies.
Continued outreach to unresponsive CAIs to invite them to become engaged with the SBI program by participating in the online survey.
Verify the available connectivity information based upon new survey information
Update the physical addresses of the CAIs, with the goal of eliminating P.O. Boxes from the dataset

CAI Philosophy

Our work with CAIs is guided by three principles.

First, CAIs are important stakeholders within the planning process. Our goal is to engage participants in regional planning that have strong ties into the CAI categories identified by NTIA. This has a direct benefit of engaging an established stakeholder community. It also allows broadband planning to tie into existing organizational and planning networks. In each of our states, key relationships with education, public safety, libraries, and economic development sectors are being identified and developed.

Second, we believe that CAIs will likely be one of the primary beneficiaries of targeted broadband funding. Our belief stems from the sense that many of the benefits of Broadband will extend from these community 'anchor points'. In other words, it isn't solely the existence of Broadband at a library that provides a benefit. It is people using applications that work only on a Broadband network to upgrade their skills (e.g., online training) and gain access to online content (e.g., job postings, goods and services), etc. The targeted use of a specific application--that can only take place with Broadband networks-- is what produces the priority benefit. Put another way, there seems to be a realization that things are less about pure connectivity (for the sake of connectivity) than about connectivity in terms of an application (for the sake of the benefit obtained through the application).

Third, we continue to use a rational and targeted approach to derive information. This means we will utilize our planning teams for as much field work as possible. This also means that a goal of our CAI process is not an exhaustive Census of anything that could be a CAI; rather, it is the discovery, inventory and integration of Broadband planning activities into those CAIs that stand to produce the greatest synergies with the SBI planning process.

The above implies two significant points. First, the team's goal is to document community anchor institution connectivity within a broader context of regional and statewide planning objectives. Second, if a particular category of CAI has an independent Broadband planning effort underway, we will encourage that organization to take the lead, and we will provide relevant expertise and support as warranted. For example, in one of our states, the public safety community was engaged in a mobile Broadband survey effort. We aligned our CAI data collection process with that effort and shared information and expertise (e.g., hosting a survey) to support their mission. In another state we attempted to glean connectivity information from a municipal government survey. There may be some downside to this collaborative approach in that we may have to work with data spanning different times or we may not have all of the location-specific information we need, but this does prevent the same user from receiving multiple inquiries.

Anchor Institution Survey

During the third submission period we designed and developed a simple on-line survey system called CAVS (Community Anchor Verification Survey). The intent of the survey was to both verify received connectivity information and garner additional connectivity information from CAIs. The link for the survey is housed on the Home Page of the State SBI website, thus providing the added opportunity for responding institutions to learn more about broadband activities in their state. The survey remains open between collection periods so that the Regional Planning Teams can update information as they engage with the community, and to allow responding institutions access to update their data as necessary.

Although we have found that reaching out to central contacts, for specific institution groups, is the most fruitful way of collecting connectivity data we find value in inviting individual anchor institutions to participate through means of a survey. In each round we reach out to CAIs using an adaptive approach that consists of: 1) Emailing individual institutions inviting them to participate in the on-line survey; and, 2) Follow-up phone calls, when appropriate, to the CAIs to obtain/confirm contact information and encourage participation in the survey. From our perspective, although this method is very time consuming and work intensive, it allows the opportunity to personally explain the objectives of the program and answer questions. It also provides an opportunity for the individual institutions to become engaged in the broadband planning process.

Anchor Institution Trends

To date we have focused our CAI attention on schools, libraries, and hospitals with respect to connectivity. We benefit from strong relationships throughout the education sector, (K-12 and Post-Secondary), and have found excellent resources with State librarians. In addition, we have formed organizational relationships with the major hospital associations and other key health organizations within each state. Our goal with these relationships is to cull information from their planning process and partner with them on outreach.

As in the prior submissions, we rely on public domain sources of information for the public safety-category. Collecting connectivity data for this group continues to be one of our most significant challenges. We continue to look for ways to reduce the size of this category and connectivity information specific to root nodes of the public safety network--such as County Emergency Operation Centers.[30] At this point we have had minimal success gaining this information.

Further, because we have a wide ranging population of CAIs in our data set we have a variety of Broadband services that don't always fit NOFA parameters. Services like PRI or T1 are classified into "other copper," We also had difficulty obtaining both the upstream and downstream channel capacities. In most instances, when it was logical to do so, we made the speeds symmetrical, but this is an assumption on our part. If a site records bandwidth across several services (eg. video and data), we record the total bandwidth to give a picture of available site bandwidth. We are also working to standardize our response to NTIA in circumstances where an entity shares a Broadband connection among a campus. In this case we use the total campus bandwidth and use the primary campus Internet connection. In this regard, we have also received strong comments that for many school districts the problem is less about connectivity to a central node then connectivity from the central node out to served buildings.

As a final verification step, we attempt to screen the CAI data for duplicate values. Because many CAI are closely clustered together and may even share the same building (physical address) we perform the de-duplication manually.

[30] Within the public safety category, it is also very difficult to derive precise locations as many CAI are addressed to PO boxes . This is further complicated due to the many Volunteer Fire Departments used in Rural Communities which often do not have a physical location.

Appendix Two

Data Collection Challenges

This section summarizes some of the challenges we have experienced with data collection and processing. The team believes it is important to categorize these challenges as they help inform the geoprocessing and verification methods used. It is also our hope that some of the more global issues can be discussed and decided within the Grantee community.

We begin with several global issues and then continue toward more granular challenges.

Global Data Collection Issues

Maximum Advertised Speed is Not Reported Consistently

As has been discussed in webinars and also within the context of NTIA data assessments, much reported speed information continues to be reported at the market level (MSA/RSA) and then uniformly pushed down to the Census blocks. This has a tendency to create a problem with NTIA speed tripwires since the technology is reported by block but the maximum advertised speed is reported at a regional level.

This challenge gets further amplified at a block level when comparing to a third party data provider. It can create a mismatch between third party data generated at an area larger than block level versus block level generated speed and vice versa. To minimize the potential confusion, it might be helpful to be able to provide a flag at the submitted record level which indicates the geographic basis by which the Maximum Advertised Speed is reported.

Census Block and Road Standards are not clear

There seem to be several methods by which providers are calculating the Census block area. So the distinction at 2.00 square miles can be uniform, it would be ideal to articulate an operational area calculation definition.

Providers Not Wishing for Block Level Aggregation of Their Data

For providers who submit address point data, we do minimal additional processing. Our main test is to ensure that points are contained within 1 mile of exchange boundaries; the only other processing was normalization into NTIA formats.

Broadband providers not Meeting the NOFA "provider" Definition

Comments on PBWorks appear to reflect a concern among a number of grantees about what a Broadband provider is--and how that definition impacts mapping.

If the 7-10 day provisioning rule is to be strictly enforced, it could seem to eliminate a number of prominent Broadband providers[31]. Further, the need for clarification around a facilities-based provider, versus the reseller, has injected even more uncertainty. Right now we are unclear on how strictly to interpret either of these important distinctions, but we are concerned that we are beginning to create an NTIA exclusion criterion that is going to confuse downstream consumers of the data.

Given mergers and acquisitions in the CLEC space we are noticing a drop off in participation in this program by several national CLECs. We hope this is an artifact of the mergers and resource constraints rather than a long term trend.

Again, we do not want to exclude a service provider, but we believe there needs to be further clarification around the "7-10 day rule," the definition of a "reseller," and better interpretation of facility-based providers, versus equipping UNEs, SpA or leased lines.

We have used the provider Type of "Other" to classify a number of providers who offer Broadband services, but we do not offer them in a manner consistent with Technical Appendix A definitions.

To What Extent Should We Begin "Classifying" the Data and Maps?

The question immediately preceding gets to the intent of a Broadband provider. This question gets to the intent of the Data and Maps.

Earlier in this document we discussed the question of what type of bias we should introduce to our online map messaging. In an online environment, do we want to more likely create an overstatement of coverage for a provider than an understatement? In other words, is the larger problem allowing a consumer to self-disqualify, versus calling a number of neighboring providers? There is a related issue to this. Clearly in our maps there is a lot of scatter in data that we believe should be more continuous. These are the islands of coverage from an incumbent provider[32]. There are a number of processes that could be put in place to deal with this type of scatter, but without more information from the service provider-- essentially the last mile facilities-- it will be difficult to perform this clean up in an informed manner. On the one hand, we can aesthetically clean the maps up and reduce the scatter, but we have little sub-block engineering information upon which to make this decision. Right now our preference is to put out a somewhat aesthetically messier deliverable and work with providers to get better

---

[31] By email ***REDACT*** informed us they could not provision in 7-10 days, but they also supply information on qualified locations to the address point level. Therefore, we draw a distinction between an incumbent provider owning the facility--which terminates at a customer premise--who cannot turn up service at a qualified location, versus a provider not reporting any specific qualified locations in which they cannot turnup service in the 7-10 day window. In the first case we have a sense of where service can be offered and verified. In the second, we have no evidence that a service could exist there until a specific location becomes a customer.

[32] For a provider who sells opportunistically (not within a franchise area) it becomes even more problematic to classify their coverage because the points are more related to the type of consumer purchasing the service than a bounded offering. In a matter of speaking, the ProviderType is more determined by the technology and/or location than a type of business. The core intent of the NOFA and our grant application was centered around the 7-10 day providers but we believe maintaining information on provider Type "Other" and "Reseller" is important to assist in validation and market segment analysis as resources are available.

information to clarify their submission. If that isn't forthcoming, we are limited in what can be done given the lack of facility level information. In summary this yields two questions

In our online maps should we error on overstating coverage to prevent consumer self-disqualification? In our online maps should we work to clean up a lot of the scatter that we see without having facility-based evidence from which to remove it?
As we examine results from third party data assessments, it appears that this scatter is something that is also problematic with the assessment results. It also appears to be evident that different third party data sources treat water areas differently. When we are developing data based upon Wireline facilities, we exclude water blocks. We do not filter out water blocks from provider submitted data. We are unsure if there is or should be a standard in how water covered blocks are treated for Wireline broadband providers.

Community Anchor Institution Surveys
Over time the base of participation in CAI surveys has broadened. Our teams are interacting with more organizations interested in broadband planning. This is a benefit because it helps integrate the importance of Broadband mapping, planning and capacity building within their organizational framework. But it also begins to create challenges in data collection. There are two noticeable trends in this area.

First, CAIs are organizationally diverse. For a school, you expect to have a centralized entity that can answer and support questions about Broadband services. For a rural, volunteer fire department answering questions about broadband may go to the Chief. The way that he/she answers about Broadband is probably specific to her experience and context.   The implication is two-fold. First saying that some percentage of CAIs in a state have access to broadband can be misleading because the formality of a school or government building is much different than the formality of a volunteer fire department. Second, that volunteer fire department may get broadband via a 3G mobile hotpsot when they need it…but the presence of *this* type of broadband is a very different thing than the presence of a responder who has mobile LTE broadband.

Second, technical knowledge of the survey respondent differs within each organization. This complicates our data collection. It is not uncommon for someone to say yes we have Broadband, I just don't know how we get it or how fast this is. So in response we report they are broadband served but unknown speed or technology. This doesn't mean they haven't been surveyed, it just means the response was unknown. As there are now a large number of people collecting this data, it would be helpful to have some consistent national business rules from which we can answer questions about the meaning of any particular data element. As an example, when should "no" be used versus when should "unknown "be used. In other words, what is the standard for the difference between never made contact with the CAI versus a respondent didn't know/couldn't answer. We have guidelines internally but are unsure if this is consistent across states.

Granular Data Collection Issues

Non-Uniform Submission Standards

It is clear among providers that there isn't a consistent method used to derive Broadband coverage. Some providers appear to be use a geocoding approach and then point in polygon or point on segment process. Others may be using GPS locations. In some cases, it is difficult to infer what reference data was used to georeference plant (is it the carrier's roadbase?). This leads to uncertainty regarding the input data scale or accuracy relative to other base layers. Although we may be trading off absolute accuracy, our standard has been to conflate submitted data to TIGER 2010 Blocks and TIGER 2010 roads. We perform our verification against this conflated data product.

Temporal

We are unsure of how well the data are temporally consistent. Some providers gave us their best effort to control to June 30, 2012. We note that some providers were clear that the submission was as of extract date without any way to move back in time. They have no means to control for time and cannot provide any audit support beyond when the data are released to us. Some data-especially loop qualification data-may change from day to day. It will be very difficult to clarify why something was changed from a given point in time.

Perceived Inaccuracy with Respect to Internal Standards

The NOFA is clear on submitting a list of Blocks in which a provider delivers Broadband service. This is a different objective than perfectly reflecting service territories. If a firm's accuracy standard is a reflection of their service area, then the data created under the NOFA will not meet their perception of accuracy. This leads to two other issues: First, using Census Blocks rather than serving area may overstate or understate a particular provider's Broadband serving area. This was a significant concern of ***REDACT*** who specifically required us to submit only address-level qualification data. The second issue this brings up is how or if, there should be some standard on how much of a Census Block needs to be covered to call it covered.

Confidentiality

Several providers have noted concerns with CPNI-related issues and have stated this as a reason for non-participation. We have also heard expressions of comparable concern regarding identifiable responses to Anchor Institution information.

Unclear on Definitions

As discussed earlier, several providers claimed confusion on several key terms involved in Middle Mile. We note a consistent stream of questions around the interpretation of Maximum Advertised Speed. Some providers understand this to be the most common speed package bought within the mass market, while others view this as a speed that can be purchased for an additional cost above a mass market offering (e.g. a Turbo option for an additional fee per month). Others interpret this as the fastest speed that is available for that particular location--in terms of xDSL, a structure qualified speed, for example.

Perception of Data Use

There seems to be some hesitancy releasing speed information because no one is sure of how the information will be used, or what the speed is intended to reflect. A number of providers have verbally indicated that typical speed will be about (on average) 80% of purchased speed due to overhead. But there are many other factors (such as a user's home network) that influence speeds measures. Providers are concerned about introducing statistics without a clear understanding of how those statistics are derived and will then be used. Also, as advertised speed is pushed down to a block level, we sense more trepidation to report speed values. This quickly begins to touch on parity across network types (why is wireline down at the block when wireless is half the state, etc.). Finally we note a significant increase in speed values reported to us. This may be due to network upgrades or competitive concerns to match the theoretical network speed.

Location Uncertainty In Source Data

Within this document we have noted concerns about the impact of source data accuracy. Our geoprocessing methodology provided what we believe is a relatively conservative tolerance to account for the scale issue in the source data, but we are unsure of how this may impact downstream users. Clearly, it also impacts the verification process because we can't attempt to verify received data beyond a scale at which it was developed.

Covered Segment Process

Deriving Broadband covered segments in Census Blocks greater than 2 square miles has proved to be a challenge. Moving from a NOFA specified tabular deliverable to a requested geographic deliverable also increases the complexity of the effort.

Record Level Metadata

It would be helpful to have one or two additional fields in each feature class transmitted to NTIA. One User Defined field could be helpful as an expression of record level confidence. The second field could be used as a Key between the transfer geodatabase and our systems. Ideally, both fields could be large text fields (50 char) so the Grantee can use them to express a variety of attributes.

Miscellaneous Data Collection Notes

We note the following important observations regarding our data submission:

There are Middle Mile plant records for providers who are not present in the Census block, segment or wireless area feature classes. This is due to classification as non-NOFA Broadband providers.
In some cases, we have trimmed wireless coverage estimates to honor state boundaries.
We believe some providers are trimming their coverage to honor license area boundaries.
Where a provider submitted Middle Mile points out of state, we are no longer passing those points to NTIA as they fail the validation script.
In tables with mandatory Street and Zip5 attributes (Service Address), if the value is unavailable we fill the default value.
As before there remain some differences between the Data Model, Data Model Default Values and the Python Validation Script.
We have a significant amount of VDSL, ADSL 2 and ADSL 2+ coverage categorized into the xADSL category. This introduces large variance in speed availability as some providers are using VDSL, shortened loops and/or pair bonding to increase speed to levels nearly 30 Mbps.

We note a few providers who have speeds seemingly inconsistent with their technology of transmission. This is either very low speeds with optical fiber, or very high speeds with non DOCSIS 3.0 systems. We have verified on provider websites that the reported speeds are available in the area but these speeds will fall out of the NTIA frequency table analysis.

We have a small number of providers who serve an area with both a residential and business speed tier. In cases where we cannot distinguish which speed tier offering to use, we use the higher of the speed tiers.

Per NTIA request we have modified the manner in which we handle Wireless coverage polygons. If a Provider submits a single geometry but specifies multiple spectrum codes in use in that polygon, we duplicate the polygon for each spectrum code. In other words the geographic object is identical but the attribute data for the object is unique.

In point level data submissions (Service Address and CAI) we note points that are spatially coincident. With respect to Service Address points our thought is these represent multi-unit dwellings or businesses but we don't have enough address detail to determine if these are multi-unit structures or duplicated customers. Because we cannot determine the reason for the duplication we leave spatially coincident records in our submission. We also leave in our CAI submission points which may be the same physical structure but have slight variations in addressing.

In point level middle mile data, we are finding a variance in the quality of the geocoded longitude and latitude returned. Given the data received we are unsure if this is an issue where the plant address is difficult to geocode or if the longitude and latitude provided to us is different than what would be returned in geocoding.

For Block and Segment level data which we produce based upon provider facility or service area boundaries, we remove Census blocks which are entirely water covered. This results in a drop of Census block counts for a number of providers.

Appendix Three

This appendix contains the confidentiality clarification supplied in a series of emails between CostQuest and NTIA.

Feature Class	*Metadata*	*NOFA Confidential?*	*Online Map*	*Public Disclosure*	*Exemption*
Last Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Middle Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Service Address	Constraints on accessing and using the data	No	No	Yes	
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
CAI	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential

	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Census Block	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Service Overview	Constraints on accessing and using the data	No	Yes	Yes	The only provider who may not show up on this table is a provider who has provided only confidential data (last mile, Middle Mile,

					address point with provider name)
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Road Segment	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None.				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Wireless	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				

	There are no restrictions on distribution of the data by users

Appendix Four-Wisconsin

This appendix details our analysis of the potential and actual broadband provider market. We include both our internal tracking description document and then our categorization for each provider. As this extract was made prior to final submission, there may be differences between provider categorization and the attributes on the day of submission to NTIA.

Provider Categorization

Provider Type and Status Definitions

The Provider Type is based upon categories provided by NTIA, while the Provider Status is based upon categories developed internally for tracking purposes. It should be noted that the Provider Status discussed here relates to the provider's overall status within the program.

Provider Type Codes and Definitions:

NTIA code	Code	Name	Definition
1	P	Provider	This code applies to all confirmed providers of broadband service per the SBI program NOFA. A provider is given a "P" designation if we have determined that the company does indeed exist and appears to be providing broadband services.

2	R	Reseller	This code applies to all broadband entities that have been confirmed as pure resellers – meaning they do not own their own facility/equipment and simply resell services under their own brand name or the brand name of an actual Provider.
3	O	Other	The code applies to entities who were originally placed on the SBI provider list, but whose status is still in question or has been determined to be non-NOFA compliant.
4	N/A	Not applicable	This code applies to entities who appeared on the original state provider list or a third party list (such as the FCC 477, American Roamer, or Warren Media lists) but who have been confirmed as NOT providing broadband services.
	X	Inactive	This code applies to entities that may have appeared on an early provider list but whose identity and existence we subsequently have been unable to verify. This code may also apply to providers who have since been acquired or simple gone out of business and for which no FRN appears on the FCC list – These no longer need to be reported to NTIA. This is an INTERNAL category used to remove entities completely from the list of entities submitted to NTIA.

Once the proper Provider Type has been assigned to an entity, an overall Provider Status must be established. The Provider Status codes are specific to the Provider Types, and are not interchangeable. The following table lists the status codes associated with each Provider Type.

Provider Status Definitions

Provider Type Code	Provider Status Code	Name	Definition
P	D	Declined	A provider is given a Status of "D" if they have officially stated verbally or in writing that they will not participate in the SBI program.
	P	Participating	A provider is considered to be "Participating" if they have submitted USABLE data in at least one data submission round. The data does not need to be 100% complete for a provider to be assigned a "P" code – they simply have to have provided a level of data that is sufficient to submit to NTIA.
	NR	Non Responsive	A provider is considered "Non Responsive" if they have either failed to respond to any of our correspondence, or they have submitted insufficient data that makes inclusion of their data in the NTIA submission impossible.
	V	Submitted under other ID	A provider whose data is submitted under another Provider ID, but is operating under their own FRN.
	E	Estimated	A provider is marked as "Estimated" if they have not submitted usable data, and would otherwise be considered non-responsive, BUT for whom we are able to submit data by using estimation techniques and/or third party sources. This designation applies only to providers whose data is 100% estimated.
R	R	Reseller	"R" is the only status code for Resellers and it simply reconfirms their status as a reseller –data may not be submitted but name of provider is included in NTIA data package.
O	U	Unknown	The status of Unknown is assigned to an entity whose name has appeared on a list (or been submitted as a new possible provider) and is currently under investigation. It has not been determined yet if this entity is indeed offering broadband services or not.
	NC	Non-Compliant	This status is assigned to entities who appear to be in the broadband industry, but who do not meet the formal definition of a BB provider under NOFA requirements. Examples may be entities who cannot provision service within 7-10 days.

	P	Participating	These are providers who do not meet the formal definition of a BB provider under NOFA requirements, but are participating in the program and submitting data.
	NP	Not a Provider	This status applies to entities who may appear on a third partly list of valid providers, but who have been proven to either no longer exist, or simply no longer provides broadband services.
N/A			No status codes associated with this Provider Type
X			

Provider Disposition

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
192	WI	24-7 Telcom, Inc.	24-7 Telcom, Inc.	West Wisconsin Telcom Cooperative, Inc.	P	P
193	WI	360 NETWORKS (USA) INC	360 NETWORKS (USA) INC	n/a	O	NC
110094	WI	Access Spectrum	Access Spectrum	Access Spectrum	N/A	NP
434	WI	Airadigm	Airadigm	Airadigm	N/A	NP
199	WI	Airespring, Inc.	AirespriNg, Inc.	n/a	R	R
203	WI	Amherst Telephone Company	Amherst Telephone Company	Amherst Telephone Company	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
207	WI	AT&T Corp, Inc.	AT&T Corp, Inc.	n/a	P	P
633	WI	AT&T Mobility LLC	AT&T Mobility LLC	AT&T Mobility	P	P
206	WI	AT&T Inc.	AT&T Services, Inc.	n/a	P	V
539	WI	Wisconsin Bell, Inc	AT&T Wisconsin	AT&T Inc.	P	P
110003	WI	American Tower Corporation	ATC OUTDOOR DAS LLC	n/a	X	
634	WI	Baldwin Telecom, Inc.	Baldwin Broadband LLC.	Baldwin Telecom, Inc.	P	P
212	WI	Baldwin Telecom, Inc.	Baldwin Telecom, Inc.	Baldwin Telecom, Inc.	P	P
110096	WI	Barat Wireless (USCC)	Barat Wireless (USCC)	Barat Wireless (USCC)	N/A	NP
110005	WI	Bay Communications Inc.	Baycom Inc	n/a	R	R
215	WI	Bayland Communications, Inc.	Bayland Communications, Inc.	Northeast Communications of Wisconsin, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
697	WI	Bayland Telephone, Inc.	Bayland Telephone, Inc.	Northeast Communications of Wisconsin, Inc.	P	P
217	WI	Lynch Interactive Corporation	Belmont Telephone Company	n/a	P	V
218	WI	Bergen Telephone Company	Bergen Telephone Company	Bergen Telephone Company	P	P
745	WI	Bertram Communications, LLC	Bertram Communications, LLC	n/a	P	P
110025	WI	GenisysNotWiresInternet	Blast Communications	n/a	N/A	NP
221	WI	Bloomer Telephone Company	Bloomer Telephone Company	Bloomer Telephone Company	P	P
110006	WI	BORDERLAND COMMUNICATIONS LLC	BORDERLAND COMMUNICATIONS LLC	n/a	P	V
110007	WI	Broadcore, Inc.	Broadcore, Inc.	n/a	R	R
811	WI	Broadview Networks Holdings, Inc.	Broadview Networks Holdings, Inc.	Broadview Networks Holdings, Inc.	P	NR
225	WI	Broadwing Communications, LLC	Broadwing Communications, LLC	n/a	P	V

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
227	WI	Brown Telephone	Brown Telephone	n/a	P	V
228	WI	Bruce Telephone Company, Inc.	BruceTel Communications LLC	Bruce Telephone Company, Inc.	P	P
742	WI	Bug Tussel Wireless	Bug Tussel Wireless, LLC	Bug Tussel Wireless	P	P
110010	WI	BullsEye Telecom, Inc.	BullsEye Telecom, INnc.	n/a	R	R
110097	WI	Carroll Wireless, LP (USCC)	Carroll Wireless, LP (USCC)	Carrol Wireless, LP (USCC)	N/A	NP
231	WI	Spring Valley Telephone Company, Inc.	Celect Communications, LLC	Celect Communications	P	V
728	WI	CellCom	CellCom	Northeast Communications of Wisconsin, Inc.	P	P
662	WI	CenturyTel, Inc.	CenturyLink	CenturyTel, Inc.	P	P
368	WI	Qwest Communications Company, LLC	CenturyLink	Qwest Communications International, Inc.	N/A	NP
234	WI	CenturyTel, Inc.	CenturyTel Acquisition LLC	n/a	P	V

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
526	WI	Charter Communications	Charter Communications	Charter Communications	P	P
669	WI	Chippewa Valley Cable, Inc.	Chippewa Valley Cable, Inc.	Nelson Telephone Cooperative	P	P
242	WI	Choicetel LLC	Choicetel LLC	Choicetel LLC	P	P
110012	WI	CIMCO Communications, Inc.	CIMCO Communications, Inc.	n/a	P	NR
110085	WI	Cincinnati Bell	Cincinnati Bell Any Distance Inc.	Cincinnati Bell Inc.	N/A	NP
781	WI	Computer Frontier	Cirrinity	Niagara Telephone Company/Wittenber g Telephone Com	P	P
780	WI	Wittenberg Wireless, LLC	Cirrinity	Niagara Telephone Company/Wittenber g Telephone Com	P	P
782	WI	Niagara Wireless, LLC	Cirrinity	Niagara Telephone Company/Wittenber g Telephone Com	P	P
246	WI	Citizens Telephone Cooperative, Inc.	Citizens Telephone Cooperative, Inc.	Citizens Telephone Cooperative, Inc. (WI)	P	P
248	WI	Clear Lake Telephone Company LLC	Clear Lake Telephone Company LLC	Clear Lake Telephone Company	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
751	WI	Clearwire	Clearwire	Clearwire Corporation	P	P
252	WI	Cochrane Cooperative Telephone Company	Cochrane Cooperative Telephone Company	Cochrane Cooperative Telephone Company	P	P
812	WI	Cogent Communications Group	Cogent Communications Group	n/a	O	NC
682	WI	Comcast Cable Communications, LLC	Comcast	Comcast Corporation	P	P
254	WI	Comcast of Minnesota Wis. Inc.	Comcast	n/a	P	V
720	WI	Community Antenna System, Inc.	Community Antenna System, Inc.	Community Antenna System Inc.	P	P
584	WI	WI Connect	Computer Connections	n/a	P	P
258	WI	Coon Valley Farmers Telephone Company	Coon Valley Farmers Telephone Company	Coon Valley Farmers Telephone Company, Inc.	P	P
110002	WI	COON VALLEY TELECOMMUNICATIONS INC	COON VALLEY TELECOMMUNICATIONS INC	n/a	N/A	NP
764	WI	Country Wireless, LLC	Country Wireless	n/a	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
268	WI	DIECA Communications, Inc.	Covad Communications Company	Covad Communications Group, Inc.	O	P
190	WI	Leap Wireless International, Inc.	Cricket Communications, Inc.	Leap Wireless International, Inc.	P	P
264	WI	Cuba City Telephone Exchange	Cuba City TelephoNe Exchange Co	n/a	P	V
110018	WI	CyberLynk Network	CyberLynk Network	n/a	N/A	NP
265	WI	Mid West Data Systems	CyberZone	n/a	P	NR
450	WI	Cricket Communications, Inc.	Denali Spectrum License Sub, LLC	n/a	P	V
110098	WI	Dish Network	Dish Network	Dish Network	R	R
813	WI	DLS Computer Services, Inc.	DLS Computer Services	DLS Computer Services, Inc.	R	R
553	WI	Door Peninsula Internet, Inc.	Door Peninsula Internet, Inc.	n/a	N/A	NP
271	WI	DSLnet Communications, LLC	DSLnet Communications, LLC	n/a	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
110022	WI	The IservCo	EagleNet, Inc.	Eaglenet, Inc.	N/A	NP
783	WI	Wisconsin RSA #7	Element Mobile	Wisconsin RSA #7 Limited Partnership	P	P
110090	WI	Ethoplex	Ethoplex	n/a	O	U
273	WI	Hickory Tech Corporation	Eventis Telecom Inc.	Hickory Tech Corporation	N/A	NP
554	WI	E-Vergent.com, LLC	E-Vergent Wireless	E-Vergent.com, LLC	P	P
555	WI	Excel.Net, Inc.	Excel.Net, Inc.	n/a	P	P
727	WI	Farmers Telephone	Farmers Telephone	Farmers Independent Telephone Company	P	P
748	WI	Fast-Air Internet, Inc.	Fast-Air Internet, Inc.	n/a	P	P
750	WI	Fastbytes Wireless	Fastbytes Wireless	n/a	P	P
454	WI	Firefly Mobile	Firefly Mobile	n/a	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
420	WI	Frontier North	Frontier	Frontier Communications Corporation	P	P
635	WI	Frontier Communications - Mondovi	Frontier Communications - Mondovi	Frontier Communications Corporation	P	P
279	WI	Frontier Communications - St Croix, Inc.	Frontier Communications - St Croix, Inc.	Frontier Communications Corporation	P	P
280	WI	Frontier Communications - Viroqua	Frontier Communications - Viroqua	Frontier Communications Corporation	P	P
245	WI	Citizens Communications Company	Frontier Communications Corporation	n/a	P	V
281	WI	Frontier Communications of Wisconsin	Frontier Communications of Wisconsin	Frontier Communications Corporation	P	P
373	WI	Rhinelander Telephone Company	Frontier Rhinelander Telephone Company	Frontier Communications Corporation	P	P
558	WI	Geneva On-Line, Inc.	Geneva On-Line, Inc.	Geneva On-Line, Inc.	P	D
403	WI	TechCom Inc.	Genuine Telecom	Tech-Com, Inc.	P	P
285	WI	Global Crossing North America, Inc.	GLOBAL CROSSING TELECOMMUNICATIONS, INC.	Global Crossing North America, Inc.	R	R

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
287	WI	GRANITE TELECOMMUNICATIONS LLC	Granite Broadband, Inc	n/a	P	NR
276	WI	Farmers Independent Telephone Company	Grantsburg Telcom	Farmers Independent Telephone Company	P	P
110099	WI	Great River Energy	Great River Energy	Great River Energy	N/A	NP
289	WI	Hager Telecom, Inc.	Hager Telecom, Inc.	Hector Communications Corporation	P	P
110027	WI	Hiercomm Networks	Hiercomm Networks	n/a	P	NR
291	WI	Hillsboro Telephone Company, Inc.	Hillsboro Telephone Company, Inc.	Hillsboro Telephone Company, Inc.	P	P
816	WI	HNS License Sub, LLC	Hughes Communications, Inc.	Hughes Communications, Inc.	P	P
110030	WI	Hughes Communications, Inc.	HughesNet	n/a	X	
672	WI	International Broadband Electric Communications, Inc.	IBEC	IBEC, Inc.	N/A	NP
296	WI	Indianhead Telephone Company	Indianhead Telephone Company	Hector Communications Corporation	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
683	WI	DiMan Systems	Internet Kmoraine	DiMan Systems	P	P
110034	WI	MITEL NET SOLUTIONS INC	Inter-Tel NetSolutions	n/a	O	NC
110100	WI	Iowa Wireless Services LP	Iowa Wireless Services LP	Iowa Wireless Services LP	N/A	NP
775	WI	JCWIFI.com	JCWIFI.com	Computer Dynamics of NW Illinois, LLC	P	P
110101	WI	King Street Wireless, LP (USCC)	King Street Wireless, LP (USCC)	King Street Wireless, LP (USCC)	N/A	NP
466	WI	LaGrant Connections, LLC	LaGrant Connections, LLC	LICT Corporation	P	P
561	WI	Lakefield Telecom, Inc.	Lakefield Communications, Inc.	n/a	P	D
306	WI	Lakefield Telephone Company	Lakefield Telephone Company	Lakefield Telecom, Inc.	P	P
308	WI	Lakeland Telecom, Inc.	Lakeland Telecom, Inc.	Lakeland Communications, Inc.	P	P
309	WI	LAMBEAU TELECOM COMPANY, LLC	LAMBEAU TELECOM COMPANY, LLC	n/a	R	R

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
304	WI	LaValle Telephone Cooperative	LaValle Telephone Cooperative	LaValle Telephone Cooperative, Inc.	P	P
310	WI	Talk America	LDMI TELECOMMUNICATIONS INC	n/a	N/A	NP
562	WI	Lemonweir Valley Telephone Company	Lemonweir Valley Telephone Company	Lemonweir Valley Telephone Company	P	P
110071	WI	WilTel Communications, LLC.	Level 3	n/a	P	V
312	WI	Level 3 Communications, LLC	Level 3 Communications, LLC	Level 3 Communications, LLC	P	P
110033	WI	LightEdge Solutions, Inc.	LightEdge Solutions, Inc.	n/a	N/A	NP
563	WI	LiteWire Internet Services, Inc.	LiteWire	LiteWire Internet Services, Inc.	P	P
313	WI	Luck Telephone Company	Luck Telephone Company	Lakeland Communications, Inc.	P	P
529	WI	Manawa Telephone Company	Manawa Telephone Company	Manawa Telecommunications, Inc.	P	P
318	WI	Marquette-Adams Telephone Cooperative, Inc.	Marquette-Adams Telephone Cooperative, Inc.	Marquette-Adams Telephone Cooperative, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
323	WI	MCI Communication Services, Inc.	MCI Communication Services, Inc.	n/a	O	NC
325	WI	PaeTec Corporation	McLeodUSA Telecommunications Services, Inc.	PaeTec Corporation	O	NC
531	WI	Mediacom Wisconsin, LLC	Mediacom	Mediacom Communications Corp.	P	P
649	WI	Megapath, Inc.	Megapath	Megapath, Inc.	N/A	NP
565	WI	Mercury Network Corporation	Mercury Network Corporation	Mercury Network Corporation	P	P
532	WI	Merrimac Communications Ltd.	Merr.com	Merrimac Communications, Ltd.	P	P
327	WI	Metropolitan Telecommunications Holding Company	Metropolitan Telecommunications Holding Company	n/a	R	R
533	WI	MH Telecom LLC	MHTC	Mount Horeb Telephone Company	P	P
335	WI	Mt Horeb Telephone Company	MHTC	Mount Horeb Telephone Company	P	P
773	WI	Midcontinent Communications	Midcontinent Communications	Midcontinent Communications	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
331	WI	Milltown Mutual Telephone Company	Milltown Mutual Telephone Company	Lakeland Communications, Inc.	P	P
110067	WI	Verizon Wireless PKA Rural Cellular Corporation	MINNESOTA SOUTHERN WIRELESS CO	n/a	P	V
545	WI	Chibardun Telephone Cooperative	Mosaic Telecom	Mosaic Telecom	P	P
263	WI	CTC Telecom	Mosaic Telecom	CTC Telecom	P	P
339	WI	Nelson Telephone Cooperative	Nelson Telephone Cooperative	Chippewa Valley Cable Co. Inc.	P	P
340	WI	Northeast Communications of Wisconsin, Inc.	Net Lec, LLC	Northeast Communications of Wisconsin, Inc.	P	V
567	WI	Netwurx	Netwurx	Netwurx	P	P
476	WI	AT&T Inc.	New Cingular Wireless Services, Inc.	n/a	P	V
675	WI	New Edge Network, Inc.	New Edge Holding Company	New Edge Holding Company	O	NC
568	WI	NEWWIS	NEWWIS	n/a	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
818	WI	NW Spectrum Co.	Next Wave Wireless	NextWave Wireless Inc.	N/A	NP
847	WI	Nextera Holding, LLC	Nextera Wireless	n/a	P	NR
345	WI	Nextgen Communications, LLC	Nextgen Communications, LLC	Clear Lake Telephone Company	P	P
752	WI	Niagara Community TV Coop.	Niagara Community TV Co-op.	Niagara Community TV Cooperative	P	NR
347	WI	Niagara Telephone Company	Niagara Telephone Company	Niagara Telephone Company/Wittenberg Telephone Com	P	P
569	WI	Northern Telephone and Data	Northern Telephone and Data	Northern Telephone and Data Corp.	P	P
542	WI	Athenet (PKA Athena Group)	Northern Telephone and Data	n/a	P	V
386	WI	Somerset Telephone Company	Northwest Communications	Amery Telcom, Inc.	P	P
352	WI	Northwest Community Communications	Northwest Communications	Northwest Community Communications	P	P
202	WI	Amery Telecom	Northwest Communications	Amery Telcom, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
240	WI	Chequamegon Communications Cooperative	Norvado	Chequamegon Communications Cooperative, Inc.	P	P
239	WI	Cheqtel	Norvado	Cheqtel Communications	P	P
534	WI	Northeast Telephone Company LLC	Nsight Telservices	Northeast Communications of Wisconsin, Inc.	P	P
731	WI	One Communications Corporation	One Communications Corp.	One Communications Corporation	O	NC
110041	WI	Open Range	Open Range	n/a	X	
715	WI	Packerland Broadband	Packerland Broadband	CCI Systems, Inc.	P	P
110042	WI	Phoenix PC Service	Phoenix PC Service	n/a	N/A	NP
574	WI	Price County Information Systems LLC	Price County Information Systems LLC	Price County Telephone Company	P	P
367	WI	Price County Telephone Company	Price County Telephone Company	Price County Telephone Company	P	P
110102	WI	Qualcomm	Qualcomm	Qualcomm	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
488	WI	RANGE CORPORATION	Range Telecommunications	n/a	R	R
719	WI	Rapid Cable	Rapid Cable	n/a	P	E
110103	WI	Redwood Wireless Corporation	Redwood Wireless Corporation	Redwood Wireless Corporation	N/A	NP
369	WI	Reedsburg Utility Commission	Reedsburg Utility Commission	Reedsburg Utility Commission	P	P
110019	WI	CYS INC.	RICHLAND CENTER CABLE TV	Richland Center Cable TV	N/A	NP
375	WI	Richland-Grant Telephone Cooperative Inc.	Richland-Grant Telephone Cooperative Inc.	Richland-Grant Telephone Cooperative, Inc.	P	P
110045	WI	Ridge Runner Internet Services	Ridge RuNner Internet Services	n/a	N/A	NP
378	WI	Sage Spectrum, LLC	SAGE TELECOM INC	n/a	N/A	NP
382	WI	Sharon Telephone Co.	Sharon Telephone Co.	Sharon Telephone Company (IL & WI)	P	P
110049	WI	Sharon Telephone Company (IL & WI)	Sharon Telephone Company - CLEC	n/a	P	V

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
110052	WI	Siren Telephone Company	SIREN COMMUNICATIONS	n/a	P	V
385	WI	Siren Telephone Company, Inc.	Siren Telephone Company, Inc.	Siren Communications	P	P
839	WI	Skycasters, LLC	Skycasters, LLC	n/a	P	P
110053	WI	DCS Netlink	Skywalk Wireless	n/a	R	R
110084	WI	SCA Cable Inc.	Solarus	n/a	P	V
431	WI	Wood County Telephone Company	Solarus	Wood County Telephone Company	P	P
747	WI	Sonicnet	SonicNet	n/a	P	P
110104	WI	SpectrumCo	SpectrumCo	SpectrumCo	N/A	NP
390	WI	Spring Valley Telephone Company, Inc.	Spring Valley Telephone Company, Inc.	Spring Valley Telephone Company, Inc.	P	P
650	WI	Sprint Nextel Corporation	Sprint	Sprint Nextel Corporation	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
819	WI	StarBand Communications Inc.	StarBand Communications Inc.	StarBand Communications Inc.	P	P
110056	WI	StealthNet	StealthNet	n/a	X	
399	WI	T6 Wireless, Inc.	T6 Broadband	T6 Wireless, Inc.	P	P
425	WI	Waunakee Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
418	WI	Utelco, LLC	TDS	Telephone and Data Systems, Inc.	P	P
408	WI	The Farmers Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
407	WI	Tenney Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
394	WI	Stockbridge & Sherwood Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
393	WI	The State Long Distance Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
387	WI	Southeast Telephone Co. Of Wisconsin, LLC	TDS	Telephone and Data Systems, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
381	WI	Scandinavia Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
377	WI	Riverside Telecom, LLC	TDS	Telephone and Data Systems, Inc.	P	P
336	WI	Mt. Vernon Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
334	WI	Mosinee Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
329	WI	Midway Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
328	WI	Mid-Plains Telephone, LLC	TDS	Telephone and Data Systems, Inc.	P	P
288	WI	Grantland Telecom, LLC	TDS	Telephone and Data Systems, Inc.	P	P
272	WI	Eastcoast Telecom Of Wisconsin, LLC	TDS	Telephone and Data Systems, Inc.	P	P
267	WI	Dickeyville Telephone, LLC	TDS	Telephone and Data Systems, Inc.	P	P
232	WI	Central State Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
230	WI	Burlington, Brighton & Wheatland Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
222	WI	Bonduel Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
220	WI	Black Earth Telephone Company, LLC	TDS	Telephone and Data Systems, Inc.	P	P
209	WI	Badger Telecom, LLC	TDS	Telephone and Data Systems, Inc.	P	P
330	WI	MIDWEST FIBER NETWORKS LLC	TDS Telecom	n/a	O	NC
402	WI	Telephone and Data Systems, Inc.	TDS TELECOMMUNICATIONS CORPORATION	n/a	P	V
820	WI	Telephone Associates	Telephone Associates	Telephone Associates, Inc.	P	NR
110087	WI	Telephone Associates Inc	Telephone Associates Inc	n/a	X	
110088	WI	Telovations, Inc.	Telovations, Inc.	Telovations, Inc.	R	R
758	WI	Karban TV Systems, Inc. (KTVS)	Three Lakes Cable TV	Karban TV Systems Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
654	WI	Time Warner Cable LLC	Time Warner Cable	Time Warner Cable Inc.	P	P
499	WI	T-Mobile USA, Inc.	T-Mobile	Deutsche Telekom AG	P	P
410	WI	Tri-County Communications Cooperative	Tri-County Communications Cooperative	Tri-County Communications Cooperative, Inc.	P	P
322	WI	MATRIX TELECOM INC	Trinsic Communications brand.	n/a	R	R
846	WI	Tri-Valley Communications, LLC	Tri-Valley Communications, LLC	n/a	P	V
412	WI	tw telecom of wisconsin l.p.	tw telecom	tw telecom inc.	P	P
467	WI	MADISON CELLULAR TELEPHONE COMPANY	U.S. CELLULAR CORPORATION	n/a	P	V
465	WI	LA CROSSE CELLULAR TELEPHONE CO INC	U.S. CELLULAR CORPORATION	n/a	P	V
415	WI	Union Telephone Company	Union Telephone Company	Union Telephone Company	P	P
110031	WI	Interlink Computers Tecnology Inc.	UP Logon	n/a	P	NR

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
110093	WI	US Cable	US Cable	n/a	N/A	NP
416	WI	P&V Capital Holdings, LLC (US Signal)	US Signal Company, LLC	P&V Capital Holdings, LLC	O	P
504	WI	UsCellular	UsCellular	United States Cellular	P	P
110066	WI	Verizon Business Global LLC	Verizon Business	n/a	O	NC
507	WI	Verizon Wireless	Verizon Wireless	Verizon Communications Inc.	P	P
582	WI	Vernon Communications, LLC	Vernon Communications, LLC	Vernon Telephone Cooperative, Inc.	P	P
422	WI	Vernon Telephone Cooperative, Inc.	Vernon Telephone Cooperative, Inc.	Vernon Telephone Cooperative, Inc.	P	P
667	WI	ViaSat, Inc.	ViaSat, Inc.	WildBlue Communications, Inc.	P	P
426	WI	City of Waupaca	WaupacaOnline	n/a	P	P
537	WI	West Wisconsin Telcom Cooperative	West Wisconsin Telcom Cooperative	West Wisconsin Telecom	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
655	WI	Western Wisconsin Communications	Western Wisconsin Communications	Tri-County Communications Cooperative, Inc.	P	P
110044	WI	Q-Comm Corporation	Windstream (PKA-Norlight Inc .PKA-Cinergy Communications Company)	n/a	O	NC
511	WI	Rural Cellular Corporation	WIRELESS ALLIANCE LLC	n/a	N/A	NP
270	WI	DiscoverNet	Wireless Wisconsin	n/a	P	NR
515	WI	WISCONSIN RSA #3 LTD PARTNERSHIP	WISCONSIN RSA #3 LTD PARTNERSHIP	n/a	P	V
110004	WI	Atlantis Holding	Wisconsin RSA #7 Limited Partnership	n/a	N/A	NP
732	WI	Wittenberg Cable TV Company	Wittenberg Cable TV Company	Wittenberg Cable TV	P	P
430	WI	Wittenberg Telephone Company	Wittenberg Telephone Company	Niagara Telephone Company/Wittenberg Telephone Com	P	P
744	WI	Wittenberg Telephone Company	Wittenberg Wireless	Niagara Telephone Company/Wittenberg Telephone Com	P	P
835	WI	Wiztech, LLC	Wiztech, LLC	n/a	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
110089	WI	WOW!Internet and Cable	WOW!Internet and Cable	n/a	N/A	NP
110106	WI	Xanadoo Company	Xanadoo	Xanadoo Company	N/A	NP
432	WI	XO Comm Inc.	XO Comm Inc.	n/a	R	R
823	WI	Zayo Group, LLC	Zayo Enterprise Networks, LLC	Zayo Group, LLC	O	NC
110107	WI	North East Iowa Telephone Co.		n/a	O	U
110082	WI	Cache Valley Wireless		n/a	N/A	NP
110081	WI	RICHLAND CENTER ELECTRIC UTILITY		n/a	X	
110079	WI	Greenfly Networks, Inc.		Greenfly Networks, Inc.	N/A	NP
822	WI	World Discount Telecommunications Company		World Discount Telecommunications Company	R	R
110075	WI	WOODMAN TV CABLE SYSTEM		n/a	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
110074	WI	Wonderwave Internet		n/a	P	NR
110073	WI	WISCONSIN RSA #5 CORP		n/a	P	NR
110072	WI	WINDSTREAM COMMUNICATIONS INC		Windstream Corporation	N/A	NP
110069	WI	VILLAGE OF BOAZ		Village of Boaz	N/A	NP
110068	WI	VerizonClearwave		n/a	N/A	NP
110065	WI	UPPER PENINSULA COMMUNICATIONS		Upper Peninsula Communications	N/A	NP
110064	WI	UNI-TEL COMMUNICATIONS GROUP INC		n/a	R	R
110063	WI	UNION INFORMATION SYSTEMS, LLC		n/a	R	R
110062	WI	U.S. TELECOM LONG DISTANCE INC		n/a	R	R
110061	WI	TRI-M COMMUNICATIONS INC		n/a	R	R

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
110060	WI	TOUCHTONE COMMUNICATIONS INC		n/a	R	R
110059	WI	TON SERVICES INC		n/a	R	R
110057	WI	Telefonica Data Corp SA		Telefonica Data Corp S.A.	N/A	NP
110054	WI	SPECTROTEL INC		n/a	N/A	NP
110051	WI	SIMICOMM LLC		n/a	R	R
110050	WI	SILV COMMUNICATION INC		n/a	R	R
110047	WI	S & K TV SYSTEMS		S & K TV Systems	P	NR
110046	WI	RIDLEY TELEPHONE COMPANY LLC		n/a	R	R
110043	WI	PHONE1 INC		n/a	R	R
110040	WI	Oconto Falls Cable TV		Oconto Falls Cable TV	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
110039	WI	NORSTAR TELECOMMUNICATIONS, LLC		n/a	R	R
110038	WI	NOBELTEL LLC		n/a	R	R
110036	WI	New Century Communications		New Century Communications	N/A	NP
110035	WI	Net Cable		n/a	N/A	NP
110029	WI	Howard Cable		Howard Cable	N/A	NP
110026	WI	Grant Wireless		n/a	N/A	NP
110024	WI	Genesis Wireless		n/a	N/A	NP
110020	WI	DairyLand Cable Systems		Dairyland Cable Systems Inc.	N/A	NP
110017	WI	Cyber Broadcasting LLC		n/a	N/A	NP
110011	WI	CANNON TELEPHONE COMPANY		n/a	P	NR

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
810	WI	Broadstar, LLC		Broadstar, LLC	O	NC
110001	WI	BETTER WORLD TELECOM LLC		n/a	X	
110000	WI	BAYNET INC		n/a	X	
583	WI	WaupacaOnline.net		n/a	X	
581	WI	Tri-County Electronics & Internet Service		n/a	P	NR
580	WI	T-NETIX TELECOMMUNICATIONS SERVICES INC		n/a	R	R
579	WI	TheGlobalNet		n/a	N/A	NP
575	WI	Selk ElectroNics		n/a	R	R
557	WI	Fibernet Communications Company		n/a	P	D
550	WI	db Wireless		n/a	O	U

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
547	WI	Cutting Edge Systems		n/a	N/A	NP
541	WI	Air-Speed.Net		n/a	P	NR
540	WI	AirRunner Networks LLC		n/a	P	NR
519	WI	ZTAR MOBILE		n/a	N/A	NP
505	WI	USA MOBILITY WIRELESS INC		n/a	N/A	NP
497	WI	TELECORP COMMUNICATIONS LLC		n/a	R	R
494	WI	SOUTHERN & CENTRAL WIRELESS LLC		n/a	R	R
491	WI	SHARED TECHNOLOGIES CELLULAR INC		n/a	R	R
490	WI	ROADPOST USA INC		n/a	R	R
484	WI	PNG TELECOMMUNICATION S INC		n/a	P	NR

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
481	WI	ONSTAR CORPORATION		n/a	R	R
472	WI	MILWAUKEE SMSA LTD PARTNERSHIP		n/a	N/A	NP
436	WI	AllTell Communications		n/a	P	V
433	WI	YGNITION NETWORKS, INC		n/a	X	
428	WI	WI INDEPENDENT TELE SYSTEMS INC		n/a	R	R
427	WI	WAUPUN PUBLIC UTILITIES		n/a	R	R
423	WI	VERTEX BROADBAND CORPORATION		n/a	N/A	NP
419	WI	VCI COMPANY		n/a	R	R
413	WI	TWO RIVERS WATER & LIGHT UTILITY		n/a	R	R
411	WI	TSR COMMUNICATIONS INC		n/a	O	NC

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
405	WI	TELEPHONE USA OF WISCONSIN LLC		n/a	R	R
400	WI	TCG MILWAUKEE INC		n/a	R	R
398	WI	SUN PRAIRIE WATER & LIGHT COMMISSION		n/a	O	NC
396	WI	Studio Tech LLC		n/a	N/A	NP
395	WI	STOUGHTON MUNICIPAL UTILITIES		n/a	O	NC
366	WI	PRAYZTEL COMMUNICATIONS LLC		n/a	N/A	NP
365	WI	POWERCOM CORPORATION		n/a	N/A	NP
364	WI	PLYMOUTH UTILITIES		n/a	N/A	NP
362	WI	PIONEER COMMUNICATIONS INC		n/a	N/A	NP
361	WI	PHOENIX INTERSTATE DATA SYSTEMS INC		n/a	R	R

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
360	WI	Peerless Network of Wisconsin, LLC		n/a	R	R
359	WI	TELECOM PARTNERS INC		n/a	N/A	NP
357	WI	ONVOY INC		n/a	R	R
354	WI	NORTHSTAR TELECOM INC		n/a	R	R
353	WI	NORTHERN TELEPHONE & DATA CORP		n/a	R	R
346	WI	NEXVO LLC		n/a	P	NR
343	WI	NEW LONDON ELECTRIC & WATER UTILITY		n/a	R	R
338	WI	NAVIGATOR TELECOMMUNICATION S LLC		n/a	N/A	NP
337	WI	NATIONAL COMMUNICATIONS LLC		n/a	O	U
333	WI	MOMENTUM TELECOM INC		n/a	O	U

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
302	WI	KAUKAUNA UTILITIES		n/a	P	NR
295	WI	ILLINOIS TELEPHONE CORPORATION		n/a	N/A	NP
244	WI	CITIZENS FIBERNET INC		n/a	N/A	NP
198	WI	AIRDIS LLC		n/a	X	
195	WI	ACCESS ONE INC		n/a	X	
194	WI	ACCESS MEDIA 3, INC.		n/a	X	

West Virginia Geological and Economic Survey

State Broadband Mapping Methodology

For the State of West Virginia, October 2012

Contents

Overview

This document gives a summary of the data collection, normalization and verification processes used by the State of West Virginia (State) up to the sixth data submission, in October 2012, to the National Telecommunication and Information Agency (NTIA) in accordance with the State Broadband Data Development (SBDD) program. While most of the processes used in this data submission remained the same as ones for the previous submissions, there were additional adjustments made to continue to refine the process to receive 2010 census geography from the providers in more efficient ways. The State of West Virginia interactive broadband map continues to provide the broadband coverage information to the public and is able to receive comments and feedback from consumers and citizens of the state.

Purpose

This documentation was developed to illustrate the processes used during the data collection, normalization and verification processes. The information within this document will provide a background to the development of the provider list and data request, and specific issues encountered by West Virginia regarding data collection, normalization and validation.

Data Sources

Provider List

The provider list for this sixth round of data collection started during the first round of data collection. For this round, the list was regenerated to include any new providers within the state. The list was created by contacting the West Virginia Cable Telecommunications Association, the West Virginia Public Services Commission (PSC) and the West Virginia Broadband Deployment Council. The state receives an updated provider list from the PSC every six months. This information was compiled and compared against the list from the Federal Communications Commission (FCC). Providers were then contacted using information provided by the FCC's public information search Web tool. Providers who were contacted during the first round of data were contacted again through the same name and address. If a provider contacted during the first round had given more detailed contact information for a specific individual, those individuals were contacted instead of the contact provided by the FCC.

The provider list is updated every six months to reflect any mergers or acquisitions that have occurred. There are some legal issues when a merger occurs, but the data integration does not occur until up to a year later. In those circumstances, the data is kept separate until a full merger occurs.

Data Gathering

Provider Data Request

This component of the project was heavily reliant on working with service providers to obtain data. Each identified provider was mailed a standard data request outlining the elements identified in the Notice of Funds Availability (NOFA) Technical Appendix that were requested from providers. This request included information regarding the availability of broadband services, technology used to provide them, the location of certain broadband infrastructure and the speed of the service. Data was requested to be submitted in the form of census block lists and service area boundaries, including address level and street segment data. If a provider was unable to fulfill such requirements, the West Virginia Geological and Economic Survey (WVGES) worked with those providers to gather the necessary data in an alternative approach. For the last round of data collection, an updated guide for broadband data submission was developed for the providers. Along with this guide, a letter outlining the continued overall goals of the broadband mapping program and the objectives of the new updated guide were sent to each provider. The guide was developed to continue to standardize the data received from providers, including modifications and updates that have been made to the requirements by the NTIA since the original Technical Appendix.

Examples of the letter and guide are provided in Appendix A and Appendix B in this document. This same letter and guide were sent out again for this round of data submission requests. All of the providers that submitted census block information for this submission provided census 2010 geometry or census block numbers. However, once again, no providers submitted TLIDs for roads as described within the guide. Without TLIDs, roads need to be hand selected or geocoded, which can lead to some additional processes and inaccuracies because of the limitations described in the Geocoding Issues section.

After the initial data request was mailed, follow up phone calls and emails were made to remind providers of due dates and to collect any missing or unclear data. As of this submission, the response rate from providers continues to be over 90 percent. After data was received, the data was normalized per NTIA standards and placed into the provided geodatabase. WVGES continued to operate under the same assumption as used in the first round of data gathering. WVGES let the data "speak for itself" and did not make any grand assumptions or estimates in the interest of maintaining clean and accurate data.

Providers submitted only maximum advertised speed data. Providers have not been very willing to submit typical speed data as the typical speeds are generally lower than the advertised speeds. Advertised speed data was given by all providers and then pushed to typical speeds as per NTIA's advice in the Round 3 data review conference call.

In addition to the data request, each provider was required to sign a Nondisclosure Agreement (NDA) between themselves and WVGES. The NDA outlined how provider data would be handled and what portions of that data would be considered confidential, which would be shared with the NTIA and which were to be made publically available.

Coverage Information

Data was derived and normalized into four formats in accordance with the data model:

- Census blocks (2010) of two or less square miles
- Street segments (2010) of census blocks greater than two square miles
- Address level (geocoded point data)
- Wireless area (shapefile)

The normalization procedures were as follows:

- Determine service being provided – what technologies are being used to provide the service
- Understand data/determine how to process – determine which feature class in the geodatabase data belongs
- Georeferencing/geocoding necessary data – georeferencing data for wireless area coverage and other service area maps, as well as geocoding address level data
- Segregating data into NOFA compliant formats – completely filling in geodatabase fields, as well as making sure topology is correct
- Quality assurance/quality control (QA/QC) – verification and validation of data

Typically there were two main types of data supplied for normalization – service area maps and flat Excel tables.

Service areas were georeferenced, digitized and then intersected with the master blocks and roads files. These blocks and road segments were then loaded into the geodatabase and the additional company specific data was appended to those records.

Flat Excel tables were exported to a database and then joined with the FIPS ID for the block files and the TLID for the roads files. The joined fields were exported and then imported into the database. NTIA has not required this information and in cases where a TLID was not given by the provider there was much greater difficulty and inaccuracy as roads had to be geocoded and hand selected.

Geocoding Issues

The West Virginia Statewide Addressing and Mapping Board (SAMB) information is not yet completed across all of the counties in West Virginia, leaving areas within the State without complete or verified address information. This led to low geocoding match rates of provider supplied information, especially in rural areas, throughout the data normalization workflows. For some of these areas, additional broadband coverage processes were used to derive coverage estimates described in the next section.

Other Issues

Another issue of incomplete broadband coverage was due to the acquisition of Verizon by Frontier. When Frontier submitted digital subscriber line access multiplexer (DSLAM) locations for the April 1, 2011 deadline it did not include the entire Verizon infrastructure. Frontier has since re-submitted its DSLAM locations for the October 1, 2011 deadline, which now should include those missing Verizon DSLAMs and the coverage map has been extended into certain areas that were not previously included.

Additional Data Processing Techniques

Because of geocoding inconsistencies in certain areas of the State, some provider address information could not be mapped and other data processing techniques had to be implemented to create broadband coverage estimates. In cases where DSLAM points were able to be provided, broadband coverage was mapped by loading the DSLAM points into Environmental System Research Institute's (ESRI's) Network Analyst. For this processing, the West Virginia State SAMB street centerlines were used as the source roads. DSLAM points were loaded into the facilities point feature class of the service area template using a 1000 foot snapping tolerance to help locate points to nearest roadway. Any points still not connecting to the road network were viewed and manually linked to the road network. Processing was run to create segment lines for each point and to create a detailed polygon area around each street segment area for each point. A 15,000 foot distance parameter was used and no impedances were placed on the streets.

Once the process was run, the created segment lines and polygon areas were linked to the original DSLAM point attribute table and exported from the analyst dataset into standalone polygon and line feature classes. These two feature classes were clipped to the provided wire center boundaries. These coverage areas were used to select covered census blocks and street segments for the data submission. Final broadband coverage estimates were reviewed with the provider prior to final submission.

One of the foremost issues of the fourth round of data collection, submitted in October 2011 was converting to 2010 Census Blocks. NTIA's decision to switch to 2010 Census Blocks did not leave much time during that data collection window to notify providers of the change. Many providers submitted 2000 Census Blocks, not 2010 Census Blocks. The conversion led to multiple inaccuracies between Round 3 and Round 4 submissions because of the problems intersecting 2000 Census Blocks with 2010 Census Blocks and errors of commission. Many block boundaries had been redrawn and the crosswalk file provided by the Census was in a very unwieldy format and not much help. For this sixth round submission, most of the providers submitted 2010 Census Block information and with the previous submission base data having been already converted to 2010 Census Block information, the processing techniques for 2010 Census Blocks has become integrated into the long-term maintenance process.

Prior to this sixth submission, another unique processing issue occurred when providers submitted address-level fixed wireless data which would produce error through the new data model. As per discussion with NTIA, the unlicensed fixed wireless points were plotted and then buffered out to 800 feet. A shapefile was created and moved to the wireless feature class within the geodatabase. For this October 2012 submission, computerized radio propagation studies were used to predict coverage for StratusWave service areas. Site location information as well as equipment and antenna system data was provided by StratusWave engineers. This information was utilized in wireless network engineering software to create propagation prediction models using the Anderson 2D propagation model and 10 meter digital terrain elevation data. Median signal levels (50% time & 50% location variability) are predicted and then an additional margin (Prediction Confidence Margin) is incorporated to account for performance objectives and environmental losses. The propagation prediction models were then exported to map data which indicates StratusWave predicted coverage areas to include in the data submission.

FRN Number Discrepancies

Discrepancies between Round 2 and Round 3 data submissions were noticed concerning FCC Registraton Numbers (FRNs). Effected providers were contacted directly to clear up these issues. FRNs that were loaded into the database come from direct contact with providers. FRNs are verified as a continued validation process during each data collection period.

Community Anchor Institutions

The process used to identify the Community Anchor Institutions was based on the information provided by NTIA. This included the categories of schools K-12, libraries, medical/healthcare, Public Safety, higher education and other community support consisting of either government or nongovernmental facilities.

All public schools in West Virginia were used for the K-12 category. Libraries consisted of all public libraries throughout West Virginia. Medical/healthcare included hospitals, nursing homes and primary care centers. The primary care centers are made up of main locations of the primary care centers along with satellite clinics and school-based health centers. Public Safety consisted of West Virginia police departments along with the correctional facilities and juvenile centers, fire departments and 9-1-1 centers. Higher education consisted of public and private universities located across West Virginia. The community support consisted of courthouses, regional development centers and workforce locations.

There was a cutoff created to focus on identifying main facilities as Community Anchor Institutions (CAIs). However, if there is a need to go and include more facilities, the State is open to adding those facilities for future updates.

The following agencies were contacted for information: West Virginia (WV) Department of Education, WV Library Commission, Hospitals located throughout the state, Nursing Homes located throughout the State, WV Division of Primary Care, WV Primary Care Association, WV 9-1-1 Center Directors, WV Emergency Management Directors, WV Regional Jail Authority, WV Higher Education Policy Commission, WV Courthouse Facility Improvement Authority, WV Workforce, WV Regional Development Centers and county addressing coordinators.

Data was collected and verified by the West Virginia Division of Homeland Security. Surveys were sent out to various facilities and included a section where their primary city-style address could be filled in. For those facilities that returned the survey, the statewide addressing and mapping data that the counties provided was used as a way to verify the address. Once the location was verified the latitude and longitude coordinates were added. In cases where surveys were not returned, the statewide addressing and mapping data was used to determine if the information could be matched. If this wasn't possible, then the Internet was used to find a Webpage with additional information. If this method was not successful, attempts were made to contact the facility directly. At this point in time, there is approximately a 90-95 percent match rate for the location of the CAIs.

Since the October 2011 data submission, additional surveys were sent by mail to healthcare facilities and fire, police and ambulance locations throughout the state. This amounted to approximately 1,500 surveys that were mailed out. Based on the information that was received back from the surveys, the primary city-style address, broadband technology, speeds and other attributes associated with the community anchor institution feature class were verified and updated where necessary. An on-line survey was released since the last data submission with the objective of receiving further updates and also getting the survey, via email address, to those locations where the survey sent by mail was returned by the United State Postal Service due to invalid address information or a facility having changed location. The survey was successful in collecting additional missing attribute information for some of those CAI locations but there are still locations where attributes are missing that did not respond to the survey. Additional methodologies to collect this final missing information will be reviewed and another approach to communicate with these specific CAIs will be undertaken prior to the next data submission. For the April 2012 submission, there were additional community anchor institution locations that are included in the map due to the NTIA allowing some 'unknown' classifications for attributes within the community anchor institution feature class.

Validation and Verification

Throughout the data gathering and data preparation processes for each data submission, the data verification has been continuous and has evolved based on the evolution of the data model. The focus has been on getting complete data from all providers and assuring that all data can be processed into the required data model for submission. Where providers did not submit data in acceptable formats for data normalization into NOFA formats or where they did not submit complete data or any data, there has been continued focus on working with the providers by WVGES to continue to improve the source information being provided. Data verification and validation is an on-going, long term process that will continue to evolve throughout the broadband data development program. With the fourth data submission in October 2011 being a much more complete broadband coverage across the State because of additional data supplied by providers, additional data verification methods, beyond what has been implemented to date, continue to be evaluated to refine the map, where applicable. This sixth submission incorporated further refinement to validate the provider supplied information against the Census 2010 geographies. Limited research was performed for specific areas of the map where any user feedback points to a gap in coverage or an over-estimate in coverage. The research was limited due to a small sampling of user feedback at this time. Plans to advertise surveys and the interactive broadband map continue to be executed and are described further in other sections of this document.

Validation Processes

Data validation begins within the data collection process to determine if the data submission by providers is formatted in a way that can be normalized into the required NOFA formats. Where data is deemed incomplete or in non-conforming standards, WVGES staff reached out to providers as necessary to improve the data submissions. After each round of data preparation the format for the updates being collected has improved.

Quality assurance and quality control has been a big focus of the data validation of the submittals assuring that the required data fields are populated properly and that data fields are populated with values that follow the data model rules. As the data model has evolved over each round of data submission these QA/QC checks have been modified to include the changes in fields, values, domains, etc. that are being required for submission.

Validation methods employed include the following:

- Assuring all applicable providers' datasets are propagated forward to each round of data collection
- Verifying that all required fields are populated with valid values and default values are used when appropriate. This includes:
    - Speeds valid for the technologies reported
    - Latitude/longitude coordinates fall within an acceptable range, given the state boundaries
    - The relationships between maximum and typical, and downstream and upstream speeds are valid
    - Service reported at the block level is done using blocks of the appropriate size (less than two square miles)
    - Speeds and technologies reported per provider are consistent between blocks and segments

- Administrative information (provider name, doing business as [DBA] Name, FRN) is consistently reported per provider in each populated feature class.

Outreach to Providers

To further assure the providers' broadband footprints would be accurately represented in data submissions, "check maps" depicting each respective provider's served small census blocks and segments located in large blocks were distributed back to providers. Providers were requested to either approve their check maps as-is, or submit additional changes if their coverage was not accurately represented. Any modifications received as a result of this effort were incorporated into the broadband coverage maps. WVGES plans to incorporate future data reviews with providers using web collaboration tools.

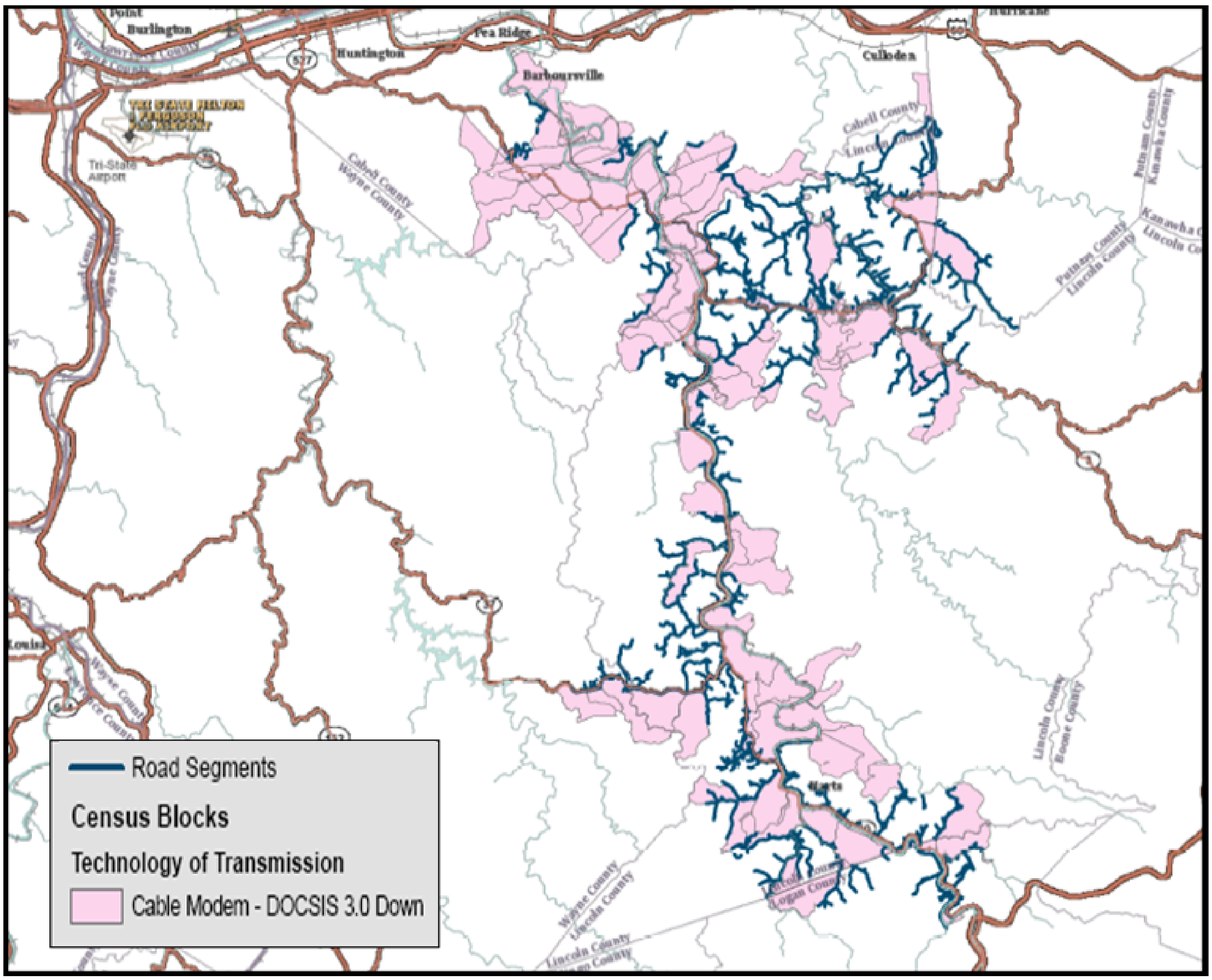


Figure 1—Example of a portion of a provider check map

The validation process for the October 2012 submission includes the use of the Python scripts for validation provided by NTIA.

Third Party Datasets

As data collections and data normalization processes progressed, additional validation was conducted using commercially available datasets. The following commercially available datasets were used as a reference for the specific technologies that their data represented.

- American Roamer datasets

- TeleAtlas Exchange boundaries
- Media Prints Cable boundaries

These datasets were used primarily as a validation source for provider service coverage.

State Broadband Interactive Map

The State of West Virginia released its interactive broadband mapping Website to the public in May 2011. The Website address is www.wvbroadbandmap.org. The Website provides consumers the opportunity to review broadband availability across the State.

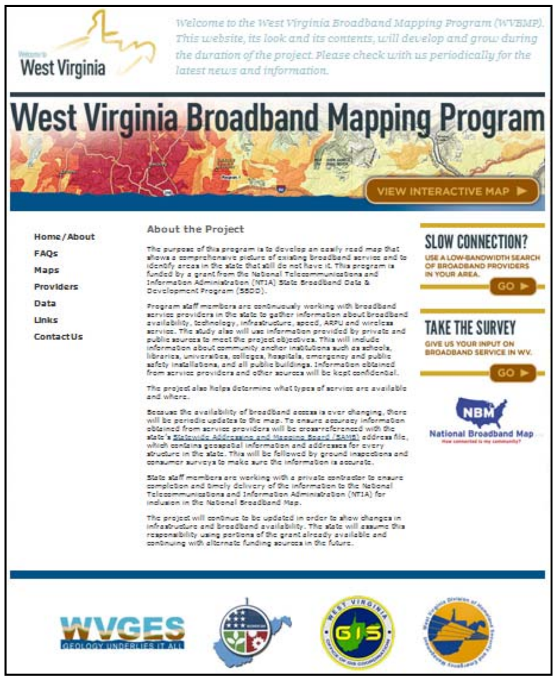


Figure 2—WVBMP main landing page

The main landing page for the West Virginia Broadband Mapping Program (WVBMP) provides background information on the program, contact information and a frequently asked questions section. The landing page has the main link to the broadband coverage map and a link to an address lookup tool for users with slow internet connections. This will allow them to view what coverage is available around their address or zip code without needing to view the entire map, which might not be feasible for users who might still be on dial-up connection speeds. By having this slow internet connection coverage tool, it allows feedback from those consumers even if they do not have the capabilities to bring up the interactive map application.

The Web application has the functionality for consumers and citizens using the State broadband map Web application to submit comments and feedback. The information gathered from that feedback is being reviewed as more potential source information for validating and determining confidence levels of the broadband coverage across the regions of the State. By comparing comments supplied by consumers about broadband availability to the broadband coverage, trends could be recognized where potential inconsistencies in the existing broadband map could exist. This could delineate the need for further focused validation or verification in specific areas that could refine the broadband coverage information for future data submissions.

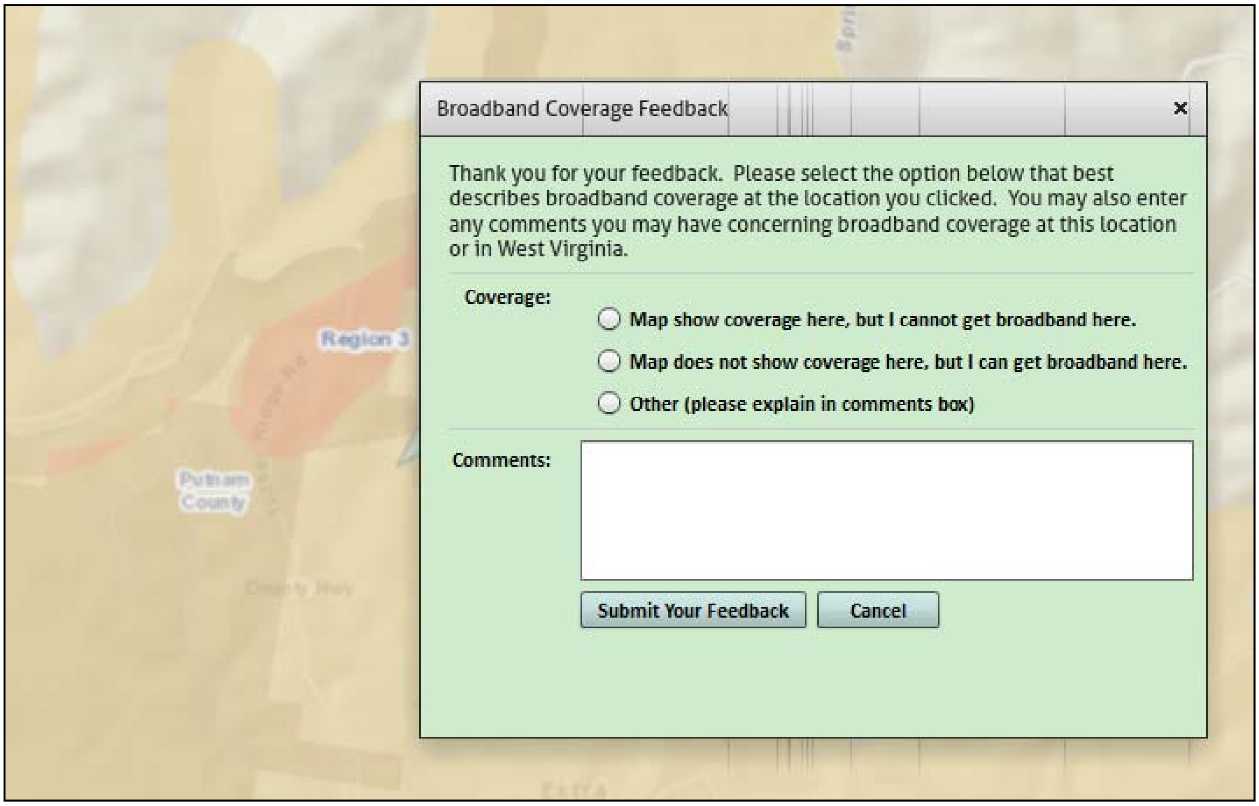


Figure 3—Example of feedback tool interface

For users that can browse the interactive map, they can click on any location on the map and choose to provide specific feedback for that location. This will store the coordinate information of the location that they selected allowing them to choose from a couple of coverage categories for their comment or choose other. Within the feedback tool, they can type in more specific details about their broadband coverage.

After the initial release of the broadband map, there was some initial feedback and comments mainly pertaining to a few areas that were not showing coverage. The feedback indicated that there should be coverage or scenarios where we were showing coverage. One resident made a comment that there was not cable service on a particular road or area. Some of the missing coverage was due to the acquisition of Verizon by Frontier as discussed above.

The State continues to implement plans to incorporate more advertising to the interactive broadband map and feedback tools. Continuing to work more closely with the regional planning councils to review coverage in their communities, a plan to include an advertisement of the interactive broadband map into local phone bills is being developed.

A speed test has been developed within the WVBMP interactive Website. The design of the Website includes links to the speed test developed using the Ookla broadband speed test tools. The speed test is embedded within a broadband survey wizard that allows consumers to provide specific information that will help the State analyze information about use and demand for broadband within the State. To get more users to take the speed test to obtain more results for analysis over the next six months, the speed test will be advertised along with the interactive Website. Speed test results and statistics will be leveraged to compare against the existing broadband coverage and help validate speed information. As stated previously, this could assist in determining if there are any trends or patterns in the information that could be an additional tool for prioritizing areas where more refined verification and validation might need to occur. To date there is still a lack of substantial data collected via the speed-test or surveys to be able to detect patterns or trends and continued planning within the regional planning councils could provide more exposure to the web sites and speed test at the grass roots level. Links to the speed test and the interactive map have also been added to additional web sites, including a new West Virginia Broadband Deployment Council web site (www.broadband.wv.gov) that was launched at the end of 2011.

Future Steps for Validation

Future plans for data validation continue to include establishing confidence levels to assign to broadband coverage based on comparisons with other source information collected, such as feedback from crowd sourcing results from the State broadband map and the national broadband map. Confidence rankings will be used to prioritize any areas where additional verification techniques might be used (consumer and business surveys).

As part of continued broadband planning activities and future validation of data, a third party dataset from Infogroup has been purchased. For broadband map validation, the Infogroup datasets provide consumer broadband use information including coordinate based location information along with provider name and technology that is being used by that particular consumer. The Infogroup data will allow the consumer information to be plotted on the map and compared against existing coverage maps to determine if there are any trends within the Infogroup data that help to determine where additional validation needs to occur. For example, there may be clusters of consumer points for a particular provider that exists in an area of the State where there is no coverage for that provider. The goal would be to identify the major patterns or trends that might need to be re-visited with a provider, if data appears to be missing.

During the summer of 2012, as part of the data verification tasks, a comparison was performed between the State broadband coverage area from the State's last data submission to the National Telecommunication and Information Administration (NTIA) in April 2012 with the third party information from Infogroup purchased by the State. An Excel spreadsheet was provided by Infogroup and contains customer location information for cable, digital subscriber line (DSL), fiber optic (fiber), and wireless subscribers and can be converted into a spatial geographic information system (GIS) dataset. The findings were used to indicate whether or not there are any areas in the submitted broadband coverage data that may need to be updated or verified.

Also present in the spreadsheet table is customer location information for dialup subscribers. This dataset can be converted into a spatial GIS layer and used to identify areas that may not have broadband services, but can still access information through a dialup service.

When comparing the current broadband coverage area and the new XY point layer from the Infogroup records, only a small percentage of points fell outside of the coverage area. Table one highlights the key results that were found.

Type of Service	Total Number of Points	Number of Points Outside of Coverage Area	Number of points Within 50 ft of Coverage Area	Number of points Over 500 ft of Coverage Area
Cable	108503	303	60	92
DSL	63462	268	69	64
Fiber	428	4	1	1
Wireless	4962	54	2	25
Total	17,7355	629	132	182

Table 1—Points Outside of Coverage Area by Technology

In conclusion, the analysis of the dataset indicates that no immediate changes need to be made to the existing broadband coverage area because of the low percentage of points that fell outside of the current coverage areas. The few clusters of points that fell outside of the current coverage area should be reviewed and potentially discussed with providers in those areas to determine if any existing coverage needs to be expanded in those areas. This will be incorporated within data submission request period for the next data submission.

Another dataset that is being considered for purchase for broadband planning activities and broadband demand analysis is Telogical's broadband statistical datasets that provide pricing information. Included in the datasets is information on broadband maximum advertised speed by providers which could help validate some of the speed data within the broadband mapping datasets.

Throughout the broadband data development program, as addressing information from the State Addressing and Mapping Board's addressing datasets are continually updated, address point information from providers will continually be re-verified prior to each submission to NTIA to improve geocoding results and refine the broadband coverage areas.

Specific Verification Tasks- Fourth Quarter 2012

The West Virginia Broadband Mapping Program has outlined specific objectives for data verification through the end of 2012. These objectives are focused on five main components:

1. Begin development of a plan for integration of Public Data Sources for verification activities
2. Begin development of a plan to compile free wireless broadband services offered and operated by a government, business, or community entity
3. Continue verification activities by revisiting contacts for each anchor institution and developing verification strategy for data with which we are less confident
4. Continue to refine a confidence scale that indicates the level of confidence for each record
5. Obtain speeds at the block/segment level

To continue to achieve these objectives as outlined to the National Telecommunications and Information Administration (NTIA) in the West Virginia Broadband Mapping Program activities for 2012, the West Virginia Office of GIS Coordination (WVOGC) will finalize the planning and implementation of the following tasks in 2012.

- Receive the current FCC Form 477 data from the WVOGC and provide comparisons to the round 6 submission data to determine if there are additional build out by providers that need to be requested for the round 7 submission.
- Use service availability query tools published on providers' websites to compare to what has been submitted
- Begin compilation of free wireless broadband services offered and operated by a government, business, or community entity. Research information on web sites and applications that list free Wi-Fi hotspots. Further field verification of these hotspots through a pilot test is described in a separate section of this document.
- Work with WVOGC and the West Virginia of Department of Homeland Security and Emergency Management (WVDHSEM) to launch an outreach campaign to have community anchor institutions take the speed test and take a specific survey developed for community anchors beyond what has already been surveyed and collected so far by WVDHSEM.
- Review submitted wireline attributes (Central offices, remote terminals, etc.) and compare locations as submitted by providers to any visible location information on orthophotos or against of any facilities coded in the State Addressing and Mapping Board (SAMB) data. Additional field verification would be completed in pilot area testing described in this document.
- Launch another outreach campaign to resellers to determine if they want to be included on the state web map in some capacity and determine the best approach to adding those resellers.
- Refine a confidence scale to provide a level of confidence for records in the database. A matrix would be developed to rank quality metrics for each provider to develop a weighted score that could then be applied by to the database. The quality metrics and matrix would be developed with WVOGC.
    - Rank 1-5 on:

- Consistency/cohesiveness of their coverage – if their coverage pattern is consistent with what is expected given their technology, or if isolated blocks/address points exist
- Quality of data supplied – customer address points instead of qualified address points, solid wireless coverage patterns instead of propagation-style, street segments that can't be mapped, generalized data, etc.
- Completeness of data – missing field values, etc.
- Cooperation of the providers – e.g. whether they are responsive to the data requests each round, if they submit data on time, etc.

- Obtain speeds at the block/segment level. Research the currently available options for obtaining more detailed speed information, including third-party source data, and providing recommendations to WVOGC.
- Continue to mine information from the speed tests and develop new campaigns to encourage the use of the speed test.

Field verification pilot test:

To achieve the long-term success of specific verification tasks outlined above as the project continues into 2013 and 2014, an initial field verification pilot test will be conducted during the fourth quarter of 2012. Field verification will be performed in specific areas of the state as determined by WVOGC. This pilot test will involve the following activities:

- Using mobile applications on smart phones or laptops to test wireless broadband availability and speeds. Verify location of Central Offices, Remote Terminals, etc.
- Collect and verify location of Wi-Fi hotspots and free public broadband to help compile of map of these locations

Once the field verification portion has been completed, analysis of the results will be performed and an overall report developed outlining the activities and recommendations on expanding these verification activities beyond these pilot areas in 2013. A determination will be made as to whether or not the results for the specific activities returned data and information that are beneficial in the development of a more accurate broadband coverage map and valuable for the continued broadband planning activities. If these results indicate that these activities should be expanded beyond the pilot test area, an implementation plan will be developed for the specific field verification activities that should be expanded to a large geographic area.

Use of Broadband Mapping Datasets for State Broadband Grant Program

The West Virginia Broadband Deployment Council launched a state grant program in the summer of 2012 to help bring affordable broadband to unserved areas of West Virginia. One of the most important ways it does this is by providing grants to help fund broadband deployment projects. Broadband deployment projects can be of two types – infrastructure and demand stimulation. Infrastructure projects are those that bring affordable broadband service to people and businesses that do not currently have it and may never have it without some sort of public funding. Demand stimulation projects are those that help people and businesses understand and value the benefits broadband service would bring to them, and cause them to want to use that service. To help delineate specific potential project areas, as described in the West Virginia Code 31-15C-1, the broadband mapping coverage that has been developed as part of the NTIA's broadband mapping program was used to generate maps that depicted Type 1, 2 and 3 areas outlined in that statute.

A Type 1 un-served area is an area in which broadband may be deployed by service providers in an economically feasible manner. A Type 2 un-served area is an area in which broadband may be deployed by broadband service providers and other entities in an economically feasible manner, provided some form of public money is made available. A Type 3 un-served area is an area in which, at present, cable or wireline broadband cannot be deployed in an economically feasible manner and an intermodal approach employing other technologies, such as satellite and wireless, is required to provide that area with high-speed internet access.

Broadband service providers each have unique processes for determining when it is economically feasible to deploy broadband service to a given area. The process varies from provider to provider and depends greatly on the technology being deployed. Because no consistent formula exists and the definition of a Type 1, 2 or 3 un-served area is not strictly defined, an objective means to classify un-served areas based upon known metrics for populations more likely to have broadband service today. Metrics regarding current broadband deployment were obtained from Federal Communications Commission (FCC) reports. Factors including structure points, population density, median income, age, distance from existing networks and terrain were considered in classifying un-served areas as Type 1, 2 or 3.

The known areas currently served by broadband service providers were documented from the state broadband mapping program through the geographic information systems (GIS) coordinator's office and the West Virginia Geological and Economic Survey (WVGES). Areas currently served by broadband service were excluded from the determination. Un-served areas were then subdivided based on proximity to structure points and road segments. Each area was then correlated with 2000 and 2010 census data for population density, income and population age to determine likelihood for deploying broadband service.

Criteria used to determine the likelihood of a given area receiving broadband service was based on metrics provided by the Broadband Adoption and Use in America, OBI Working Paper Series No. 1, by John B. Horrigan for areas where broadband is currently deployed. Specific categories considered in the determination included population density, population age, income and proximity to existing networks. Each category was weighted on a scale of one to five, with a score of five indicating a high likelihood to receive broadband service and a score of one indicating a low likelihood to receive broadband service. Based on the average of the four considered categories, each subdivided area was classified as Type 1, 2 or 3.

Based on the determination, a map was developed which depicts the Type 1, 2 and 3 classifications across the state. A 1,000 foot boundary was included within the documented area around each structure point to reflect the area that a wireline provider may be willing to lay cable from a roadway in order to provide broadband service. Served areas are reflected with a yellow color. Each un-served area is color classified according to the Type 1, 2 and 3 determinations.

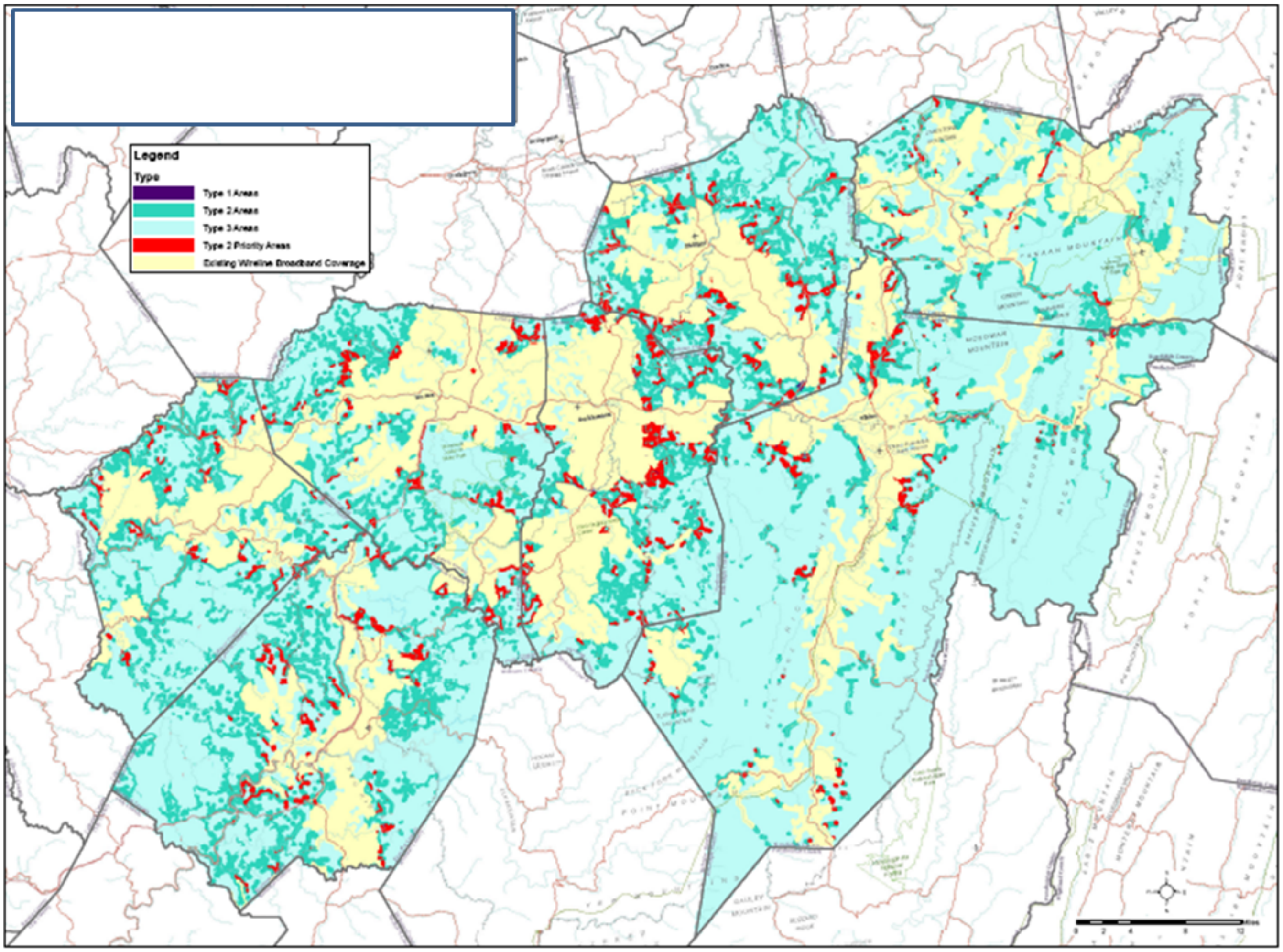


Figure 4 - Sample of a Type 1, 2 and 3 Map

Providers

Non-Responsive Providers

Names of providers who were non responsive will be passed along to the WV Geographic Information Systems (GIS) Coordinator's Office to be contacted again.

Atlantic Broadband LLC
DBA: Atlantic Broadband, LLC
FRN: 0009596883
This provider was contacted eight times. Data was not provided by the October submittal date. Further attempts at data gathering will be made in the next round of data collection.

**Skyweb, Inc
DBA: SKYWEB Inc.
FRN: 0018516799

**Tower locations were provided along with additional information for each tower site. Two computerized propagation studies were performed to approximate coverage for a local provider supplying broadband data. The two studies were predicted in the 900 MHz and 2.4 GHz bands that are utilized at these locations. The data was received from the provider that defined the tower sites currently utilized to provide coverage. Parameters provided include site locations, ground elevation, transmit power, antenna height above ground, and antenna gain. All of these components were compiled into EDX Signal software program which calculates the associated link budget and in which the program takes into account terrain and land use land clutter (LULC). Propagation studies show potential coverage throughout the area. Additional assumptions made include a predicted reliability of 90 percent for any signal received by a device and no additional signal loss was taken into account for signals received inside buildings which may further impact the coverage predictions. Coverage areas based on the propagation studies do not seem to represent realistic coverage patterns and will need to be reviewed again with SkyWeb in the future.

Satellite Providers

Data requests sent to Satellite providers were met with the response of "We provide to the entire state." Attempts made at gathering more detailed data sets were unsuccessful for this round of data collection. Further attempts will be made for the next round of data collection.

Hughes Communications, Inc.
DBA: HNS Licensuse Sub, LLC
FRN: 0018483073
Detailed data was not provided by the October submittal date. Further attempts at data gathering will be made in the next round of data collection.

StarBand Communications Inc.
DBA: StarBand Communications Inc.
FRN: 0005087457
Detailed data was not provided by the AprilOctober submittal date. Further attempts at data gathering will be made in the next round of data collection.

WildBlue Communications, Inc.
DBA: WildBlue Communications, Inc.
FRN: 0007843766
Detailed data was not provided by the October submittal date. Further attempts at data gathering will be made in the next round of data collection.

Provider that Submitted Data

Provider Name	DBA Name	FRN
Armstrong Holdings, Inc.	Armstrong Telephone Company - Northern Division	0004311528
Armstrong Holdings, Inc.	Armstrong Telephone Company-WV	0004379731
Armstrong Holdings, Inc.	Armstrong Utilities, Inc.	0003765617
AT&T Inc	New Cingular Wireless Services, Inc.	0003766532
Broadview Networks Holdings, Inc.	Broadview Networks Holdings, Inc.	0010296853
Blue Devil	Blue Devil	0003749116
Cequel Communications, LLC	Suddenlink Communications	0015784663

Provider Name	DBA Name	FRN
Citizens Communications Company	Frontier Communications Corporation	0003576352
City of Philippi	City of Phillipi	0001984244
Comcast Corporation	Comcast Cable Communications Inc.	0003768165
Community Antenna Service, Inc.	Community Antenna Service Inc.	0004966131
Deutsche Telekom AG	T-Mobile USA, Inc.	0006945950
Gateway Telecom, LLC	Gateway Telecom LLC	0018536623
Hardy Telecommunications, Inc.	Hardy Telecommunications Inc	0002008043
Hardy Telecommunications, Inc.	Hardy Telecommunications,Inc CLEC	0013169313
Hickory Tech Corporation	Enventis Telecom Inc.	0008394322
Inter Mountain Cable, Inc.	Inter-Mountain Cable Inc	0001789080
Inter Mountain Cable, Inc.	Mikrotec CATV, LLC	0014471288
JB-Nets	JB-Nets	0016474868
Leap Wireless International, Inc.	Cricket Communications, Inc.	0002963528
Level 3 Communications, LLC	Level 3 Communications, LLC	0003723822
Level 3 Communications, LLC	Broadwing Communications, LLC	0008599706
LightEdge Solutions, Inc	LightEdge Solutions, Inc.	0015546443
Metropolitan Telecommunications Holding Company	Metropolitan Telecommunications Holding Company	0009806019
Micrologic, Inc.	Micrologic, Inc.	0018675256
New Edge Holding Company	New Edge Network, Inc.	0003720471
NTELOS, Inc.	NTELOS Communications Inc.	0004342762
NTELOS, Inc.	West Virginia PCS Alliance, L.C.	0002049328
Otelco Inc.	War Acquisition Corp	0018657858
Qwest Communications International, Inc.	Qwest Communications Company, LLC	0003605953
Shenandoah Telecommunications Company	Shentel Cable Company	0018024075
Sprint Nextel Corporation	Sprint Nextel Corporation	0003774593
Spruce Knob Seneca Rocks Telephone, Inc.	Spruce Knob Seneca Rocks Telephone, Inc.	0004337002
TelAtlantic, Inc.	West Side Telecommunications	0002009405
TelAtlantic, Inc.	Communications Plus, Inc.	0009281262
Time Warner Cable LLC	Time Warner Cable LLC	0013430244
TW Telecom inc.	tw telecom holdings inc.	0014942668
Verizon Communications Inc.	Cellco Partnership	0018506568
Verizon Communications Inc.	Verizon Business Global LLC	0010856284
Verizon Communications Inc.	Verizon West Virginia Inc.	0002011278
Visual Link Internet LLC	Visual Link Internet LLC	0017645813

Table 2—Providers That Have Submitted Data for SBDD Program

Appendix A WVGES Provider Data Request Letter

The WVGES Provider Data Request Letter can be found on the following page

The balance of this page is intentionally left blank.

WEST VIRGINIA
GEOLOGICAL AND ECONOMIC SURVEY

1 Mont Chateau Road
Morgantown, WV 26508-8079

Earl Ray Tomblin, *Governor*
Keith Burdette, *Secretary, Department of Commerce*
Michael Ed. Hohn, *Director and State Geologist*

Phone: (304) 594-2331
Fax: (304) 594-2575
E-mail: info@geosrv.wvnet.edu
Web Site: http://www.wvgs.wvnet.edu

January 6, 2012
(Address of Recipient)

Re: Data Request in Compliance with the State Broadband Data and Development Grant Program and the Broadband Data Improvement Act

Response Requested by March 1st, 2012

Dear < >:

The West Virginia Geological and Economic Survey (WVGES) must collect certain data regarding the availability of broadband services, technology used to provide them, and the location of certain broadband infrastructure. The WVGES is required to provide the collected data to the NTIA every six months beginning March 2010 until October 2014. Entities that provide broadband service, as defined below, on either a commercial or noncommercial basis within West Virginia are subject to this request.

WVGES was designated as the single West Virginia entity eligible to receive a grant under the Broadband Data Improvement Act of 2008 (BDIA), 47 U.S.C. §§ 1301-04. In 2009, the WVGES successfully applied to the National Telecommunications and Information Administration (NTIA) for such a grant, pursuant to the NTIA's Notice of Funds Availability (NOFA).

The NTIA's State Broadband Data and Development Grant Program Notice of Funds Availability, Docket No. 0660ZA (July 8, 2009) (NOFA), defines broadband as follows:

> …two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and at least 200 kbps upstream to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end users…

Please note that the broadband inventory maps derived from these data may result in government-subsidized broadband deployment in unserved and underserved areas. Providers that do not respond may face subsidized competition in areas they already serve.

Attached to this request are the Technical Appendix to the NOFA and a technical appendix written by the WVGES to clarify the data that needs to be collected. **Please note this appendix is new as of January 1, 2012.** These documents outline the broadband availability information WVGES is required to collect. Every broadband service provider within the state of West Virginia is expected to provide the information specified in the attached documents to WVGES **<u>no later than March 1st, 2012</u>**, in the format WVGES has specified.

Six Month Update:
Pursuant to the BDIA and the NOFA, WVGES must collect updates on broadband data on a six month rolling basis. **If you had submitted adequate information during the 2nd collection period of 2011 and there are no changes to your infrastructure, the WVGES requests a letter stating such**. If infrastructures changes have been made in the interim period, submissions of the changes are required.

Contact Information:
Please submit the requested data **<u>no later than March 1, 2012</u>** by CD or DVD to Michael "Ty" Clifford, West Virginia Geological and Economic Survey, 1 Mont Chateau Rd. Morgantown WV 26508-8079.

If you have questions about this request, contact Michael "Ty" Clifford by email at mclifford@geosrv.wvnet.edu, or by phone at (304) 594-2331.

Nondisclosure Agreement:
Data submitted to WVGES in response to this request will be protected under the confidentiality requirements set forth in Section 106 (h)(2) of the BDIA. This section states that, "[n]ot withstanding any provision of Federal or State law to the contrary, an eligible entity shall treat any matter that is a trade secret, commercial or financial information, or privileged or confidential, as a record not subject to public disclosure except as otherwise mutually agreed to by the broadband service provider and the entity." Further, the NOFA states that "[a]s a measure to protect the confidential or proprietary nature of the information received from broadband service providers and other organizations during the data collection phase, awardees may execute nondisclosure agreements (consistent with applicable law) that require awardees to treat any matter that is a trade secret, commercial or financial information, or privileged or confidential, as a record not subject to public disclosure except where mutually agreed upon by the information provider and the awardee, provided, however, that any such nondisclosure restriction a) will not restrict the providing of all data collected under this Program to NTIA, nor b) restrict NTIA's use of such data as contemplated under this Notice (including sharing such data with the FCC or other federal agencies)". NTIA expects awardees to enter into such agreements upon the request of the service provider. WVGES believes that these provisions will protect the confidentiality of information that broadband providers submit pursuant to this request and intends to enter into a nondisclosure agreement with any provider that wishes to do so.

Michael Ed Hohn
Director and State Geologist
West Virginia Geological and Economic Survey

Additional information may be obtained from the NOFA, available at 74 Fed. Reg. 32,545 or online at http://broadbandusa.sc.egov.usda.gov.

Enclosures:

- Letter from Gov. Joe Manchin III to Mr. Larry Strickling, Administrator NTIA (August 12, 2009)
- State Broadband Data and Development Grant Program, Notice of Funds Availability; clarification (August 7, 2009). Available at http://broadbandusa.sc.egov.usda.gov/ broadband_mapping.htm
- WVGES Guide to Broadband Submission January 1, 2012

Appendix B WVGES Guide to Broadband Submission

The WVGES Guide to Broadband Submission can be found on the following page.

The balance of this page is intentionally left blank.

WEST VIRGINIA
GEOLOGICAL AND ECONOMIC SURVEY

1 Mont Chateau Road
Morgantown, WV 26508-8079

Earl Ray Tomblin, *Governor*
Keith Burdette, *Secretary, Department of Commerce*
Michael Ed. Hohn, *Director and State Geologist*

Phone: (304) 594-2331
Fax: (304) 594-2575
E-mail: info@geosrv.wvnet.edu
Web Site: http://www.wvgs.wvnet.edu

January 6, 2012

West Virginia Geological and Economic Survey Guide to Broadband Submission

Purpose:
Several changes in submission guidelines have been made by NTIA since the writing of the original Technical Appendix. This document clarifies what is preferred and required for submission and the original NTIA Technical Appendix no longer adequately describes what is required.

Broadband definition:
Broadband Service is the provision, on either a commercial or noncommercial basis, of data transmission technology that provides two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream **and greater than 200 kbps upstream** to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end-users within the project area.

2010 census requirements:
Beginning in June 2011, all census block and road information **must be derived from 2010 Census Data**. All block and road data submitted **must have a unique identifier present**, such as census block # or **TLID.**
The WVGES has created two shapefiles which contain all census blocks in West Virginia less than 2 square miles and all roads contained in census blocks greater than 2 square miles. All census and road data must correspond to these master files.

The shape files are located at:
https://dssfm.kimballdata.com

```
Username: censusdata
Password: censusdata#1
```

Data preferences:
The WVGES prefers data to be submitted in the following order of preference:

- ESRI shapefile format with all required fields submitted.
- Service area boundary with defined speeds and fields that can be converted to blocks and roads.
- Flat Excel or comma-delimited files that contain all data field and unique identifiers.

Data Types and required fields:

Wireless Services not Provided to a Specific Address – Shapefile

Facilities-based providers of wireless broadband service that is not address specific (e.g., nomadic, terrestrial mobile wireless, or satellite), may provide WVGES with GIS-compatible shapefiles depicting areas in which broadband service is available to end users.

For this purpose, an "end user" of broadband service is a residential or business party, institution, or state or local government entity that may use broadband service for its own purposes and that does not resell such service to other entities or incorporate such service into retail Internet-access service. Internet Service Providers (ISPs) are not "end users" for this purpose. An entity is a "facilities-based" provider of broadband service connections to end user locations if any of the following conditions are met: (1) it owns the portion of the physical facility that terminates at the end user location; (2) it obtains unbundled network elements (UNEs), special access lines, or other leased facilities that terminate at the end user location and provisions/equips them as broadband; or (3) it provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.

For this purpose, "broadband service" is "available" at a location if the provider does, or could, within a typical service interval (7 to 10 business days) without an extraordinary commitment of resources, provision two-way data transmission with advertised speeds of at least 768 kilobits per second (kbps) downstream and greater than 200 kbps upstream to end-users at that location. The data shall be submitted to WVGES as an ESRI Shapefile such that the associated data contains the following fields:

- Instructions for providers needing to obtain a FRN can be accessed at https://fjallfoss.fcc.gov/coresWeb/publicHome.do.
- All map areas must be closed, non-overlapping polygons with a single, unique identifier.
- Any variation in any of the required fields necessitates the creation of a separate closed, non-overlapping polygon.
- In the area covered by each polygon, subscribers must have broadband service with the speed characteristics shown in the data record 95% of the time to within 50 feet of the polygon's boundary.
- The technology of transmission should be entered as an integer based on the coding scheme shown below.
- The speed tiers should be entered as integers according to the reference in below.
- The data must be expressed using the WGS 1984 geographic coordinate system.
- Maps must be accompanied by metadata or a plain text "readme" file that contains a comprehensive explanation of the methodology employed to generate the map layer including any necessary assumptions and an assessment of the accuracy of the finished product.
- Since ESRI Shapefiles typically consist of 5 to 7 individual files including the associated metadata and geodatabase, data for the entire state or territory should be submitted as a single, zipped file containing all the component files. The file should be named "area_availability_XX.zip" where XX is the two-letter postal abbreviation for the state or territory.

Record Format for Availability Area Data for Each Provider – Use Only in Connection with Wireless Services not Provided to a Specific Address

Field	Description	Type	Example
Provider Name	Provider Name	Text	ABC Co.
DBA Name	"Doing-business-as" name	Text	Superfone, Inc.
FRN	Provider FCC Registration Number	Integer	8402202
Technology of Transmission	Category of technology for the provision of service (see details following Part 1(a) for codes)	Integer	41
Spectrum Used	If technology of transmission is wireless, is Cellular spectrum (824-849 MHz; 862-869) used to provide service (Y/N)?	Text	Y
Spectrum Used	If technology of transmission is wireless, is 700 MHz spectrum (698-758 MHz; 775-788 MHz; 805-806 MHz) used to provide service (Y/N)?	Text	Y
Spectrum Used	If technology of transmission is wireless, is Broadband Personal Communications Services spectrum (1850-1915 MHz; 19301995) used to provide service (Y/N)?	Text	Y
Spectrum Used	If technology of transmission is wireless, is Advanced Wireless Services spectrum (1710-1755 MHz; 2100-2155) used to provide service (Y/N)?	Text	N
Spectrum Used	If technology of transmission is wireless, is Broadband Radio Service/Educational Broadband Service spectrum (2496-2690 MHz) used to provide service (Y/N)?	Text	N
Spectrum Used	If technology of transmission is wireless, is Unlicensed (including broadcast television "white spaces") spectrum used to provide service (Y/N)?	Text	N
Spectrum Used	If technology of transmission is wireless, but the spectrum used to provide service is not listed above, please identify as one of the following: Specialized Mobile Radio Service (SMR) (817-824 MHz; Spectrum Used 862-869 MHz; 896-901 MHz; 935-940 MHz), Wireless Text SMR Communications Service (WCS) spectrum (2305-2320 MHz; 2345-2360 MHz), 3650-3700 MHz, Satellite (L-band, Big LEO, Little LEO, 2 GHz).	Text	SMR
Maximum Advertised Downstream Speed	Speed tier code for the maximum advertised downstream speed available (see details following Part 1(a) for codes)	Integer	8

Maximum Advertised Upstream Speed	Speed tier code for the maximum advertised upstream speed that is offered with the above maximum advertised downstream speed available (see details following Part 1(a) for codes)	Integer	8
Typical Downstream Speed	Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details following Part 1(a) for codes).	Integer	8
Typical Upstream Speed	Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details following Part 1(a) for codes).	Integer	8

Middle Mile and Backbone Interconnection Points

In addition to the information shown in the tables below, awardees shall provide NTIA with a list of interconnection points of facilities in their state that provide connectivity between (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. (Collectively, (a) and (b) are "middle-mile and backbone interconnection points").

Middle-mile and backbone interconnection points typically enable relatively fast data rates, are built to handle substantial capacities, and may be service-quality assured.

Examples might include: points of interconnection enabling communications between an incumbent local exchange carrier central office and the Internet, between a cable aggregation point (headend) and the Internet, or between a wireless base station and the provider's core network elements that connect to other networks including the internet.

These data shall be submitted to NTIA as a tab-delimited text file in which each record has the following format:

- Instructions for providers needing to obtain a FRN can be accessed at https://fjallfoss.fcc.gov/coresWeb/publicHome.do.
- The capacity of the serving facility should represent the capacity as currently configured and be expressed according to the following reference:
- Coordinates must be expressed using the WGS 1984 geographic coordinate system.
- Data for the entire state or territory should be submitted as a single, tab-delimited plain text file named "middlemile_XX.txt" where XX is the two-letter postal abbreviation for the state or territory.

Record Format for Middle-Mile and Internet Backhaul Connection Points Data for Each Provider

Field	Description	Type	Example
Provider Name	Provider Name	Text	ABC Co.
DBA Name	Doing-business-as name	Text	Superfone, Inc.
FRN	FCC Registration Number	Integer	8402202
Ownership	Is the facility owned (0) or leased (1)?	Integer	0
Serving Facility Capacity	Serving capacity of transport facility (see details below)	Integer	1
Serving Facility Type	Type of transport facility (1=Fiber; 2=Copper; 3=Hybrid Fiber Coax (HFC); 4=Wireless)	Integer	1
Latitude	Latitude in decimal degrees	Float	38.88456
Longitude	Longitude in decimal degrees	Float	-77.028123
Elevation	Elevation relative to grade to the nearest foot (positive integers indicate above grade, negative below grade)	Integer	-10

Serving Facility Codes

Data Rate Code	Interconnection Point Data Rate
1	Multiple T1s and less than 40 mbps
2	Greater than 40 mbps and less than 150 mbps
3	Greater than 150 mbps and less than 600 mbps
4	Greater than or equal to 600 mbps and less than 2.4 gbps
5	Greater than or equal to 2.4 gbps and less than 10 gbps
6	Greater than or equal to 10 gbps

Service Address Service Associated with Specific Address

For each facilities-based provider of broadband service to specified end-user locations in their state, awardees shall provide NTIA with a list of all addresses at which broadband service is available to end users in the provider's service area, along with the associated service characteristics identified below.

For this purpose, "broadband service" is the provision, on either a commercial or noncommercial basis, of data transmission technology that provides two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream **and greater than 200 kbps upstream** to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end-users within the project area.

For this purpose, an “end user” of broadband service is a residential or business party, institution or state or local government entity that may use broadband service for its own purposes and that does not resell such service to other entities or incorporate such service into retail Internet-access services. Internet Service Providers (ISPs) are not “end users” for this purpose. An entity is a “facilities-based” provider of broadband service connections to end user locations if any of the following conditions are met: (1) it owns the portion of the physical facility that terminates at the end user location; (2) it obtains unbundled network elements (UNEs), special access lines, or other leased facilities that terminate at the end user location and provisions/equips them as broadband; or (3) it provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.

For this purpose, “broadband service” is “available” at an address if the provider does, or could, within a typical service interval (7 to 10 business days) without an extraordinary commitment of resources, provision two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and greater than 200 kbps upstream to endusers at that address. The list of addresses shall be submitted to WVGES as a tab-delimited text file in which each record has the following format:

- All fields are required.
- Instructions for providers needing to obtain a FRN can be accessed at https://fjallfoss.fcc.gov/coresWeb/publicHome.do.
- The ID field is a sequential integer ranging from 1 to the total number of addresses.
- Address data fields should be space-delimited in standardized Postal Service form. See http://pe.usps.gov/cpim/ftp/pubs/Pub28/pub28.pdf.
- Categories of end users should be entered as integers based on the following table.
- For reporting the technology of transmission, report the technology used by the portion of the connection that terminates at the end-user location. If different technologies are used in the two directions of information transfer (“downstream” and “upstream”), report the connection in the technology category for the downstream direction. The technology of transmission should be entered as an integer based on the following tables.
- Speed tiers should be entered as integers based on the following tables.
- Data for the entire state or territory should be submitted as a single, tab-delimited plain text file named “address_availability_XX.txt” where XX is the two-letter postal abbreviation for the state or territory.

Record Format for Address Data for Each Provider

Field	Description	Type	Example
Provider Name	Provider Name	Text	ABC Co.
DBA Name	“Doing-business-as” name	Text	Superfone, Inc.
FRN	Provider FCC Registration Number	Integer	8402202
ID	Sequential record number	Integer	1

End User location/Service Data End-User Address	Complete address	Text	1401 Constitution Ave NW Washington DC 20230
End-User Building Number End-User Prefix Direction	Building number Prefix direction	Text	1401
End-User Street	Street name	Text	Constitution
End-User Street Type End-User Suffix Direction	Street type Suffix direction	Text	Avenue NW
End-User City	City	Text	Washington
End-User State Abbreviation	Two-letter state postal abbreviation	Text	DC
End-User ZIP Code	5-digit ZIP code (with leading zeros)	Text	20230
End-User ZIP Plus 4	4-digit add-on code (with leading zeros)	Text	0005
Category of End User	Category of End User Served at Address (see details below for codes)	Integer	3
Technology of Transmission	Category of technology available for the provision of service at the address (see details below for codes)	Integer	50
Maximum Advertised Downstream Speed	Speed tier code for the maximum advertised downstream speed available at the address (see details below for codes)	Integer	8
Maximum Advertised Upstream Speed	Speed tier code for the maximum advertised upstream speed that is offered with the above maximum advertised downstream speed available at the address (see details below for codes)	Integer	8
Typical Downstream Data	Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8

Typical Upstream Speed	Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8

End User Codes

End User Category Code	End User Category	Description
1	Residential	Address denotes a residential living unit, individual living unit in institutional settings such as college dormitories and nursing homes and other locations designed primarily for residential use at which broadband service is available.
2	Governmental	Address denotes a state orl ocal govermnent location at which broadband service is available.
3	Small Business	Address denotes the location of a small business.
4	Medium or Large Enterprise	Address denotes the location of a medium or large enterprise.
5	Other	Address denotes a location not meeting any of the above descriptions.

Technology of Transmission Codes

Technology Code	Description	Details
10	Asymmetric xDSL	
20	Symmetric xDSL	
30	Other Copper Wireline	All copper-wire based technologies other than xDSL (Ethernet over copper and T-1 are examples)
40	Cable Modem - DOCSIS 3.0	
41	Cable Modem - Other	

50	Optical Carrier/Fiber to the End User	Fiber to the home or business end user (does not include "fiber to the curb")
60	Satellite	
70	Terrestrial Fixed Wireless - Unlicensed	
71	Terrestrial Fixed Wireless - Licensed	
80	Terrestrial Mobile Wireless	
90	Electric Power Line	
0	All Other	Any specific technology not listed above.

Speed Tier Codes

Upload Speed Tier	Download Speed Tier	Description
1	--	Less than or equal to 200 kbps
2	--	Greater than 200 kbps and less than 768 kbps
3	3	Greater than or equal to 768 kbps and less than 1.5 mbps
4	4	Greater than or equal to 1.5 mbps and less than 3 mbps
5	5	Greater than or equal to 3 mbps and less than 6 mbps
6	6	Greater than or equal to 6 mbps and less than10 mbps
7	7	Greater than or equal to 10 mbps and less than 25 mbps
8	8	Greater than or equal to 25 mbps and less than 50 mbps
9	9	Greater than or equal to 50 mbps and less than 100 mbps
10	10	Greater than or equal to 100 mbpss and less than 1 gbps
11	11	Greater than or equal to 1 gbps

Census Blocks Less than Two Square Miles

Record Format for Wireline Service by Census Block

(For Census Blocks no greater than two square miles in area in which broadband service is available to end users)

Field	Description	Type	Example
Provider Identification Data			
Provider Name	Provider Name	Text	ABC Co.
DBA Name	"Doing-business-as" name	Text	Superfone, Inc.
FRN	Provider FCC Registration Number	Integer	8402202
ID	Sequential record number	Integer	1

Census Block Identification Data			
Census Block FIPS Code	15-digit Federal Information Processing Standard (FIPS) Code identifying individual Census Block. Must include leading "0"	Integer	60750160001015
Census Block Square Mileage	Provide square mileage for specific census block number to the first decimal place	Number	1.8
Broadband Technology and Speed Data			
Technology of Transmission	Category of technology available for the provision of service at the address (see details below for codes)	Integer	50
Typical Downstream Speed	Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8
Typical Upstream Speed	Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8

Roads contained within Census Blocks greater than two square miles

Record Format for Wireline Service by Street Segment

(For Census Blocks larger than two square miles in area in which broadband service is available to end users)

Field	Description	Type	Example
Provider Identification Data			
Provider Name	Provider Name	Text	ABC Co.
DBA Name	"Doing-business-as" name	Text	Superfone, Inc.
FRN	Provider FCC Registration Number	Integer	8402202
ID	Sequential record number	Integer	1

End User location/ Service Data			
Census Block FIPS Code	15-digit Federal Information Processing Standard (FIPS) Code identifying individual Census Block	Integer	60750160001015
Census Block Square Mileage	Provide square mileage for specific census block number to the first decimal place	Number	5.8
Street Name	Provide street name to identify street segment	Text	Van Ness
Street Type	Street type to identify street segment	Text	Avenue
Street Direction Prefix	Street Prefix to identify street segment	Text	N
TLID	Unique identifier for each street segment	Text	0015874962
Broadband Technology and Speed Data			
Technology of Transmission	Category of technology available for the provision of service at the address (see details below for codes)	Integer	50
Typical Downstream Speed	Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8
Typical Upstream Speed	Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8

West Virginia Geological and Economic Survey

State Broadband Mapping Methodology

For the State of West Virginia, October 2012

Contents

Overview

This document gives a summary of the data collection, normalization and verification processes used by the State of West Virginia (State) up to the sixth data submission, in October 2012, to the National Telecommunication and Information Agency (NTIA) in accordance with the State Broadband Data Development (SBDD) program. While most of the processes used in this data submission remained the same as ones for the previous submissions, there were additional adjustments made to continue to refine the process to receive 2010 census geography from the providers in more efficient ways. The State of West Virginia interactive broadband map continues to provide the broadband coverage information to the public and is able to receive comments and feedback from consumers and citizens of the state.

Purpose

This documentation was developed to illustrate the processes used during the data collection, normalization and verification processes. The information within this document will provide a background to the development of the provider list and data request, and specific issues encountered by West Virginia regarding data collection, normalization and validation.

Data Sources

Provider List

The provider list for this sixth round of data collection started during the first round of data collection. For this round, the list was regenerated to include any new providers within the state. The list was created by contacting the West Virginia Cable Telecommunications Association, the West Virginia Public Services Commission (PSC) and the West Virginia Broadband Deployment Council. The state receives an updated provider list from the PSC every six months. This information was compiled and compared against the list from the Federal Communications Commission (FCC). Providers were then contacted using information provided by the FCC's public information search Web tool. Providers who were contacted during the first round of data were contacted again through the same name and address. If a provider contacted during the first round had given more detailed contact information for a specific individual, those individuals were contacted instead of the contact provided by the FCC.

The provider list is updated every six months to reflect any mergers or acquisitions that have occurred. There are some legal issues when a merger occurs, but the data integration does not occur until up to a year later. In those circumstances, the data is kept separate until a full merger occurs.

Data Gathering

Provider Data Request

This component of the project was heavily reliant on working with service providers to obtain data. Each identified provider was mailed a standard data request outlining the elements identified in the Notice of Funds Availability (NOFA) Technical Appendix that were requested from providers. This request included information regarding the availability of broadband services, technology used to provide them, the location of certain broadband infrastructure and the speed of the service. Data was requested to be submitted in the form of census block lists and service area boundaries, including address level and street segment data. If a provider was unable to fulfill such requirements, the West Virginia Geological and Economic Survey (WVGES) worked with those providers to gather the necessary data in an alternative approach. For the last round of data collection, an updated guide for broadband data submission was developed for the providers. Along with this guide, a letter outlining the continued overall goals of the broadband mapping program and the objectives of the new updated guide were sent to each provider. The guide was developed to continue to standardize the data received from providers, including modifications and updates that have been made to the requirements by the NTIA since the original Technical Appendix.

Examples of the letter and guide are provided in Appendix A and Appendix B in this document. This same letter and guide were sent out again for this round of data submission requests. All of the providers that submitted census block information for this submission provided census 2010 geometry or census block numbers. However, once again, no providers submitted TLIDs for roads as described within the guide. Without TLIDs, roads need to be hand selected or geocoded, which can lead to some additional processes and inaccuracies because of the limitations described in the Geocoding Issues section.

After the initial data request was mailed, follow up phone calls and emails were made to remind providers of due dates and to collect any missing or unclear data. As of this submission, the response rate from providers continues to be over 90 percent. After data was received, the data was normalized per NTIA standards and placed into the provided geodatabase. WVGES continued to operate under the same assumption as used in the first round of data gathering. WVGES let the data "speak for itself" and did not make any grand assumptions or estimates in the interest of maintaining clean and accurate data.

Providers submitted only maximum advertised speed data. Providers have not been very willing to submit typical speed data as the typical speeds are generally lower than the advertised speeds. Advertised speed data was given by all providers and then pushed to typical speeds as per NTIA's advice in the Round 3 data review conference call.

In addition to the data request, each provider was required to sign a Nondisclosure Agreement (NDA) between themselves and WVGES. The NDA outlined how provider data would be handled and what portions of that data would be considered confidential, which would be shared with the NTIA and which were to be made publically available.

Coverage Information

Data was derived and normalized into four formats in accordance with the data model:

- Census blocks (2010) of two or less square miles
- Street segments (2010) of census blocks greater than two square miles
- Address level (geocoded point data)
- Wireless area (shapefile)

The normalization procedures were as follows:

- Determine service being provided – what technologies are being used to provide the service
- Understand data/determine how to process – determine which feature class in the geodatabase data belongs
- Georeferencing/geocoding necessary data – georeferencing data for wireless area coverage and other service area maps, as well as geocoding address level data
- Segregating data into NOFA compliant formats – completely filling in geodatabase fields, as well as making sure topology is correct
- Quality assurance/quality control (QA/QC) – verification and validation of data

Typically there were two main types of data supplied for normalization – service area maps and flat Excel tables.

Service areas were georeferenced, digitized and then intersected with the master blocks and roads files. These blocks and road segments were then loaded into the geodatabase and the additional company specific data was appended to those records.

Flat Excel tables were exported to a database and then joined with the FIPS ID for the block files and the TLID for the roads files. The joined fields were exported and then imported into the database. NTIA has not required this information and in cases where a TLID was not given by the provider there was much greater difficulty and inaccuracy as roads had to be geocoded and hand selected.

Geocoding Issues

The West Virginia Statewide Addressing and Mapping Board (SAMB) information is not yet completed across all of the counties in West Virginia, leaving areas within the State without complete or verified address information. This led to low geocoding match rates of provider supplied information, especially in rural areas, throughout the data normalization workflows. For some of these areas, additional broadband coverage processes were used to derive coverage estimates described in the next section.

Other Issues

Another issue of incomplete broadband coverage was due to the acquisition of Verizon by Frontier. When Frontier submitted digital subscriber line access multiplexer (DSLAM) locations for the April 1, 2011 deadline it did not include the entire Verizon infrastructure. Frontier has since re-submitted its DSLAM locations for the October 1, 2011 deadline, which now should include those missing Verizon DSLAMs and the coverage map has been extended into certain areas that were not previously included.

Additional Data Processing Techniques

Because of geocoding inconsistencies in certain areas of the State, some provider address information could not be mapped and other data processing techniques had to be implemented to create broadband coverage estimates. In cases where DSLAM points were able to be provided, broadband coverage was mapped by loading the DSLAM points into Environmental System Research Institute's (ESRI's) Network Analyst. For this processing, the West Virginia State SAMB street centerlines were used as the source roads. DSLAM points were loaded into the facilities point feature class of the service area template using a 1000 foot snapping tolerance to help locate points to nearest roadway. Any points still not connecting to the road network were viewed and manually linked to the road network. Processing was run to create segment lines for each point and to create a detailed polygon area around each street segment area for each point. A 15,000 foot distance parameter was used and no impedances were placed on the streets.

Once the process was run, the created segment lines and polygon areas were linked to the original DSLAM point attribute table and exported from the analyst dataset into standalone polygon and line feature classes. These two feature classes were clipped to the provided wire center boundaries. These coverage areas were used to select covered census blocks and street segments for the data submission. Final broadband coverage estimates were reviewed with the provider prior to final submission.

One of the foremost issues of the fourth round of data collection, submitted in October 2011 was converting to 2010 Census Blocks. NTIA's decision to switch to 2010 Census Blocks did not leave much time during that data collection window to notify providers of the change. Many providers submitted 2000 Census Blocks, not 2010 Census Blocks. The conversion led to multiple inaccuracies between Round 3 and Round 4 submissions because of the problems intersecting 2000 Census Blocks with 2010 Census Blocks and errors of commission. Many block boundaries had been redrawn and the crosswalk file provided by the Census was in a very unwieldy format and not much help. For this sixth round submission, most of the providers submitted 2010 Census Block information and with the previous submission base data having been already converted to 2010 Census Block information, the processing techniques for 2010 Census Blocks has become integrated into the long-term maintenance process.

Prior to this sixth submission, another unique processing issue occurred when providers submitted address-level fixed wireless data which would produce error through the new data model. As per discussion with NTIA, the unlicensed fixed wireless points were plotted and then buffered out to 800 feet. A shapefile was created and moved to the wireless feature class within the geodatabase. For this October 2012 submission, computerized radio propagation studies were used to predict coverage for StratusWave service areas. Site location information as well as equipment and antenna system data was provided by StratusWave engineers. This information was utilized in wireless network engineering software to create propagation prediction models using the Anderson 2D propagation model and 10 meter digital terrain elevation data. Median signal levels (50% time & 50% location variability) are predicted and then an additional margin (Prediction Confidence Margin) is incorporated to account for performance objectives and environmental losses. The propagation prediction models were then exported to map data which indicates StratusWave predicted coverage areas to include in the data submission.

FRN Number Discrepancies

Discrepancies between Round 2 and Round 3 data submissions were noticed concerning FCC Registraton Numbers (FRNs). Effected providers were contacted directly to clear up these issues. FRNs that were loaded into the database come from direct contact with providers. FRNs are verified as a continued validation process during each data collection period.

Community Anchor Institutions

The process used to identify the Community Anchor Institutions was based on the information provided by NTIA. This included the categories of schools K-12, libraries, medical/healthcare, Public Safety, higher education and other community support consisting of either government or nongovernmental facilities.

All public schools in West Virginia were used for the K-12 category. Libraries consisted of all public libraries throughout West Virginia. Medical/healthcare included hospitals, nursing homes and primary care centers. The primary care centers are made up of main locations of the primary care centers along with satellite clinics and school-based health centers. Public Safety consisted of West Virginia police departments along with the correctional facilities and juvenile centers, fire departments and 9-1-1 centers. Higher education consisted of public and private universities located across West Virginia. The community support consisted of courthouses, regional development centers and workforce locations.

There was a cutoff created to focus on identifying main facilities as Community Anchor Institutions (CAIs). However, if there is a need to go and include more facilities, the State is open to adding those facilities for future updates.

The following agencies were contacted for information: West Virginia (WV) Department of Education, WV Library Commission, Hospitals located throughout the state, Nursing Homes located throughout the State, WV Division of Primary Care, WV Primary Care Association, WV 9-1-1 Center Directors, WV Emergency Management Directors, WV Regional Jail Authority, WV Higher Education Policy Commission, WV Courthouse Facility Improvement Authority, WV Workforce, WV Regional Development Centers and county addressing coordinators.

Data was collected and verified by the West Virginia Division of Homeland Security. Surveys were sent out to various facilities and included a section where their primary city-style address could be filled in. For those facilities that returned the survey, the statewide addressing and mapping data that the counties provided was used as a way to verify the address. Once the location was verified the latitude and longitude coordinates were added. In cases where surveys were not returned, the statewide addressing and mapping data was used to determine if the information could be matched. If this wasn't possible, then the Internet was used to find a Webpage with additional information. If this method was not successful, attempts were made to contact the facility directly. At this point in time, there is approximately a 90-95 percent match rate for the location of the CAIs.

Since the October 2011 data submission, additional surveys were sent by mail to healthcare facilities and fire, police and ambulance locations throughout the state. This amounted to approximately 1,500 surveys that were mailed out. Based on the information that was received back from the surveys, the primary city-style address, broadband technology, speeds and other attributes associated with the community anchor institution feature class were verified and updated where necessary. An on-line survey was released since the last data submission with the objective of receiving further updates and also getting the survey, via email address, to those locations where the survey sent by mail was returned by the United State Postal Service due to invalid address information or a facility having changed location. The survey was successful in collecting additional missing attribute information for some of those CAI locations but there are still locations where attributes are missing that did not respond to the survey. Additional methodologies to collect this final missing information will be reviewed and another approach to communicate with these specific CAIs will be undertaken prior to the next data submission. For the April 2012 submission, there were additional community anchor institution locations that are included in the map due to the NTIA allowing some 'unknown' classifications for attributes within the community anchor institution feature class.

Validation and Verification

Throughout the data gathering and data preparation processes for each data submission, the data verification has been continuous and has evolved based on the evolution of the data model. The focus has been on getting complete data from all providers and assuring that all data can be processed into the required data model for submission. Where providers did not submit data in acceptable formats for data normalization into NOFA formats or where they did not submit complete data or any data, there has been continued focus on working with the providers by WVGES to continue to improve the source information being provided. Data verification and validation is an on-going, long term process that will continue to evolve throughout the broadband data development program. With the fourth data submission in October 2011 being a much more complete broadband coverage across the State because of additional data supplied by providers, additional data verification methods, beyond what has been implemented to date, continue to be evaluated to refine the map, where applicable. This sixth submission incorporated further refinement to validate the provider supplied information against the Census 2010 geographies. Limited research was performed for specific areas of the map where any user feedback points to a gap in coverage or an over-estimate in coverage. The research was limited due to a small sampling of user feedback at this time. Plans to advertise surveys and the interactive broadband map continue to be executed and are described further in other sections of this document.

Validation Processes

Data validation begins within the data collection process to determine if the data submission by providers is formatted in a way that can be normalized into the required NOFA formats. Where data is deemed incomplete or in non-conforming standards, WVGES staff reached out to providers as necessary to improve the data submissions. After each round of data preparation the format for the updates being collected has improved.

Quality assurance and quality control has been a big focus of the data validation of the submittals assuring that the required data fields are populated properly and that data fields are populated with values that follow the data model rules. As the data model has evolved over each round of data submission these QA/QC checks have been modified to include the changes in fields, values, domains, etc. that are being required for submission.

Validation methods employed include the following:

- Assuring all applicable providers' datasets are propagated forward to each round of data collection
- Verifying that all required fields are populated with valid values and default values are used when appropriate. This includes:
    - Speeds valid for the technologies reported
    - Latitude/longitude coordinates fall within an acceptable range, given the state boundaries
    - The relationships between maximum and typical, and downstream and upstream speeds are valid
    - Service reported at the block level is done using blocks of the appropriate size (less than two square miles)
    - Speeds and technologies reported per provider are consistent between blocks and segments

- Administrative information (provider name, doing business as [DBA] Name, FRN) is consistently reported per provider in each populated feature class.

Outreach to Providers

To further assure the providers' broadband footprints would be accurately represented in data submissions, "check maps" depicting each respective provider's served small census blocks and segments located in large blocks were distributed back to providers. Providers were requested to either approve their check maps as-is, or submit additional changes if their coverage was not accurately represented. Any modifications received as a result of this effort were incorporated into the broadband coverage maps. WVGES plans to incorporate future data reviews with providers using web collaboration tools.

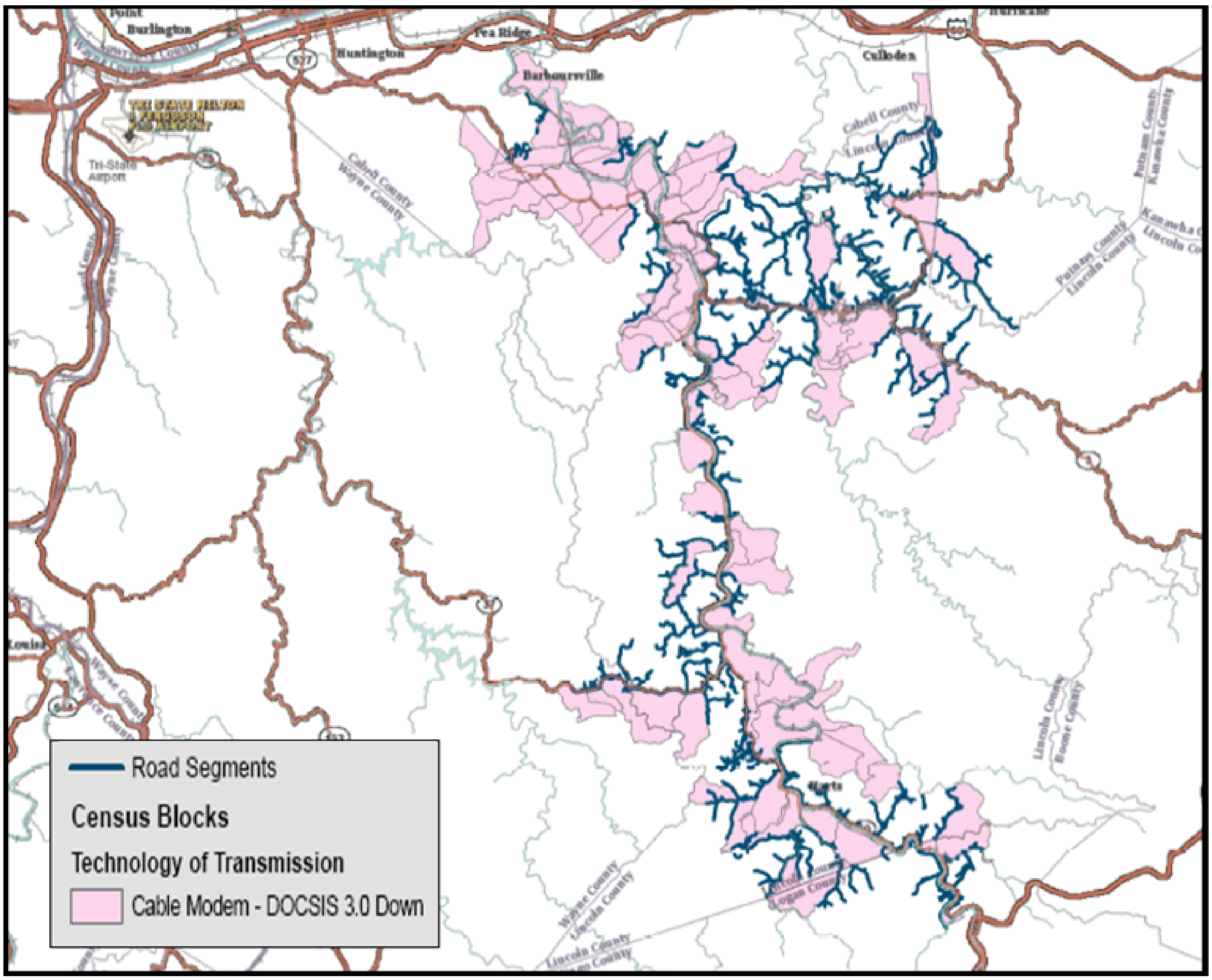


Figure 1—Example of a portion of a provider check map

The validation process for the October 2012 submission includes the use of the Python scripts for validation provided by NTIA.

Third Party Datasets

As data collections and data normalization processes progressed, additional validation was conducted using commercially available datasets. The following commercially available datasets were used as a reference for the specific technologies that their data represented.

- American Roamer datasets

- TeleAtlas Exchange boundaries
- Media Prints Cable boundaries

These datasets were used primarily as a validation source for provider service coverage.

State Broadband Interactive Map

The State of West Virginia released its interactive broadband mapping Website to the public in May 2011. The Website address is www.wvbroadbandmap.org. The Website provides consumers the opportunity to review broadband availability across the State.

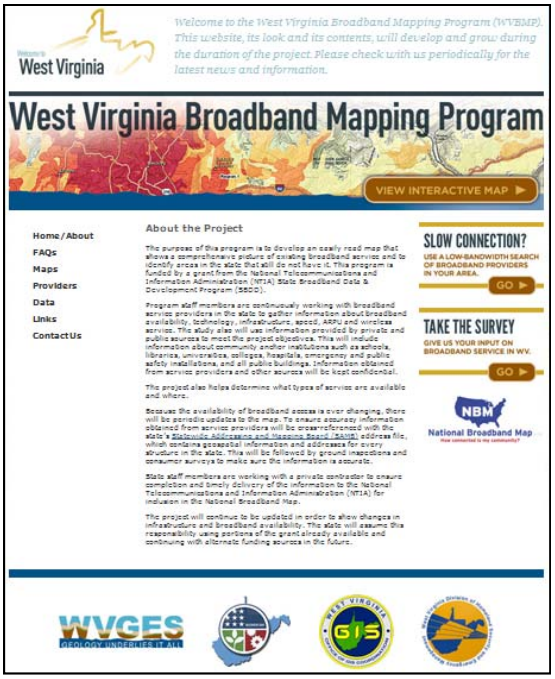


Figure 2—WVBMP main landing page

The main landing page for the West Virginia Broadband Mapping Program (WVBMP) provides background information on the program, contact information and a frequently asked questions section. The landing page has the main link to the broadband coverage map and a link to an address lookup tool for users with slow internet connections. This will allow them to view what coverage is available around their address or zip code without needing to view the entire map, which might not be feasible for users who might still be on dial-up connection speeds. By having this slow internet connection coverage tool, it allows feedback from those consumers even if they do not have the capabilities to bring up the interactive map application.

The Web application has the functionality for consumers and citizens using the State broadband map Web application to submit comments and feedback. The information gathered from that feedback is being reviewed as more potential source information for validating and determining confidence levels of the broadband coverage across the regions of the State. By comparing comments supplied by consumers about broadband availability to the broadband coverage, trends could be recognized where potential inconsistencies in the existing broadband map could exist. This could delineate the need for further focused validation or verification in specific areas that could refine the broadband coverage information for future data submissions.

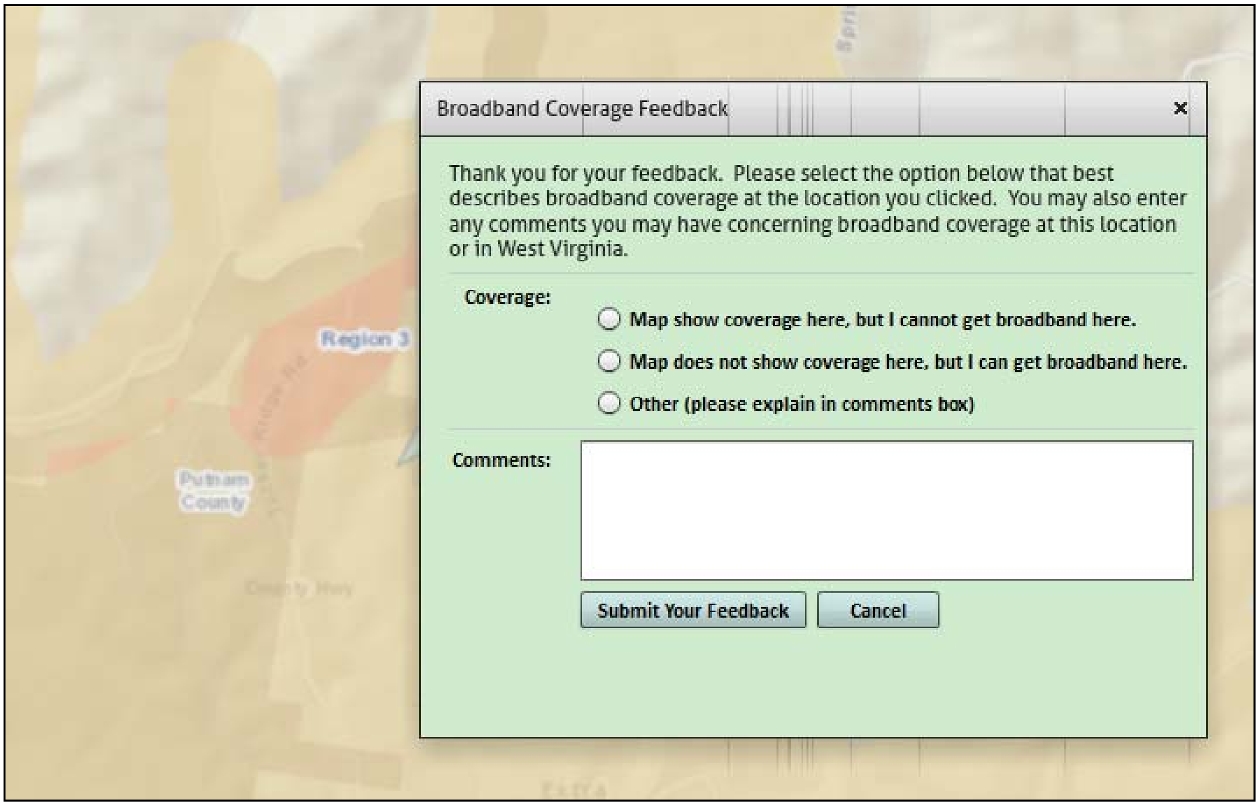


Figure 3—Example of feedback tool interface

For users that can browse the interactive map, they can click on any location on the map and choose to provide specific feedback for that location. This will store the coordinate information of the location that they selected allowing them to choose from a couple of coverage categories for their comment or choose other. Within the feedback tool, they can type in more specific details about their broadband coverage.

After the initial release of the broadband map, there was some initial feedback and comments mainly pertaining to a few areas that were not showing coverage. The feedback indicated that there should be coverage or scenarios where we were showing coverage. One resident made a comment that there was not cable service on a particular road or area. Some of the missing coverage was due to the acquisition of Verizon by Frontier as discussed above.

The State continues to implement plans to incorporate more advertising to the interactive broadband map and feedback tools. Continuing to work more closely with the regional planning councils to review coverage in their communities, a plan to include an advertisement of the interactive broadband map into local phone bills is being developed.

A speed test has been developed within the WVBMP interactive Website. The design of the Website includes links to the speed test developed using the Ookla broadband speed test tools. The speed test is embedded within a broadband survey wizard that allows consumers to provide specific information that will help the State analyze information about use and demand for broadband within the State. To get more users to take the speed test to obtain more results for analysis over the next six months, the speed test will be advertised along with the interactive Website. Speed test results and statistics will be leveraged to compare against the existing broadband coverage and help validate speed information. As stated previously, this could assist in determining if there are any trends or patterns in the information that could be an additional tool for prioritizing areas where more refined verification and validation might need to occur. To date there is still a lack of substantial data collected via the speed-test or surveys to be able to detect patterns or trends and continued planning within the regional planning councils could provide more exposure to the web sites and speed test at the grass roots level. Links to the speed test and the interactive map have also been added to additional web sites, including a new West Virginia Broadband Deployment Council web site (www.broadband.wv.gov) that was launched at the end of 2011.

Future Steps for Validation

Future plans for data validation continue to include establishing confidence levels to assign to broadband coverage based on comparisons with other source information collected, such as feedback from crowd sourcing results from the State broadband map and the national broadband map. Confidence rankings will be used to prioritize any areas where additional verification techniques might be used (consumer and business surveys).

As part of continued broadband planning activities and future validation of data, a third party dataset from Infogroup has been purchased. For broadband map validation, the Infogroup datasets provide consumer broadband use information including coordinate based location information along with provider name and technology that is being used by that particular consumer. The Infogroup data will allow the consumer information to be plotted on the map and compared against existing coverage maps to determine if there are any trends within the Infogroup data that help to determine where additional validation needs to occur. For example, there may be clusters of consumer points for a particular provider that exists in an area of the State where there is no coverage for that provider. The goal would be to identify the major patterns or trends that might need to be re-visited with a provider, if data appears to be missing.

During the summer of 2012, as part of the data verification tasks, a comparison was performed between the State broadband coverage area from the State's last data submission to the National Telecommunication and Information Administration (NTIA) in April 2012 with the third party information from Infogroup purchased by the State. An Excel spreadsheet was provided by Infogroup and contains customer location information for cable, digital subscriber line (DSL), fiber optic (fiber), and wireless subscribers and can be converted into a spatial geographic information system (GIS) dataset. The findings were used to indicate whether or not there are any areas in the submitted broadband coverage data that may need to be updated or verified.

Also present in the spreadsheet table is customer location information for dialup subscribers. This dataset can be converted into a spatial GIS layer and used to identify areas that may not have broadband services, but can still access information through a dialup service.

When comparing the current broadband coverage area and the new XY point layer from the Infogroup records, only a small percentage of points fell outside of the coverage area. Table one highlights the key results that were found.

Type of Service	Total Number of Points	Number of Points Outside of Coverage Area	Number of points Within 50 ft of Coverage Area	Number of points Over 500 ft of Coverage Area
Cable	108503	303	60	92
DSL	63462	268	69	64
Fiber	428	4	1	1
Wireless	4962	54	2	25
Total	17,7355	629	132	182

Table 1—Points Outside of Coverage Area by Technology

In conclusion, the analysis of the dataset indicates that no immediate changes need to be made to the existing broadband coverage area because of the low percentage of points that fell outside of the current coverage areas. The few clusters of points that fell outside of the current coverage area should be reviewed and potentially discussed with providers in those areas to determine if any existing coverage needs to be expanded in those areas. This will be incorporated within data submission request period for the next data submission.

Another dataset that is being considered for purchase for broadband planning activities and broadband demand analysis is Telogical's broadband statistical datasets that provide pricing information. Included in the datasets is information on broadband maximum advertised speed by providers which could help validate some of the speed data within the broadband mapping datasets.

Throughout the broadband data development program, as addressing information from the State Addressing and Mapping Board's addressing datasets are continually updated, address point information from providers will continually be re-verified prior to each submission to NTIA to improve geocoding results and refine the broadband coverage areas.

Specific Verification Tasks- Fourth Quarter 2012

The West Virginia Broadband Mapping Program has outlined specific objectives for data verification through the end of 2012. These objectives are focused on five main components:

1. Begin development of a plan for integration of Public Data Sources for verification activities
2. Begin development of a plan to compile free wireless broadband services offered and operated by a government, business, or community entity
3. Continue verification activities by revisiting contacts for each anchor institution and developing verification strategy for data with which we are less confident
4. Continue to refine a confidence scale that indicates the level of confidence for each record
5. Obtain speeds at the block/segment level

To continue to achieve these objectives as outlined to the National Telecommunications and Information Administration (NTIA) in the West Virginia Broadband Mapping Program activities for 2012, the West Virginia Office of GIS Coordination (WVOGC) will finalize the planning and implementation of the following tasks in 2012.

- Receive the current FCC Form 477 data from the WVOGC and provide comparisons to the round 6 submission data to determine if there are additional build out by providers that need to be requested for the round 7 submission.
- Use service availability query tools published on providers' websites to compare to what has been submitted
- Begin compilation of free wireless broadband services offered and operated by a government, business, or community entity. Research information on web sites and applications that list free Wi-Fi hotspots. Further field verification of these hotspots through a pilot test is described in a separate section of this document.
- Work with WVOGC and the West Virginia of Department of Homeland Security and Emergency Management (WVDHSEM) to launch an outreach campaign to have community anchor institutions take the speed test and take a specific survey developed for community anchors beyond what has already been surveyed and collected so far by WVDHSEM.
- Review submitted wireline attributes (Central offices, remote terminals, etc.) and compare locations as submitted by providers to any visible location information on orthophotos or against of any facilities coded in the State Addressing and Mapping Board (SAMB) data. Additional field verification would be completed in pilot area testing described in this document.
- Launch another outreach campaign to resellers to determine if they want to be included on the state web map in some capacity and determine the best approach to adding those resellers.
- Refine a confidence scale to provide a level of confidence for records in the database. A matrix would be developed to rank quality metrics for each provider to develop a weighted score that could then be applied by to the database. The quality metrics and matrix would be developed with WVOGC.
    - Rank 1-5 on:

  - Consistency/cohesiveness of their coverage – if their coverage pattern is consistent with what is expected given their technology, or if isolated blocks/address points exist
  - Quality of data supplied – customer address points instead of qualified address points, solid wireless coverage patterns instead of propagation-style, street segments that can't be mapped, generalized data, etc.
  - Completeness of data – missing field values, etc.
  - Cooperation of the providers – e.g. whether they are responsive to the data requests each round, if they submit data on time, etc.
- Obtain speeds at the block/segment level. Research the currently available options for obtaining more detailed speed information, including third-party source data, and providing recommendations to WVOGC.
- Continue to mine information from the speed tests and develop new campaigns to encourage the use of the speed test.

Field verification pilot test:

To achieve the long-term success of specific verification tasks outlined above as the project continues into 2013 and 2014, an initial field verification pilot test will be conducted during the fourth quarter of 2012. Field verification will be performed in specific areas of the state as determined by WVOGC. This pilot test will involve the following activities:

- Using mobile applications on smart phones or laptops to test wireless broadband availability and speeds. Verify location of Central Offices, Remote Terminals, etc.
- Collect and verify location of Wi-Fi hotspots and free public broadband to help compile of map of these locations

Once the field verification portion has been completed, analysis of the results will be performed and an overall report developed outlining the activities and recommendations on expanding these verification activities beyond these pilot areas in 2013. A determination will be made as to whether or not the results for the specific activities returned data and information that are beneficial in the development of a more accurate broadband coverage map and valuable for the continued broadband planning activities. If these results indicate that these activities should be expanded beyond the pilot test area, an implementation plan will be developed for the specific field verification activities that should be expanded to a large geographic area.

Use of Broadband Mapping Datasets for State Broadband Grant Program

The West Virginia Broadband Deployment Council launched a state grant program in the summer of 2012 to help bring affordable broadband to unserved areas of West Virginia. One of the most important ways it does this is by providing grants to help fund broadband deployment projects. Broadband deployment projects can be of two types – infrastructure and demand stimulation. Infrastructure projects are those that bring affordable broadband service to people and businesses that do not currently have it and may never have it without some sort of public funding. Demand stimulation projects are those that help people and businesses understand and value the benefits broadband service would bring to them, and cause them to want to use that service. To help delineate specific potential project areas, as described in the West Virginia Code 31-15C-1, the broadband mapping coverage that has been developed as part of the NTIA's broadband mapping program was used to generate maps that depicted Type 1, 2 and 3 areas outlined in that statute.

A Type 1 un-served area is an area in which broadband may be deployed by service providers in an economically feasible manner. A Type 2 un-served area is an area in which broadband may be deployed by broadband service providers and other entities in an economically feasible manner, provided some form of public money is made available. A Type 3 un-served area is an area in which, at present, cable or wireline broadband cannot be deployed in an economically feasible manner and an intermodal approach employing other technologies, such as satellite and wireless, is required to provide that area with high-speed internet access.

Broadband service providers each have unique processes for determining when it is economically feasible to deploy broadband service to a given area. The process varies from provider to provider and depends greatly on the technology being deployed. Because no consistent formula exists and the definition of a Type 1, 2 or 3 un-served area is not strictly defined, an objective means to classify un-served areas based upon known metrics for populations more likely to have broadband service today. Metrics regarding current broadband deployment were obtained from Federal Communications Commission (FCC) reports. Factors including structure points, population density, median income, age, distance from existing networks and terrain were considered in classifying un-served areas as Type 1, 2 or 3.

The known areas currently served by broadband service providers were documented from the state broadband mapping program through the geographic information systems (GIS) coordinator's office and the West Virginia Geological and Economic Survey (WVGES). Areas currently served by broadband service were excluded from the determination. Un-served areas were then subdivided based on proximity to structure points and road segments. Each area was then correlated with 2000 and 2010 census data for population density, income and population age to determine likelihood for deploying broadband service.

Criteria used to determine the likelihood of a given area receiving broadband service was based on metrics provided by the Broadband Adoption and Use in America, OBI Working Paper Series No. 1, by John B. Horrigan for areas where broadband is currently deployed. Specific categories considered in the determination included population density, population age, income and proximity to existing networks. Each category was weighted on a scale of one to five, with a score of five indicating a high likelihood to receive broadband service and a score of one indicating a low likelihood to receive broadband service. Based on the average of the four considered categories, each subdivided area was classified as Type 1, 2 or 3.

Based on the determination, a map was developed which depicts the Type 1, 2 and 3 classifications across the state. A 1,000 foot boundary was included within the documented area around each structure point to reflect the area that a wireline provider may be willing to lay cable from a roadway in order to provide broadband service. Served areas are reflected with a yellow color. Each un-served area is color classified according to the Type 1, 2 and 3 determinations.

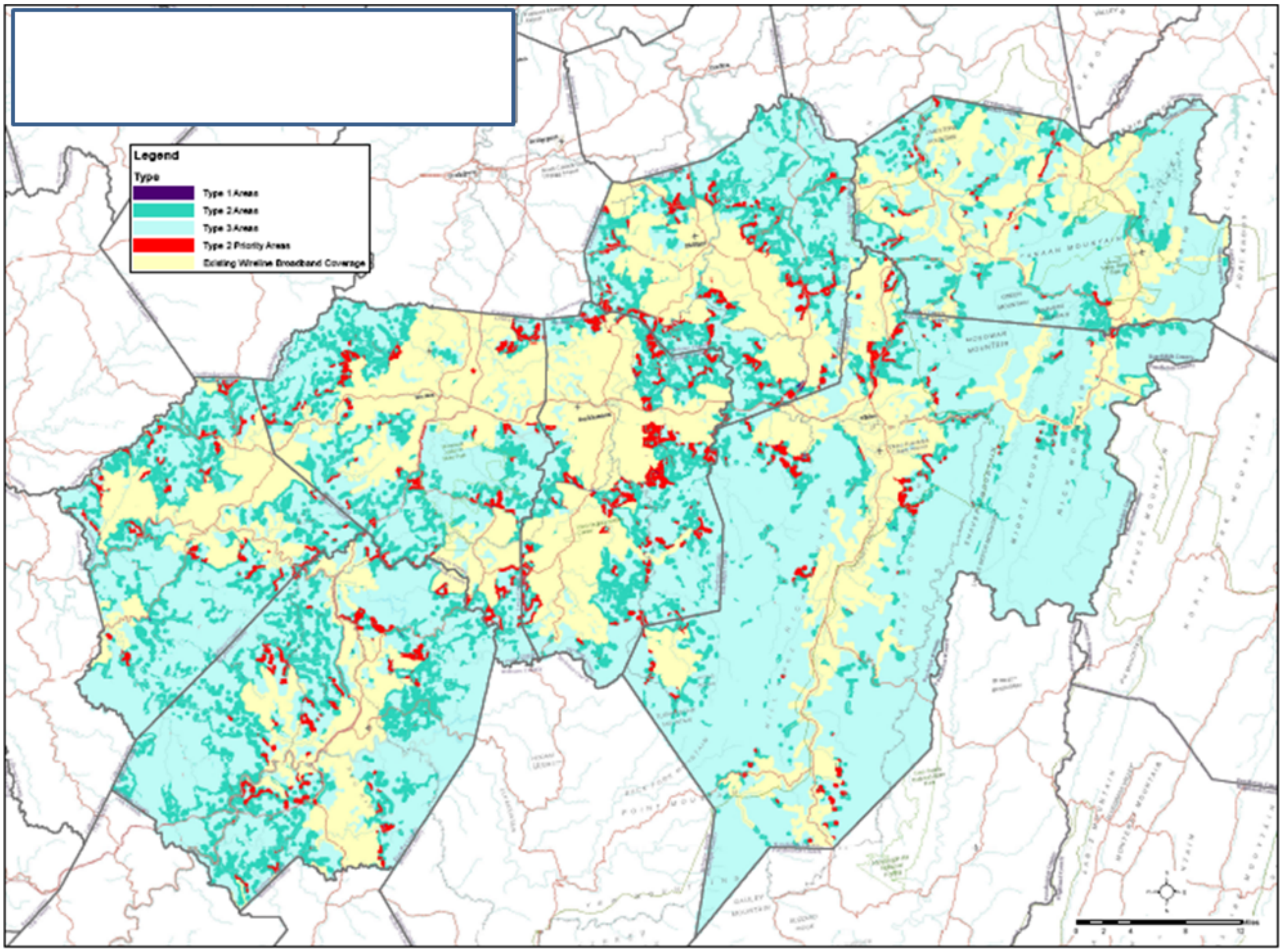


Figure 4 - Sample of a Type 1, 2 and 3 Map

Providers

Non-Responsive Providers

Names of providers who were non responsive will be passed along to the WV Geographic Information Systems (GIS) Coordinator's Office to be contacted again.

Atlantic Broadband LLC
DBA: Atlantic Broadband, LLC
FRN: 0009596883
This provider was contacted eight times. Data was not provided by the October submittal date. Further attempts at data gathering will be made in the next round of data collection.

**Skyweb, Inc
DBA: SKYWEB Inc.
FRN: 0018516799

**Tower locations were provided along with additional information for each tower site. Two computerized propagation studies were performed to approximate coverage for a local provider supplying broadband data. The two studies were predicted in the 900 MHz and 2.4 GHz bands that are utilized at these locations. The data was received from the provider that defined the tower sites currently utilized to provide coverage. Parameters provided include site locations, ground elevation, transmit power, antenna height above ground, and antenna gain. All of these components were compiled into EDX Signal software program which calculates the associated link budget and in which the program takes into account terrain and land use land clutter (LULC). Propagation studies show potential coverage throughout the area. Additional assumptions made include a predicted reliability of 90 percent for any signal received by a device and no additional signal loss was taken into account for signals received inside buildings which may further impact the coverage predictions. Coverage areas based on the propagation studies do not seem to represent realistic coverage patterns and will need to be reviewed again with SkyWeb in the future.

Satellite Providers

Data requests sent to Satellite providers were met with the response of "We provide to the entire state." Attempts made at gathering more detailed data sets were unsuccessful for this round of data collection. Further attempts will be made for the next round of data collection.

Hughes Communications, Inc.
DBA: HNS Licensuse Sub, LLC
FRN: 0018483073
Detailed data was not provided by the October submittal date. Further attempts at data gathering will be made in the next round of data collection.

StarBand Communications Inc.
DBA: StarBand Communications Inc.
FRN: 0005087457
Detailed data was not provided by the AprilOctober submittal date. Further attempts at data gathering will be made in the next round of data collection.

WildBlue Communications, Inc.
DBA: WildBlue Communications, Inc.
FRN: 0007843766
Detailed data was not provided by the October submittal date. Further attempts at data gathering will be made in the next round of data collection.

Provider that Submitted Data

Provider Name	DBA Name	FRN
Armstrong Holdings, Inc.	Armstrong Telephone Company - Northern Division	0004311528
Armstrong Holdings, Inc.	Armstrong Telephone Company-WV	0004379731
Armstrong Holdings, Inc.	Armstrong Utilities, Inc.	0003765617
AT&T Inc	New Cingular Wireless Services, Inc.	0003766532
Broadview Networks Holdings, Inc.	Broadview Networks Holdings, Inc.	0010296853
Blue Devil	Blue Devil	0003749116
Cequel Communications, LLC	Suddenlink Communications	0015784663

Provider Name	DBA Name	FRN
Citizens Communications Company	Frontier Communications Corporation	0003576352
City of Philippi	City of Phillipi	0001984244
Comcast Corporation	Comcast Cable Communications Inc.	0003768165
Community Antenna Service, Inc.	Community Antenna Service Inc.	0004966131
Deutsche Telekom AG	T-Mobile USA, Inc.	0006945950
Gateway Telecom, LLC	Gateway Telecom LLC	0018536623
Hardy Telecommunications, Inc.	Hardy Telecommunications Inc	0002008043
Hardy Telecommunications, Inc.	Hardy Telecommunications,Inc CLEC	0013169313
Hickory Tech Corporation	Enventis Telecom Inc.	0008394322
Inter Mountain Cable, Inc.	Inter-Mountain Cable Inc	0001789080
Inter Mountain Cable, Inc.	Mikrotec CATV, LLC	0014471288
JB-Nets	JB-Nets	0016474868
Leap Wireless International, Inc.	Cricket Communications, Inc.	0002963528
Level 3 Communications, LLC	Level 3 Communications, LLC	0003723822
Level 3 Communications, LLC	Broadwing Communications, LLC	0008599706
LightEdge Solutions, Inc	LightEdge Solutions, Inc.	0015546443
Metropolitan Telecommunications Holding Company	Metropolitan Telecommunications Holding Company	0009806019
Micrologic, Inc.	Micrologic, Inc.	0018675256
New Edge Holding Company	New Edge Network, Inc.	0003720471
NTELOS, Inc.	NTELOS Communications Inc.	0004342762
NTELOS, Inc.	West Virginia PCS Alliance, L.C.	0002049328
Otelco Inc.	War Acquisition Corp	0018657858
Qwest Communications International, Inc.	Qwest Communications Company, LLC	0003605953
Shenandoah Telecommunications Company	Shentel Cable Company	0018024075
Sprint Nextel Corporation	Sprint Nextel Corporation	0003774593
Spruce Knob Seneca Rocks Telephone, Inc.	Spruce Knob Seneca Rocks Telephone, Inc.	0004337002
TelAtlantic, Inc.	West Side Telecommunications	0002009405
TelAtlantic, Inc.	Communications Plus, Inc.	0009281262
Time Warner Cable LLC	Time Warner Cable LLC	0013430244
TW Telecom inc.	tw telecom holdings inc.	0014942668
Verizon Communications Inc.	Cellco Partnership	0018506568
Verizon Communications Inc.	Verizon Business Global LLC	0010856284
Verizon Communications Inc.	Verizon West Virginia Inc.	0002011278
Visual Link Internet LLC	Visual Link Internet LLC	0017645813

Table 2—Providers That Have Submitted Data for SBDD Program

Appendix A WVGES Provider Data Request Letter

The WVGES Provider Data Request Letter can be found on the following page

The balance of this page is intentionally left blank.

WEST VIRGINIA
GEOLOGICAL AND ECONOMIC SURVEY

1 Mont Chateau Road
Morgantown, WV 26508-8079

Earl Ray Tomblin, *Governor*
Keith Burdette, *Secretary, Department of Commerce*
Michael Ed. Hohn, *Director and State Geologist*

Phone: (304) 594-2331
Fax: (304) 594-2575
E-mail: info@geosrv.wvnet.edu
Web Site: http://www.wvgs.wvnet.edu

January 6, 2012
(Address of Recipient)

Re: Data Request in Compliance with the State Broadband Data and Development Grant Program and the Broadband Data Improvement Act

Response Requested by March 1st, 2012

Dear < >:

The West Virginia Geological and Economic Survey (WVGES) must collect certain data regarding the availability of broadband services, technology used to provide them, and the location of certain broadband infrastructure. The WVGES is required to provide the collected data to the NTIA every six months beginning March 2010 until October 2014. Entities that provide broadband service, as defined below, on either a commercial or noncommercial basis within West Virginia are subject to this request.

WVGES was designated as the single West Virginia entity eligible to receive a grant under the Broadband Data Improvement Act of 2008 (BDIA), 47 U.S.C. §§ 1301-04. In 2009, the WVGES successfully applied to the National Telecommunications and Information Administration (NTIA) for such a grant, pursuant to the NTIA's Notice of Funds Availability (NOFA).

The NTIA's State Broadband Data and Development Grant Program Notice of Funds Availability, Docket No. 0660ZA (July 8, 2009) (NOFA), defines broadband as follows:

> …two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and at least 200 kbps upstream to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end users…

Please note that the broadband inventory maps derived from these data may result in government-subsidized broadband deployment in unserved and underserved areas. Providers that do not respond may face subsidized competition in areas they already serve.

Attached to this request are the Technical Appendix to the NOFA and a technical appendix written by the WVGES to clarify the data that needs to be collected. **Please note this appendix is new as of January 1, 2012.** These documents outline the broadband availability information WVGES is required to collect. Every broadband service provider within the state of West Virginia is expected to provide the information specified in the attached documents to WVGES **<u>no later than March 1st, 2012</u>**, in the format WVGES has specified.

Six Month Update:
Pursuant to the BDIA and the NOFA, WVGES must collect updates on broadband data on a six month rolling basis. **If you had submitted adequate information during the 2nd collection period of 2011 and there are no changes to your infrastructure, the WVGES requests a letter stating such**. If infrastructures changes have been made in the interim period, submissions of the changes are required.

Contact Information:
Please submit the requested data **<u>no later than March 1, 2012</u>** by CD or DVD to Michael "Ty" Clifford, West Virginia Geological and Economic Survey, 1 Mont Chateau Rd. Morgantown WV 26508-8079.

If you have questions about this request, contact Michael "Ty" Clifford by email at mclifford@geosrv.wvnet.edu, or by phone at (304) 594-2331.

Nondisclosure Agreement:
Data submitted to WVGES in response to this request will be protected under the confidentiality requirements set forth in Section 106 (h)(2) of the BDIA. This section states that, "[n]ot withstanding any provision of Federal or State law to the contrary, an eligible entity shall treat any matter that is a trade secret, commercial or financial information, or privileged or confidential, as a record not subject to public disclosure except as otherwise mutually agreed to by the broadband service provider and the entity." Further, the NOFA states that "[a]s a measure to protect the confidential or proprietary nature of the information received from broadband service providers and other organizations during the data collection phase, awardees may execute nondisclosure agreements (consistent with applicable law) that require awardees to treat any matter that is a trade secret, commercial or financial information, or privileged or confidential, as a record not subject to public disclosure except where mutually agreed upon by the information provider and the awardee, provided, however, that any such nondisclosure restriction a) will not restrict the providing of all data collected under this Program to NTIA, nor b) restrict NTIA's use of such data as contemplated under this Notice (including sharing such data with the FCC or other federal agencies)". NTIA expects awardees to enter into such agreements upon the request of the service provider. WVGES believes that these provisions will protect the confidentiality of information that broadband providers submit pursuant to this request and intends to enter into a nondisclosure agreement with any provider that wishes to do so.

Michael Ed Hohn
Director and State Geologist
West Virginia Geological and Economic Survey

Additional information may be obtained from the NOFA, available at 74 Fed. Reg. 32,545 or online at http://broadbandusa.sc.egov.usda.gov.

Enclosures:

- Letter from Gov. Joe Manchin III to Mr. Larry Strickling, Administrator NTIA (August 12, 2009)
- State Broadband Data and Development Grant Program, Notice of Funds Availability; clarification (August 7, 2009). Available at http://broadbandusa.sc.egov.usda.gov/ broadband_mapping.htm
- WVGES Guide to Broadband Submission January 1, 2012

Appendix B WVGES Guide to Broadband Submission

The WVGES Guide to Broadband Submission can be found on the following page.

The balance of this page is intentionally left blank.

WEST VIRGINIA
GEOLOGICAL AND ECONOMIC SURVEY

1 Mont Chateau Road
Morgantown, WV 26508-8079

Earl Ray Tomblin, *Governor*
Keith Burdette, *Secretary, Department of Commerce*
Michael Ed. Hohn, *Director and State Geologist*

Phone: (304) 594-2331
Fax: (304) 594-2575
E-mail: info@geosrv.wvnet.edu
Web Site: http://www.wvgs.wvnet.edu

January 6, 2012

West Virginia Geological and Economic Survey Guide to Broadband Submission

Purpose:
Several changes in submission guidelines have been made by NTIA since the writing of the original Technical Appendix. This document clarifies what is preferred and required for submission and the original NTIA Technical Appendix no longer adequately describes what is required.

Broadband definition:
Broadband Service is the provision, on either a commercial or noncommercial basis, of data transmission technology that provides two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream **and greater than 200 kbps upstream** to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end-users within the project area.

2010 census requirements:
Beginning in June 2011, all census block and road information **must be derived from 2010 Census Data**. All block and road data submitted **must have a unique identifier present**, such as census block # or **TLID.**
The WVGES has created two shapefiles which contain all census blocks in West Virginia less than 2 square miles and all roads contained in census blocks greater than 2 square miles. All census and road data must correspond to these master files.

The shape files are located at:
https://dssfm.kimballdata.com

```
Username: censusdata
Password: censusdata#1
```

Data preferences:
The WVGES prefers data to be submitted in the following order of preference:

- ESRI shapefile format with all required fields submitted.
- Service area boundary with defined speeds and fields that can be converted to blocks and roads.
- Flat Excel or comma-delimited files that contain all data field and unique identifiers.

Data Types and required fields:

Wireless Services not Provided to a Specific Address – Shapefile

Facilities-based providers of wireless broadband service that is not address specific (e.g., nomadic, terrestrial mobile wireless, or satellite), may provide WVGES with GIS-compatible shapefiles depicting areas in which broadband service is available to end users.

For this purpose, an “end user” of broadband service is a residential or business party, institution, or state or local government entity that may use broadband service for its own purposes and that does not resell such service to other entities or incorporate such service into retail Internet-access service. Internet Service Providers (ISPs) are not “end users” for this purpose. An entity is a “facilities-based” provider of broadband service connections to end user locations if any of the following conditions are met: (1) it owns the portion of the physical facility that terminates at the end user location; (2) it obtains unbundled network elements (UNEs), special access lines, or other leased facilities that terminate at the end user location and provisions/equips them as broadband; or (3) it provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.

For this purpose, “broadband service” is “available” at a location if the provider does, or could, within a typical service interval (7 to 10 business days) without an extraordinary commitment of resources, provision two-way data transmission with advertised speeds of at least 768 kilobits per second (kbps) downstream and greater than 200 kbps upstream to end-users at that location. The data shall be submitted to WVGES as an ESRI Shapefile such that the associated data contains the following fields:

- Instructions for providers needing to obtain a FRN can be accessed at https://fjallfoss.fcc.gov/coresWeb/publicHome.do.
- All map areas must be closed, non-overlapping polygons with a single, unique identifier.
- Any variation in any of the required fields necessitates the creation of a separate closed, non-overlapping polygon.
- In the area covered by each polygon, subscribers must have broadband service with the speed characteristics shown in the data record 95% of the time to within 50 feet of the polygon’s boundary.
- The technology of transmission should be entered as an integer based on the coding scheme shown below.
- The speed tiers should be entered as integers according to the reference in below.
- The data must be expressed using the WGS 1984 geographic coordinate system.
- Maps must be accompanied by metadata or a plain text “readme” file that contains a comprehensive explanation of the methodology employed to generate the map layer including any necessary assumptions and an assessment of the accuracy of the finished product.
- Since ESRI Shapefiles typically consist of 5 to 7 individual files including the associated metadata and geodatabase, data for the entire state or territory should be submitted as a single, zipped file containing all the component files. The file should be named “area_availability_XX.zip” where XX is the two-letter postal abbreviation for the state or territory.

Record Format for Availability Area Data for Each Provider – Use Only in Connection with Wireless Services not Provided to a Specific Address

Field	Description	Type	Example
Provider Name	Provider Name	Text	ABC Co.
DBA Name	"Doing-business-as" name	Text	Superfone, Inc.
FRN	Provider FCC Registration Number	Integer	8402202
Technology of Transmission	Category of technology for the provision of service (see details following Part 1(a) for codes)	Integer	41
Spectrum Used	If technology of transmission is wireless, is Cellular spectrum (824-849 MHz; 862-869) used to provide service (Y/N)?	Text	Y
Spectrum Used	If technology of transmission is wireless, is 700 MHz spectrum (698-758 MHz; 775-788 MHz; 805-806 MHz) used to provide service (Y/N)?	Text	Y
Spectrum Used	If technology of transmission is wireless, is Broadband Personal Communications Services spectrum (1850-1915 MHz; 19301995) used to provide service (Y/N)?	Text	Y
Spectrum Used	If technology of transmission is wireless, is Advanced Wireless Services spectrum (1710-1755 MHz; 2100-2155) used to provide service (Y/N)?	Text	N
Spectrum Used	If technology of transmission is wireless, is Broadband Radio Service/Educational Broadband Service spectrum (2496-2690 MHz) used to provide service (Y/N)?	Text	N
Spectrum Used	If technology of transmission is wireless, is Unlicensed (including broadcast television "white spaces") spectrum used to provide service (Y/N)?	Text	N
Spectrum Used	If technology of transmission is wireless, but the spectrum used to provide service is not listed above, please identify as one of the following: Specialized Mobile Radio Service (SMR) (817-824 MHz; Spectrum Used 862-869 MHz; 896-901 MHz; 935-940 MHz), Wireless Text SMR Communications Service (WCS) spectrum (2305-2320 MHz; 2345-2360 MHz), 3650-3700 MHz, Satellite (L-band, Big LEO, Little LEO, 2 GHz).	Text	SMR
Maximum Advertised Downstream Speed	Speed tier code for the maximum advertised downstream speed available (see details following Part 1(a) for codes)	Integer	8

Maximum Advertised Upstream Speed	Speed tier code for the maximum advertised upstream speed that is offered with the above maximum advertised downstream speed available (see details following Part 1(a) for codes)	Integer	8
Typical Downstream Speed	Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details following Part 1(a) for codes).	Integer	8
Typical Upstream Speed	Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details following Part 1(a) for codes).	Integer	8

Middle Mile and Backbone Interconnection Points

In addition to the information shown in the tables below, awardees shall provide NTIA with a list of interconnection points of facilities in their state that provide connectivity between (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. (Collectively, (a) and (b) are "middle-mile and backbone interconnection points").

Middle-mile and backbone interconnection points typically enable relatively fast data rates, are built to handle substantial capacities, and may be service-quality assured.

Examples might include: points of interconnection enabling communications between an incumbent local exchange carrier central office and the Internet, between a cable aggregation point (headend) and the Internet, or between a wireless base station and the provider's core network elements that connect to other networks including the internet.

These data shall be submitted to NTIA as a tab-delimited text file in which each record has the following format:

- Instructions for providers needing to obtain a FRN can be accessed at https://fjallfoss.fcc.gov/coresWeb/publicHome.do.
- The capacity of the serving facility should represent the capacity as currently configured and be expressed according to the following reference:
- Coordinates must be expressed using the WGS 1984 geographic coordinate system.
- Data for the entire state or territory should be submitted as a single, tab-delimited plain text file named "middlemile_XX.txt" where XX is the two-letter postal abbreviation for the state or territory.

Record Format for Middle-Mile and Internet Backhaul Connection Points Data for Each Provider

Field	Description	Type	Example
Provider Name	Provider Name	Text	ABC Co.
DBA Name	Doing-business-as name	Text	Superfone, Inc.
FRN	FCC Registration Number	Integer	8402202
Ownership	Is the facility owned (0) or leased (1)?	Integer	0
Serving Facility Capacity	Serving capacity of transport facility (see details below)	Integer	1
Serving Facility Type	Type of transport facility (1=Fiber; 2=Copper; 3=Hybrid Fiber Coax (HFC); 4=Wireless)	Integer	1
Latitude	Latitude in decimal degrees	Float	38.88456
Longitude	Longitude in decimal degrees	Float	-77.028123
Elevation	Elevation relative to grade to the nearest foot (positive integers indicate above grade, negative below grade)	Integer	-10

Serving Facility Codes

Data Rate Code	Interconnection Point Data Rate
1	Multiple T1s and less than 40 mbps
2	Greater than 40 mbps and less than 150 mbps
3	Greater than 150 mbps and less than 600 mbps
4	Greater than or equal to 600 mbps and less than 2.4 gbps
5	Greater than or equal to 2.4 gbps and less than 10 gbps
6	Greater than or equal to 10 gbps

Service Address Service Associated with Specific Address

For each facilities-based provider of broadband service to specified end-user locations in their state, awardees shall provide NTIA with a list of all addresses at which broadband service is available to end users in the provider's service area, along with the associated service characteristics identified below.

For this purpose, "broadband service" is the provision, on either a commercial or noncommercial basis, of data transmission technology that provides two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream **and greater than 200 kbps upstream** to end users, or providing sufficient capacity in a middle mile project to support the provision of broadband service to end-users within the project area.

For this purpose, an “end user” of broadband service is a residential or business party, institution or state or local government entity that may use broadband service for its own purposes and that does not resell such service to other entities or incorporate such service into retail Internet-access services. Internet Service Providers (ISPs) are not “end users” for this purpose. An entity is a “facilities-based” provider of broadband service connections to end user locations if any of the following conditions are met: (1) it owns the portion of the physical facility that terminates at the end user location; (2) it obtains unbundled network elements (UNEs), special access lines, or other leased facilities that terminate at the end user location and provisions/equips them as broadband; or (3) it provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.

For this purpose, “broadband service” is “available” at an address if the provider does, or could, within a typical service interval (7 to 10 business days) without an extraordinary commitment of resources, provision two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and greater than 200 kbps upstream to endusers at that address. The list of addresses shall be submitted to WVGES as a tab-delimited text file in which each record has the following format:

- All fields are required.
- Instructions for providers needing to obtain a FRN can be accessed at https://fjallfoss.fcc.gov/coresWeb/publicHome.do.
- The ID field is a sequential integer ranging from 1 to the total number of addresses.
- Address data fields should be space-delimited in standardized Postal Service form. See http://pe.usps.gov/cpim/ftp/pubs/Pub28/pub28.pdf.
- Categories of end users should be entered as integers based on the following table.
- For reporting the technology of transmission, report the technology used by the portion of the connection that terminates at the end-user location. If different technologies are used in the two directions of information transfer (“downstream” and “upstream”), report the connection in the technology category for the downstream direction. The technology of transmission should be entered as an integer based on the following tables.
- Speed tiers should be entered as integers based on the following tables.
- Data for the entire state or territory should be submitted as a single, tab-delimited plain text file named “address_availability_XX.txt” where XX is the two-letter postal abbreviation for the state or territory.

Record Format for Address Data for Each Provider

Field	Description	Type	Example
Provider Name	Provider Name	Text	ABC Co.
DBA Name	“Doing-business-as” name	Text	Superfone, Inc.
FRN	Provider FCC Registration Number	Integer	8402202
ID	Sequential record number	Integer	1

End User location/Service Data End-User Address	Complete address	Text	1401 Constitution Ave NW Washington DC 20230
End-User Building Number End-User Prefix Direction	Building number Prefix direction	Text	1401
End-User Street	Street name	Text	Constitution
End-User Street Type End-User Suffix Direction	Street type Suffix direction	Text	Avenue NW
End-User City	City	Text	Washington
End-User State Abbreviation	Two-letter state postal abbreviation	Text	DC
End-User ZIP Code	5-digit ZIP code (with leading zeros)	Text	20230
End-User ZIP Plus 4	4-digit add-on code (with leading zeros)	Text	0005
Category of End User	Category of End User Served at Address (see details below for codes)	Integer	3
Technology of Transmission	Category of technology available for the provision of service at the address (see details below for codes)	Integer	50
Maximum Advertised Downstream Speed	Speed tier code for the maximum advertised downstream speed available at the address (see details below for codes)	Integer	8
Maximum Advertised Upstream Speed	Speed tier code for the maximum advertised upstream speed that is offered with the above maximum advertised downstream speed available at the address (see details below for codes)	Integer	8
Typical Downstream Data	Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8

Typical Upstream Speed	Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8

End User Codes

End User Category Code	End User Category	Description
1	Residential	Address denotes a residential living unit, individual living unit in institutional settings such as college dormitories and nursing homes and other locations designed primarily for residential use at which broadband service is available.
2	Governmental	Address denotes a state orl ocal govermnent location at which broadband service is available.
3	Small Business	Address denotes the location of a small business.
4	Medium or Large Enterprise	Address denotes the location of a medium or large enterprise.
5	Other	Address denotes a location not meeting any of the above descriptions.

Technology of Transmission Codes

Technology Code	Description	Details
10	Asymmetric xDSL	
20	Symmetric xDSL	
30	Other Copper Wireline	All copper-wire based technologies other than xDSL (Ethernet over copper and T-1 are examples)
40	Cable Modem - DOCSIS 3.0	
41	Cable Modem - Other	

50	Optical Carrier/Fiber to the End User	Fiber to the home or business end user (does not include "fiber to the curb")
60	Satellite	
70	Terrestrial Fixed Wireless - Unlicensed	
71	Terrestrial Fixed Wireless - Licensed	
80	Terrestrial Mobile Wireless	
90	Electric Power Line	
0	All Other	Any specific technology not listed above.

Speed Tier Codes

Upload Speed Tier	Download Speed Tier	Description
1	--	Less than or equal to 200 kbps
2	--	Greater than 200 kbps and less than 768 kbps
3	3	Greater than or equal to 768 kbps and less than 1.5 mbps
4	4	Greater than or equal to 1.5 mbps and less than 3 mbps
5	5	Greater than or equal to 3 mbps and less than 6 mbps
6	6	Greater than or equal to 6 mbps and less than10 mbps
7	7	Greater than or equal to 10 mbps and less than 25 mbps
8	8	Greater than or equal to 25 mbps and less than 50 mbps
9	9	Greater than or equal to 50 mbps and less than 100 mbps
10	10	Greater than or equal to 100 mbpss and less than 1 gbps
11	11	Greater than or equal to 1 gbps

Census Blocks Less than Two Square Miles

Record Format for Wireline Service by Census Block
(For Census Blocks no greater than two square miles in area in which broadband service is available to end users)

Field	Description	Type	Example
Provider Identification Data			
Provider Name	Provider Name	Text	ABC Co.
DBA Name	“Doing-business-as” name	Text	Superfone, Inc.
FRN	Provider FCC Registration Number	Integer	8402202
ID	Sequential record number	Integer	1

Census Block Identification Data			
Census Block FIPS Code	15-digit Federal Information Processing Standard (FIPS) Code identifying individual Census Block. Must include leading "0"	Integer	60750160001015
Census Block Square Mileage	Provide square mileage for specific census block number to the first decimal place	Number	1.8
Broadband Technology and Speed Data			
Technology of Transmission	Category of technology available for the provision of service at the address (see details below for codes)	Integer	50
Typical Downstream Speed	Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8
Typical Upstream Speed	Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8

Roads contained within Census Blocks greater than two square miles

Record Format for Wireline Service by Street Segment

(For Census Blocks larger than two square miles in area in which broadband service is available to end users)

Field	Description	Type	Example
Provider Identification Data			
Provider Name	Provider Name	Text	ABC Co.
DBA Name	"Doing-business-as" name	Text	Superfone, Inc.
FRN	Provider FCC Registration Number	Integer	8402202
ID	Sequential record number	Integer	1

End User location/ Service Data			
Census Block FIPS Code	15-digit Federal Information Processing Standard (FIPS) Code identifying individual Census Block	Integer	60750160001015
Census Block Square Mileage	Provide square mileage for specific census block number to the first decimal place	Number	5.8
Street Name	Provide street name to identify street segment	Text	Van Ness
Street Type	Street type to identify street segment	Text	Avenue
Street Direction Prefix	Street Prefix to identify street segment	Text	N
TLID	Unique identifier for each street segment	Text	0015874962
Broadband Technology and Speed Data			
Technology of Transmission	Category of technology available for the provision of service at the address (see details below for codes)	Integer	50
Typical Downstream Speed	Speed tier code for the downstream data transfer throughput rate that most subscribers to service at the maximum advertised downstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8
Typical Upstream Speed	Speed tier code for the upstream data transfer throughput rate that most subscribers to service at the maximum advertised upstream speed (above) can achieve consistently during expected periods of heavy network usage (see details below for codes)	Integer	8

State Broadband Initiative Mapping Methodology

For the State of Wyoming
Revised September 30, 2012

CostQuest Associates

LinkAMERICA Alliance

Contents

Overview

This document provides an overview of how the sixth required data set was collected and processed for the State Broadband Initiative (SBI) in the state of Wyoming.

This submission builds upon prior efforts to increase in state broadband mapping and planning capacity. Although each state has taken a slightly different path to building in house capacity, this cross-state partnership helps the LinkAMERICA team focus on comparable outcomes across the four states, where appropriate and support each state based upon the State's elected transition path. Our intent is not to make the states look and be the same, rather it is to leverage economies of scope and scale among the business processes while at the same time pursuing the longer term goal of transitioning sustainable program leadership to the respective states.

As our team completes the third year of the SBI program, more work has shifted to in state partners. Much of this work focuses upon the capacity building, planning and technical assistance components of the program. One immediate result of this is that in some of our states in-State partners have taken direct responsibility for the survey, validation and development of Community Anchor Institution information. The methods by which CAI data were developed are included as Appendix One. During this third program year we also anticipate at least one in State partner taking over the state web presence, both in terms of content and hosting. We also have States hiring in dedicated resources to support the program.

As expected, this document rests heavily on the prior drafts but has also been updated and expanded.

Significant changes include additions covering:

1. Trends in provider inputs
2. Modification to internal provider tracking
3. Increases in the amount of WISP coverage using propagation estimates
4. Requested changes based upon NTIA guidance
    a. Review of submitted speed with respect to NTIA supplied frequency table
    b. Review of NTIA speed guidelines and provider documentation
    c. Inclusion of Provider Universe Table (Appendix 4)
    d. Expansion of verification methods summary table
5. Transition planning with respect to capacity building within the State for Broadband map development (even while the technical data development components of the program continue to rest with CostQuest and the LinkAMERICA Alliance).

Treatment of the following subjects has been expanded:

1. Verification and validation
2. Data production methods

3. Provider advertised speed and coverage validation

As anticipated, the SBI program continues to mature and evolve. Technical leadership and strong program office guidance has been appreciated. We continue to focus resources on establishing stable business processes to track submissions, verify received and processed data, test for temporal stability and provide reporting deliverables consistent with NTIA expectations.

In our view, the mapping deliverable reflects (1) a good faith effort, which results in a reasoned response to the NOFA, Technical Appendix A, as well as supplementary program office guidance and modifications offered in phone calls, emails, and webinars, (2) a stable foundation for improvement and prioritization of both NTIA and state needs and interests , (3) a valid data processing model to support online mapping, consumer feedback, provider verification and reporting, and finally, (4) a valid use of the evolving data transfer model and its intrinsic validation methods. More importantly, the resulting data and online coverage maps that follow from this work are providing good input and context for the Broadband planning teams working across the states we have the pleasure to serve.

We also note that the mapping deliverable is increasingly important to state policy makers as each of the states we work with continues to assess the policy ecosystem that supports the advancement of broadband access and adoption.

We close this methodology document with 4 appendices. Appendix 1 refers to efforts related to Community Anchor Institutions. Appendix 2 describes data collection challenges. This section describes some of the open issues, challenges and questions we are exploring. Our hope is to receive clarification and counsel from NTIA in how best to confront some of these issues, which are likely common across states. Appendix 3 describes the confidentiality framework explained by NTIA. Appendix 4 details the provider universe, those providers found to be non-NOFA compliant and those providing data.

Purpose of This Manual

This technical document was developed to provide transparency in our data production process.

Our goal is to illustrate a thoughtful process designed to meet the intent of the submission. Our hope is that we have developed a process that is reasonable, with respect to the data it deals with, as well as flexible enough to change with evolving NTIA requirements and lessons learned from the Broadband mapping community.

Data Sources

Developing the Provider List

Broadband provider lists for all states were developed from the following sources:

- Prior comparable mapping/research efforts
- State lists of regulated telecommunications, cable and wireless service providers
- State and national industry organizations (i.e. cable associations, wireless service provider organizations, telecommunications associations)
- FCC Form 477 respondents
- Third party data sources such as Warren Media, Media Prints, American Roamer Coverage Right, GeoResults Wirecenter Boundaries.
- Independent web searches
- Interviews with key state staff members and important community influencers

As one would expect in a dynamic marketplace, provider identification is an ongoing and important component of our work. Mergers and acquisitions, the use of multiple regional DBAs, the lack of any universal identity management attribute, and the generally complex parent-subsidiary structure of many telecommunications companies, make provider identification and tracking very challenging. Because of this dynamic environment, the Provider list is reviewed on an on-going basis and changes are made as necessary to ensure that the list remains current.

At the start of each round, email and telephone contact is made to all known providers. This time consuming, but necessary, process ensures that the list of contact persons remains current, and that providers are aware of data request changes and deadlines associated with each round. Where necessary, we execute new NDAs with providers. We maintain this communication with providers throughout the Data Collection period, providing multiple paths and opportunities for participation in the program. Providers that respond too late to be included in the final dataset are flagged for inclusion in the next submission. Unresolved data concerns are also flagged and tracked so that we can begin working on a plan for resolution prior to the next data collection round.

As contact is made in each round, we qualify each provider by asking a series of questions regarding the type of service and speeds offered. If the provider does not meet the minimum specifications for a

Broadband provider (as defined in the NOFA) we make a note of the change in status.[1] Providers remain on our list and are included in program communications so that in the event that their service is upgraded or expanded their status can be updated accordingly.

Provider Outreach

To meet the program's aggressive deadlines and participation goals, LinkAMERICA believes it is critical to maintain rapport with providers. To do this we reach out to providers with regular project communications, including a program newsletter and links to the various State mapping websites. In several states we have participated in trade association and policy summits.

As described above, individual e-mails and/or telephone calls are made to all providers explaining the status of the program and requesting their continued support. In some instances we've also had the opportunity to support providers in their BTOP / BIP applications. Through these collective outreach initiatives, and our engagement with various industry associations, we continue to enjoy a healthy and appropriate relationship with Broadband service providers.

NDA

To provide protection for all parties involved, LinkAMERICA continues to honor the terms of our NDA. If providers did not execute the NDA in previous rounds they were offered the opportunity to do so in this collection round. New providers were of course also supplied with a copy of the NDA.

To facilitate the execution of NDA's, LinkAMERICA continues to use the DocuSign online document management solution. This system allows providers to review and digitally sign the NDA in a legally binding manner, and has been instrumental in achieving rapid approval and execution of NDAs with the majority of providers. In some cases, NDA's were individually negotiated to address specific provider concerns. In all cases, minimum standards established by the NOFA are honored. In other cases, providers chose to submit data without executing an NDA.

Provider Survey

Since five prior rounds of data collection have been completed, the LinkAMERICA team has a solid base of coverage and speed information with which to begin Round 6. This allowed us to provide flexible response options to participating providers. One option allowed them to review check maps of their coverage and speed data – submitting only corrections and additions to the existing dataset. (For provider convenience the check maps were created in both PDF and Google Earth (.KMZ) formats.) The second option was to allow submittal of completely new datasets, either in tabular form or in multiple other digital formats. For those without CAD or GIS systems, we continued to allow the submittal of printed/scanned maps and other written materials.

---

[1] As with other Grantees, we struggle with appropriate and consistent classification for service providers who opportunistically provision Broadband services. In this submission we continue to bring them into the analysis as a provider type "other". As the inclusion of this category isn't our primary goal, we are working to process data as we can. We are similarly categorizing and retaining reseller information. Appendix 4 illustrates the categorization of non Broadband providers within our provider tracking and verification systems.

Survey Methods

Once again, we used a secure digital survey process (via our provider portal websites) to collect and display information for providers. The Round 6 survey process was designed to accommodate both new and returning providers, and the different types of information they would be submitting. The following is a summary of the process encountered by each group:

New providers: New providers were routed directly to our standard survey where they were provided with templates for uploading data in tabular NTIA-compliant formats. As in previous rounds, if providers could not supply information in the requested format, alternatives were offered. These alternatives included uploading service-area boundary maps, exchange area maps, CAD drawings or customer address lists. From that information, the LinkAMERICA team developed a geographic representation of coverage and was able to build coverage features for each provider.

Returning providers: For Round 6 we continued to work with participating providers to improve their datasets. Check maps continue to be a useful tool to show providers how their area would be displayed on the resulting interactive state map and to get constructive feedback regarding corrections and changes that need to be made to their coverage and speed data. Generating these customized documents in each round is an extremely time consuming verification process, but it allows us to close many of the gaps that might have otherwise persisted.

Follow Up

After the release of the Round 6 survey in early July 2012, LinkAMERICA launched an extensive effort to encourage responses. Every known provider was contacted at least twice during the months of July and August. The initial data submission deadline was set for mid-August, but we continued to accept "straggler" submissions into September.

No Response Policy

As mentioned above, every effort was made to contact each provider who appeared on our initial list. However, if no current information could be found on the company (i.e. no website, no valid phone number, and no contact person identified) they were removed from the list of "known providers". We believe the vast majority of those we were unable to reach were providers who have simply ceased to exist[2]. If we verify that a company is a broadband provider still doing business and are not able to get a response to our request for data, we make note of that in our datapackag.xls, and continue to reach out to encourage participation.

Summary

In summary, an intensive 45-60 day provider outreach and data collection process is initiated at the beginning of each round. In Round 6, given the data vintage of June 30, 2012, we began this process in June and the last submissions were accepted in September, 2012.

While we continue to successfully engage the majority of providers in each round, the amount of manpower required to solicit complete and timely responses should not be underestimated. This process is one of the most costly and complex within the entire SBI program.

[2]The list of known providers and important submission statistics are contained in the datapackage.xls file.

Third Party Data Used

We acquired the following commercial/restricted use data products:

- American Roamer, Coverage Right Advanced Services (tabular). This data served two purposes. The first was to verify the provider list and help find Broadband service providers not on other lists. The second was to verify the reasonableness of the Broadband service provider's submission.
- GeoResults Wirecenter Boundaries. This data was used in the verification of 'telephone' Broadband provider data. Where a public domain exchange boundary wasn't available, the boundary was used for coverage containment tests.
- Media Prints Cable boundaries. This data was used in the verification of Cable/HFC Broadband provider data. It was used to research valid providers and discover if that provider was offering Internet service. FCC 477 restricted use data were analyzed to find valid providers within a given area.
- Proprietary Provider Serving Areas. Since the first survey, a number of providers have supplied their engineering, serving area and/or franchise boundaries. We have maintained and enhanced these proprietary data sources.

We have included third party data sources which touch on each of the three major technologies analyzed within the SBI program. Each of these data sources tie back to a public domain data source, which provides a cross-verification mechanism for the commercial data product.

Although there are a large number of third party licensed data sources available, we remain conservative in our acquisition plans. From our limited analysis we are concerned about the ability to cross-verify additional third party licensed sources against public domain data. Further, we are unsure of how we may be able to integrate another data provider's view of valid Broadband providers within the definitions used by the NOFA (e.g. Are they using an FRN/DBA identity view or a marketing view? Can the provider supply in a 7-10 day window? Are they facilities based or not?). This leads us back to a statement we made in a 'lessons learned' Webinar (April 2010) about exploring a consortia to lower the cost of data acquisition and allow multiple entities to peer review the quality and methodologies behind licensed data products.[3]

Beyond these commercial data sources, we used a number of public domain sources. These included:

Geographic Data Files

- US Census TIGER data[4]

Sources that helped isolate providers, identity management or provider service areas

- NECA Tariff 4
- State produced exchange boundaries
- Carrier produced wirecenter boundaries (sometimes proprietary to provider)

---

[3] We also suggested forming a technical standards committee and a consistent system for confidence reporting.

[4] Census data were derived from < http://www.census.gov/cgi-bin/geo/shapefiles2010/main>, Census 2010 files. Roads were derived from the county faces and edges file downloaded at the same location and tiled for a full state.

- FCC Coals reports (321/325)
- FCC FRN API lookup tool
- FCC/FAA Antenna Registration System
- FCC FRN Lookup Tool (plain text search)
- USAC High Cost FCC Filing Appendices

Sources that helped isolate anchor institutions

- USAC Grant lookup tool
- USAC High-Cost FCC Filing Appendices
- HRSA data warehouse
- NCES data lookup
- State managed lists of schools (K-12), post-secondary institutions and libraries
- List of museums, conventions, and visitors bureaus from www.onlineatlas.us
- In state relationships to key stake holders.

Finally, challenges exist when dealing with the inevitable conflicts between provider-submitted data and third party sources (public or commercial). There is no guarantee third party sources are more accurate or timely than the providers' own reports. Indeed, some third party sources are based upon different standards than those specified in the NOFA, perhaps making them less reliable than information collected directly from providers. At the very minimum, provider data has a lineage and temporal status that we can identify. A concern we have with increasing use of third party data is that we have no way to verify its quality or development methodology. Particularly in rural areas we are concerned about what third party data may reflect based upon what we assume to be a small sample of information.

In other words, we may hit a wall in which we can't determine how the commercial source derived its coverage conclusion. To us this means that third party data sources are beneficial, but represent a supplementary view, not an authoritative one, of the NOFA defined Broadband market.

In short, we have chosen to use provider data as the baseline. We will challenge provider reports when third party data shows major anomalies, when submitted data conflict with prior submissions or when a consistent volume of consumer feedback points to a potential error.

Confidentiality and the Use of Licensed Materials

As a mapping vendor, we are reliant upon the cooperation of Broadband service providers. In large part, what underlies this cooperation is trust that we will not violate the proprietary and confidential nature of the data provided to us.

We are thankful for the confidentiality clarification that NTIA shared with us (included as Appendix 3). We use this as a guiding document to help us communicate with providers about what information NTIA considers to be confidential. Our suggestion is that NTIA publish this, or something comparable, to ensure a consistent interpretation of the NOFA and how it guides NDAs.

As some providers are non-responsive to requests for information, or lack resources necessary to put data into NTIA compliant formats, we have fallen back to the use of commercial data sources in several places.

For incumbent telephone providers we have used commercial wirecenter boundary products to filter Census Blocks and segments that are clearly out of their exchange areas. For cable providers we will use an estimate based upon Census Designated Places within MediaPrints named areas.

Public Engagement: Crowd Sourcing, Surveys and Social Media

Crowd sourcing (i.e., an intentional and carefully designed effort to tap into the collective intelligence of the public at large to expand our knowledge base) continues to be an important element of our data collection and validation process. An expanding use of social media is also an important strategy in our efforts to promote the state programs overall and engage more citizens in the work at hand. In addition to the various opportunities the public has to provide input via the online service coverage maps and the related 'Broadband story' process, our crowd sourcing efforts are grounded in a time tested telephone survey approach focused on the consumer market. In addition, we continue to advance our process to include certain initiatives centered in two social media outlets – Facebook and Twitter. These initiatives are discussed below.

Consumer Surveys

Working under contract for the state of Alabama in 2009, our initial consumer survey was performed before the NTIA SBI grant was in place. Subsequent consumer surveys funded by the SBI grant were hosted in 2010 for the states of Idaho, Wisconsin and Wyoming and then again in 2011 for Alabama (as noted below). These surveys will be repeated after two years to establish and evaluate trends. These primarily telephone based surveys include two distinct and carefully scripted tracks: one for Internet users and one for non-users. The telephone survey approach allows us to reach the non-Internet user group as well as the current Internet user. A secondary online approach is also used to augment input from current Internet users. In the most recent Alabama survey we added a third tier to our approach as we equipped local field survey teams with an iPad-based survey tool and targeted their time to reaching the younger market. For non-users, the surveys help determine why they don't have or don't use Broadband. For current Broadband users, the survey helps determine the nature of their Broadband access and how they use that connectivity in their daily lives. In addition to our state-specific surveys a nation-wide survey was also hosted to provide a broader view of consumer views for comparison purposes. State-specific surveys are, where possible, framed to match the state's regional Broadband planning structure (e.g., the updated consumer survey in Alabama was designed to produce results relevant to the state's twelve Broadband planning regions).

The resulting data is helpful on a number of fronts in the SBI's mission to advance the access and adoption to Broadband. Survey data provides an important, albeit broad, gauge for assessing coverage information obtained by providers. For example, areas with widely available coverage (according to provider information), but lower consumer subscription levels (according to survey results), or perhaps where survey results suggest Broadband is not available, can be examined in more detail. Survey results

are also very important to the broadband planning (and capacity building) components of the SBI program in that they help inform and formulate Broadband advancement priorities. Survey results also help inform Broadband policy discussions on both the local and state levels. Finally, survey results provide important information to the service provider community regarding market demand and specific Internet use in specific communities (i.e., regions).

Our ongoing consumer survey process adheres to a consistent process. For example, consistent with prior practice the 2011 Alabama survey was launched in June 2011 with a test number of survey calls to confirm (and adjust as needed) the structure of the survey and the underlying survey process. Our surveys typically run for three to four months. All telephone surveys are completely random beginning with the acquisition of a list of state-specific, randomly selected landline telephone numbers. Mobile phones are not typically included in the surveys. Upon evaluation of the survey statistics, auxiliary surveys are executed to ensure appropriate representation is achieved on both demographic and geographic fronts. For example and as noted above, the recent Alabama survey was augmented with a field effort to ensure the younger demographic (i.e., age 18 – 25) was adequately represented. This secondary step is required because of the continued migration (by younger markets) to non-landline based communications. This younger market is also surveyed by reaching out through social media outlets (primarily Facebook and Twitter) to encourage their participation in an online survey process.

As noted above, our telephone survey process is augmented by providing online access to the survey. Participation in the online survey is promoted on all of our state-specific public web sites and selected social media.

As a final relevant point with respect to the consumer survey process the length of the survey is noteworthy. By survey standards, these tend to be long surveys. The surveys typically average just over fifteen minutes. While this clearly contributes to the number of survey call attempts that were required to reach the level of statistical validity, it is not insurmountable.

Social Media

The phenomenon of social media is widely documented and yet still emerging as an effective access point for public engagement. We continue to explore appropriate ways to use a variety of social media venues in our SBI efforts. All of our efforts are informed by and consistent with relevant state statues and guidelines. Different states have different perspectives on if and how the state will participate in the use of social media. Some state requirements are well defined and some are still being formed. Where appropriate, we use LinkedIn, Facebook and Twitter to support our work. A central focus is on promoting awareness of the program and seeking to expand engagement. In some situations we find that sub-program initiatives (e.g., regional planning teams) are making very effective use of Facebook to help inform and engage citizens impacted by the SBI program. As noted above, we are able to promote additional input on the consumer surveys through a social media outreach program aimed at our younger market segments.

In addition, we continue to evaluate how Facebook and Twitter can be used to drive public input on two important crowd sourced issues: online speed tests and input on map accuracy. Based on data obtained

through our web site traffic monitoring process and readily available social media tracking processes, results are promising.

Capacity Building and Transitioning to State Partners

A fundamental goal of LinkAMERICA has always been to transfer knowledge and capacity to our in-State partners.

Within each State, transition planning and responsibility for specific activities is on a slightly different timeline. Much of this is driven by resource availability and partner identification within the State. For example we began transitioning the responsibility for Community Anchor Institution data to the State of Alabama in Round 3, starting with the use of interns to validate Community Anchor Institution data. In Round 4 the state's responsibility expanded to include collection of all CAI data, and in Round 5 the effort culminated with Alabama assuming responsibility for the CAI submission. LinkAMERICA supported this process with detailed transition documents and technical support.

Alabama plans to continue the transition process though the end of year 3 assuming more responsibility for the interactive State maps and website. In Idaho the SBI Framework Coordinator took on the responsibility of reaching out to CAIs in round 5. In round six the outreach became more relationship based and face to face. Other States are looking more towards program year 4 and/or the in-State hire of a Broadband Coordinator as the initiation point to support their transition efforts. Broadband Coordinators were brought on board in both Idaho and Wyoming in year three. An open position was recently filled in Wisconsin. Alabama has had a broadband coordinator in place for nearly two years.

Data Sharing With Other States

Where possible, LinkAMERICA works to share data with other state mapping entities. This data exchange tends to take two routes.

First for wireless providers if we find a fair amount of coverage that crossess into an adjacent state, we will ask the provider's permission to convey this information to the neighboring states. If the permission is received, we send the data to the mapping agency.

Second, in circumstances where we receive a speed that is outside of the technology speed 'norms' and this provider offers service in another state we try to check with other covered states to find out if the service is comparably marketed.

Trends in Submitted Data

Overall we note several important trends in this data submission. The list below represents general trends and not a scientific survey.

We note the following trends:

The coverage of advertised speeds is increasingly important. More and more providers are specifically concerned about where the submitted NTIA footprint shows available of 4 x 1 Mbps or 6 x 1 Mbps service.

Large national providers are beginning to submit block level speed information. In round 6 AT&T submitted block level coverage and speed. Other national Wireline providers, such as Frontier improved their submission based upon the completion of system conversion of acquired properties.

xDSL speeds are increasing. More and more xDSL is likely ADSL 2+, VDSL, shortened loops, pair bonded or some combination of these. As we talk to providers who trigger speed/technology tripwires, we receive more and more feedback about the presence of these new technologies to enable speeds comparable with DOCSIS systems.

DOCSIS 3 is becoming the norm. Most cable systems are becoming DOCSIS 3.0. Over time we are seeing the DOCSIS 2.0 areas diminish. In some DOCSIS 3 areas there tend to be pockets of non DOCSIS 3 in predominant DOCSIS 3.0 markets.

There seems to be an increase in acquisitions among fixed wireless providers. A large consolidation with respect to T6/Digis/Skybeam/JAB has changed the provider landscape in several of our states. As much of the system consolidation has not yet taken place our coverage remains largely in tact but we anticipate changes in the next submission.

Fixed wireless providers are offering broadband services approaching 1 Gbps. This is occurring both in terms of licensed and unlicensed spectrum. Part of this is driven by where a provider has fiber or high capacity wireless backhaul but we are receiving more and more information from providers and radio manufacturers specific to very high speed wireless services. Although the service can be deployed within the 7-10 day NOFA window, these higher speed services tend to be purchased by high capacity customers. It may be worth reconsidering the speed norms in this category as well as adding a field in the datatable to indicate when a speed value is geared toward a specific end-user class.

There is less and less of a distinction between fixed wireless and mobile wireless. As firms market LTE and/or WiMax as home DSL alternatives we are a bit unsure how these two classes are to be established-what is the operating distinction between Transtech 80 (mobile licensed) and Transtech 71 (fixed licensed) when both are used as in in-home Broadband service?

Satellite providers are advertising broadband services exceeding the speed ranges in the data model. Further the spectrum used isn't available in the NTIA data model.

We continue to see a number of national Broadband providers who do not show broadband coverage within pockets of otherwise covered areas. In the figure below, the orange represents Census blocks which are NOFA broadband covered. The transparent areas have no NOFA broadband coverage from the same provider.

Figure 1--Uncovered pockets within urban, covered areas

This coverage drop-out appears to be happening in urban Census blocks typically with schools, shopping malls, universities and large businesses. We don't know what his is happening, but it could be an impact of the NOFA restriction on 7-10 provisioning. This is a noticeable artifact in the data and does challenge the notion of some who see NOFA compliant Broadband coverage as a uniform surface across an area.

Data Production Process

To support our objective of transitioning the data development process to our State partners, we continue to model, refine and document our data production process. We find this to be a very beneficial step for two purposes.

First, it helps us understand why (and if) a task is being done, and if it is being done efficiently. Much of this program started so quickly that it was difficult to plan logical integration and hand off points among the various workgroups. Further, we are currently in the process of consolidating much of the process data (check-ins, check-outs, metadata) and we can use this process model to efficiently plan cohesive information architecture.

Second, our process documentation and modeling helps explain why resources are being consumed in a particular way. This helps our State partners plan for in-sourcing specific tasks as their time and

budgetary constraints allow. It also helps our LinkAMERICA team better plan and cross-train members to deal with the work surge that occurs 30-45 days prior to submission.

Finally, documenting and modeling our process helps us to take advantage of increasing specialization and proficiency with certain types of data and management responsibilities. In submission 3, we had identified data "czars" responsible for check-in and check-out of data. That data czar helped to bridge the gap among receipt functions, provider feedback, production and DBA. In round 5 the data czar was also tasked with alerting on speed/technology tripwires. This individual was responsible for taking the initial review of each submission and determining if an NTIA speed/technology warning would be triggered.

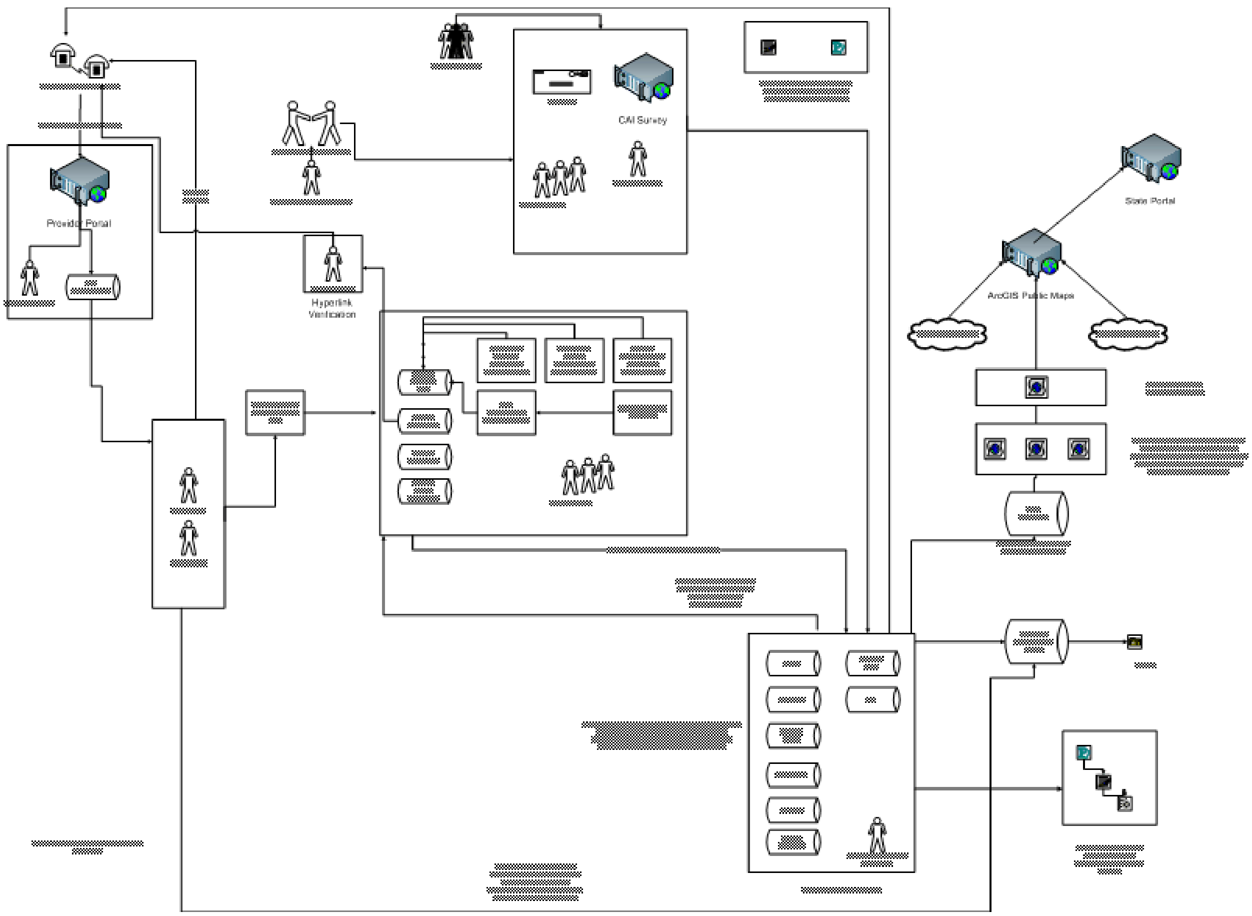


Figure 2—SBI Data Development Business Process Diagram

Provider Tracking In the Cloud

Prior to initiating the Round 5 survey, LinkAMERICA transitioned in house provider tracking systems to a Cloud based application, TrackVia.

The movement away from desktop solutions was based upon several factors. First, the architecture these systems were designed under no longer met the program realities. For example, deliverables like

Datapackage.xls were not contemplated when the original provider tracking system was developed. Second, the ability to share data across multiple geographic areas and organizations was becoming increasingly important as the program evolves and responsibility moves to in-State partners. Third, portions of this data need to securely transition back to State resources who may or may not be able to support a specific IT infrastructure. These factors combined to make the Cloud applications a valuable alternative.

As with any IT transition, the process has not been without challenges. Nonetheless the investment in time and resources has proven to be effective and worthwhile. We anticipate further movement away from desktop oriented architecture to a more open, Cloud type solution.

Data Production Methods

As raw data were received from the provider community, attention turned to normalizing the disparate submission formats[5]. The team considered each submission with respect to the following criteria. These criteria are important because they perform the basis for our verification and quality assurance process. In other words, we have to appropriately scale our data verification efforts to match the scale or ambiguity of the following:

- Locational certainty
- Speed certainty
- Temporal certainty
- Provider and network ownership certainty

The team's goal was NOT to quantify a particular degree of precision with respect to any of these criteria. Rather, we are working to attribute the above "certainty attributes" to each submission, and will continue to implement quality assurance and verification mechanisms that are resource-appropriate for each.

Deriving Broadband Coverage Information

Broadband Coverage[6] was normalized into four formats:

1. Coverage in Census Blocks (2010) of 2.00 or less square miles
2. Covered Street Segments (2010) in Census Blocks greater than 2 square miles[7]
3. Address Level Coverage (point data)
4. Wireless Service Areas (SHP file format)

---

[5] In line with NTIA Best Practices we continue to request and receive a large number of data input formats. This ranges from tabular Block lists to hand drawn maps.

[6] Speed, Anchor institutions and Middle Mile facilities are discussed in later sections.

[7] To help clarify issues relating to Census block area and vintages in use, our team published a technical paper to the Grantee workspace. Because we were unsure if this standard should be implemented uniformly, this document was never distributed to the provider community.

With each submission, the team went through a series of steps to normalize and categorize the data. Since data arrived in many different formats, and at many levels of granularity, the following normalization procedures were used:

- Determining the nature of service being provisioned (who is providing service and what technologies are in use)
- Planning an attack strategy for the submission –understanding the data and assigning team members to various tasks
- Alert provider relations staff if the received data trigger an NTIA speed/coverage tripwire.
- Geo-referencing the data; QA the geo-referenced data
- Geoprocessing the geo-referenced response
- Segregating the submission into the correct NOFA-compliant submission formats.
- Apply appropriate source metadata[8]

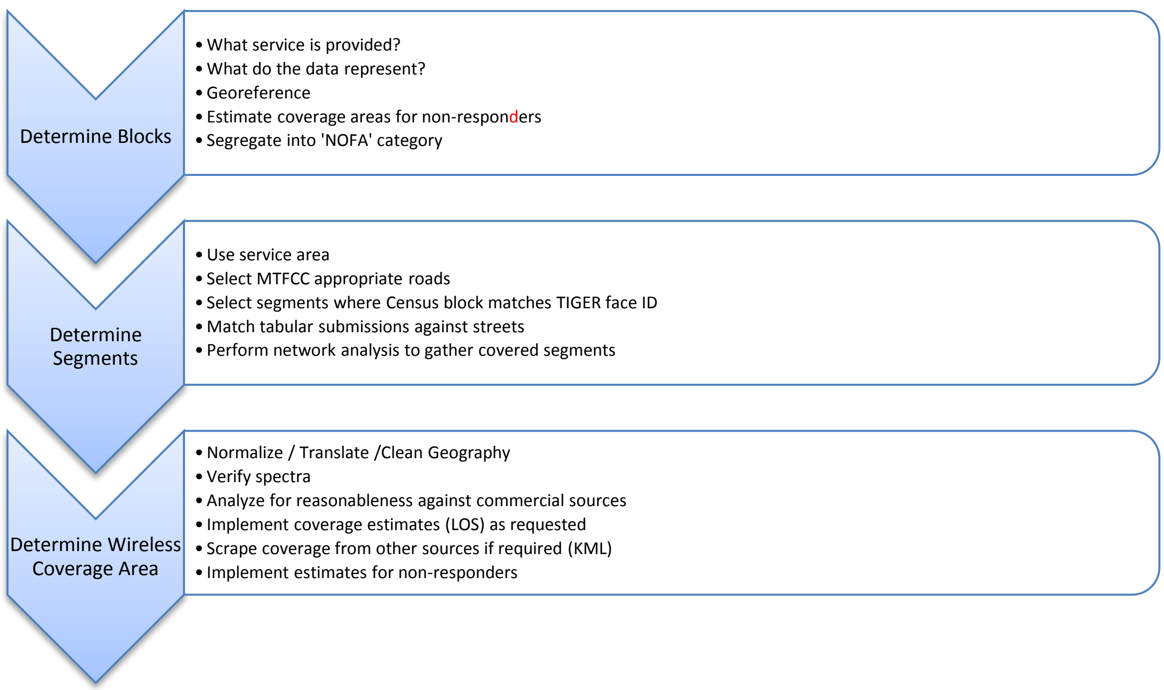


Figure 3-Components of Broadband Coverage Process

Impact of Program Change

There were several important program changes that impacted how Broadband coverage was developed and submitted to NTIA in Round 6.

[8] When our team logs a submission into the staging database we record at least two attributes. One records the method used to derive the coverage, the other records the method by which speed was attributed to that object. Other attributes carried to NTIA carry source meta values as well.

Speed Examination

Given recent concerns about the depiction of speed and what that mapped speed represents, LinkAMERICA invests considerable time requesting detailed information on speed which appeared to be beyond normal speeds for a given Technology of Transmission given the NTIA supplied frequency tables.

Based upon these conversations we learned

A) For incumbent telephone providers; the speeds beyond the normal xDSL range represent significantly shortened copper loops, as well as upgrading DSLAMs and modems to support ADSL2+ or VDSL.

B) For cable providers the intermixing of DOCSIS 3.0 and non 3.0 systems in a market area is typical and sometimes reflects a circumstance where segments of plant cannot be upgraded to DOCSIS 3.0. This variance can be at a level below the Census block. In these cases the maximum advertised speeds remain to represent the market area but the plant variance is typical. We also have one 'cable' provider who is delivering DOCSIS 2.0 over fiber plant.

C)There exists a fundamental disconnect between some providers reporting a service qualified speed--the maximum speed available at a structure versus other providers submitting their maximum speed at the market (MSA/RSA level). Both submission paths are available to providers but the likelihood of providing a speed incompatible with a technology is much greater for providers submitting market level speed.

D)Fixed wireless provides are using new radio technology to quickly deploy services which rival and sometimes exceed those of wireline service providers. These speeds are being advertised, sometimes on public facing websites as well as using direct field sales staff to target specific high demand customers. These services are actively marketed but they challenge the data model in that the speed is marketed and available within 7-10 days of request but the nature of the fixed wireless submission forces attribution of this speed within a potentially large geographic area.

E) There exists a minority of providers who submit a theoretical speed that is unmatched by their web advertising. In these cases we request clarification from the provider on the inconsistency. Our experience has been that providers will modify the speed to be consistent with their marketing and advertising.

F) The maximum advertised speed offered is not always clear. Sometimes the speed is described in advertisements in terms of a combination of video and data. Other times it is data not video. Some providers allow a customer to select how much bandwidth they want to allocate to their data stream versus video stream. In other words the bandwidth available to a household is constant but how it gets allocated among the data versus video becomes a customer or service directed choice. This makes getting Maximum Advertised Downstream speed very difficult because it is not just a product of the broadband network which we are mapping but also the customer's selected service package.

Provider Definitions

Within our provider verification process we work to derive a state level provider match against third party data sources. As discussed in the early pages of this manual, there is no guarantee that a third

party data source is any more accurate than submitted data, nor does it necessarily reflect the provider ecosystem specified in the NOFA, Technical Appendix A. We devote significant resources to matching our submitted data against outside data sources. In many cases this becomes a judgment call trying to match provider names across systems. It is a difficult and somewhat arbitrary process. Nonetheless we do believe it has value because it forces a re-examination of who we believe is an appropriate provider within a non-NOFA context[9].

The use of a provider match system, as well as the webinar comments (3/17/11)[10] directing grantees to estimate, wherever possible, non-participating providers have made us back away from one of our fundamental assumptions in data collection. As discussed in prior versions of this manual, we had developed a certain "hold-out" class of data when a provider's data wasn't of sufficient quality to verify, or we were unable to put it into the data model (e.g. address points submitted for fixed wireless). In submission four, much of this hold-out data was included[11]. In some cases this involved using simple polygons to capture a wireless ISPs serving area. Other times, if we are confident in the coverage, but can get little clarification on the submitted speeds or frequencies, we release the coverage and note in our internal metadata the source issues with the other attributes.

In the weeks leading to submission 5 we received a request from NTIA to clarify the presence of unusual shaped wireless polygons. Our interpretation of this was a request for information relating to the source of these data which do not appear as propagated coverage. Although the 'unusual shapes request' represents a very small portion of the submitted data, it begs an important question about the expectations with respect to wireless coverage patterns. We look forward to working with NTIA to address these issues in a fair way across States and providers. We would not want to create a coverage dichotomy where advertised coverage was disallowed from the NTIA submission because of an expectation about how advertised coverage should appear. One concern we have when we develop a coverage estimate which differs from a providers advertised coverage pattern, which should we submit?

Finally, we use the provider type classification of 'other' to bring specific aspects of certain provider's data into our submission. There still seems to be confusion on how to handle provider types where a provider offers multiple paths to provision Broadband for typically business customers. Rather than waiting for certainty on the answer, we bring the provider in and list them as provider Type "other". Our sense is provider Type "other" will continue to expand in subsequent submissions.

Clearly one challenge is the data, but an equally significant challenge is appropriate messaging around this "other" provider type category. We do not want to leave consumers with the impression that they

---

[9] We have requested from NTIA information on how provider matching is done within their QA process; beyond the relatively short whitepaper posted with the national map <http://www.broadbandmap.gov/blog/wp-content/uploads/2011/02/DataComparison_Methodology2.pdf>, we have not received any more detailed information on how providers are cross verified between submitted and third party sources at the national level. Our understanding is licensing concerns are holding the release of this information.

[10] Clarifying comments from Akins Lawl indicate the Program Office does not want Satellite providers estimated if the provider is non-responsive to data requests (email 9/12/12).

[11] We continue to process older submission data looking for information and methods by which we can estimate coverage information. This will be an ongoing process.

can get a high capacity fiber or microwave link despite the fact that the hospital next to them or in a nearby Census block can get this service.

After the April 2011 Grantee conference, LinkAMERICA submitted a paper describing our provider classification system[12]. It is our feeling that understanding the type of provider is essential to appropriate verification methods.

Coverage Geoprocessing Methods

The next section discusses how data were georeferenced and geoprocessed given a particular submission format. We have yet to find a particular method that works across all submissions. Rather we tend to tailor our geoprocessing to meet the specifics of the service provider and data submitted.

In most cases, in Round 6 we were not provided with street segment geographic objects for Blocks greater than two square miles (large Blocks). This necessitated subsidiary geoprocessing. As stated before, our first goal was to derive block level coverage. Then, for Blocks greater than 2.00 square miles, we moved to a segment gathering processing. The segment process will be described in the last section.[13]

Block Level Coverage Derivation Using Service Point Data

A number of providers submitted point level customer data.

In some cases the submissions themselves were not internally consistent. For example, in the image below, unprojected points are shown, while the Census block polygon to which the points are supposed to “belong” is highlighted. In this case, one of the following scenarios has occurred: block attribution is wrong, the points are not in the location to which they are attributed, or different block shapes were used than what is assumed.

[12] https://sbdd-granteeworkspace.pbworks.com/w/file/42309493/provider%20ClassificationFINAL.docx

[13] As has been discussed previously, we note inconsistency in how providers are supplying information at the block and segment level. Beyond the temporal differences, we see that providers are computing area differently, as well as including or excluding water areas. This provides an inconsistent measure across providers for the 2.00 sq mile cut off. Our preference would be to provide guidance to service providers within our states, but our concern is that we will inconsistently message this with grantees in other states. We would appreciate consistent guidance from FCC/NTIA on this topic.

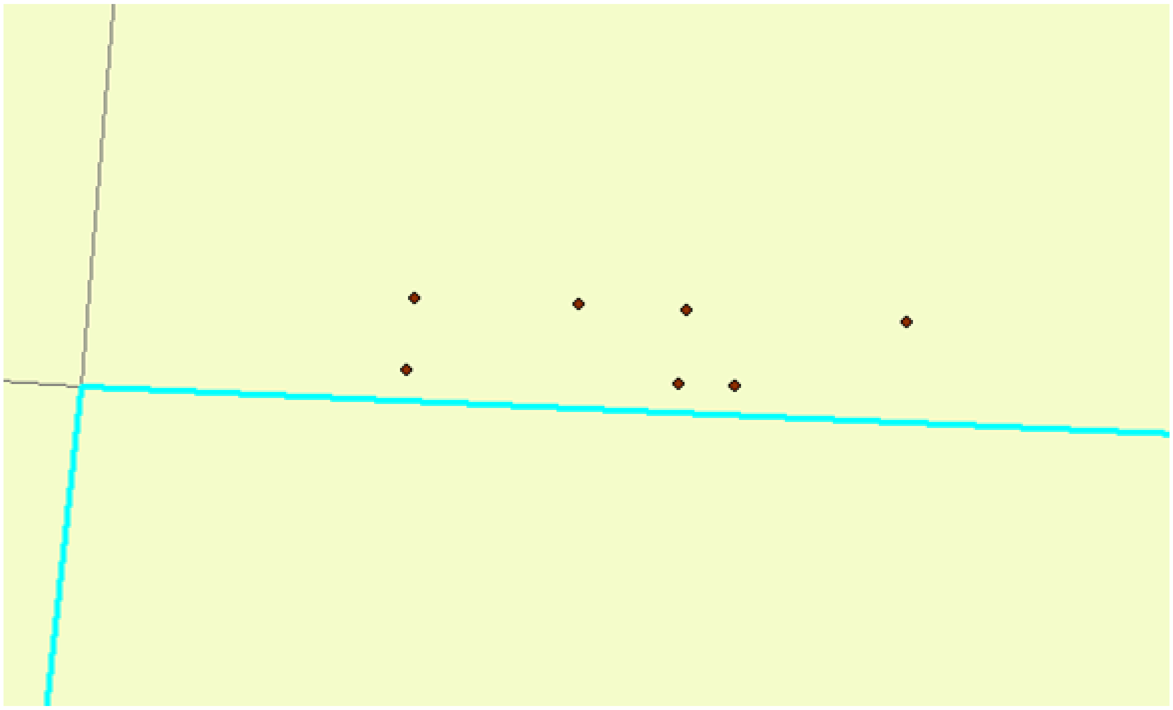


Figure 4-Internal inconsistency in submitted data

In other circumstances, we found that inconsistent geocoding standards may produce misleading results. The next image shows point level data, and the Blocks are colored based upon the counts of points intersecting Blocks. The challenge this presents is that if geocoding was performed on a different dataset than the block boundaries (the road traces are not coincident with block boundaries) and/or geocoding was done without an offset, it becomes problematic to assign coverage to a Census block based upon only the point locations.

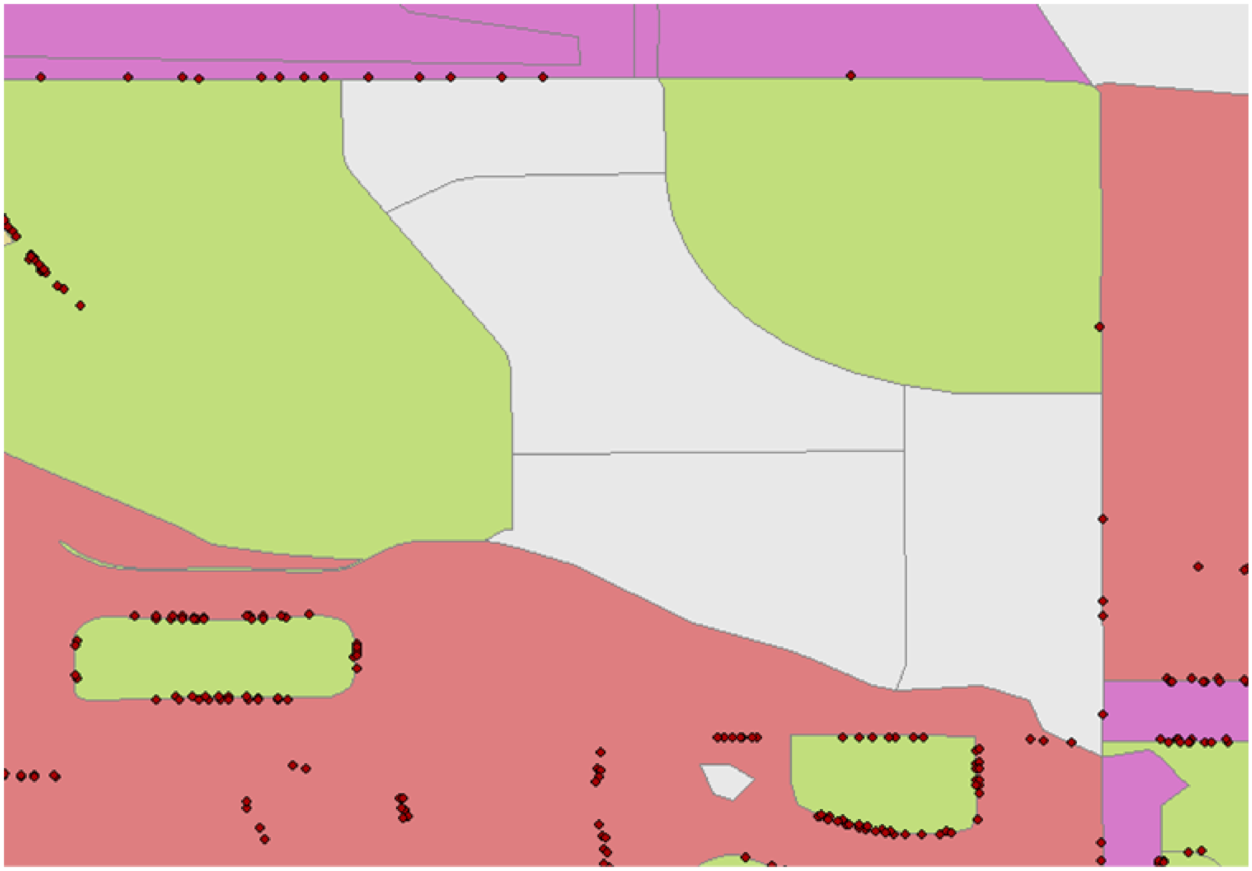


Figure 5-Block Coverage

For this reason, where we were provided address point data and asked to generate covered Census blocks, we elected to use a 200-foot buffer to select Census Blocks that intersect our points.

We also see a number of providers submit customer data and facility data. Their intent is to allow us to have two primary sources from which to derive the most accurate coverage. In these cases we tend to look for clusters of customers in areas where we see no facility based coverage.

With respect to deriving Block level speed from sub-Block data, we have instituted a business rule where the predominant speed in a Block is the speed we attribute to the Block.

Block Level Coverage Derivation Using Customer Facing Plant Level Point Data

In other circumstances, providers submitted point level plant data. From what we could gather, these points tended to be customer-dedicated terminals. Typically, these providers were high speed Broadband producers—which may somewhat strain the definition of Broadband as other providers supplying comparable services specifically disclaimed the ability to provide high-capacity Broadband services in the required 7-10 day interval. In these plant point data submissions, we had similar concerns to the point level customer data, but two factors tended to make us use a more conservative intersection buffer. First, we tended to have far fewer points to work from, so our concern was grabbing too many covered Blocks as the Blocks tended to be much smaller in these urban areas.

Second, these plant points tended to be dedicated to distinct customers, but it was difficult to know which element of the customer's campus to attach coverage to.

In the case of the image below, given a small shift to the left, it would be easily possible to gather 1 to 3 Census Blocks from this point. Although orthoimagery is helpful in a circumstance such as this, it is still indeterminate.

Thus, in the circumstance of plant level point data, we used a 100-foot intersection buffer.

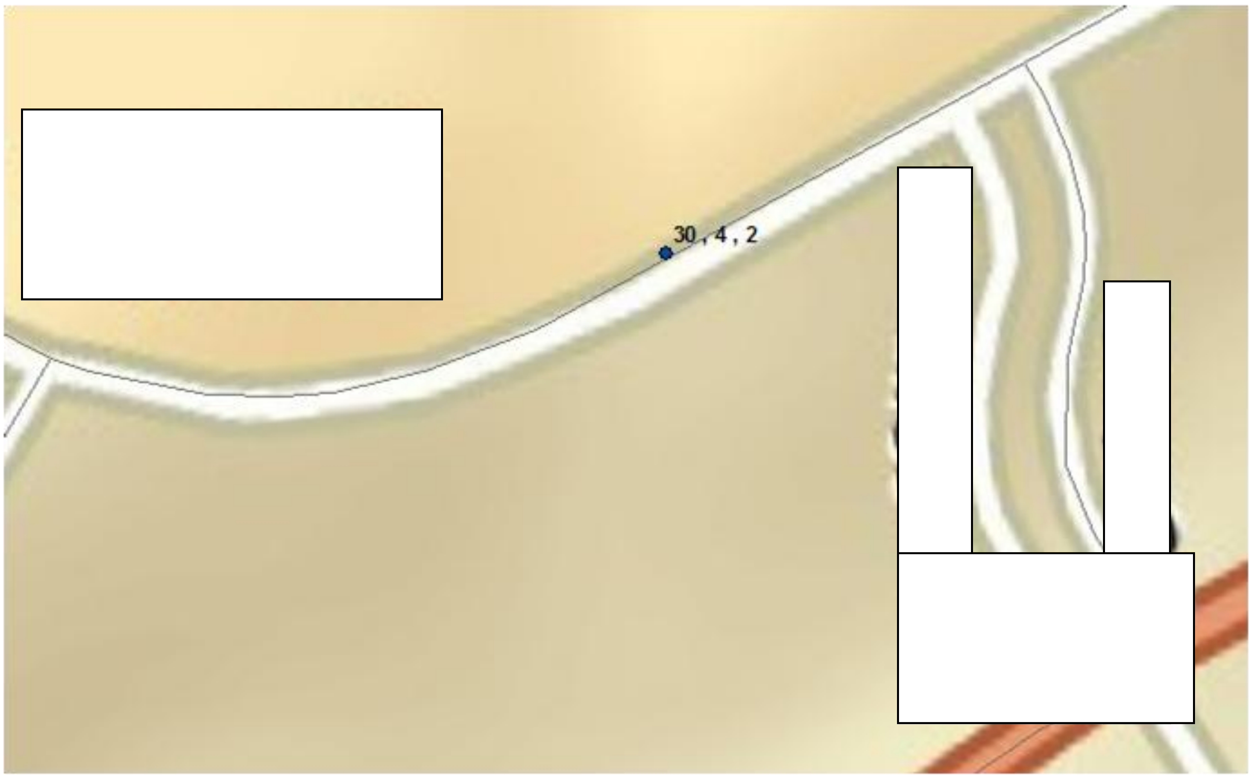


Figure 6-Plant Point level data

Coverage Derivation Using Linear Facilities Data

A number of providers submitted facilities data. We handled this data in different ways depending upon what we believed the facility data represented.

Most telecommunications networks are divided into two components. Feeder - supplies higher capacity nodes (eg. DSLAMs, Fiber Nodes). Distribution - usually supplies customer premises (NIDs, Pedestals, Taps, ONTs). Where we could discern what facilities we were provided, we used different methods.

The next image demonstrates a geo-referenced CAD image as given to us by a service provider. Note the light and dark green shading. We would infer that the lighter segments represent distribution and the dark green represents the feeder network.

In the case of a combined strand map, we used a relatively tight buffer of 200 feet to gather covered Census Blocks. Our intersection tolerance is based upon an assumption that our data likely represent a

situation comparable to customer point level submission in that we have most of the network footprint captured.

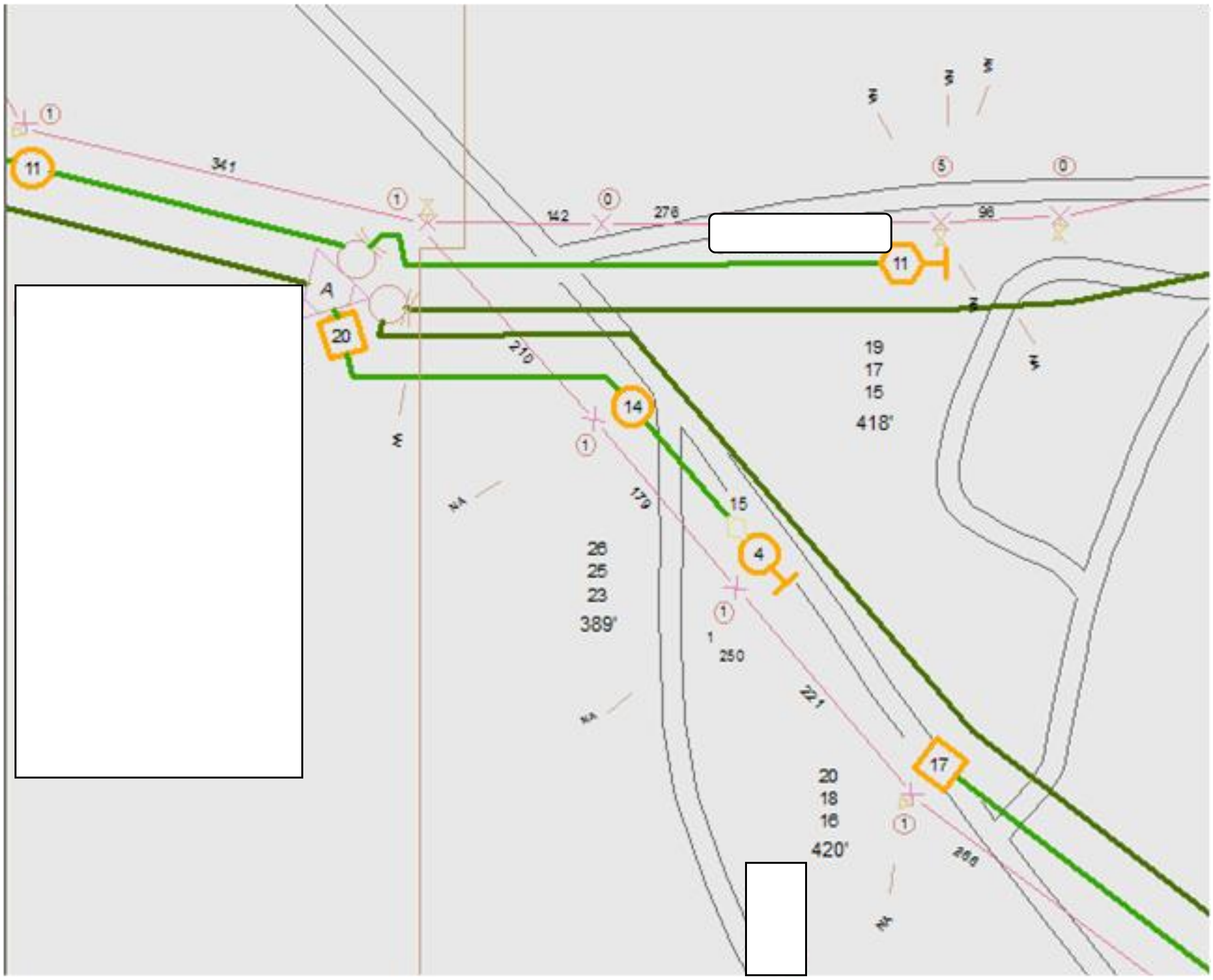


Figure 7-Georeferenced CAD information supplied by Broadband provider

In other circumstances, we were provided engineering information that we inferred to be feeder only. This inference was typically based upon the presence of fiber optic equipment only. In these cases, we used a more generous 2,000 meter Census block intersection. The 2,000 meter criteria was based upon an informal survey of population in proximity to the geo-referenced strand data, but it could be varied based upon a more complete survey.

Coverage Derivation Using Covered Street Segment Data

In some cases we were provided with covered street segment data. Covered segments tended to come from two sources.

In some circumstances, providers gave us CAD data, which was not drawn in a projected manner. This is relatively common for older engineering data derived from hand drawn records. This meant that our

team geo-registered the image into an approximate position. In this case, the boundary streets were selected, and an enclosing polygon was derived. The intersection of this polygon and the Blocks within became the geoprocessing method to derive Blocks.

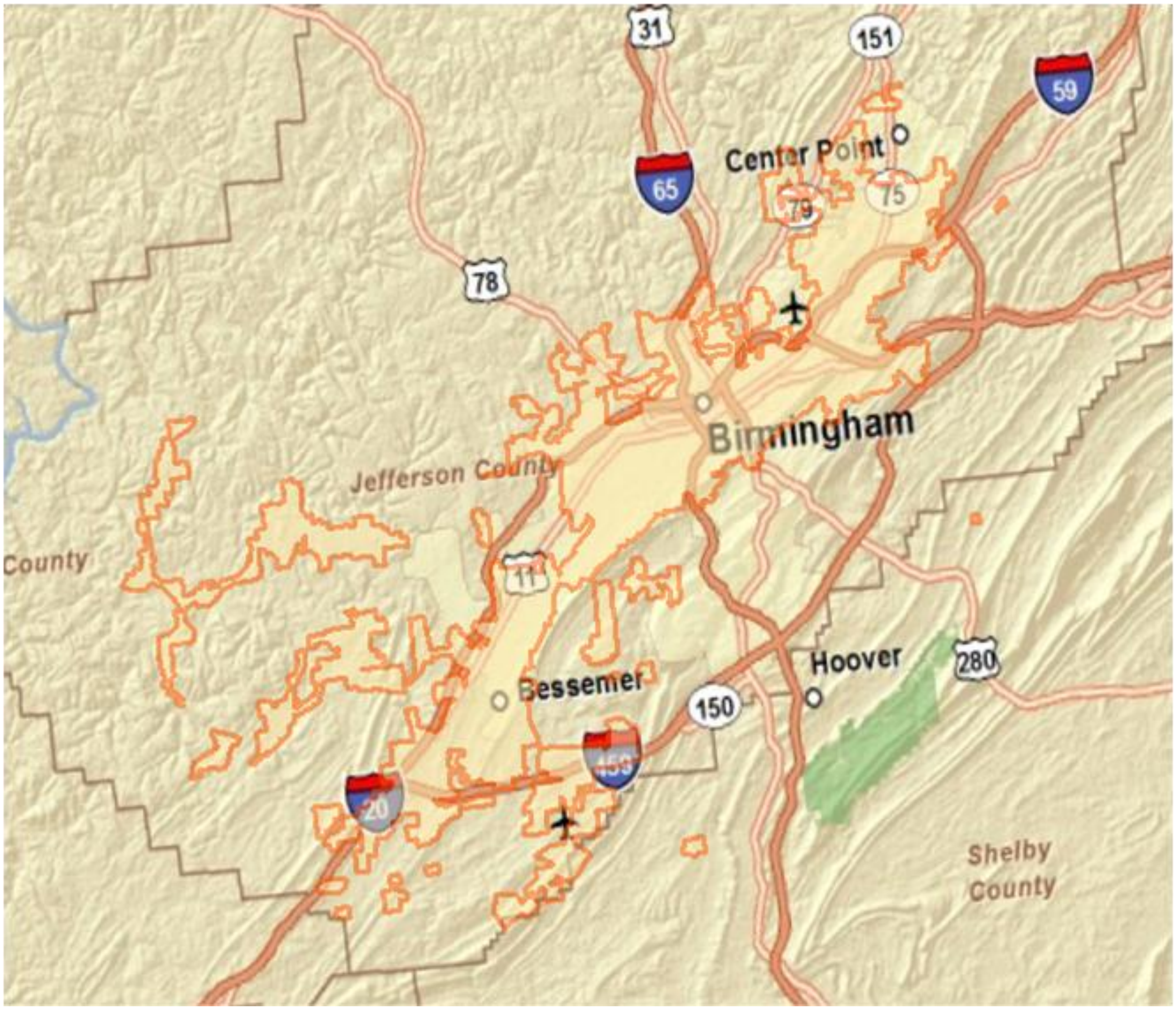


Figure 8-Coverage derived from street segments

In a second circumstance, street segment data was developed during coverage estimation. Handling the estimated data is discussed below.

Coverage Derivation Using Serving Area Point Submission Data

In other cases we worked with providers to derive service areas based upon point plant data. In these cases we were given a serving node and an appropriate road length service boundary. There is an important distinction from the plant data discussed above. In this specific case, the data submitted was a node that served many locations--such as a Central Office or DSLAM. This is contrasted with the earlier example in which the point represents a node serving only a few customers.

When trying to derive coverage from Central Office or DSLAM nodes, the team used ESRI Network Analyst to derive covered road segments honoring these road engineering parameters.

The figure below shows street level coverage derived from Central Office and remote DSLAM point data.

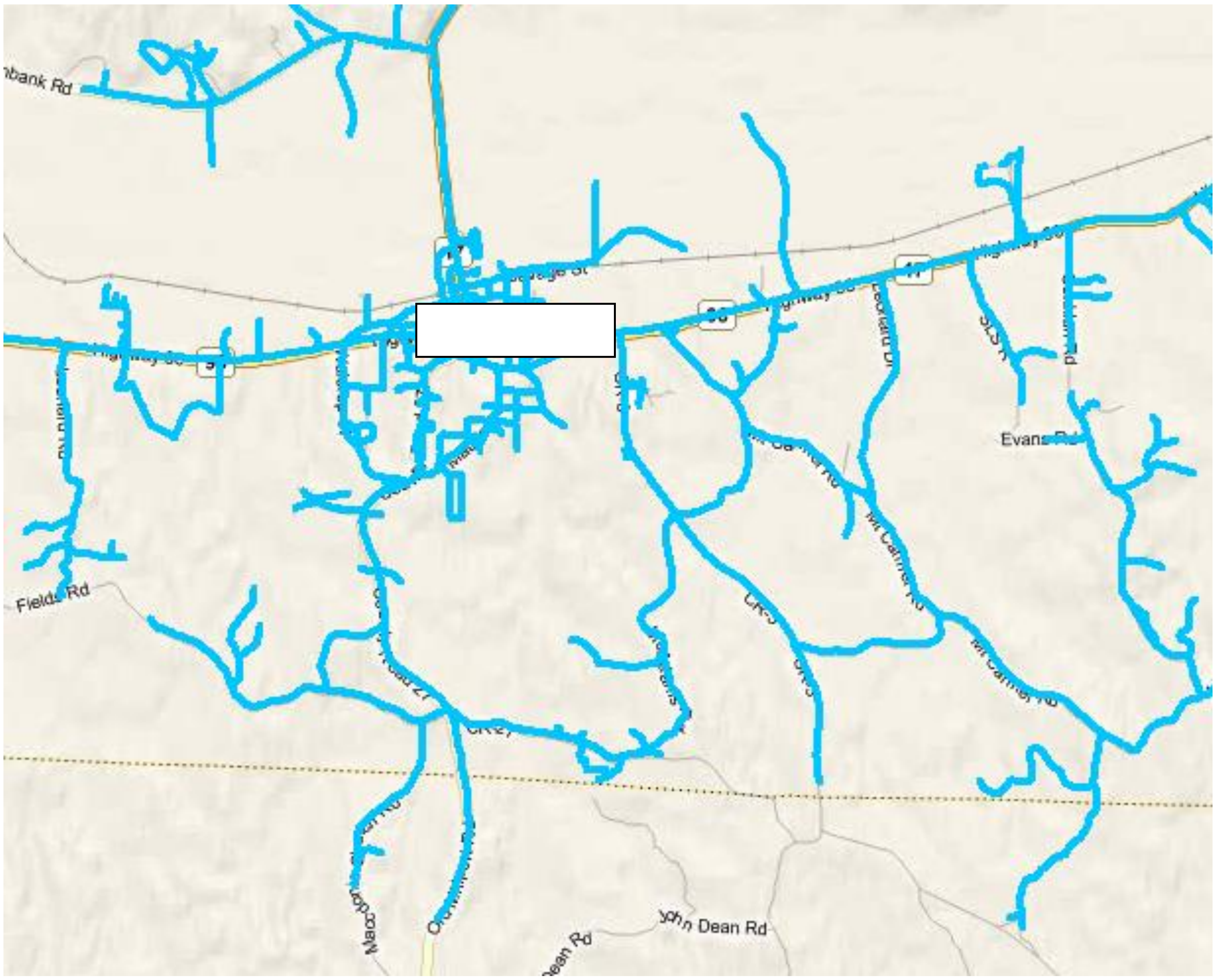


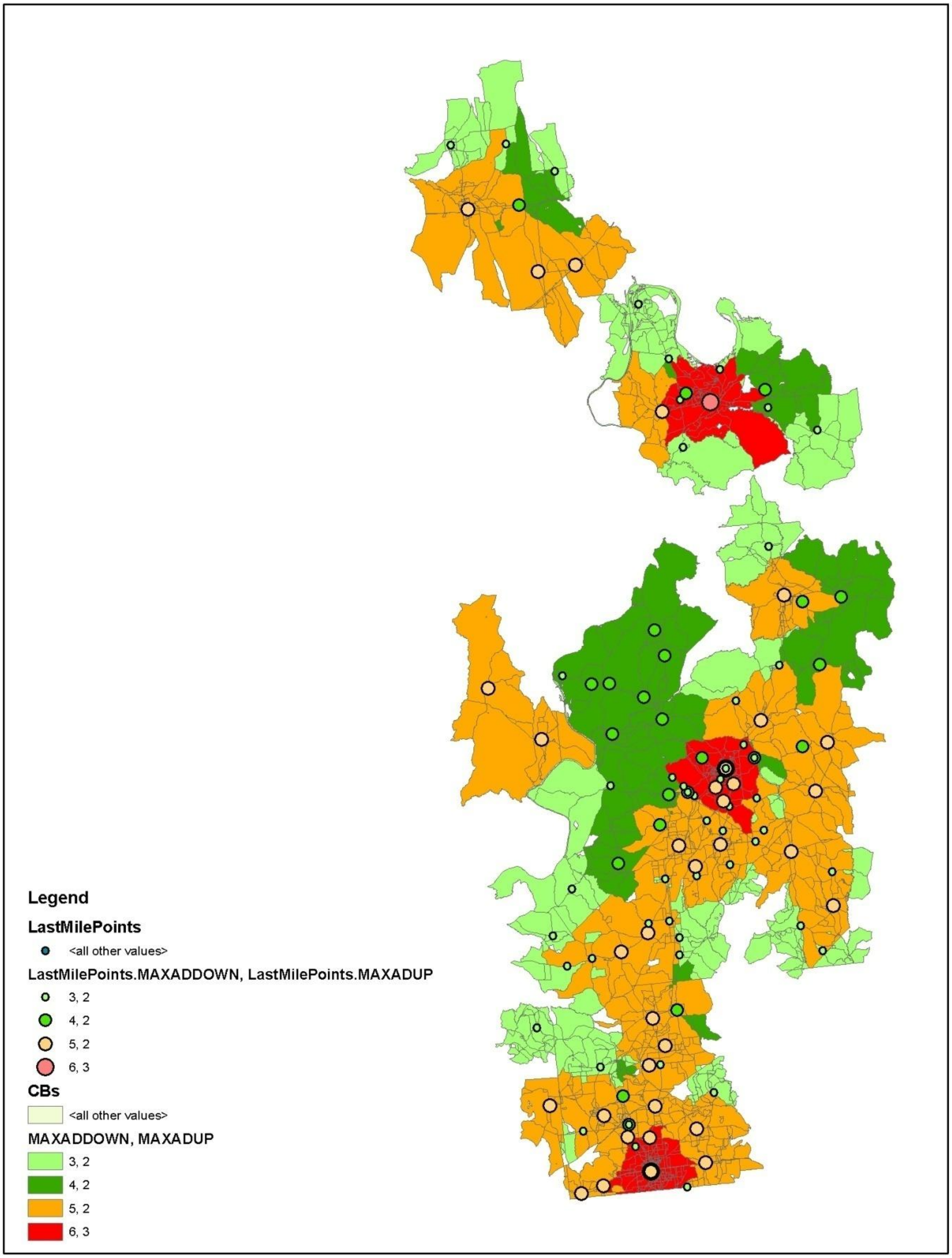
Figure 9-Coverage derived through road paths

In response to Provider feedback we revised this process to include a larger variety of TIGER road types. In Round 1, unimproved roads were not used. In the current submission -- particularly to improve estimates in areas bordering parks and public lands -- a wider class of TIGER roads was used.[14]

The segment level coverage is easily extendable to derivations of Census block level speed. The figure below shows the attributions of block level speed based upon the Maximum Advertised Speed available from a DSLAM. Although the methodology isn't perfect, it does provide insight into the value of granular infrastructure data.

[14]Only TIGER features of MTFCC type S1100 and S1200 were excluded from use.

Over time we have seen an increase in the number of providers submitting this type of data for our use. Our sense is some providers find plant level data easier to generate and are satisfied with the results of derived coverage.


Legend
LastMilePoints
<all other values>
LastMilePoints.MAXADDOWN, LastMilePoints.MAXADUP
3, 2
4, 2
5, 2
6, 3
CBs
<all other values>
MAXADDOWN, MAXADUP
3, 2
4, 2
5, 2
6, 3

Coverage Derivation Using Polygon/Polyline Serving Areas

Broadband service providers sometimes submitted coverage in terms of served areas. This was either in direct geospatial formats, CAD files, or paper maps. The image below reflects a carrier's service area. Within that service area, there are variations in technology of transmission and served speeds. When polygons with speed data and technology of transmission were available, we used a spatial intersection to gather covered Census Blocks. In many cases, using covered Census Blocks resulted in a loss of the speed variation (sometimes the speed variation was at a level smaller than a Block and did not get picked up within a spatial query).

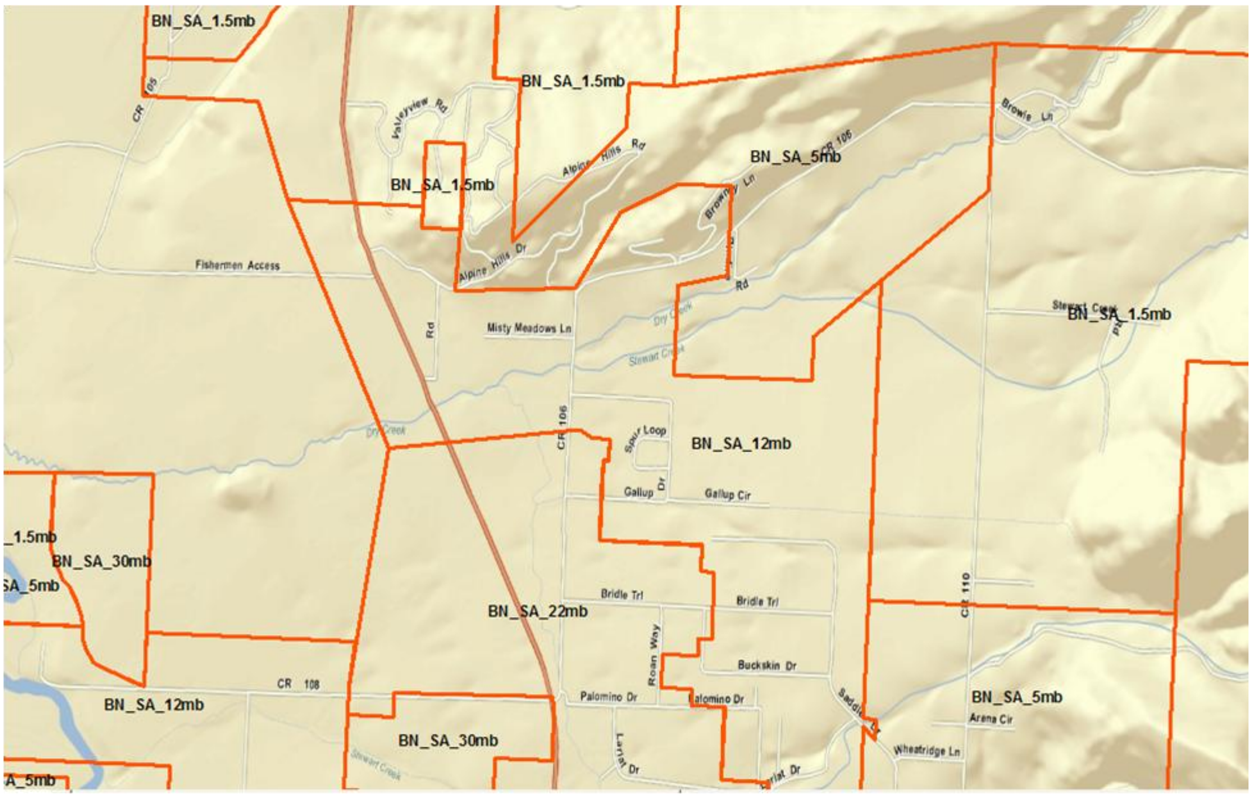


Figure 10-Coverage derived through serving area polygons

Although we cannot directly solve the loss of speed granularity due to Block shapes, we honor a business rule wherein we always select Blocks from the highest speed areas first, and then allow the lower speeds to select from the remaining Blocks. This is an arbitrary rule, but our feeling was that it should be a consistent selection, rather than an unordered selection.

Street Segment Derivation, Large Blocks

For those calculated Blocks greater than 2.00 square miles (large Blocks), we provided coverage in terms of covered street segments and corresponding geography.

With respect to segments we had four sources of data:

1. Covered large Blocks
2. Tabular street segments and address ranges for large Blocks

3. Geographic segments either with street attributes or without
4. Service area boundaries

A few providers only provided a list of covered large Blocks without corresponding segment information beneath the block. This provided the choice of either selecting all segments in the block, or none. Because we had little information from which to make the selection, we elected to be conservative and did NOT pass any covered segments to NTIA from this submission format.

Some Broadband providers submitted covered street names and street ranges. In these cases we performed a manual analysis trying to link to specific segment names and address ranges within covered Blocks. Sometimes this was a simple process because a provider used a TIGER derived street database. In other cases we could not determine the source of the provider's street data. Street and Address matching tended to yield a relatively good result (typically between 30% and 100% of possible segments in the Block), but was very time consuming. Where yield rates were low, our result was a shredded

segment coverage pattern, like the image shown below.[15]

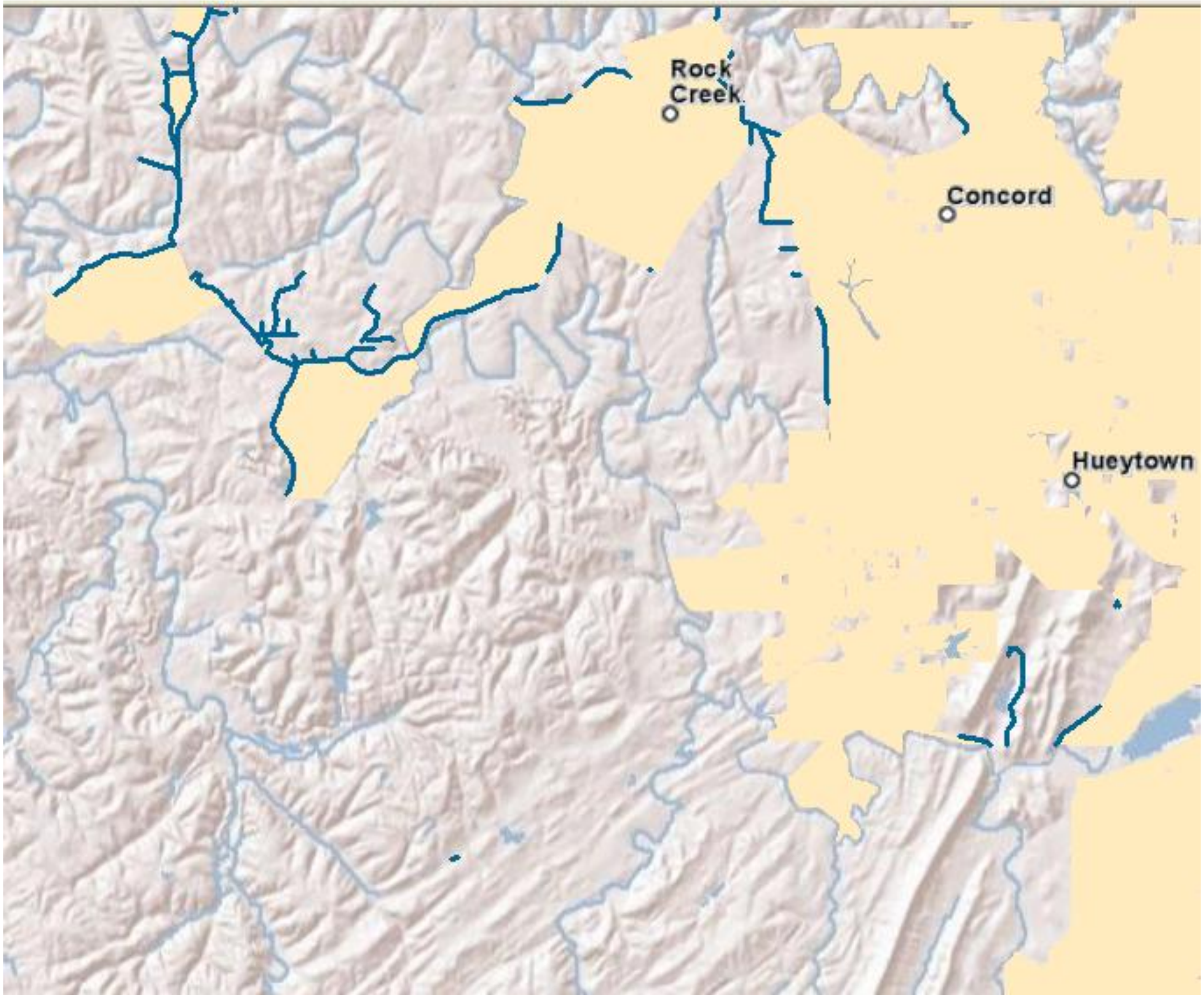


Figure 11-Blue road segments adjacent to peach covered small Blocks

A number of providers submitted geographic objects. In this case, our manual process was directed toward a conflation of data sources. The goal was to take provider submitted segments and put these segments in terms of our TIGER 2010 basemap. Although there is a trade-off in the accuracy using non-provider submitted segments, we felt it was more important to have a license-free road set that would edgematch our Block features, the TIGER state boundary and remain consistent with the block size standards we used for other providers. This is important for the appearance of the online maps, as well as potential verification work where we are attempting to judge a feature based upon its attachment to a covered small Census block. The figure below shows street segment input data.

[15] We continue to hear providers expressing concern that our request for either a geographic object or TIGER Line ID is beyond the scope of the NOFA clarification. Therefore, they cannot supply additional information to us.

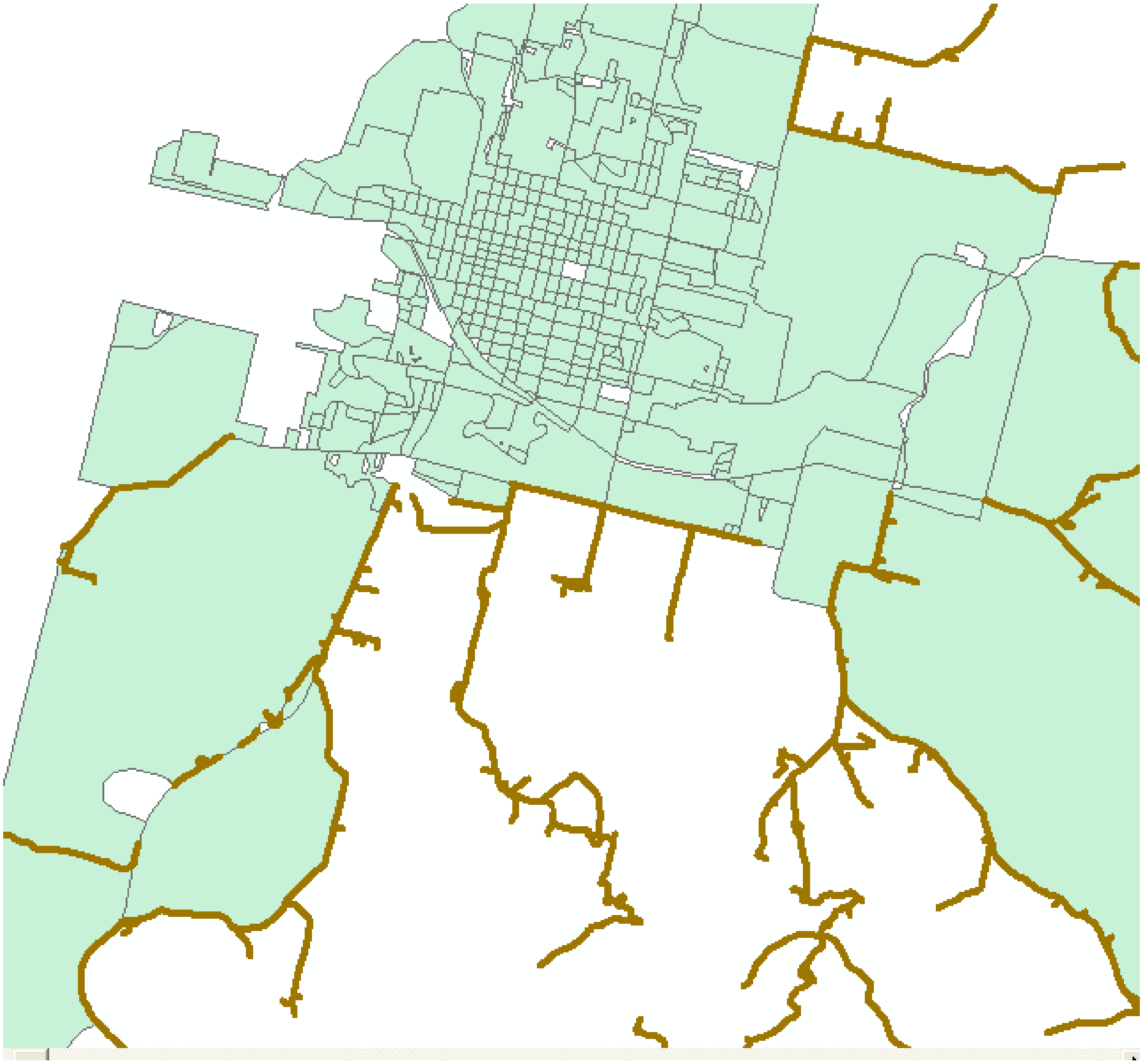


Figure 12-provider Submitted Street Segment Objects. The segments don't edge match the Blocks nor are they continuous.

The figure following demonstrates the same area after the conflation process. Blue segments are the conflated TIGER roads which will be passed to NTIA.

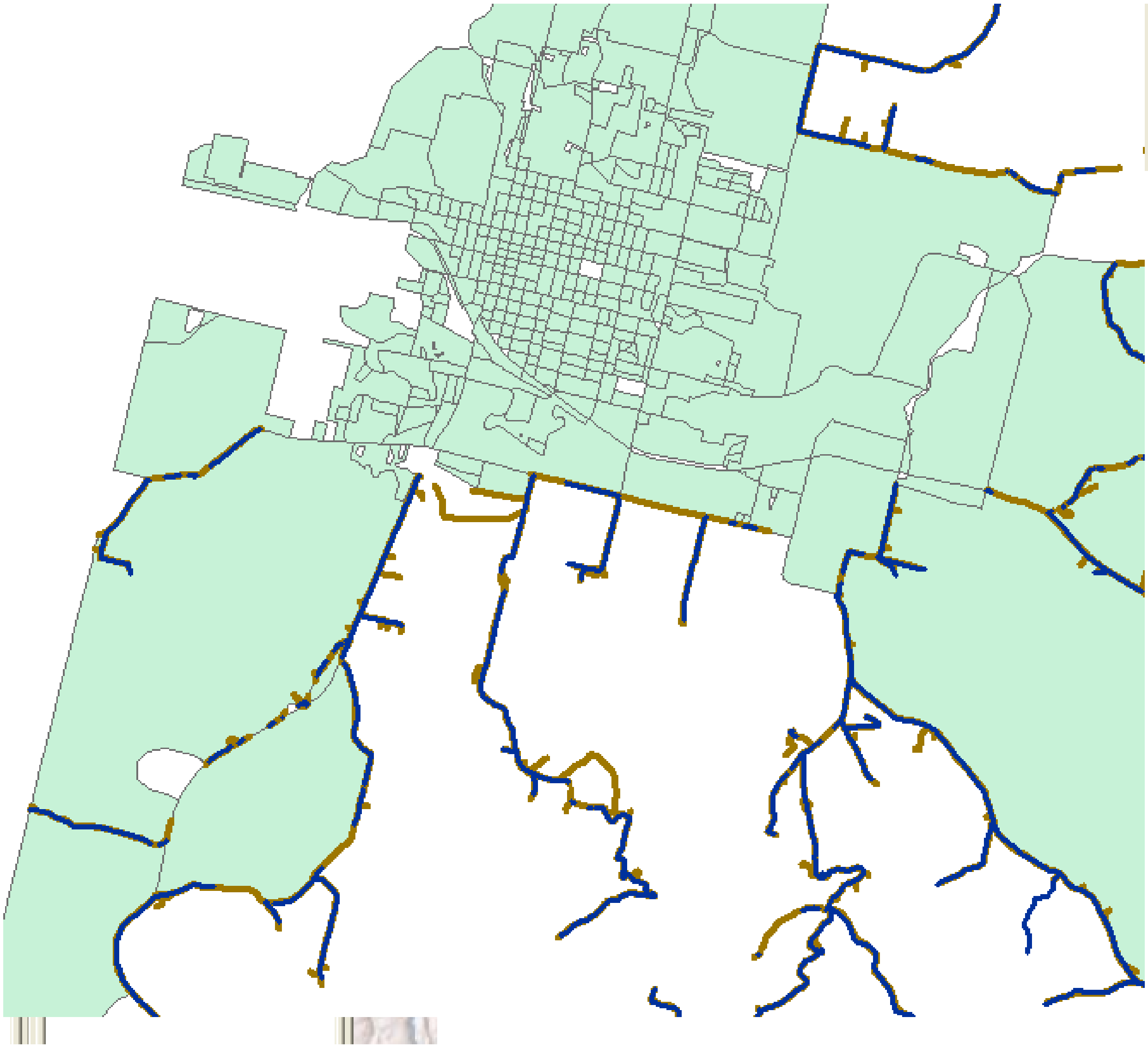


Figure 13-provider submitted segments in gold, selected TIGER in blue—Conflation result; in many cases what was a continuous segment is made discontinuous because even with a distance buffer the TIGER segment doesn't always intersect the provider segment

The final segment process was used when we were supplied with a Broadband covered area polygon. In this case, we found the segments within covered areas and eliminated those segments inside of Blocks less than or equal to 2.00 square miles.

Because there was more control over the format of the inputs (we knew we had a boundary and were working with TIGER segments), this was an automated process that followed this general format:

- Select large covered Blocks by provider ID (from updated Large Block table)
- Select TIGER 2010 road segments (MTFCC like 'S%') that face (CB = CBLeft2010 or CB = CBRight2010) covered large Blocks for provider

- Select segments as distinct records, max speed with corresponding technology, join in feature names, export selected records to temporary DBMS table
- Join TIGER roads feature class to temporary table on TLID
- Select covered segments (Python script)
- Select service area polygons for provider
- Clip selected facing segments with selected service area
- Export clipped segments to staging feature class, keyed by providerID

In this figure, orange represents covered small Blocks; black lines are covered segments in large Census Blocks (light blue). The service area boundary is shown in grey. Based upon feedback from providers, we have elected to clip segments at the end of a coverage boundary.[16]

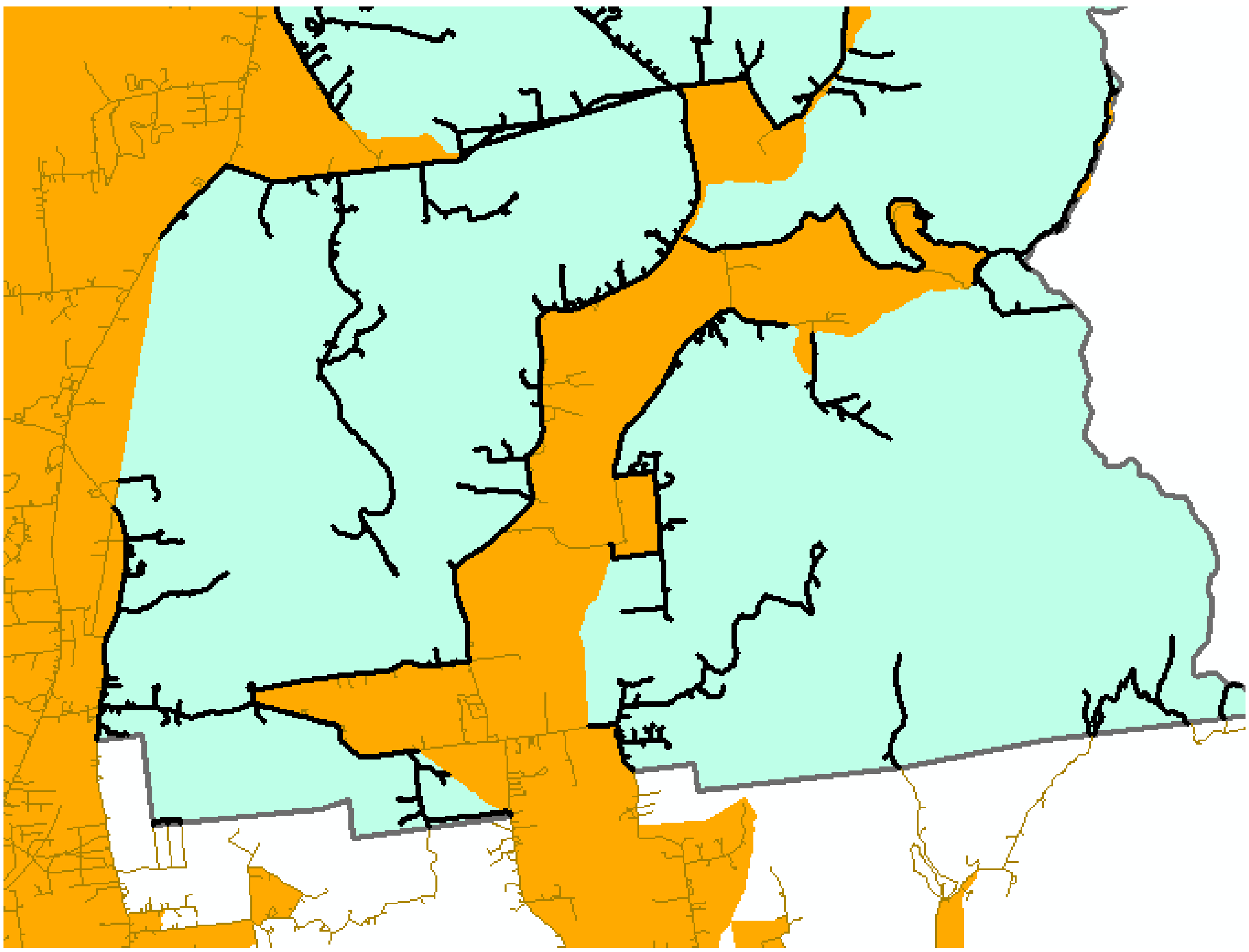


Figure 14-Output of the Segment Process

Wireless Coverage Process

In general, most providers of mobile Broadband submitted coverage information in a NOFA-compliant format. Other than attributions for spectrum and speed, little was done to this coverage.[17]

[16] An outcome not discussed here is how to handle address ranges on segments. As NTIA has asked for a Min and Max on the segment, deriving theses values for clipped segments is very problematic. Also the prevalence of alphabetic characters in addresses makes the min/max selections very arbitrary. We are grateful that addresses are nullable data elements.

Per Program Office direction, LinkAMERICA followed up with wireless providers where we determined that submitted data did not edgematch TIGER 2010 state boundaries. For the most part providers were unable to submit coverage data that edgedmatched as requested. In this case, we left the submitted data alone and did not perform any adjustments.

LinkAMERICA continues to make aggressive efforts to bring additional WISP coverage into the NTIA dataset. For the most part, our outreach was with providers who were unable to supply sufficiently granular data in the past or those that could only submit wireless address points which is no longer a valid submission format.

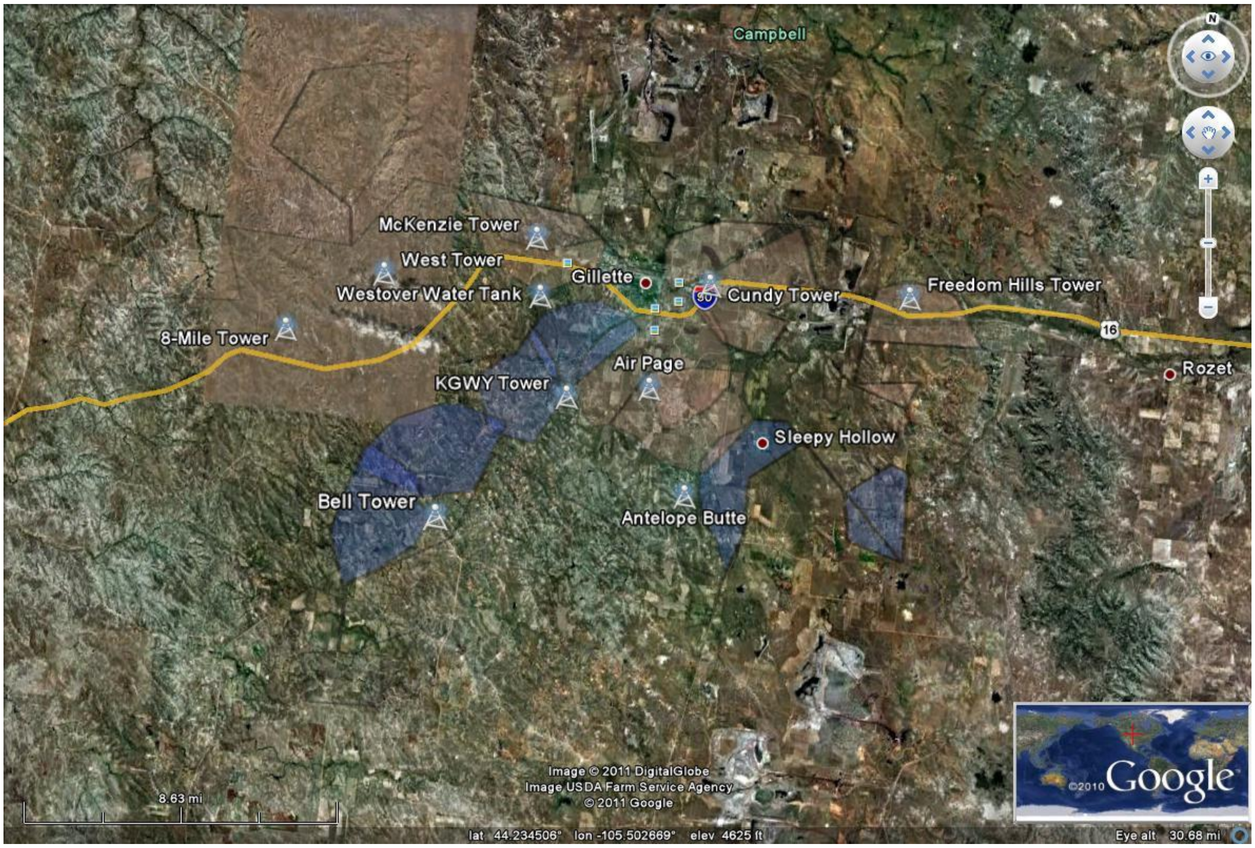
In Round 6 fixed wireless providers generally either supplied coverage information or infrastructure from which coverage estimates could be derived. Many allowed us to use their tower locations, antenna heights and direction/spread of coverage to derive a line of sight coverage estimate. In our experience, this is a conservative and reasonable derivation of coverage.

Some wireless providers submitted RF propagation studies. When this was done, there was a request that the signal strength be removed from coverage data. The request was honored. We note that some providers are very careful in that their coverage is an estimate of the probability of receiving an upstream link to their network. It is not intended as a depiction of any particular speed availability.

Other fixed providers were able to supply us with hand drawn maps or polygons/polylines drawn in Google Earth format. In these cases we did our best to georeference and verify the coverage areas with the WISP.

When we received coverage information in KML format, like the image below, we accepted the data as it was presented to us as the submitted coverage patterns were used in the provider advertising.

[17] Some polygon data did exceed the node count threshold. In these cases, data was rasterized to 100m cells and then converted back to polygons. The polygons were dissolved to multi-part geometry. This addressed the node count concern.



As the image above shows, in some cases we were provided hand-drawn coverage, as well as infrastructure. Instead of estimating their coverage using a line of sight or RF study, we elected to stick with the provider's supplied information. Our decision was guided by two primary factors:

If the provider is advertising using this coverage they must have specific confidence in its accuracy.
If the provider can supply coverage, as well as infrastructure that reasonably supports the coverage, there is a very high likelihood in the accuracy of the information.

The downside, of course, is the polygon shown on the map may not represent our notion of how wireless coverage should appear.

In general we note several interesting trends in the wireless data. First, we can be successful in increasing the amount of WISP coverage when we aggressively pursue WISPs. This means we have to be willing to accept data on their terms and convey it into SBI formats. Some of our WISP submissions have taken over 12 hours to normalize into SBI formats. Second, we have to accept that some WISPs will not be able to supply FRNs. Third, there appears to be some variation on how the NOFA coverage definition is met. In other words, there seems to be a disparity on the necessary link budget necessary (e.g. -80 dB, -98 db, -120 dB, etc) to provide the appropriate quality of service for data services to be provided at a location/inside a location.. Fourth it was very difficult getting providers to identify spectra used for

Broadband data services[18]. We are unsure if this is a competitive concern, or if the same coverage pattern is yielded for multiple frequencies. Typically, the spectra returned were those that a provider was licensed for. At this point, we have no reliable way to locally determine what set of frequencies are used to provide Broadband data services in a local area at a specific point in time.

Service Address Point Process

A handful of providers have requested that customer level, service address point data be submitted to NTIA. In these circumstances we have done minimal processing to preserve the provider's intent with this deliverable and not bias downstream NTIA use.

Our verification included checks against commercial or Public Utility/Public Service Commission exchange boundary maps. Points not contained within three miles of a boundary are not submitted to NTIA. The percentage of excluded data varies cross providers, but it tends to be under 1% of the total submission.

We retain from the provider the provided latitude and longitude, as well as Census block. For some coverage data, if a provider is unable to supply a longitude, latitude or Census block, we fill in these attributes. In those circumstances where we do not have a Census block, but we do have a longitude and latitude, we accept the given longitude and latitude and use that as the basis for our Census block assignment.

With point data we have tested for comparable geocoding success rates but do not overwrite provider information.[19] From this type of analysis we note the amount (usually little more than 10%) of addresses that seem to locate with less than street segment certainty. Deriving a thematic representation of the points on speed also illustrates some of the locational certainty issues in this point level data.

Coverage Estimation Process

Although the derivation of Broadband coverage into Census Blocks, street segments, or wireless coverage files is, in itself, a bit of an estimation process, there was an explicit estimation process required in cases where a Broadband provider either refused to participate in our survey, or provided such a threadbare submission that no carrier-based coverage information could be gleaned[20].

We typically resorted to three possible estimation paths.

---

[18] One provider responded by email, "This mapping program is to provide the coverage area for Broadband provided by a company. Not to keep a detailed account of every aspect of a companies (sic) network."

[19] We will make a second geocoding pass on locations with no longitude or latitude from provider. We typically pick up ~5% from our second geocoding pass. Typically the issue is address quality but also difficulties in geocoding in very rural areas.

[20] We report estimated submissions to NTIA as a non-responsive provider but we have data in the submission for them. This is the reason for datapackage.xls entries which are non responsive but contain submitted data.

For Cable (HFC) providers who did not provide any coverage information, we fell back to Media Prints data. Rather than using the entire Census Block Group gathered by Media Prints, we used only those Census Designated Places carrying the same or similar names to the Media Prints p_com field. Our reasoning was that Cable systems tend to be franchised on a municipal or at least administrative basis so the coverage will likely follow a governmental boundary. As a general rule, cable infrastructure is not available in the public domain[21] and what could be found was poor in quality and difficult to ascertain for validity.

For DSL providers who did not provide any coverage information, we estimated road-based coverage from their Central Offices[22]. We only used Central Offices that showed evidence of DSL or fiber-based services in the NECA 4 tariff. Road-based engineering areas were derived via ESRI Network Analyst to 18kft. These segments/boundaries were clipped to commercial wirecenter boundary edges.

For fixed wireless providers who provided no coverage information, we relied on their public websites to derive coverage maps. When these maps were available, we georeferenced them and tried to use the outer polygon boundary to represent their serving area. In other cases, when only a tower could be provided, we used a view shed analysis and estimated line of sight coverage at 10mi per tower[23]. Because much wireless propagation is driven far below the Census Block and much engineering information isn't known (frequency in use, polarization of the signal, coverage pattern of antenna(s), local terrain/land cover) this was the most complicated group to estimate.

Speed

Speed attributes are reported both at the block (typical) and higher levels (maximum advertised and subscriber weighted). We note that in many cases, providers did not supply typical or subscriber-weighted speeds. In some cases, it appears--although we cannot verify--that their maximum advertised speeds were used to populate typical speed columns.

We do have limited testing data on reported speeds, but we have been careful to not use our typical reported values with carrier-provided information. If we do not have a speed value from a provider, we report an empty value.

Several service providers claim they do not have data on typical speeds available, but estimate a 20% overhead factor between the advertised speed and what may be experienced by an end user.

We continue to request advertised speed at the block level. Nevertheless we appear to be getting speeds that do not vary over a large geographic area – leading us to believe that providers may still be submitting the maximum speed advertised in local media for the entire market. For the most part, we

[21] The team tried to use data from the FCC Coals system and 321/325 fillings but this seemed to be a bit non-uniform in quality.

[22] Central Office location was derived from GeoResults. Wirecenter boundaries also came from this commercial product.

[23] In some cases we had an approximate radius of coverage but no height. In this case we used a 50' height estimate and then clipped the coverage to the provided coverage range. We also clipped wireless coverage to honor state boundaries but did not look for providers serving coverage with out of study state facilities.

have been unsuccessful in messaging that advertised speed should not correspond to a market area, but instead, the maximum speed, which can be provided to a household—what some may describe as a 'qualified speed.'[24]

As a general rule, in circumstances where a provider supplies a range of speed attributes, we assign NTIA categories based upon the midpoint of the range. We follow this rule unless we can determine other grantees are handling the same submitted information differently.

To support NTIA program office requests, we have also modified the structure of the Service Overview table. Even if Maximum Advertised Speed is supplied at the market or county level, we push that speed down to the contained Blocks. The only records that remain in this table, will be those wireline records with either a non NULL nominal weighted speed or ARPU value.

Middle Mile

Middle Mile information was collected directly from providers via survey or interview. Middle Mile is a "chicken or egg" type of challenge in that it is possible to verify that the infrastructure exists, but extremely difficult to know what the site is doing without engineering level assistance. Although most providers submitted "something," there was a significant variance in what that "something" represented.

The purpose of this section is to record some of the comments and questions we have received about Middle Mile. We hope this provides better context for our data submission.

Within the NOFA, Middle Mile was defined as (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. (Collectively, (a) and (b) are "middle-mile and backbone interconnection points.")[25]

Given the existence of the "or" in this definition, providers submitted a variety of information. Based upon the NOFA example, several fixed wireless providers interpreted Middle Mile in terms of the connection points from their towers to their own serving backhaul location. The topology was commonly Microwave from their distribution towers to their NOC. The NOC and towers were listed as the Middle Mile points. This seems to be consistent with the first definition clause (a).

Telephone, Mobile Wireless, and Cable providers tended to remain either silent on the question, or would provide a single location in which Internet peering occurred (clause b). A number of participants explained that the NOFA was quite ambiguous with data traffic moving back and forth over both TDM

[24] As an example of a response to our request for Block level advertised speeds, we received the following comment from one anonymous provider, "This is and of itself does not require anything new of us – just states the NTIA supports efforts focused on getting that information on the CB level." It would be helpful to have broader messaging so that providers understand this new direction.

[25] From http://broadbandusa.gov/files/BroadbandMappingNOFA(FederalRegisterVersion).pdf at 54, visited March 28, 2010

and IP networks--it was unclear where the distinction should be drawn. As a general rule it seemed like many providers listed a single location where Internet Peering occurred.

A number of providers refused to answer the question on grounds of confidentiality[26]. Others would not disclose as their Middle Mile points are not owned--another company provides the physical and electronic connection to their network. In other words, the entity providing Broadband is not the entity providing Middle Mile.

Additionally, based upon the new Provider Type classification of "other," we have started to integrate points provided by Broadband service providers not meeting the NOFA definition. This includes POP locations and aggregation points for public / private networks.[27] Within a given submission there were two final attributes that tended to concern respondents. First, speed should be measured in terms of only data capacity and what exactly is "data" (e.g., can/should you segregate out voice or video), and is the relevant capacity of the physical connection, channelized to a specific virtual circuit on their network.

Finally, a number of other providers were unsure of the height above grade measure (is this their floor, the street outside, etc). We seem to have a combination of height above or below grade, as well as heights above mean sea level (AMSL).

To the extent possible in our timeframe, we verified the location of a sample of Middle Mile points. Where we could see infrastructure that appeared to be consistent in location with other provider infrastructure, we felt that the location was accurate. In some cases, the point provided seems sensible (is on a road, near other equipment), but using imagery, we couldn't find a place where this type of connection could occur. This wouldn't be unforeseen, in that Middle Mile connectivity likely takes place in a protected environment much smaller than a standard Central Office installation.

Mobile Wireless Coverage

We have received mobile wireless coverage from most mobile Broadband providers in each state. At this point we have cleaned the geometry of the data and attributed it with spectra, NTIA speed categories and FRN as required.

Where possible, provider derived coverage has been reviewed for consistency against the commercial licensed product.. To a limited extent we also use licensing locations and tower infrastructure to spot-check supplied coverage. This mode of verification remains complex, given the lack of facility-based information with mobile wireless.

---

[26] As received in email 9/30/10, "Due to security concerns and the risk of public disclosure of highly sensitive data, whether inadvertent or otherwise, ***REDACT***response to the Middle Mile and backbone interconnection request is limited to publicly available information available on {remainder not included}"

[27] As discussed in our readme.txt file, a number of middle mile points were lost in validation due to their location in adjacent state. This will cause a decrease in some providers relative to prior submission.

Finally with respect to mobile Broadband services, we note several trends.

First LinkAMERICA used the NTIA supplied frequency tables to report speeds consistent with other grantees. In circumstances where a provider supplied a range of experienced speeds, we used the portion of the range consistent with the most frequently reported Grantee value.

Second where a provider reports multiple frequency bands in use but doesn't distinguish these bands by submitted SHP file, we submit identical geometries but attribute one geometry to each submitted spectrum value.

Third we are seeing a trend toward increasing Broadband speed. As of this writing, there is not consistency across providers in how they attribute the advertised 4G speed values. In other words, for some providers 4G means advertised speed categories increase. For other providers the speed value did not change.

Fourth, we have requested providers submit SHP files that are consistent with the TIGER 2010 boundaries. For the most part, providers have not done this. As the request came late in the round six submissions our hope is this request will be honored for round 7. We have not modified the submitted data to impose the TIGER 2010 state boundary.

Verification

Data verification is an ongoing and evolving process. Clearly, with each new data submission there will be a validation process at hand and at the same time, our team continues to expand and improve the efficiency and effectiveness of our data verification routines. Consistent with the movement toward an fGDB export database and use of a data receipt script, much of our validation effort is spent in supporting the ETL processes into the required formats. In future data submissions we will continue our work to stabilize and improve the business process that normalizes provider submissions into NOFA formats and expands in more depth on the confidence analysis within the data.

Verification Methods Summary

Our overall verification standard is focused on the level at which we supply processed data to NTIA. This means that the vast majority of our verification process and resources will be focused on verifying provider identity, coverage, advertised speed and appropriate metadata for Census block's less than or equal to 2 square miles.

We believe three broad verification themes are important to consider

a) The first step of broadband service verification is a consistently applied market definition—we call this provider identity verification.

b) There is probably not a single dispositive method of verification. Rather, a number of verification approaches are needed to appropriately classify confidence in data submitted to NTIA.

c) Verification approaches tend to meld together. As an example a web survey is complimented by a phone survey but expert review and external data may be necessary to reach a final informed judgment.

The table below demonstrates the various methods used across each feature class submitted to NTIA.

	Data Types			
Verification Method	**Census Block, Road segment or, address specific service availability**	**Mobile wireless service availability**	**Middle mile infrastructure locations**	**Community anchor institutions**
Provide/Subscriber Identity Verification	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Internal data consistency check	METHOD USED	METHOD USED	METHOD USED	METHOD USED
External data consistency checks	METHOD USED	METHOD USED		
Carrier confirmation	METHOD USED	METHOD USED	METHOD USED	
Public review	METHOD USED	METHOD USED		METHOD USED
Anchor institution review				METHOD USED
Expert review	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Telephone sampling	METHOD USED			METHOD USED
Purchased Datasets	METHOD USED	METHOD USED	METHOD USED	METHOD USED
Developed Datasets	METHOD USED			
Web-based surveys	METHOD USED	METHOD USED		METHOD USED
Field Surveys	METHOD USED	METHOD USED		METHOD USED

The following table defines each of these methods and provides a summary of why this method is used, and the value we gain from it.

	Definition	Methodology	Purpose	Benefit
Provider Verification	Provider verification is the process of assembling a broadband provider database, determining which providers are properly classified into SBI eligible providers and developing contact information.	Provider verification involves combining multiple data sources, interviewing providers and classifying the broadband provider type.	Without a consistent understanding of the provider 'market' it is impossible to appropriately classify the coverage data. It is also impossible to explain to consumers of the data why a given provider is or isn't available in the submitted data.	The main benefit of this verification process is understanding who is providing broadband services, are the broadband services NTIA compliant and how do you 'contact' this provider (Name, DBA, FRN, Holding Company)
Internal data consistency check	An internal data consistency check is a validation measure across at least two dimensions. First is the provider data consistent with prior submissions. This would be an examination of this submission relative to a prior submission. Second is this submission	Most of this validation is performed using our spatial databases and running queries that compare submissions. We also use a similar set of queries to isolate transmission of technology outliers. These would be data sets which offer speed technology combinations	The purpose of this type of validation is to understand how things change over time and why. It also helps inform us for circumstances where we have data points which appear to be outside of the norm. If these outliers are	The main value is understanding why something changes and providing an opportunity to engage with the provider to understand why there has been a change.

	consistent with the technical specifications of the service offered.	which are unusual relative to other data received across all states.	detected, they can be pursued directly with the provider.	
External data consistency checks	An external data consistency check is a measure of the provider data against external sources (not from the Provider). The distinction between internal and external isn't pure, but our typical experience has been that External checks involve the acquisition of additional data sets and a comparison across multiple sets.	External validation can be performed by verifying supplied coverage against third party data sources. An example would be to test provider claimed DSL Census blocks against a commercial source of exchange boundaries. Wireless coverage is also compared to tower locations.	We don't believe a single, exhaustive third party data set is available for validation. We do believe a combination of external datasets can be used to inform and help filter out the false positive cases from provider data. We also note that the external data appears to diminish in accuracy as the area of analysis becomes less urban.	External validation provides an external measure of data quality assessment not influenced by internal data sources. It can be one of the more effective means of isolating false positives in submitted data.
Carrier confirmation	Carrier confirmation is the process of sending processed data back to the service provider	We use two techniques to accomplish this. First a provider's data is summarized in a tabular format. This lets the	One of the more critical steps in broadband mapping is translating carrier	Carrier confirmation gives the provider information on how their data will look when submitted to NTIA. It also helps short circuit complex problems like

	to ensure that translation into NTIA formats is fair and appropriately accurate.	provider quickly verify firm information (FRNs, DBAs, counties served). We also develop two sets of check maps. One is a PDF version and the second is a Google Earth (KMZ) version. Both versions display the NTIA reported coverage and speed. A different map is developed for each technology of transmission	supplied data into NTIA formats. Providing verification deliverables to the service provider (carrier) isan important external feedback process. Several providers also ask us to repeat this process before data are submitted to NTIA so they can see what will be submitted to NTIA.	online map display problems—which tend to come from FRN issues or incorrect data entry. This process also helps to strengthen the sense of ownership and participation with providers.
Public review	Public review is the process of collecting structured feedback from the general public in a manner which can be analyzed and used to improve/validate the submitted data.	Currently we use an online map 'layer' which provides consumers the ability to feedback about the coverage and provide in depth information about their concerns. The maps are also discussed within the context of planning teams within each state. We receive	As with other crowd-source approaches the intent is to allow the general public to feedback and improve the displayed and submitted data.	The benefit is to provide feedback and also display real time the comments of the general public. As a mechanism for validation the key is to develop feedback data which is structured in way that informs the mapping process.

		feedback from these meetings.		
Anchor institution review	Anchor institution review is targeted surveys intended to better understand the Anchor Institution broadband market.	We have used three methods to verify anchor institution data. The first is a targeted series of telephone calls. The second is specifically targeted mailers. The third is direct interviews with stakeholders. Schools for example, may have someone at the state level who maintains information about broadband connectivity.	As Anchor Institutions represent a different class of coverage information as well as a very different type of end user, a focused stakeholder management, data acquisition and data review process is advantageous.	Because CAIs represent a very distinct stakeholder community, building identifiable connections between the SBI program and the anchor institution community is important. Tailoring a specific data acquisition/ data review process helps Anchor Institutions establish a reliable set of infrastructure benchmarks which they can use to fulfill their mission.
Expert review	Expert review is the process of using subject matter experts to review submitted or processed provider data.	The method of subject matter review will be dependent upon the type of data in question. In the past this has taken the form of conversing with a wireless engineer to ensure that the coverage pattern appears plausible for a given technology. It may also involve a cross check on data from a second source—	The purpose of expert review is to get a second opinion regarding some aspect of submitted or processed data. Given the large number of submission formats and innovative ways to supply broadband, it is always	The most significant benefit is to have a secondary source for back checks and verification. For the most part expert review is from an engineering or deployment resource. Expert review also helps support process transparency so there isn't a closed GIS driven process making all the decisions.

		can this type of middle mile infrastructure support the maximum advertised speeds in this area? SME validation is also helpful trying to understand ambiguous information in submissions.	helpful to have multiple sets of eyes available to reduce errors from misunderstanding.	
Telephone sampling	Telephone sampling is the process of using targeted phone calls to verify aspects of submitted or processed data.	Telephone methodology tends to be consistent across the type of data being verified. A subject location or individual is identified. The phone number for that location is identified and a call is placed. The person performing the survey asks a scripted set of questions and records the responses in a database. For example, our team produces a survey to develop and monitor access and use trends at a regional level.	The purpose of a telephone survey is to gather in depth information from a targeted respondent. We would likely use telephone survey for targeted purposes--either clarifying anchor institution data or randomly polling consumers to better understand attitudes.	The primary benefits are to develop in depth information as well as surveying a large number of respondents regarding opinions or behavior. Phone surveys tend to be more helpful to survey attitudes or to find out location specific information. Telephone sampling is used in our consumer surveys.

Purchased Datasets	See external data consistency checks.			Also note that not all external data checks must be purchased. For example Census data could be used for an external consistency check but it is freely available for download.
Web-based surveys	Web based surveys can involve three dimensions. First a web survey (a form available to be filled out on the Internet) can be used to supplement and better understand consumers. A web survey could be a compliment or a substitute for a telephone survey to target a specific demographic (a web survey can also be part of a social media campaign). Further web surveys can be used to verify provider information.	In the case where a web survey is a compliment to phone or in person, a survey,instrument is developed and then respondents are invited to complete the form. In the case where a survey is a mechanism to gather additional information from provider web sites, this could take the form of manual queries (looking for address listed in a Census block) or automated scraping where information is pulled from a website via a specific web application. We currently use both approaches depending on our goal.	The purpose in all cases is to gather additional information via the Web.	The benefits of web survey are its relatively low cost as well as the ability to gather specific information into a form that can be easily used by downstream work processes.

Field Surveys	A field survey is sending a team of skilled participants into the field to verify submitted data or sample some aspect of the environment in a given area.	Field survey methods involve assigning a field team, equipping them with data acquisition hardware, ensuring they have a consistent skill basis and recording observations. To date most of our field survey work has been in engaging CAIs into the process. We have performed limited wireless testing and infrastructure verification.	Although expensive, field surveys are sometimes the best way to verify information such as provider equipment presence or the strength of a wireless broadband signal.	The benefits to field work are significant. They can help us better understand the exact phenomenon in a particular area.

Verification Standard

Verification is a broad term, but in our definition it boils down to determining if broadband coverage is in the right place. For a given provider, the question is whether the coverage is assigned to appropriate Census Blocks, road segments or area features. Coverage verification can be further broken out into two distinct classes:

- Technology verification, which is determining if the provider is listed with a technology consistent with their marketing information.
- Speed verification, which is determining if the speed supplied for that block, road segment, point area file or market area is consistent with the technology and the marketing information received.

The final verification dimension is consumer feedback and crowd-source verification. This is a dynamic set of steps we are beginning to implement. One side of this is responding to consumer concerns. The second is using the crowd sourced data to validate provider claims and, if appropriate, update the map and the underlying data.

At this stage, our working hypothesis (confirmed by our experience) is that there will not be a single measure to indicate broadband coverage availability in a Census block or along a segment. From prior work, and examining our current provider submissions, we believe that there is too much variation below the submitted record to make a single binary yes/no indication. Rather, there will be a series of measures that combine to provide qualitative confidence (a classification scheme) in our indication of Broadband availability at the block, segment, or wireless polygon level. We believe such a qualitative classification scheme is both relevant to and supportive of NTIA interests, as well as the interests of our end-user community – that is, the states and citizens we serve through this program.

The intent of this section is to illustrate why our team is moving toward a particular verification methodology. Our team is learning as we go along, and will adjust and improve this thinking. But given our experience to date, this is our path. As stated above:

- First, coverage verification is at the level of data submitted to NTIA.
- Second, coverage verification is enhanced when there is a secondary measure of availability (such as infrastructure presence or serving area boundaries)
- Third, given the limited resources of this effort, the most important coverage verification process to implement is the erroneous dispersion of coverage. These are the “islands” of coverage isolated by significant distance from other covered areas. In other words, Broadband Internet likely doesn’t exist far away from other areas with Broadband Internet access supplied by the same provider.
- Next we present several examples which illustrate the complexity of coverage verification.

The first example is taken from a gentleman who requested a map change in Alabama. His home is near the yellow dot. The darker grey Blocks are covered Census Blocks. The black lines are covered road segments. He cannot receive DSL from his incumbent provider, although his neighbors can. The incumbent carrier does have at least one structure in that block from which Broadband services can be provided; unfortunately his home is not served.

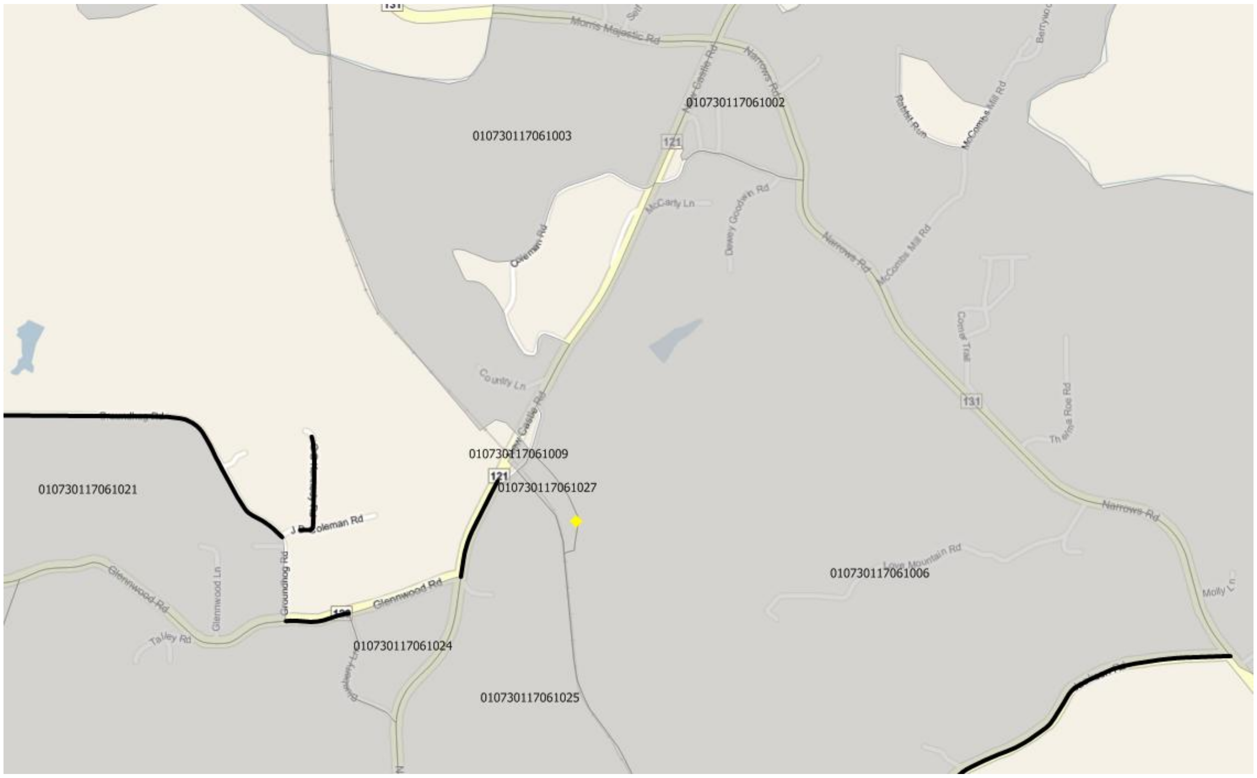


Figure 15--Sub block variation

Because the SBI program requires the depiction of coverage at the block level, the above map has been correctly generated. However, from the customer's point of view, the map is inaccurate. This requires us to explain that the maps are not intended to be a structure-level qualification, at which point some consumers question the value of the maps when seeking service information.

Beyond this type of one-off structure-level qualification, sometimes, as shown below, we have even larger gaps in provided coverage. The image here shows an "outlier" block that could be an error, or it could indicate missing Blocks along a major road that should have been filled in. In this figure, the outlier block is highlighted in turquoise.

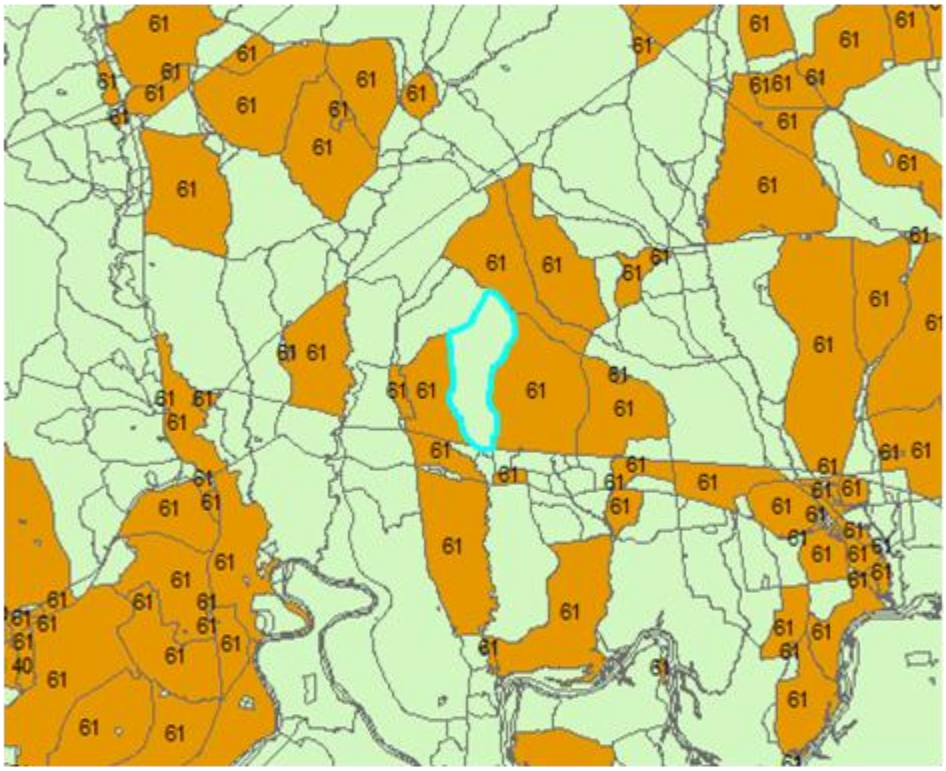


Figure 16--Dispersion in Submitted Data

In this particular case, we are faced with a different verification question. Based upon the properties of the neighbors, we believe this block should likely be covered (coverage interpolation,) but supplied data from the incumbent says otherwise. Although we don't have information to know how much of the data submitted to us is generated, our sense is that geocoded customers or plant are used. In this case the block dispersion could be the result of a side of the street assignment rather than an availability assignment. In other words the data may speak to where is working plant rather than where could service be provided in 7 to 10 days.

The next example shows where an interpolation process could require some adjustment. The figure below shows a town level view. There are some smaller Blocks that are likely covered by interpolation logic, but we also do not want to extend coverage beyond a franchise boundary as in the areas shown in a box on the bottom of the map.

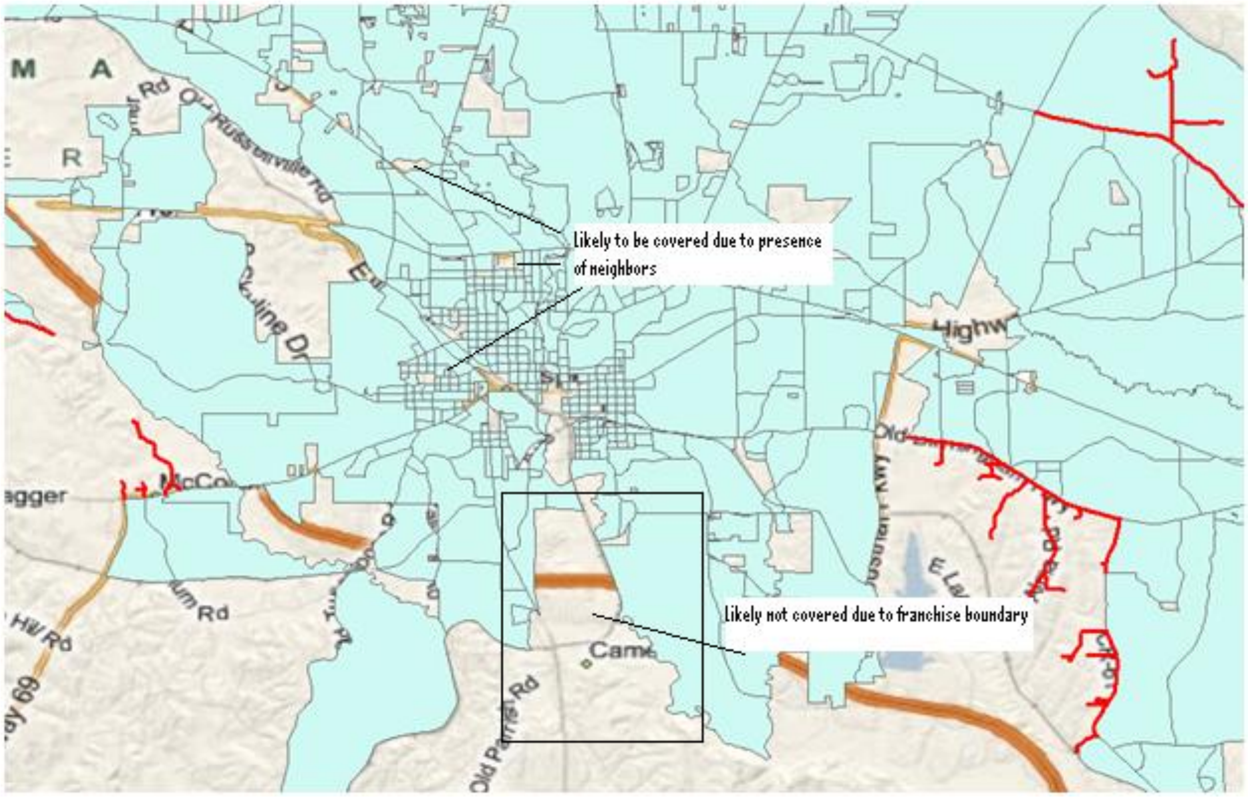


Figure 17-Where do you stop interpolating?

From what we can gather from some providers, the submitted data—data with consistently high degrees of dispersion or coverage holes—tends to come from geocoded billing records. In this paradigm, this means where there are no billing address points; service is not identified on a map. The interpolation verification question then takes on three dimensions.

First, if a provider has no customers in an area, how can we know if they would be able to provide service in a 7-10 day interval?

Second, if we use the properties of neighboring Blocks to interpolate coverage, when should we stop (e.g., at a franchise boundary, at a certain distance, etc.)?

Third, if we are comparing to a data source that examines coverage at a higher level (such as 477 Tract) do we use the Tract information to assign information block level coverage or do we use the tract coverage to filter out dispersions in coverage.

We continue to work with providers to get additional information to help us better understand and contend with this type of circumstance. However, we have not been entirely successful at getting franchise/service area boundaries that would address much of the issue.

The final map shows this dispersion problem, but to an even larger degree. This solitary large block is likely the result of a bad geocode, but we don't know, given the data that has been submitted by the provider and the "single customer in a block standard" set by the NOFA clarification.

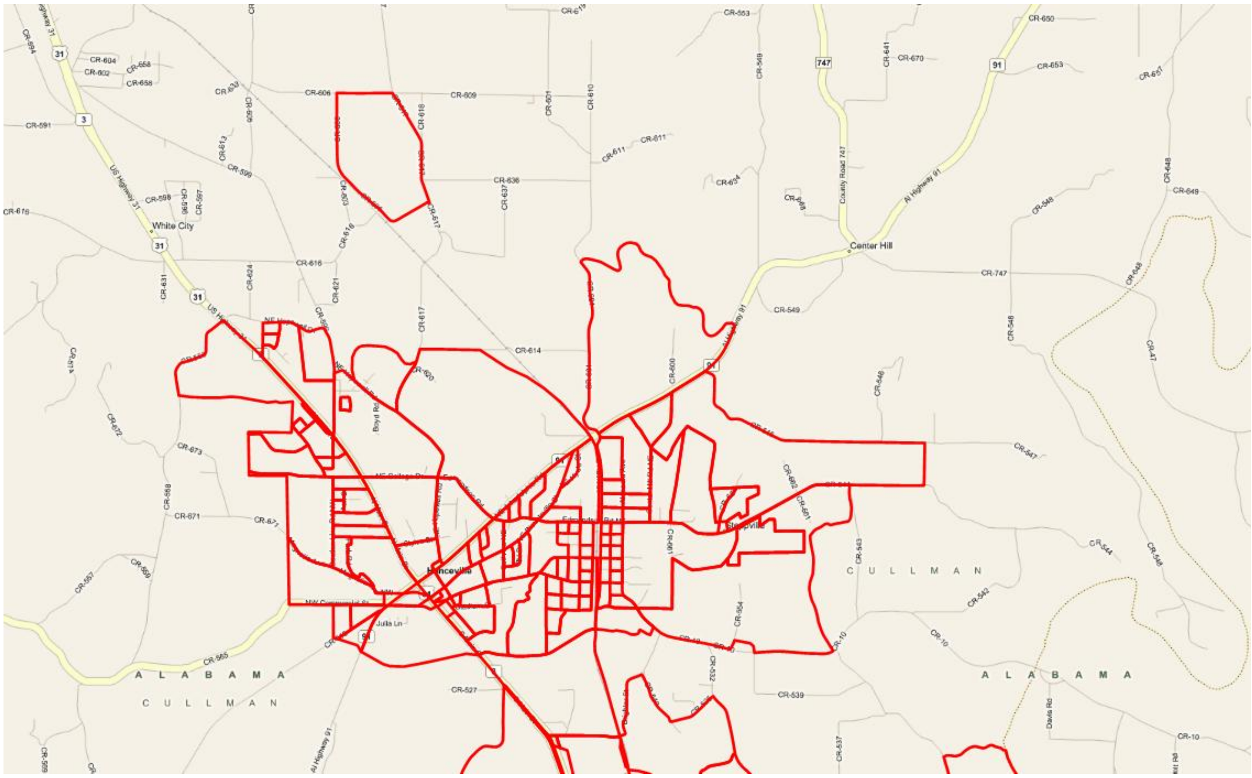


Figure 18-Dispersion in covered Blocks

Due to the fact that this situation is quite obvious in display, this type of problem is one that we are more aggressively trying to resolve. Where a single block has no neighbor offering comparable coverage and is a specified distance beyond an exchange boundary, our approach has been to filter these Blocks out. As of now, this filter is limited to incumbent xDSL providers because we have a good source of exchange boundaries.

The exchange boundary dispersion verification method breaks down when examining providers who are more likely to CLEC into neighboring territory. In the figure below, the black line represents the exchange boundary, while the continuity in the DSLAMs likely points to coverage extending along a road into another provider's territory.

Figure 19--DSL Coverage outside of exchange boundary

In sum, the variability in our source data continues to suggest that our dynamic verification process is relevant, appropriate and evolving in a manner consistent with the overall program. And, as noted above, we believe the more meaningful outcome of our verification processes will likely be a series of qualitative indicators or expressed confidence levels. Our concern, as with the development of any sort of classification process, is how rigid we should make this classification given the variation in our input data and the varied perceptions of service providers, map viewers and down-stream data consumers.

Verification Work Process

To support our dynamic multi-factor verification process, we have implemented the following steps.

Between submissions our provider relations team works to analyze our current broadband provider ecosystem and capture any changes such as acquisitions, mergers or cessation of operations. They also remain in touch with providers who have indicated when follow-up is necessary. The team confirms that the providers who submit data are NOFA compliant. Given these steps they begin a survey and awareness campaign to get data submitted for the program.

When data is received, an analyst reviews the submission and any immediate questions or concerns are sent back to the provider as quickly as possible. We have found this gatekeeping step very helpful in making sure we understand the intent of the submission.

For all providers who submitted data to us in the prior round, the provider received both a tabular data summary and mapped output[28]. Prior to releasing the "check maps" to providers, we inspected each provider's coverage area. After this in-house review, we solicited a second level of feedback from providers and received a number of requested changes and corrections used in the development of the current dataset.

For those providers who submit only block or segment level coverage (i.e., in those cases where we have no infrastructure to test with) we test for coverage containment within known service boundaries. The intent of this validation step is to remove Blocks that are obviously erroneous.

We have also begun to perform a mechanical test against wireline providers. This is an examination to ensure that each feature submitted has some neighbor within 1 mile. We are testing this process to try to understand what the neighbor distance should be. This has proven to be a difficult process.

We also verify the submitted speeds against the typical speed ranges in the NTIA frequency tables. If we note a value outside of typical range, we ask the provider for clarification. These responses are recorded.

As mentioned in the sections above, we have implemented a check on dispersed Blocks, but we have implemented less with respect to coverage interpolation (holes in coverage). We continue to work on a

[28] For the verification of round 3 data, we submitted both PDF and KMZ (Google Earth) format check maps. Some providers prefer to work with the Google format as it supports easier modification. Others continue to submit marked up PDFs.

series of mechanical tools to assist with the inspection process but have run into challenges related to geographic basemap and timing.

As our submissions have moved online, we have also begun to benefit from crowd source feedback. In some cases this has helped us identify and fix errors in our underlying data. In other cases, as we have shared with NTIA, we have encountered some perceptual issues rooted in how the data are developed and modeled to comply with the NOFA. Depiction of uniform coverage in small Census Blocks continues to be a challenge. Despite our best efforts to explain the full block coverage requirement, we continue to receive complaints that the coverage shown on the map is not accurate for a particular location within that block.

Consumer and Provider Responses to Deliverables

Here, we segue from internal verification to external verification. We view responses to our work product as a form of validation and verification. On the one hand, this gives us the opportunity to fix mistakes and then generate QA steps to make sure that the problem does not reoccur. We also learn how to improve what we are doing or better explain what we are doing to a community not always familiar with the NOFA and program office framework. On the other hand, listening and learning from this feedback helps us better target our mapping deliverable to meet the needs of our external customers. In this second case, external feedback not only provides feedback on perceived qualities (or lack of quality) in the data, it helps us to learn if we are developing data that is truly helpful to downstream users across a wide range of usage and intent.

At this point, our external deliverables take three forms: State Broadband Maps, data transfer to NTIA used for the National Broadband Map, and text format data requested by outside parties.

Online Map Experiences

With our State maps online, we continue to harvest viewer feedback and comments. Because an online map allows someone to zoom in far below the scale of the data, a large number of comments reflect sub-Census block concerns. While important to the citizens reporting these issues and to our Broadband planning teams, this level of data is outside the scope of our core validation process, which as noted above, is focused on the level of data submitted to NTIA.

There are several other themes that our team believes are important to share. These comments are actually quite helpful because they also improve our data processes to better meet the needs of map viewers. For example, we have invested significant time in harvesting more segments from provider data. Because the appearance of segments is so important, we are putting time into ensuring a visually appropriate edge match between the roads we harvest and the Blocks/roads we will show online. On a technical level, we also believe that a good segment process will help us understand more about dispersion in the data, and what is valid versus what is not valid.

Online Display of Consumer Feedback

We have completed development of a consumer feedback layer for our online maps.

The intent of the new layer is to show viewers the feedback of other map viewers. This layer went live after the Round 4 data was posted.

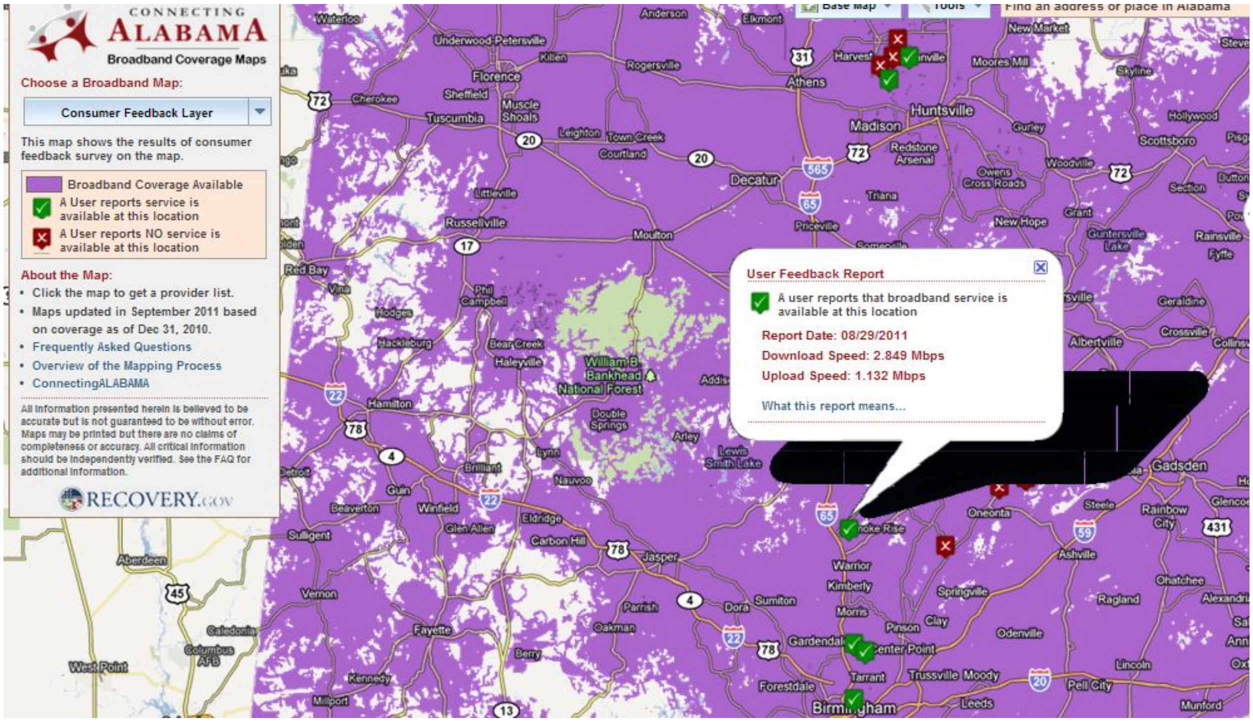
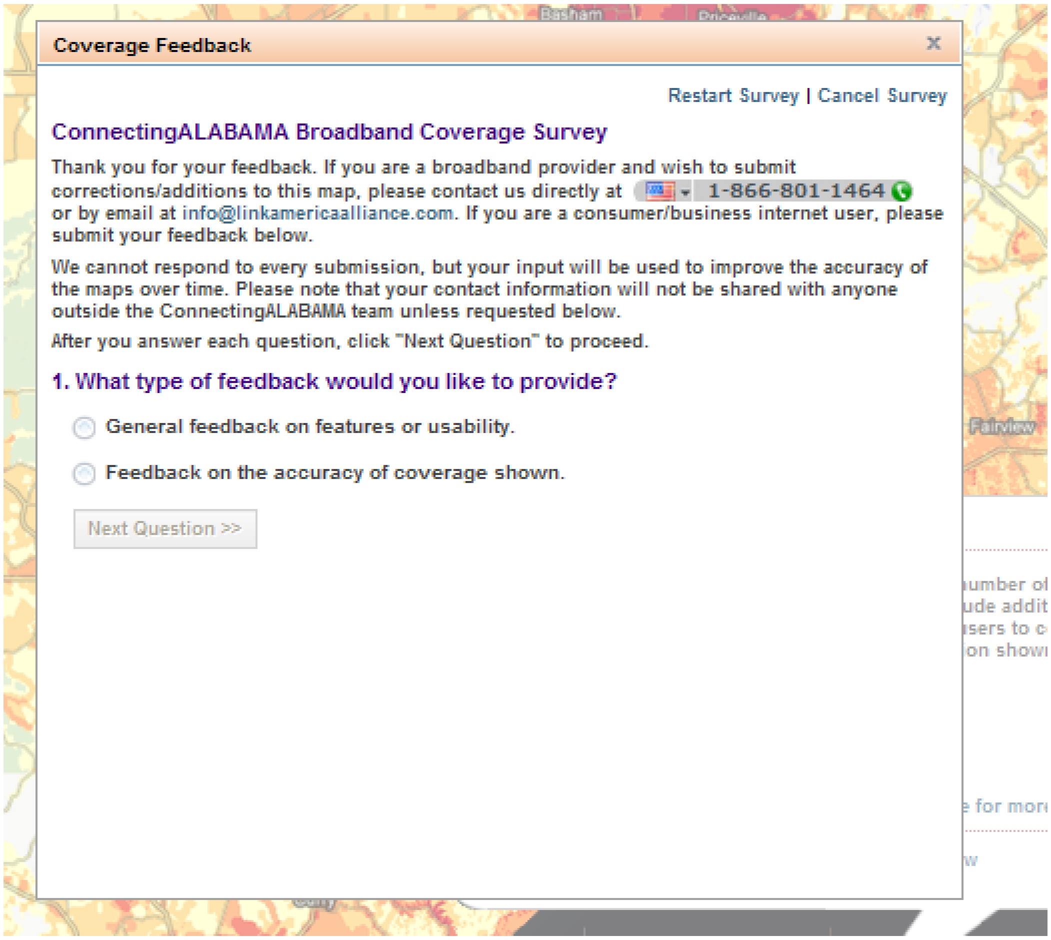


Figure 20--Consumer Feedback Layer

To gather feedback, we use a survey wizard which asks the end users to categorize their concerns. The survey went through several iterations of design and usability testing. Our experience has been unless we get a way to constrain the user feedback into manageable categories, it becomes very difficult to act upon.



As mentioned by other Grantees we struggle with how to use all of the feedback we receive. The qualified data points seem to fall below a volume in which we can infer significant modifications to the map data. Nevertheless, we believe it is important to gather structure and display the feedback to support project transparency.

Perception of Unfair Treatment Across Technologies

Several Broadband service providers have expressed strong concerns regarding how wireline services are displayed, as contrasted to how wireless coverage is displayed. This is an artifact of the SBI data model. As an example, consider the figure below.

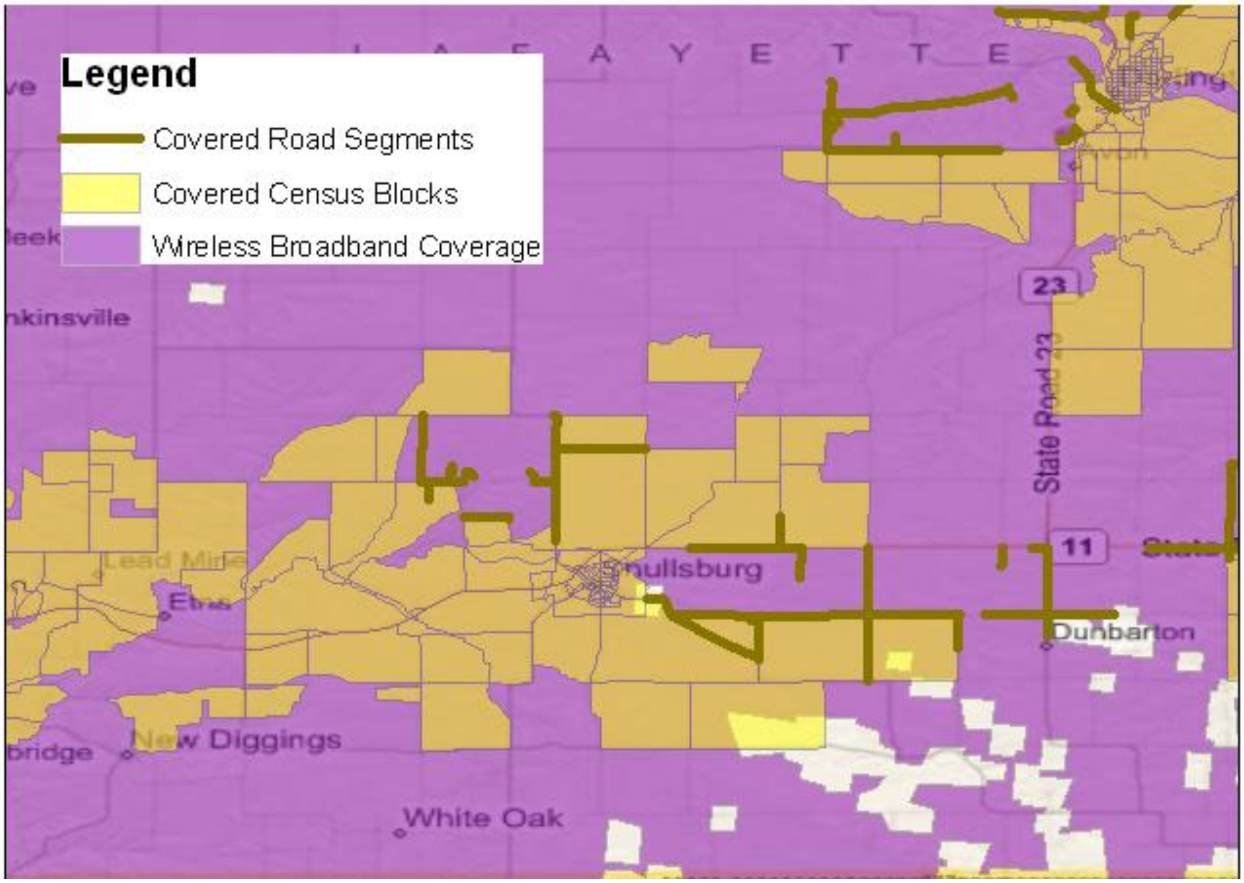


Figure 21--Multi Network Coverage portrayal

In this image, covered Census Blocks are light gold. Covered road segments are a darker gold and wireless coverage is purple. The concern seems to come down to how a wireline provider's coverage is shown in the large Census Blocks (greater than 2.0 sq mi). Some wireline providers have expressed dissatisfaction because their coverage is only tied to road geography, which leads to a visual "hole" in their coverage map. At the same time, they feel that it is unfair that the wireless provider's coverage is shown to be uniform in the same area. Put another way, if our maps show wireline in terms of Blocks and segments, why don't our maps show wireless the same way?

Loss of Geographic Granularity

Some providers particularly those who submitted facility level information are disappointed when we have to roll the derived data up to Census blocks or road segments as this changes the appearance of their service areas. This is especially important in rural areas where the larger blocks represent more of the service territory.

Perceptions of Carrier of Last Resort (COLR) Obligations

Some wireline providers have also expressed dissatisfaction because online maps limit the distance of coverage from a road segment. In our current online maps we buffer a wireline carrier's service 300' from road centerline. A number of providers have expressed that they are mandated to provide voice coverage (which Broadband will accompany) anywhere in the Exchange. There seems to be many

dimensions to this argument, but the basic concern comes down to not being able to accurately reflect the scope of their COLR obligation within the mixed block/segment view. Their ability (or lack thereof) to actually provision such services for new users within a 7-10 day period adds yet another level of complexity when attempting to fairly portray their coverage capabilities.

Intentions of Coverage Mapping

When a viewer of an online map clicks on the map (or zooms to an address), they are provided with a pop-up of service provider coverage in the area. The critical question is this: what is the area to which that pop-up window responds to? In the past, we reported back to the specific Census block, or buffered road segment intersected by the user click. As far as the map was concerned, once we move off of that road, or out of that segment, we have a new area to examine.

Our sense, given feedback received, is that our provider view should be a bit more tilted toward finding providers in a general area, rather than finding providers at a single-click location. If the goal of the map is to get someone to call a provider for service, our bias should be to include all of the potential providers in the general area, rather than giving potential customers a method to self-disqualify. That is, we want to cast a wider coverage net, rather than one too narrow. The problem with this approach is that it will create a number of false positive Broadband reports. As of this date we cannot determine if the claims of inaccurate coverage in online maps are due to the looser provider view standard or not. We keep this looser standard in place to minimize the likelihood of self-disqualifications.

Appendix One--Wyoming

Community Anchor Institutions

In earlier submissions, the Community Anchor Institution (CAI) process was referred to in terms of a learning curve. This continues to be an appropriate metaphor. The mapping team continues to focus on data that will support and help inform policy makers and the SBI planning process. Obtaining connectivity information for CAIs continues to be a significant challenge. In general we have found that one of the primary obstacles is identifying the correct person in the CAI organization that can provide the information we seek.

In the first submission, the team gathered information on what data was available and what resources will be required to engage these categories of important institutions. In subsequent submissions we have focused our efforts on obtaining connectivity information for CAIs through direct outreach to the specific institutions as well as through central sources within the state or institution associations. In the current submission we had the following objectives:

Identify the correct person in the organizations that can provide connectivity data for the institution. For schools we focused on district level contacts.
Raise awareness of the broadband mapping program to organizations associated with the CAI categories with special emphasis to relevant local and, state government agencies.
Continued outreach to unresponsive CAIs to invite them to become engaged with the SBI program by participating in the online survey.
Verify the available connectivity information based upon new survey information
Update the physical addresses of the CAIs, with the goal of eliminating P.O. Boxes from the dataset

CAI Philosophy

Our work with CAIs is guided by three principles.

First, CAIs are important stakeholders within the planning process. Our goal is to engage participants in regional planning that have strong ties into the CAI categories identified by NTIA. This has a direct benefit of engaging an established stakeholder community. It also allows broadband planning to tie into existing organizational and planning networks. In each of our states, key relationships with education, public safety, libraries, and economic development sectors are being identified and developed.

Second, we believe that CAIs will likely be one of the primary beneficiaries of targeted broadband funding. Our belief stems from the sense that many of the benefits of Broadband will extend from these community 'anchor points'. In other words, it isn't solely the existence of Broadband at a library that provides a benefit. It is people using applications that work only on a Broadband network to upgrade their skills (e.g., online training) and gain access to online content (e.g., job postings, goods and services), etc. The targeted use of a specific application--that can only take place with Broadband networks-- is what produces the priority benefit. Put another way, there seems to be a realization that things are less about pure connectivity (for the sake of connectivity) than about connectivity in terms of an application (for the sake of the benefit obtained through the application).

Third, we continue to use a rational and targeted approach to derive information. This means we will utilize our planning teams for as much field work as possible. This also means that a goal of our CAI process is not an exhaustive Census of anything that could be a CAI; rather, it is the discovery, inventory and integration of Broadband planning activities into those CAIs that stand to produce the greatest synergies with the SBI planning process.

The above implies two significant points. First, the team's goal is to document community anchor institution connectivity within a broader context of regional and statewide planning objectives. Second, if a particular category of CAI has an independent Broadband planning effort underway, we will encourage that organization to take the lead, and we will provide relevant expertise and support as warranted. For example, in one of our states, the public safety community was engaged in a mobile Broadband survey effort. We aligned our CAI data collection process with that effort and shared information and expertise (e.g., hosting a survey) to support their mission. In another state we attempted to glean connectivity information from a municipal government survey. There may be some downside to this collaborative approach in that we may have to work with data spanning different times or we may not have all of the location-specific information we need, but this does prevent the same user from receiving multiple inquiries.

Anchor Institution Survey

During the third submission period we designed and developed a simple on-line survey system called CAVS (Community Anchor Verification Survey). The intent of the survey was to both verify received connectivity information and garner additional connectivity information from CAIs. The link for the survey is housed on the Home Page of the State SBI website, thus providing the added opportunity for responding institutions to learn more about broadband activities in their state. The survey remains open between collection periods so that the Regional Planning Teams can update information as they engage with the community, and to allow responding institutions access to update their data as necessary.

Although we have found that reaching out to central contacts, for specific institution groups, is the most fruitful way of collecting connectivity data we find value in inviting individual anchor institutions to participate through means of a survey. In each round we reach out to CAIs using an adaptive approach that consists of: 1) Emailing individual institutions inviting them to participate in the on-line survey; and, 2) Follow-up phone calls, when appropriate, to the CAIs to obtain/confirm contact information and encourage participation in the survey. From our perspective, although this method is very time consuming and work intensive, it allows the opportunity to personally explain the objectives of the program and answer questions. It also provides an opportunity for the individual institutions to become engaged in the broadband planning process.

Anchor Institution Trends

To date we have focused our CAI attention on schools, libraries, and hospitals with respect to connectivity. We benefit from strong relationships throughout the education sector, (K-12 and Post-Secondary), and have found excellent resources with State librarians. In addition, we have formed organizational relationships with the major hospital associations and other key health organizations within each state. Our goal with these relationships is to cull information from their planning process and partner with them on outreach.

As in the prior submissions, we rely on public domain sources of information for the public safety-category. Collecting connectivity data for this group continues to be one of our most significant challenges. We continue to look for ways to reduce the size of this category and connectivity information specific to root nodes of the public safety network--such as County Emergency Operation Centers.[29] At this point we have had minimal success gaining this information.

Further, because we have a wide ranging population of CAIs in our data set we have a variety of Broadband services that don't always fit NOFA parameters. Services like PRI or T1 are classified into "other copper," We also had difficulty obtaining both the upstream and downstream channel capacities. In most instances, when it was logical to do so, we made the speeds symmetrical, but this is an assumption on our part. If a site records bandwidth across several services (eg. video and data), we record the total bandwidth to give a picture of available site bandwidth. We are also working to standardize our response to NTIA in circumstances where an entity shares a Broadband connection among a campus. In this case we use the total campus bandwidth and use the primary campus Internet connection. In this regard, we have also received strong comments that for many school districts the problem is less about connectivity to a central node then connectivity from the central node out to served buildings.

As a final verification step, we attempt to screen the CAI data for duplicate values. Because many CAI are closely clustered together and may even share the same building (physical address) we perform the de-duplication manually.

[29] Within the public safety category, it is also very difficult to derive precise locations as many CAI are addressed to PO boxes . This is further complicated due to the many Volunteer Fire Departments used in Rural Communities which often do not have a physical location.

Appendix Two

Data Collection Challenges

This section summarizes some of the challenges we have experienced with data collection and processing. The team believes it is important to categorize these challenges as they help inform the geoprocessing and verification methods used. It is also our hope that some of the more global issues can be discussed and decided within the Grantee community.

We begin with several global issues and then continue toward more granular challenges.

Global Data Collection Issues

Maximum Advertised Speed is Not Reported Consistently

As has been discussed in webinars and also within the context of NTIA data assessments, much reported speed information continues to be reported at the market level (MSA/RSA) and then uniformly pushed down to the Census blocks. This has a tendency to create a problem with NTIA speed tripwires since the technology is reported by block but the maximum advertised speed is reported at a regional level.

This challenge gets further amplified at a block level when comparing to a third party data provider. It can create a mismatch between third party data generated at an area larger than block level versus block level generated speed and vice versa. To minimize the potential confusion, it might be helpful to be able to provide a flag at the submitted record level which indicates the geographic basis by which the Maximum Advertised Speed is reported.

Census Block and Road Standards are not clear

There seem to be several methods by which providers are calculating the Census block area. So the distinction at 2.00 square miles can be uniform, it would be ideal to articulate an operational area calculation definition.

Providers Not Wishing for Block Level Aggregation of Their Data

For providers who submit address point data, we do minimal additional processing. Our main test is to ensure that points are contained within 1 mile of exchange boundaries; the only other processing was normalization into NTIA formats.

Broadband providers not Meeting the NOFA "provider" Definition

Comments on PBWorks appear to reflect a concern among a number of grantees about what a Broadband provider is--and how that definition impacts mapping.

If the 7-10 day provisioning rule is to be strictly enforced, it could seem to eliminate a number of prominent Broadband providers[31]. Further, the need for clarification around a facilities-based provider,

[31] By email ***REDACT*** informed us they could not provision in 7-10 days, but they also supply information on qualified locations to the address point level. Therefore, we draw a distinction between an incumbent provider

versus the reseller, has injected even more uncertainty. Right now we are unclear on how strictly to interpret either of these important distinctions, but we are concerned that we are beginning to create an NTIA exclusion criterion that is going to confuse downstream consumers of the data.

Given mergers and acquisitions in the CLEC space we are noticing a drop off in participation in this program by several national CLECs. We hope this is an artifact of the mergers and resource constraints rather than a long term trend.

Again, we do not want to exclude a service provider, but we believe there needs to be further clarification around the "7-10 day rule," the definition of a "reseller," and better interpretation of facility-based providers, versus equipping UNEs, SpA or leased lines.

We have used the provider Type of "Other" to classify a number of providers who offer Broadband services, but we do not offer them in a manner consistent with Technical Appendix A definitions.

To What Extent Should We Begin "Classifying" the Data and Maps?

The question immediately preceding gets to the intent of a Broadband provider. This question gets to the intent of the Data and Maps.

Earlier in this document we discussed the question of what type of bias we should introduce to our online map messaging. In an online environment, do we want to more likely create an overstatement of coverage for a provider than an understatement? In other words, is the larger problem allowing a consumer to self-disqualify, versus calling a number of neighboring providers? There is a related issue to this. Clearly in our maps there is a lot of scatter in data that we believe should be more continuous. These are the islands of coverage from an incumbent provider[32]. There are a number of processes that could be put in place to deal with this type of scatter, but without more information from the service provider-- essentially the last mile facilities-- it will be difficult to perform this clean up in an informed manner. On the one hand, we can aesthetically clean the maps up and reduce the scatter, but we have little sub-block engineering information upon which to make this decision. Right now our preference is to put out a somewhat aesthetically messier deliverable and work with providers to get better information to clarify their submission. If that isn't forthcoming, we are limited in what can be done given the lack of facility level information. In summary this yields two questions

In our online maps should we error on overstating coverage to prevent consumer self-disqualification?

---

owning the facility--which terminates at a customer premise--who cannot turn up service at a qualified location, versus a provider not reporting any specific qualified locations in which they cannot turnup service in the 7-10 day window. In the first case we have a sense of where service can be offered and verified. In the second, we have no evidence that a service could exist there until a specific location becomes a customer.

[32] For a provider who sells opportunistically (not within a franchise area) it becomes even more problematic to classify their coverage because the points are more related to the type of consumer purchasing the service than a bounded offering. In a matter of speaking, the ProviderType is more determined by the technology and/or location than a type of business. The core intent of the NOFA and our grant application was centered around the 7-10 day providers but we believe maintaining information on provider Type "Other" and "Reseller" is important to assist in validation and market segment analysis as resources are available.

In our online maps should we work to clean up a lot of the scatter that we see without having facility-based evidence from which to remove it?
As we examine results from third party data assessments, it appears that this scatter is something that is also problematic with the assessment results. It also appears to be evident that different third party data sources treat water areas differently. When we are developing data based upon Wireline facilities, we exclude water blocks. We do not filter out water blocks from provider submitted data. We are unsure if there is or should be a standard in how water covered blocks are treated for Wireline broadband providers.

Community Anchor Institution Surveys

Over time the base of participation in CAI surveys has broadened. Our teams are interacting with more organizations interested in broadband planning. This is a benefit because it helps integrate the importance of Broadband mapping, planning and capacity building within their organizational framework. But it also begins to create challenges in data collection. There are two noticeable trends in this area.

First, CAIs are organizationally diverse. For a school, you expect to have a centralized entity that can answer and support questions about Broadband services. For a rural, volunteer fire department answering questions about broadband may go to the Chief. The way that he/she answers about Broadband is probably specific to her experience and context. The implication is two-fold. First saying that some percentage of CAIs in a state have access to broadband can be misleading because the formality of a school or government building is much different than the formality of a volunteer fire department. Second, that volunteer fire department may get broadband via a 3G mobile hotpsot when they need it…but the presence of *this* type of broadband is a very different thing than the presence of a responder who has mobile LTE broadband.

Second, technical knowledge of the survey respondent differs within each organization. This complicates our data collection. It is not uncommon for someone to say yes we have Broadband, I just don't know how we get it or how fast this is. So in response we report they are broadband served but unknown speed or technology. This doesn't mean they haven't been surveyed, it just means the response was unknown. As there are now a large number of people collecting this data, it would be helpful to have some consistent national business rules from which we can answer questions about the meaning of any particular data element. As an example, when should "no" be used versus when should "unknown "be used. In other words, what is the standard for the difference between never made contact with the CAI versus a respondent didn't know/couldn't answer. We have guidelines internally but are unsure if this is consistent across states.

Granular Data Collection Issues

Non-Uniform Submission Standards

It is clear among providers that there isn't a consistent method used to derive Broadband coverage. Some providers appear to be use a geocoding approach and then point in polygon or point on segment process. Others may be using GPS locations. In some cases, it is difficult to infer what reference data was used to georeference plant (is it the carrier's roadbase?). This leads to uncertainty regarding the input data scale or accuracy relative to other base layers. Although we may be trading off absolute accuracy, our standard has been to conflate submitted data to TIGER 2010 Blocks and TIGER 2010 roads. We perform our verification against this conflated data product.

Temporal

We are unsure of how well the data are temporally consistent. Some providers gave us their best effort to control to June 30, 2012. We note that some providers were clear that the submission was as of extract date without any way to move back in time. They have no means to control for time and cannot provide any audit support beyond when the data are released to us. Some data-especially loop qualification data-may change from day to day. It will be very difficult to clarify why something was changed from a given point in time.

Perceived Inaccuracy with Respect to Internal Standards

The NOFA is clear on submitting a list of Blocks in which a provider delivers Broadband service. This is a different objective than perfectly reflecting service territories. If a firm's accuracy standard is a reflection of their service area, then the data created under the NOFA will not meet their perception of accuracy. This leads to two other issues: First, using Census Blocks rather than serving area may overstate or understate a particular provider's Broadband serving area. This was a significant concern of ***REDACT*** who specifically required us to submit only address-level qualification data. The second issue this brings up is how or if, there should be some standard on how much of a Census Block needs to be covered to call it covered.

Confidentiality

Several providers have noted concerns with CPNI-related issues and have stated this as a reason for non-participation. We have also heard expressions of comparable concern regarding identifiable responses to Anchor Institution information.

Unclear on Definitions

As discussed earlier, several providers claimed confusion on several key terms involved in Middle Mile. We note a consistent stream of questions around the interpretation of Maximum Advertised Speed. Some providers understand this to be the most common speed package bought within the mass market, while others view this as a speed that can be purchased for an additional cost above a mass market offering (e.g. a Turbo option for an additional fee per month). Others interpret this as the fastest speed that is available for that particular location--in terms of xDSL, a structure qualified speed, for example.

Perception of Data Use

There seems to be some hesitancy releasing speed information because no one is sure of how the information will be used, or what the speed is intended to reflect. A number of providers have verbally indicated that typical speed will be about (on average) 80% of purchased speed due to overhead. But there are many other factors (such as a user's home network) that influence speeds measures. Providers are concerned about introducing statistics without a clear understanding of how those statistics are derived and will then be used. Also, as advertised speed is pushed down to a block level, we sense more trepidation to report speed values. This quickly begins to touch on parity across network types (why is wireline down at the block when wireless is half the state, etc.). Finally we note a

significant increase in speed values reported to us. This may be due to network upgrades or competitive concerns to match the theoretical network speed.

Location Uncertainty In Source Data

Within this document we have noted concerns about the impact of source data accuracy. Our geoprocessing methodology provided what we believe is a relatively conservative tolerance to account for the scale issue in the source data, but we are unsure of how this may impact downstream users. Clearly, it also impacts the verification process because we can't attempt to verify received data beyond a scale at which it was developed.

Covered Segment Process

Deriving Broadband covered segments in Census Blocks greater than 2 square miles has proved to be a challenge. Moving from a NOFA specified tabular deliverable to a requested geographic deliverable also increases the complexity of the effort.

Record Level Metadata

It would be helpful to have one or two additional fields in each feature class transmitted to NTIA. One User Defined field could be helpful as an expression of record level confidence. The second field could be used as a Key between the transfer geodatabase and our systems. Ideally, both fields could be large text fields (50 char) so the Grantee can use them to express a variety of attributes.

Miscellaneous Data Collection Notes

We note the following important observations regarding our data submission:

There are Middle Mile plant records for providers who are not present in the Census block, segment or wireless area feature classes. This is due to classification as non-NOFA Broadband providers.
In some cases, we have trimmed wireless coverage estimates to honor state boundaries.
We believe some providers are trimming their coverage to honor license area boundaries.
Where a provider submitted Middle Mile points out of state, we are no longer passing those points to NTIA as they fail the validation script.
In tables with mandatory Street and Zip5 attributes (Service Address), if the value is unavailable we fill the default value.
As before there remain some differences between the Data Model, Data Model Default Values and the Python Validation Script.
We have a significant amount of VDSL, ADSL 2 and ADSL 2+ coverage categorized into the xADSL category. This introduces large variance in speed availability as some providers are using VDSL, shortened loops and/or pair bonding to increase speed to levels nearly 30 Mbps.
We note a few providers who have speeds seemingly inconsistent with their technology of transmission. This is either very low speeds with optical fiber, or very high speeds with non DOCSIS 3.0 systems. We have verified on provider websites that the reported speeds are available in the area but these speeds will fall out of the NTIA frequency table analysis.
We have a small number of providers who serve an area with both a residential and business speed tier. In cases where we cannot distinguish which speed tier offering to use, we use the higher of the speed tiers.

Per NTIA request we have modified the manner in which we handle Wireless coverage polygons. If a Provider submits a single geometry but specifies multiple spectrum codes in use in that polygon, we duplicate the polygon for each spectrum code. In other words the geographic object is identical but the attribute data for the object is unique.

In point level data submissions (Service Address and CAI) we note points that are spatially coincident. With respect to Service Address points our thought is these represent multi-unit dwellings or businesses but we don't have enough address detail to determine if these are multi-unit structures or duplicated customers. Because we cannot determine the reason for the duplication we leave spatially coincident records in our submission. We also leave in our CAI submission points which may be the same physical structure but have slight variations in addressing.

In point level middle mile data, we are finding a variance in the quality of the geocoded longitude and latitude returned. Given the data received we are unsure if this is an issue where the plant address is difficult to geocode or if the longitude and latitude provided to us is different than what would be returned in geocoding.

For Block and Segment level data which we produce based upon provider facility or service area boundaries, we remove Census blocks which are entirely water covered. This results in a drop of Census block counts for a number of providers.

Appendix Three

This appendix contains the confidentiality clarification supplied in a series of emails between CostQuest and NTIA.

Feature Class	*Metadata*	*NOFA Confidential?*	*Online Map*	*Public Disclosure*	*Exemption*
Last Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Middle Mile	Constraints on accessing and using the data	Yes	No	No	None
	Access constraints: None				
	Use constraints:				
	This data is confidential as defined in the NOFA.				
Service Address	Constraints on accessing and using the data	No	No	Yes	
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
CAI	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential

	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Census Block	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Service Overview	Constraints on accessing and using the data	No	Yes	Yes	The only provider who may not show up on this table is a provider who has provided only confidential data (last mile, Middle Mile,

					address point with provider name)
	Access constraints: None				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Road Segment	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None.				
	Use constraints:				
	There are no restrictions on distribution of the data by users.				
Wireless	Constraints on accessing and using the data	No	Yes	Yes	NO attributes on any record in this feature class are considered confidential
	Access constraints: None				
	Use constraints:				

	There are no restrictions on distribution of the data by users	

Appendix Four-Wyoming

This appendix details our analysis of the potential and actual broadband provider market. We include both our internal tracking description document and then our categorization for each provider. As this extract was made prior to final submission, there may be differences between provider categorization and the attributes on the day of submission to NTIA.

Provider Categorization

Provider Type and Status Definitions

The Provider Type is based upon categories provided by NTIA, while the Provider Status is based upon categories developed internally for tracking purposes. It should be noted that the Provider Status discussed here relates to the provider's overall status within the program.

Provider Type Codes and Definitions:

NTIA code	Code	Name	Definition
1	P	Provider	This code applies to all confirmed providers of broadband service per the SBI program NOFA. A provider is given a "P" designation if we have determined that the company does indeed exist and appears to be providing broadband services.
2	R	Reseller	This code applies to all broadband entities that have been confirmed as pure resellers – meaning they do not own their own facility/equipment and simply resell services under their own brand name or the brand name of an actual Provider.
3	O	Other	The code applies to entities who were originally placed on the SBI provider list, but whose status is still in question or has been determined to be non-NOFA compliant.
4	N/A	Not applicable	This code applies to entities who appeared on the original state provider list or a third party list (such as the FCC 477, American Roamer, or Warren Media lists) but who have been confirmed as NOT providing broadband services.
	X	Inactive	This code applies to entities that may have appeared on an early provider list but whose identity and existence we subsequently have been unable to verify. This code may also apply to providers who have since been acquired or simple gone out of business and for which no FRN appears on the FCC list – These no longer need to be reported to NTIA. This is an INTERNAL category used to remove entities completely from the list of entities submitted to NTIA.

Once the proper Provider Type has been assigned to an entity, and overall Provider Status must be established. The Provider Status codes are specific to the Provider Types, and are not interchangeable. The following table lists the status codes associated with each Provider Type.

Provider Status Definitions

Provider Type Code	Provider Status Code	Name	Definition
P	D	Declined	A provider is given a Status of "D" if they have officially stated verbally or in writing that they will not participate in the SBI program.
	P	Participating	A provider is considered to be "Participating" if they have submitted USABLE data in at least one data submission round. The data does not need to be 100% complete for a provider to be assigned a "P" code – they simply have to have provided a level of data that is sufficient to submit to NTIA.
	NR	Non Responsive	A provider is considered "Non Responsive" if they have either failed to respond to any of our correspondence, or they have submitted insufficient data that makes inclusion of their data in the NTIA submission impossible.
	V	Submitted under other ID	A provider whose data is submitted under another Provider ID, but is operating under their own FRN.
	E	Estimated	A provider is marked as "Estimated" if they have not submitted usable data, and would otherwise be considered non-responsive, BUT for whom we are able to submit data by using estimation techniques and/or third party sources. This designation applies only to providers whose data is 100% estimated.
R	R	Reseller	"R" is the only status code for Resellers and it simply reconfirms their status as a reseller –data may not be submitted but name of provider is included in NTIA data package.
O	U	Unknown	The status of Unknown is assigned to an entity whose name has appeared on a list (or been submitted as a new possible provider) and is currently under investigation. It has not been determined yet if this entity is indeed offering broadband services or not.
	NC	Non-Compliant	This status is assigned to entities who appear to be in the broadband industry, but who do not meet the formal definition of a BB provider under NOFA requirements. Examples may be entities who cannot provision service within 7-10 days.

	P	Participating	These are providers who do not meet the formal definition of a BB provider under NOFA requirements, but are participating in the program and submitting data.
	NP	Not a Provider	This status applies to entities who may appear on a third partly list of valid providers, but who have been proven to either no longer exist, or simply no longer provides broadband services.
N/A			No status codes associated with this Provider Type
X			

Provider Disposition

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
680	WY	360 Networks (USA) Inc.	360 Networks (USA) Inc.	Zayo Group, LLC	O	NC
130027	WY	Access Spectrum	Access Spectrum	Access Spectrum	N/A	NP
681	WY	Advanced Communication Technology	ACT	Range Telephone Cooperative, Inc.	P	P
824	WY	Action Communications, Inc.	Action Communications Inc.	Action Communications, Inc.	R	R
597	WY	All West Communications, Inc. (FNA Adelphia Cable)	All West	n/a	P	V
588	WY	All West Communications	All West Communications	All West Wireless	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
130002	WY	Atlantis Holdings LLC	Alltel Corporation	n/a	P	V
612	WY	AllureTech/CoffeyNet	AllureTech/CoffeyNet	AllureTech/Coffeynet	P	NR
130022	WY	AT&T Inc.	AT&T MOBILITY CORPORATION	n/a	P	V
596	WY	AT&T Mobility LLC	AT&T Mobility LLC	AT&T Mobility	P	P
599	WY	CSC Holdings, Inc.	Bresnan Communications	CSC Holdings, LLC	P	P
721	WY	DigitalBridge Communications	Bridgemaxx	DigitalBridge Communications Corp.	N/A	NP
130009	WY	Level 3 Communications, LLC	Broadwing Communications, LLC	n/a	P	V
605	WY	Byron Cable	Byron Cable	n/a	N/A	NP
130023	WY	Cams Cable	Cams	n/a	X	
130028	WY	Cavalier Wireless LLC	Cavalier Wireless LLC	Cavalier Wireless LLC	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
130010	WY	MTPCS License Co., LLC	Cellular One	MTPCS LLC	O	U
130012	WY	NE Colorado Cellular, Inc.	Cellular ONE of Northeast Colorado	NE Colorado Cellular	O	U
130021	WY	CenturyTel, Inc.	CenturyLink	n/a	P	V
663	WY	CenturyTel, Inc.	CenturyLink	CenturyTel, Inc.	P	P
591	WY	Qwest Communications Company, LLC	CenturyLink	Qwest Communications International, Inc.	O	NC
600	WY	Champion Broadband	Champion Broadband	n/a	P	E
670	WY	Chugwater Telephone	Chugwater Telephone	Chugwater Telephone Company	P	P
826	WY	Greenfly Networks, Inc	Clearfly	Greenfly Networks, Inc.	R	R
763	WY	Collins Communications, Inc.	Collins Communications, Inc.	n/a	P	E
606	WY	Comcast Spotlight	Comcast	n/a	X	

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
130029	WY	Commnet Wireless	Commnet Wireless	Commnet Wireless	N/A	NP
130030	WY	Convey Communications	Convey Communications	Convey Communications	O	U
825	WY	Kudera Inc.	Cowboy Communications	Cowboy Communications	N/A	NP
601	WY	Cowley Telecable	Cowley Telecable	n/a	X	
615	WY	TCT West, Inc.	DirectAirNet	n/a	P	V
130031	WY	Dish Network	Dish Network	Dish Network	R	R
657	WY	DSLnet Communications, LLC	DSLnet Communications, LLC	Megapath, Inc.	N/A	NP
590	WY	Dubois Telephone Exchange, Inc.	DTE	Range Telephone Cooperative, Inc.	P	P
589	WY	Century Tel/Embarq	Embarq Corporation	n/a	P	V
616	WY	Extreme Highspeed	Extreme Highspeed	n/a	P	NR

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
617	WY	Fascinations	Fascinations	n/a	P	P
637	WY	Surf Communications, Inc.	Fiberpipe Internet	n/a	P	P
130004	WY	Global Crossing North America, Inc.	Global Crossing Telecommunications, Inc	n/a	R	R
130005	WY	Golden West Communications	Golden West Communications	Golden West Technologies	N/A	NP
602	WY	Green River Cable (SEE SWEETWATER)	Green River Cable	Green River Cable TV	P	V
130032	WY	Hemingford Cooperative Telephone Company	Hemingford Cooperative Telephone Company	Hemingford Cooperative Telephone Company	O	U
827	WY	Hughes Communications, Inc.	HNS License Sub, LLC	Hughes Communications, Inc.	P	P
688	WY	JAB Broadband - SKYBEAM	JAB Broadband - SKYBEAM	JAB Wireless, Inc.	P	P
619	WY	Jackson Hole Compunet	Jackson Hole Compunet	n/a	P	D
613	WY	AviCom-KDIS	KDIS.Net	n/a	P	NR

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
608	WY	Klip, LLC	KLIP (Bulldog Cable?)	n/a	N/A	NP
621	WY	LARIAT	LARIAT	n/a	P	D
130033	WY	Leap Wireless	Leap Wireless	Leap Wireless	N/A	NP
659	WY	Level 3 Communications, LLC	Level 3 Communications, LLC	Level 3 Communications, LLC	P	P
130015	WY	TCT West, Inc.	Lovell Cable TV	n/a	N/A	NP
130034	WY	Manti Telephone Company	Manti Telephone Company	Manti Telephone Company	O	U
739	WY	PAETEC Holding Corp	McLeodUSA Telecommunications Services, Inc.	n/a	N/A	NP
130036	WY	Qualcomm	MediaFLO	Qualcomm	N/A	NP
607	WY	James Cable	Mediastream	CommuniComm Services	P	P
130043	WY	Medicine Bow Cable	Medicine Bow Cable	Medicine Bow Cable	N/A	NP

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
656	WY	Megapath, Inc.	Megapath	n/a	N/A	NP
130035	WY	Metro PCS	Metro PCS	Metro PCS	O	U
774	WY	Millhouse Electronics Inc.	Millhouse Electronics Inc.	n/a	P	P
741	WY	Myvocom, Inc.	Myvocom	n/a	P	NR
664	WY	Project Telephone	Nemont	Nemont Telephone Cooperative, Inc.	P	P
130001	WY	AT&T Inc.	New Cingular Wireless Services, Inc.	n/a	P	V
676	WY	New Edge Network, Inc.	New Edge Networks	New Edge Holding Company	O	NC
130042	WY	Optimum	Optimum	Optimum	O	U
691	WY	OrbitCom, Inc.	OrbitCom, Inc.	OrbitCom, Inc	O	NC
130040	WY	Personal Communications Services, Inc.	Personal Communications Services, Inc.	Personal Communications Services, Inc.	O	U

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
636	WY	Range Telephone Cooperative Inc	Range Telephone Cooperative Inc	Range Telephone Cooperative, Inc.	P	P
592	WY	RT Communications, Inc.	RT Communications, Inc.	Range Telephone Cooperative, Inc.	P	P
641	WY	Columbine Telephone Company, Inc.	Silver Star Communications	Silver Star Telephone	P	P
593	WY	Silver Star Telephone Company, Inc.	Silver Star Communications	Silver Star Telephone	P	P
642	WY	Gold Star Communications LLC	Silver Star Wireless	Silver Star Telephone	P	P
840	WY	Skycasters, LLC	Skycasters, LLC	n/a	P	P
130037	WY	SpectrumCo	SpectrumCo	SpectrumCo	N/A	NP
130044	WY	Speed Connect	Speed Connect	n/a	N/A	NP
652	WY	Sprint Nextel Corporation	Sprint	Sprint Nextel Corporation	P	P
828	WY	StarBand Communications Inc.	StarBand Communications Inc.	StarBand Communications Inc.	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
770	WY	Uintah Basin Electronic Telecom	STRATA Networks	UBTA-UBET Communications	P	P
586	WY	Strat Networks pka - UBTA-UBET Communications	Strata Networks	UBTA-UBET Communications	X	
625	WY	Sundance Wireless	Sundance Wireless	n/a	P	NR
609	WY	Sweetwater Cable Television Company, Inc	Sweetwater Cable TV	Sweetwater Television Company, Inc.	P	P
130038	WY	Syringa Wireless	Syringa Wireless	Syringa Wireless	N/A	NP
587	WY	TCT West, Inc.	TCT West, Inc.	n/a	P	P
771	WY	T-Mobile USA, Inc.	T-Mobile	T-Mobile USA	P	P
603	WY	Tongue River Cable TV, Inc.	Tongue River Cable TV, Inc.	Tongue River Communications	P	P
594	WY	Tri County Telephone Association, Inc.	Tri County Telephone Association, Inc.	Tri County Telephone Association, Inc.	P	P
595	WY	Union Telephone	Union Telephone	Union Telephone Company	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
130016	WY	Verizon Business Global LLC	Verizon Business	n/a	O	NC
712	WY	Verizon Wireless	Verizon Wireless	Verizon Communications Inc.	P	P
130011	WY	N.E. Colorado Wireless Technologies, Inc.	Viaero	n/a	N/A	NP
668	WY	ViaSat, Inc.	ViaSat, Inc.	WildBlue Communications, Inc.	P	P
604	WY	Viking Broadband	Vicking Broadband	n/a	N/A	NP
627	WY	Visionary Communications	Visionary Communications, Inc.	n/a	P	P
628	WY	Inventive Wireless of Nebraska, LLC	Vistabeam	Inventive Wireless of Nebraska, LLC	P	P
130017	WY	Wamsutter	Wamsutter.us	n/a	P	NR
685	WY	WERCS Communications, Inc.	WERCS Communications Inc.	WERCS Communications Inc.	P	P
130039	WY	Western Communications Inc.	Western Communications Inc.	Western Communications Inc.	O	U

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
834	WY	Windbreak Cable	Windbreak Cable	WinDBreak Cable	P	P
710	WY	Windjammer Cable	Windjammer Cable	Windjammer Communications LLC	P	P
130018	WY	Wyoming 1 - Park L.P.	Wyoming 1 - Park L.P.	n/a	R	R
629	WY	Wyoming Internet Resources	Wyoming Internet Resources	n/a	P	D
610	WY	Wyoming PBS	Wyoming PBS	n/a	N/A	NP
630	WY	Wyoming Wireless Internet	Wyoming Wireless Internet	n/a	P	NR
130020	WY	All West Communications, Inc.	Wyoming, Inc.	n/a	P	V
762	WY	Wyoming.com	Wyoming.com	n/a	P	P
631	WY	Wyoming.com	Wyoming.com	n/a	P	P
730	WY	WYrlessInternet	WYrlessInternet	n/a	P	P

Provider ID	Provider State	Provider Name	DBA	Alternative NTIA Name (if available)	Provider Type	Provider Status
130019	WY	Zayo Group, LLC (FiberNet)	Zayo Enterprise Networks	Zayo Group, LLC	O	NC
130013	WY	Star Valley Wireless (SVWI)		n/a	P	NR
130006	WY	Great American Broadband Inc		Great American Broadband, Inc.	O	U
623	WY	Microserv Telecomputing		n/a	P	NR
622	WY	Lone Tree/Wyoming Network (reseller)		n/a	R	R
620	WY	KDIS.Net (dup see PN 613)		n/a	X	
611	WY	Allred Radio (see Notes - SVWI.net)		n/a	X	
598	WY	B & C Cablevision		n/a	N/A	NP

State of Arizona

ASET
Arizona Strategic Enterprise Technology

Arizona Broadband Assessment Project (AZ BAP)

Methodology White Paper

Submission 6 - October 1, 2011

State of Arizona

Arizona Strategic Enterprise Technology Office (ASET)

Arizona Broadband Assessment Project Methodology White Paper

Submission 6 - October 1, 2012

Arizona Broadband Assessment Project Overview

The purpose of the Arizona Broadband Assessment Project (AZ BAP) is to identify both the availability and speed of broadband services, and the location of broadband infrastructure throughout Arizona. This project is provided through the American Recovery and Reinvestment Act of 2009 (ARRA) and the Broadband Data Improvement Act (BDIA), and in conjunction with the National Telecommunications and Information Administration (NTIA).

Submission 6 for the broadband availability data set was duly submitted to NTIA prior to October 1, 2012. Fall 2012 was the sixth of ten semi-annual submissions by the State of Arizona and attempts to capture and reflect broadband availability and conditions in the field as of June 30, 2012. See Arizona's Changes & Corrections document for a list of included Broadband Providers and relevant notes.

The Methodology White Paper for this submission cycle focuses on the Data Intake and Validation Application (DIVA) developed by the Arizona team and utilized in the transformation and processing of Broadband Provider data. It was trialed in earlier submittals, but has reached a level of maturity and utility warranting its featured role here.

A brief overview of its development and role as well as a summary of its capabilities and impact, followed by a draft of the DIVA User Manual for a deeper view of its functionality and user interface.

Data Intake and Validation Application (DIVA) Overview

The Data Intake and Validation Application (DIVA) was developed by TerraSystems Southwest (TSSW) as a subcontractor to Data Site Consortium (DSC) under contract with Arizona Strategic Enterprise Technology Office (ASET) in support of the Arizona Broadband Assessment Project (AZ BAP). DIVA is a Windows desktop application designed to transform raw Broadband Provider data about the location, technology and speed of broadband services into a form that can be cleanly linked to GIS layers and imported into the NTIA standard national broadband mapping program geodatabase.

A key goal of the DIVA design was to reduce data processing time while increasing data integrity. A secondary goal was to create a freely distributable software tool that Providers and other State broadband organizations could apply to their data intake and validation tasks. Alternative approaches, such as integrating with ArcGIS or data translation software like FME were not pursued as that would mean users would have to purchase those products at a significant expense.

DIVA does not perform any spatial validation or processing. DIVA was scoped as "pre-GIS" software, designed only to speed and improve the processing of Provider data to a point where it could be more cleanly geocoded or linked to NTIA GIS layers. Based on this design criteria, DIVA is not very useful for wireless service shapefile deliveries where the feature counts (data Records) are a couple of hundred, or less, and are in more or less proper SBDD format. It really shines in processing address, census block and road segment submittals of tens or hundreds of thousands of records, and where Providers have not followed the SBDD coding scheme.

Data Intake and Validation Application (DIVA) Capabilities

DIVA offers a rich user interface for exploring and processing Provider broadband data into a form that can more easily linked to NTIA-required GIS feature classes. Some of its key features are listed below.

- Configurability – DIVA offers many opportunities for configuration. New Provider identification information can be imported and applied to every Provider submittal. New releases of the SBDD geodatabase are read and up-to-date Rules are automatically created and applied. Processes and Rules in DIVA are very general and may be user-configured to achieve various results.

- Consistency – a very structured approach to data processing is embedded in the design of DIVA. This begins with the clear definition of data elements and their relationship to one another in an Object Data Model. Consistency is also inherent in the clear definition of Processes and Rules that can be applied to the data and in the way that Processes and Rules are used to transform and validate the output data. In the rush of meeting data-delivery deadlines It is easy to forget or misapply data processing steps. By automating much of the required processing, DIVA increase the amount of time that a user has to actually review and check data, and makes it easier for the user to achieve consistent results in the exported data sets.

- Re-usability – Users can define a set of Processes within a particular Reporting Period as a Template and then apply the Template to new Input Files. Rules are uniformly applied to Providers for each Reporting Period. This includes user-defined rules: once defined and applied, they will automatically be applied to subsequent Submittals.

- Processing Documentation – metadata (e.g. notes) regarding Providers, Submittals, Input Files and other elements may be added at any time using the "Edit Metadata" button on the Status Bar. Notes can be viewed or exported at any time for cutting and pasting into NTIA documentation. These notes, plus the actual Input File(s) associated with a Submittal, the assigned Processes, Rule violations and final output, constitute DIVA's Metadata system. A good example of metadata stored in a Process is the translation table from Provider actual speed values to NTIA speed tier codes: the value mapping is preserved and can be reviewed in DIVA by opening up the applicable Submittal and generating a detailed Input File report or by right-clicking on the Translation Process in the Processes tab.

Data Intake and Validation Application (DIVA) Impact

The efficiencies resulting from the application of DIVA to Provider data are substantial. In the first submittal period in Spring of 2010 a number of larger providers would consume 24-40 hours of processing time to evaluate, transform, quality check and export to SBDD database format. Processing a similar set of data in the latest submittal period (Spring 2012) using DIVA is a 2-4 hour process.

A substantial portion of this improvement is the result of (a) knowing the data and what to expect from a given Provider and (b) improved manual processing, especially on the GIS side. However, another substantial portion of the improvement has come from the integrated data evaluation, checking, transformation, validation and export capabilities of DIVA itself. We estimate that DIVA can reduce processing time in half for large address or census block submittals from the Providers. This efficiency is gained from having all the evaluation, transformation and validation tools available in a single interface instead of applying a variety of application software packages in varying order to each Provider file in each Reporting Period.

Arizona Broadband Assessment Project (AZ BAP)

The Data Intake and Validation Application (DIVA)

User Manual for Version 1.0

As of 06/25/2012

The Data Intake and Validation Application (DIVA)

Table of Contents

Foreword

This User Manual includes three chapters to introduce users to Diva. The "Functionality Overview by GUI Elements" chapter shows keyed illustrations of the user-accessible controls on each major Graphical User Interface (GUI) element in DIVA along with a brief explanation of the purpose of those controls. More detailed descriptions of the functionality behind many of those controls can be found by clicking on the hyperlinks which take the user to the appropriate section in the "Functionality Details" chapter. Finally, an example workflow using DIVA is presented in the "Sample Workflow" chapter.

It is important before examining the use of DIVA in detail, however, that the user understands the overall approach that DIVA takes to processing data. The discussion in "The DIVA 'Paradigm'" section of the "DIVA Overview" chapter is the key to understanding this approach. Also important to user understanding are the summaries in the "Design Goals", "Processing Workflow" and "Key Features" sections of that chapter.

As part of the DIVA development process, a very specific, structured vocabulary was developed and is enforced throughout this document. The first time a particular term is used, it is hyperlinked to the Glossary where a complete definition of the term may be found. Users will greatly speed their understanding of DIVA if they become familiar with this terminology.

DIVA is made available to the State Broadband community at no charge, but it is not supported by TerraSystems or any other public or private organization. The developers are happy to hear comments, bug reports and suggestions for improvement via email at hlward@terrasw.com , but we cannot guarantee a response to each inquiry. The source code is available to the State broadband community under certain circumstances. Please ask for details at the email address above.

DIVA Overview

History:

The Data Intake and Validation Application (DIVA) was developed by TerraSystems Southwest as a subcontractor to Data Site Consortium under contract with the Arizona Broadband Mapping program.

DIVA is a Windows desktop application designed to process raw Broadband Provider data about the location, technology and speed of broadband services into a form that can then be cleanly linked to GIS layers and imported into the NTIA standard national broadband mapping program geodatabase.

Design Goals:

A key goal of the DIVA design was to reduce data processing time while increasing data integrity. A secondary goal was to create a freely distributable software tool that Providers and other State broadband organizations could apply to their data intake and validation tasks. Alternative approaches, such as integrating with ArcGIS or data translation software like FME, would mean users would have to purchase those products at a significant expense.

By design, DIVA only processes provider data to the point where it can be geocoded or joined to spatial database layers. It does not perform any spatial validation functions. See Appendix A for a summary of the User Needs document on which DIVA was designed.

The DIVA "Paradigm":

Using DIVA effectively requires an understanding of how DIVA approaches the processing of Provider data for the NTIA and, as noted in the Foreword, this view is expressed with specific vocabulary. The DIVA "Paradigm" will be outlined in these terms. Links to the glossary can be used for further reference. Figure 1 below illustrates the main DIVA entities (the "object model") and their relationships in a simplified manner. An illustration of the complete object model can be found in Appendix C.

A Submittal is the data that will be reported to the NTIA for a particular Provider for a particular Period-Type (Reporting Period / Submittal Type). **The Submittal is the key organizing element in DIVA**. The collection of all Submittals is what will ultimately be reported to the NTIA. One of the important consequences of this definition is that, for one Provider, there may be several Submittals in a Reporting Period, e.g. Census Block and Street Segment submittals.

It is possible that a Provider will provide more than one data set for a particular Submittal Type during a Reporting Period. For example, supplementary information may be sent by a Provider after their first provision of data, or the first provided data set might be entirely replaced by another. DIVA identifies each of these provided data sets as a separate Input File, and allows a Submittal to have more than one Input File in a Reporting Period. Each Input File is processed independently, although the resulting exported data may be combined later, outside of DIVA, depending on the reasons for the multiple data set submission.

An Input File in DIVA is a collection of Input Fields each of which (usually) has a value. This Input Field collection is repeated numerous times, each repetition being viewed as a data Record or Row. The order of the Input Fields in this collection does not change from Record to Record. Each Input Field may be viewed as a data Column when it is considered across all data Records (Rows).

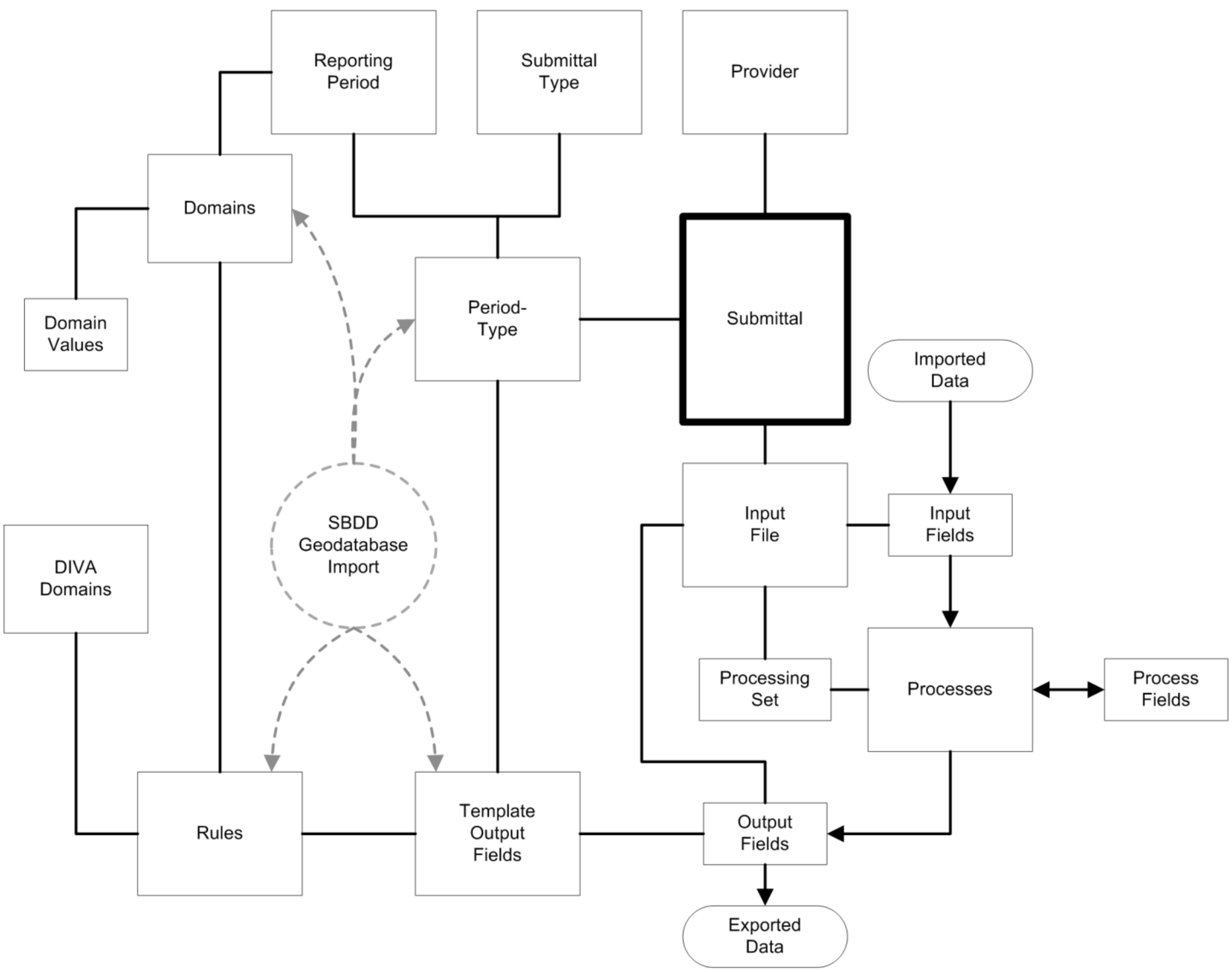


Figure 1. The DIVA "Paradigm" (Object Model) in simplified form.

Lines denote relationships and arrows denote data flow.

Each Reporting Period, the NTIA requires that certain data be submitted for each participating Broadband Provider in the State. The data is grouped into particular Submittal Types (e.g., service by Census Blocks) and these types and the required information for each type, the Output Fields, are defined by the NTIA prior to each Reporting Period in the form of an SBDD ArcGIS File Geodatabase (SBDD geodatabase, for short). A Submittal Type corresponds with a feature class in the geodatabase and the Output Fields are the attribute fields of each feature class. Since the same Output Fields will be used with each Submittal Type for a Reporting Period (i.e., for each Period-Type) for every Provider, they actually constitute a set of Template Output Fields that are used to create each particular Submittal's Output Fields that are eventually exported from DIVA. Thus, importing the SBDD geodatabase results in the creation of a set of Period-Types and a set of Template Output Fields for each Period-Type. These Template Output Fields will ultimately be used to create a set of Output Fields for each Input File.

In addition, the SBDD geodatabase contains a set of Domains that define the permissible values for a particular Template Output Field; the SBDD geodatabase specifies the Domain names and values as well as the Template Output Field to which it applies. Since the names and / or contents of the Domains may vary for each Reporting Period, a new set of Domains and values is created during SBDD geodatabase import and is used only for that Reporting Period.

In some cases, the SBDD geodatabase will specify a Default Value for an Output Field. Since this applies to all Output Fields for that Period-Type, the value is stored as part of the Template Output Field definition during SBDD geodatabase import.

While the feature classes in the SBDD geodatabase have been fairly consistent over all Reporting Periods, their defined attributes (Template Output Fields) have not been, nor have the number of Domains, their values, or assignment to Template Output Fields remained unchanged. DIVA handles this variability by creating a match between a Reporting Period and a Submittal Type called a Period-Type. Thus the “Spring 2011 Census Block” Period-Type may have a different structure (Template Output Fields, Domains, Domain assignments, etc.) than the “Spring 2012 Census Block” Period-Type. So when we speak of a “Census Block” Submittal Type, it is usually understood that this is for a particular Reporting Period and that we are actually referring to the matching Period-Type.

The “SBDD Geodatabase Import” operation, which must be done once for each Reporting Period, creates all of the Reporting Period's Period-Types (one for each feature class in the geodatabase, each feature class corresponding to a Submittal Type), creates each Period-Type's Template Output Fields (one for each attribute in a feature class, plus some additional DIVA-specific fields), and creates a set of “default” Rules that are attached to the Template Output Fields. It also assigns Default Values, if defined, to the Template Output Fields.

DIVA uses pre-defined, general data transformation operations, called Processes, to convert Input Field values to Output Field values. The collection of all Processes for a particular Input File is held in a Processing Set, and this set may be copied to other Input Files or used to create a Template Processing Set. As can be seen in Figure 1, data moves from an Input Field to an Output Field only by using a Process. In addition, depending on how Processes are "wired" together, intermediate Process Fields may be created. This is done according to the operational requirement that Processes cannot connect directly to each other (connections can only be made to Fields) and Fields cannot connect directly to each other (connections can only be made to Processes).

One of the primary reasons for creating DIVA was to automate, to a certain degree, the process of checking data. DIVA handles both data verification and data validation (the term "validation" is generally used to mean both of these, but we use these terms in a very particular sense; see Glossary). The DIVA Rule is our way of implementing this checking. For example, if an Output Field is required to have data according to the SBDD Geodatabase, then a "MustHaveData" rule is assigned to the corresponding created Template Output Field. Since all Output Fields for an Input File (Submittal) of a particular Period-Type are derived from the same set of Template Output Fields, these Rules thus apply to all such Output Fields. Rule violations can be checked after Processes are applied, and then the Processes can be adjusted to correct the data transformations to reduce the number of Rule violations.

An important item to note regarding DIVA data processing is that, unlike Input Field values, **Output Field values are never explicitly stored (saved) in an internal data table**. Output Field values are only generated during Process operations; the Processes tab must be "visited" in order to generate any Output Field values. This has important consequences in the order in which various Tabs should be visited, as well as to what information will be shown in various display windows. For instance, selecting a Submittal and then immediately opening the "Output Data Review" window will result in no output data being displayed; it has not yet been generated. You must click on the Processes tab to generate the data (or, if you are creating Processes on that Tab, then you must click the "Apply" button to have any changes take effect). If the Output Data Review window is open at this time, you will see the generated data "fill" the display.

Because Output Fields will not have values until the Processes tab is visited, the Output tab will not have any meaningful results, in terms of checking for Rule violations, until the Processes tab is visited.

The summary and detailed Input File reports will not have meaningful data until both the Processes tab is visited and the "Refresh Violation Counts" button is clicked on the Output Tab.

Generalized Processing Workflow:

The general DIVA processing workflow for a particular set of data (an Input File) for a Submittal is as follows:

1. Submittals tab: Create the Submittal or add an Input File to an existing Submittal.

2. Submittals tab: Load data from a Provider's data set (source file on disk) into the Input File (stored in an internal DIVA data table).

3. Processes tab: Create and apply transformative Processes linking Output Fields to a data source. A data source is typically an Input Field, but some Processes can serve as a data source themselves.

4. Rules tab: Assign Rules to check values in the Output Fields.

5. Output tab: Examine data errors.

6. Iterate over steps 3 – 5 to fix errors in the Output Fields by modifying assigned Processes and / or adjusting Rules as necessary.

7. Output Data Review window: Examine and export the transformed data.

8. Reports tab: Generate reports.

Key Features:

DIVA offers a rich user interface for exploring and processing Provider broadband data into a form that can more easily linked to NTIA-required GIS feature classes.

- ***Configurability*** – DIVA offers many opportunities for configuration. New Provider identification information can be imported and applied to every Provider submittal. New releases of the SBDD geodatabase are read and up-to-date Rules are automatically created and applied. Processes and Rules in DIVA are very general and may be user-configured to achieve various results.

- ***Consistency*** – The "structured approach" to data processing is embedded in the design of DIVA: in the Object Data Model that defines DIVA entities, in the definition of Processes, in the definition of Rules, and in the ways that Processes and Rules are used to generate and check output data. It is easy to lose data integrity in the rush of meeting data-delivery deadlines. By automating much of this processing, DIVA tries to increase the amount of time that a user has to actually review and check data, and made it easier for the user to achieve consistent, known results in the exported data sets.

- ***Re-usability*** – Users can define a set of Processes within a particular Reporting Period as a Template and then apply the Template to new Input Files. Rules are uniformly applied to Providers for each Reporting Period. This includes user-defined rules: once defined and applied, they will automatically be applied to subsequent Submittals.

- ***Documentation*** – Notes regarding Providers, Submittals, Input Files and other elements may be added at any time using the "Edit Metadata" button on the Status Bar. Notes can be viewed or exported at any time for cutting and pasting into NTIA documentation. These notes, plus the actual Input File(s) associated with a Submittal, the assigned Processes, Rule violations and final output, constitute DIVA's Metadata system. A good example of metadata stored in a Process is the translation table from Provider actual speed values to NTIA speed tier codes: the value mapping is preserved and can be reviewed in DIVA by opening up the applicable Submittal and generating a detailed Input File report (or by right-clicking on the Translation Process in the Processes tab).

What DIVA is Not:

DIVA does not perform any spatial validation or processing. DIVA was scoped as "pre-GIS" software, designed only to speed and improve the processing of Provider data to a point where it could be more cleanly geocoded or linked to NTIA GIS layers. Based on this design criteria, DIVA is not very useful for wireless service shapefile deliveries where the feature counts (data Records) are a couple of hundred, or less, and are in more or less proper SBDD format. It really shines in processing address, census block and road segment submittals of tens or hundreds of thousands of records, and where Providers have not followed the SBDD coding scheme.

Installation

DIVA comes with a basic installer which installs the application program, builds the basic SQL Server schema and populates various tables with DIVA-standard values (e.g. Reporting Period names). The DIVA installation requires and assumes you have already installed the latest free version of Microsoft's SQL Server Express 2008 R2.

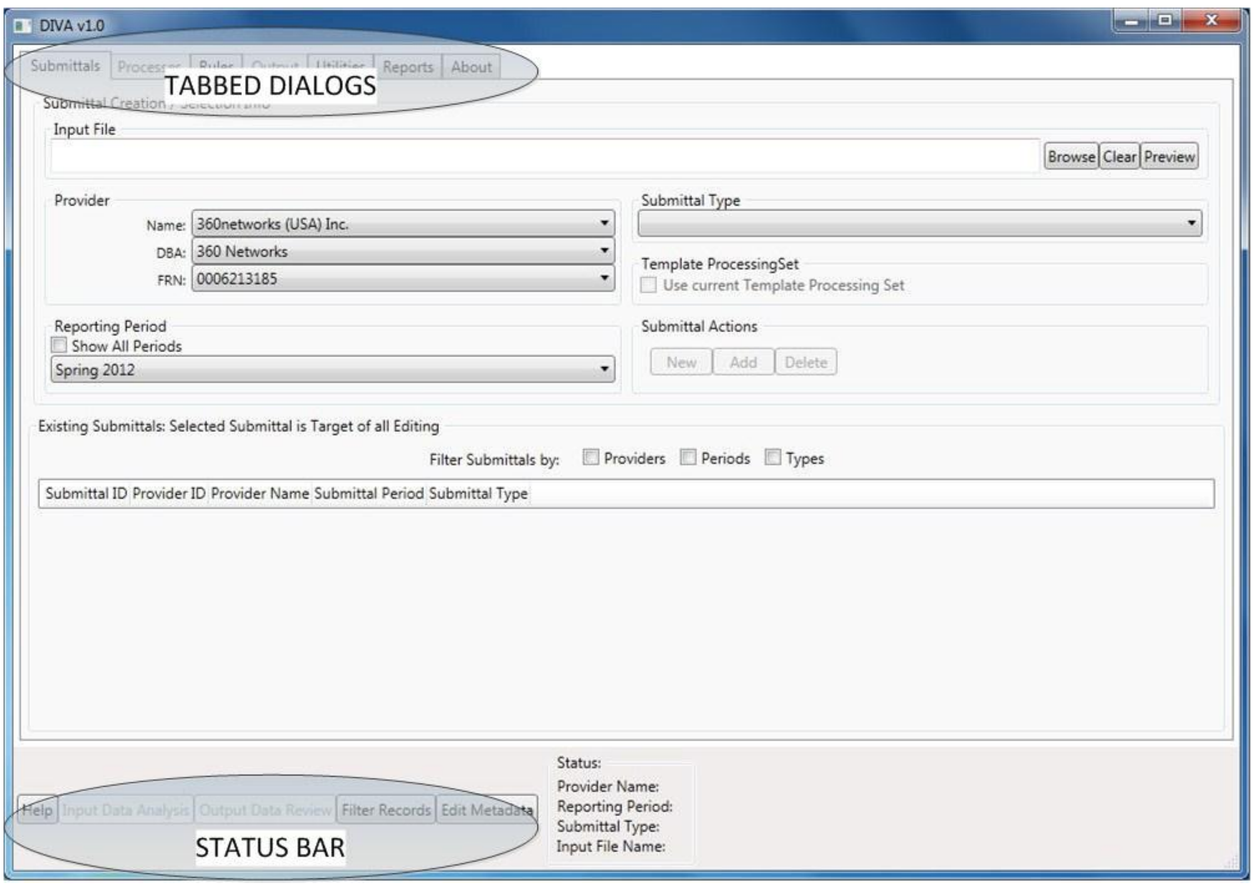
Basic installation steps are:

1. Create an install folder on your system
2. Copy the "DIVA.exe.config" file from the previous prototype folder to the new install folder.
3. In SQL Server, delete and then re-create DIVA database.
4. In SQL Server, run "DivaModel.edmx.sql"
5. In SQL Server, run, "BaseData.sql "

Provider data will now be loaded into period-specific data bases. THESE WILL HAVE TO BE DELETED IN THE FUTURE as part of the re-install. Their names look like "Diva_PData_X##" where "X" is "F" or "S" and "XX" is the two digit year. For a description of the tables that DIVA creates in SQL Server please see Appendix D.

Functionality Overview by Graphic User Interface (GUI) Elements

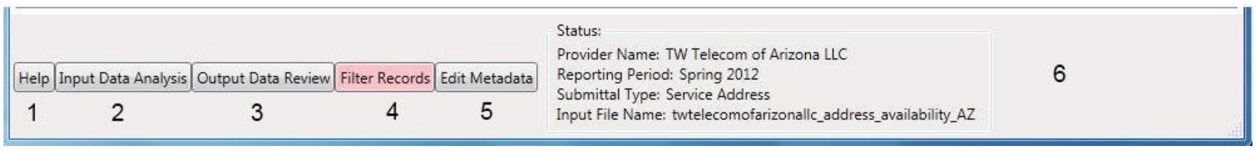
The main DIVA interface is a tabbed dialog box with the tabs organized from left to right roughly corresponding to the order in which a user would proceed while processing Provider data. The image below shows the initial DIVA view, the Submittals Tab. In addition to the left-to-right ordering of tabs, DIVA also guides users by activating tabs and various controls only when pre-requisite steps have been completed. This guidance is only approximate. DIVA was not designed as a data processing "wizard" and therefore users are allowed to choose many pathways through the DIVA application. In addition to tabs, DIVA has a "Status Bar", composed of five buttons and a status display area found at the bottom of the DIVA GUI regardless of which tab is currently active.



Following are brief explanations of the tabs and Status Bar controls on the DIVA GUI. Hyperlinks reference more detailed descriptions of how and when to apply a particular control.

Status Bar Overview

For the most part, buttons on the Status Bar can be used at any time, which is why they are visible no matter which tab is active. The “Status” area on the right side of the bar displays the currently active Provider, Period-Type (Reporting Period and Submittal Type) and Input File Name. Following is a table that briefly describes the function of each of the Status Bar elements; if an element is a button, then the description is what happens when the button is clicked Follow hyperlinks for more detailed information.



Key	Control	Description
1	Help button	Brings up an HTML version of selected portions of this documentation.
2	Input Data Analysis button	Opens the “Input Data Analysis” window which displays the data that was loaded into DIVA from the active Input File for the active Submittal.
3	Output Data Review button	Opens the “Output Data Review” window and displays the data resulting from applying the Processes (as configured on the “Processes” tab) to the Input Fields and the errors resulting from applying Rules on the Output tab. *Note: after selecting a Submittal, users must click on the “Processes Tab” to apply the Processes for the selected Submittal. This will generate the Output Field data and the “Output Data Review” window will be populated with those values.* *Note: after applying Processes, users must click on the “Refresh Violation Counts” on the Output tab. Errors will then be viewable in this window.*
4	Filter Records button	Opens the “Filter Records Window” where the user can specify a number of records or an SQL query expression (or both) to restrict the number of records that are loaded for current processing. *Note that, in the example above, the button is colored. This indicates that a filter is in effect (i.e., not all Input File records are currently being processed).*

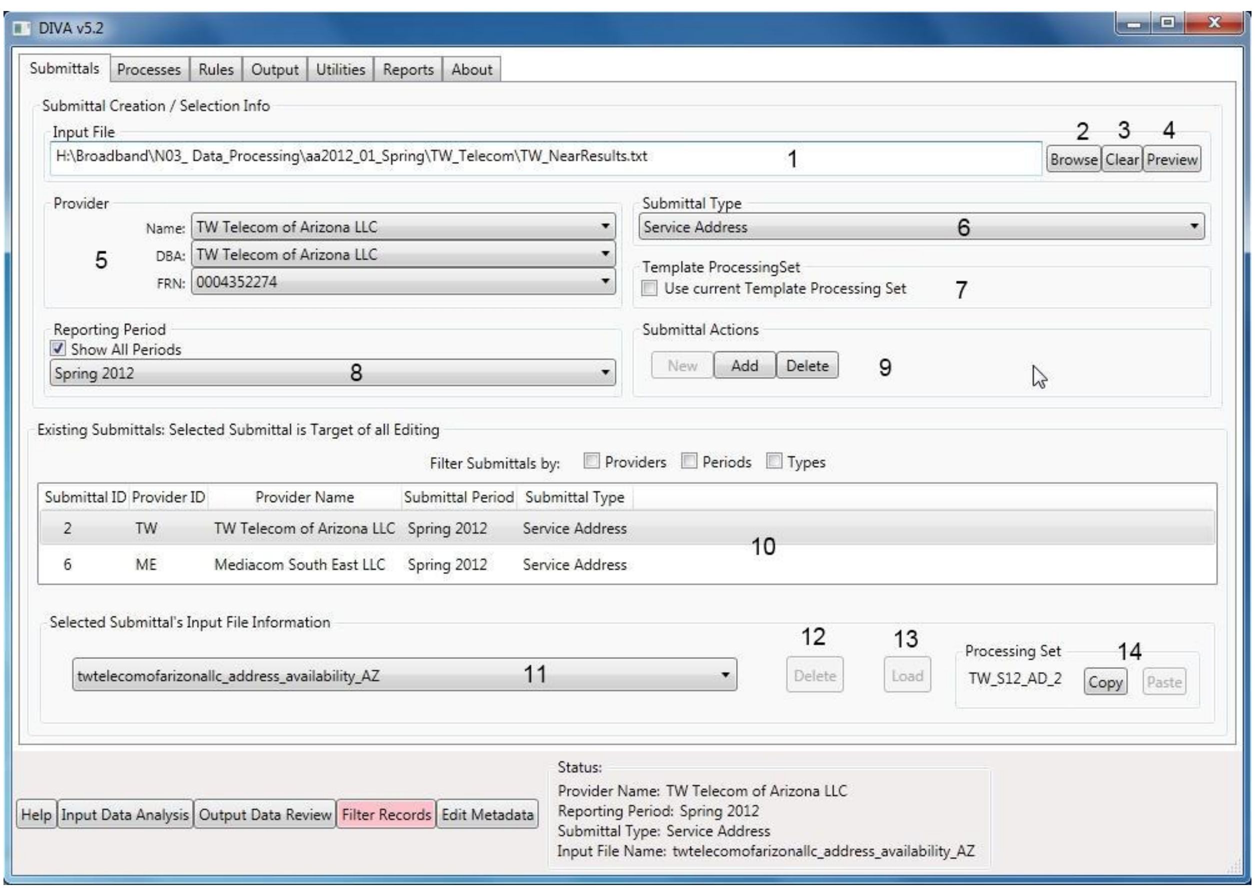
Key	Control	Description
5	Edit Metadata button	Opens the "Edit Metadata Window" where users can record notes about Providers, Reporting Periods, Submittal Types and Submittals. Metadata entries are included, as appropriate, in the various Reports.
6	Status area	The "Status" area is always visible and reports on information about the active Submittal.

Submittals Tab Overview

The Submittals tab contains all the controls a user needs to manage the intake of provider data. In the image below are numeric keys to the discussion that follows. More detailed information on how and when to use these controls can be found in the “Functional Details” and “Sample Workflow” sections of this documentation.

The upper portion of the tab, the “Submittal Creation / Selection Info” panel, is used to set the active Provider, Reporting Period and Submittal Type. If this combination has been used previously to define a Submittal, then that Submittal will automatically be selected in the lower panel and the selected data set (the Input File) can be added to the Submittal. If this combination has not been used previously, then a new Submittal (with the selected Input File data set) can be created.

The lower portion of the Tab, the “Existing Submittals” panel, displays all existing Submittals and can also be used to navigate among them. The “Filter Submittals” check boxes allow the user to restrict the display of existing Submittals to only those matching the active Provider, Reporting Period and / or Submittal Type.



Key	Control	Description
1	Input File text box	Displays the path and filename of the Provider Data Set which a user has selected using the Browse button. *Note: more than one Input File may be associated with a submittal. These files are processed separately and not combined by DIVA in any way.*
2	Browse button	This button opens a file dialog box which is used to select a Provider data set (a DIVA Input File).
3	Clear button	Clears the Input File selection from the Input File text box.
4	Preview button	Opens the selected Input File in an “Input Preview” dialog box, allowing the user to evaluate the content and format of the first 100 records of the Input File.
5	Provider area	The three drop-down lists in this area allow the user to set the active Provider using either the Provider Name, DBA Name or FRN (FCC Registration Number). Selection in one drop-down list automatically synchronizes the other two. Users may also click on an existing Submittal in the Existing Submittals list to set the active Provider (i.e., display the Provider’s identification information). The Provider drop-down lists are populated from an internal DIVA table. This table can be updated from the Utility tab (Update Provider Info).
6	Reporting Period drop-down list	This drop-down list is used to set the active Reporting Period. Only the current Reporting Period is available for selection unless the “Show All Periods” box is checked. Each Reporting Period has an internal DIVA-defined Start and End date. The Reporting Period that has a date range containing the current system date is considered current. The Reporting Period pull-down list can be modified from the Utility tab (Manage Submittal Reporting Periods).
7	Submittal Type drop-down list	This drop-down list is used to set the active Submittal Type. Each of the eight NTIA approved Submittal Types may be listed. The ones that will be shown are the ones for which a matching feature class was found during SBDD XML Importfor this Reporting Period. *Note: This is used in combination with the Reporting Period drop-down list to set the active Period-Type.*

Key	Control	Description
8	Template Processing Set checkbox	Checking this box, prior to clicking on the Processes tab for any new Submittal, will automatically generate Processes for that Submittal from the current Template Processing Set (if it exists) when the Processes tab is clicked. Template Processing Sets are created on the Processes Tab. Any existing Processes for that Submittal will be copied to the Template Processing Set overwriting any previously saved Processing Set for the current Period Type. *Note: there can be one and only one Template Processing Set for each Submittal Type for a given Reporting Period, that is, for any one Period-Type.*
9	Submittal Actions buttons	The “New”, “Add” and “Delete” buttons in this section of the Submittals tab all pertain to working with Submittals. The “New” button will only be available if no previous Submittal has the same assigned Provider, Reporting Period and Submittal Type. Clicking the button will create the Submittal with these values assigned and the currently selected data set as the Input File. This new Submittal will be added to the “Existing Submittals” list and it will be active (selected). The “Add” button will only be available if the active Provider, Reporting Period and Submittal Type have been used previously (i.e., there exists a Submittal with these values). In this case, the selected Input File will be added to that Submittal; it will be added to the Existing Input Files drop-down list and be made the active Input File. The “Delete” button will completely delete an existing Submittal, including references to its Input File(s), their Input and Output Fields, and their Processing Sets (any defined Processes and Process Fields). The internally stored data of the Input File(s) are also deleted. *Note: each new data set added to an existing Submittal is its own Input File. In other words, multiple Input Files are not appended and treated as a single Input File.*

Key	Control	Description
10	Existing Submittals list	This is a list of all Submittals that users have previously defined using DIVA. Clicking on a Submittal in this list makes it the active Submittal and synchronizes the information in the upper panel of the Submittals tab (the "Provider", "Reporting Period" and "Submittal Type") with the active Submittal. The checkboxes along the top filter the list of existing Submittals found in the Existing Submittals table area. Users may filter the list to specific Providers, Reporting Periods and / or Submittal Types. *Note: When a Submittal is created, the Input File's data is not automatically loaded into DIVA's internal storage. Users may have referenced several Input Files for a Submittal without loading data. Data loading is a separate step from Submittal creation and is required for any further processing in DIVA.*
11	Input File drop-down list	Displays the active Input File name for the selected Submittal. If there are multiple Input Files assigned to a Submittal, the active Input File may be selected using this drop-down list. *Note: When a Submittal that has multiple Input Files is selected, the first Input File will be active (selected). The user must change this as needed. DIVA does not remember (and restore) the last Input File that was used for this Submittal.*
12	Delete button	Deletes the active (selected) Input File. This deletes all associated information in the DIVA database, including Processes and Metadata, for that Input File only; the selected Submittal is not deleted. If there is only one Input File for a Submittal, then it is not possible to delete it and the button is inaccessible; use the Submittal Delete button instead. *Note: A Submittal must have at least one Input File; therefore, to remove the last Input File the user must delete the entire Submittal.*
13	Load button	Opens a "Load Data" dialog box (this is very similar to the "Input Preview" dialog box accessed with the Preview button) and allows the user to evaluate the content and format of the first 100 records of the Input File. The settings here are more critical because, when the Load button in this dialog box is clicked, these settings will determine how the data file will be loaded into DIVA's internal database. *Note: It is important to understand that you can Create a new Submittal, but nothing further can be done with it until you load the data from the Input File.*

Key	Control	Description
14	Processing Set area	This area shows the (internal) name of the Processing Set attached to the active (selected) Input File, and contains buttons for copying and pasting a Processing Set to another Submittal's Input File. The "Copy" button will be accessible only if this Input File has had its data loaded and its Processing Set contains at least one Process (the user must have created and saved at least one Process on the Processes Tab). Clicking the Copy button will "tag" this Processing Set for copying. The "Paste" button will be accessible only if this Input File has had its data loaded, another Submittal has had its Processing Set "tagged" for copying, and this Input File's Processing Set is empty (no Processes ever assigned to it). The user must remove all Processes from an Input File (by deleting them on the Processes tab and then saving the results) if another Processing Set is to be "pasted". Clicking the Paste button will automatically transfer DIVA "focus" to the Processes tab so that the Paste operation can be completed.

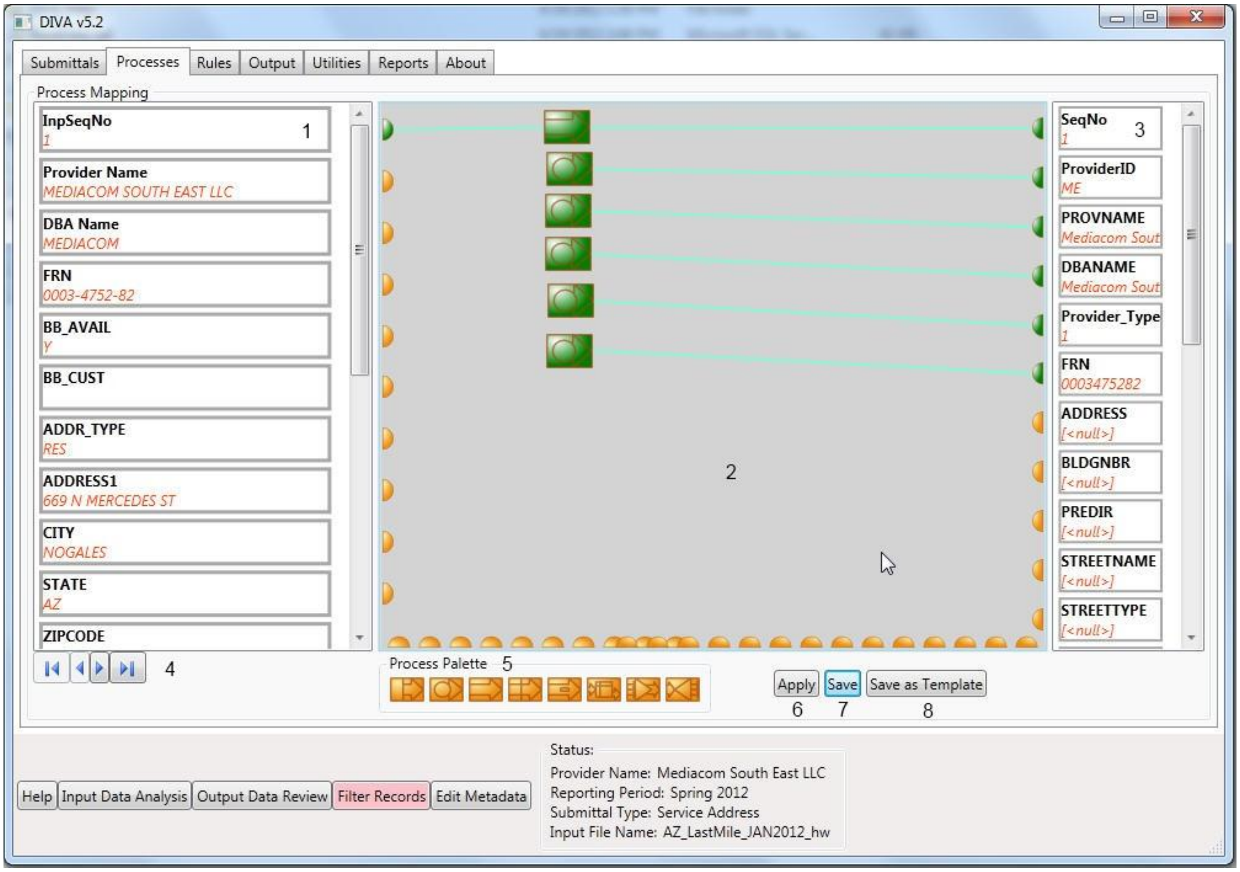
It is important to note that once a Provider's data set (computer file contents) has been loaded into internal DIVA storage (as a data table in a Reporting Period-specific database), that data set's computer file may be renamed, moved or deleted with no effect on DIVA. Prior to loading, changing the filename, the file's location or deleting the file will cause the DIVA data loading operation to fail. Doing any of these actions will force the user to browse to a new data set and add it as an Input File for that Submittal or restore the file to its original location with its original name.

Processes Tab Overview

The Processes tab is where the user assigns the data transformation Processes and uses them to link Input Fields with Output Fields. This linkage creates a data "flow" from the Input Fields (data "sources") to the Output Fields (data "sinks"). Not all Input Fields need be used and some may be used more than once (linked to more than one Process). Output Fields are typically fully linked. Most Output Fields derive from SBDD geodatabase requirements (SBDD-source), but some have been added by the DIVA design team for their utility based on past experience (DIVA-source). Some SBDD-source Output Fields will have a "MustHaveData" Rule created for them if the Output Field is required to have data (per the SBDD geodatabase).

Note that only Column Processes are placed and manipulated on the Process Mapping Canvas. There are eight DIVA-defined Column Processes, ranging from a simple copy to complex decompositions. Row Processes (of which, at this time, there is only one) will automatically appear under the Output Fields List as needed. The existence of a Row Process is determined by the existence of the corresponding Row Rule (the user cannot create or remove this Process directly); the Process is then used to resolve violations detected by the corresponding Rule.

At DIVA start-up, the Processes tab will be inaccessible. Users must select an existing Submittal that has loaded data, or define a new Submittal and load its data, before the Processes tab will be available for use. In the image below are numeric keys to the discussion that follows. More detailed information on each Process type is referenced in the hyperlinks.



Key	Control	Description
1	Input Fields list	The list of Input Fields created when the active Input File was loaded. These fields are Data Sources.
2	Process Mapping canvas	This is a drag-and-drop area where users place and connect Processes with Input Fields and Output Fields or with other Processes through Process Fields.
3	Output Fields list	The list of Output Fields as imported from the SBDD geodatabase for the user-selected Period-Type (Reporting Period and Submittal Type). These fields are Data Sinks.
4	Record Pointer controls	Moves the record pointer on the Input File to (in order) the first, previous, next or last record.

Key	Control	Description
5	Process Palette	Displays the graphics representing the eight data transformation processes defined in DIVA and serves as the "launch pad" for creating a Process. To create a Process, click one of the Process icons in the Palette, and drag-and-drop it onto the Process Mapping Canvas. The name of each Process can be found by hovering the mouse over its icon to display a tool tip. In order from left to right, these eight processes are listed below, with details on each found by following the hyperlink. • Constant Value – populate an Output Field or another Process with a user-defined value. • Provider Value – populate an Output Field or another Process using values imported into DIVA from a provider information table. See "Update Provider Information" for details on this table. • Copy – populate the Output Field or another Process by copying the value of the Input Field. • Copy with Default – populate the Output Field or another Process where values are either null or blank by copying the default value as defined in the SBDD database for the active Reporting Period. • Make Negative – populate the Output Field or another Process by copying the value from the Input Field and inversing its sign. • Translation – populate the Output Field or another Process by translating values in the Input Field to a new, user-defined value. • Composition - populate the Output Field or another Process with values appended (composed) from two or more Input Fields. • Decomposition – populate two or more Output Fields or Processes with values parsed (decomposed) from a single Input Field. DIVA currently has four types of decomposition processes: Census Block, Full Address, Simple and Zip Code. The user cannot create a Decomposition Process, per se, but only one of these four types. While each is configured and functions in its own manner, the same symbol is used on all decomposition graphics. Associated tool tip can be used to identify specifics about these Processes.
6	Apply button	Applies the Processes, transforming Input Field values to Output Field values and causing them to display in red font below each Output Field.
7	Save button	Saves the Processes to a Processing Set. If already saved, this updates that Processing Set with any changes made since the last save.
8	Save As Template button	Saves the current Processing Set as a Template Processing Set for use when creating new Submittals.
9	Row Process(es) button(s)	Below the Output Fields List, a button will be displayed for each existing Row Process. Click this button to open a dialog window to configure that Row Process. *Note: At present, DIVA has only one defined Row Process.*

Tips for creating Processes:

- Preserve the Input Field, “InpSeqNo”, in the DIVA-defined “SeqNo” Output Field. This creates a unique record identifier which is useful in subsequent processing steps. Alternatively, use some other Input Field that uniquely identifies a data record (e.g., the UNQID field suggested for shapefile processing). Failing to put a unique identifier in the “SeqNo” Output Field can make it difficult to track NTIA-submitted data back to its source.
- Apply and save Processes as you define them. This ensures work is tested and then saved. Always examine the results of applying Processes across multiple data records to ensure that you have achieved what was intended.
- Use a “Provider Value” process instead of copying a Provider’s name, DBA name, FRN, etc. information from the Input File. This keeps the Provider identification information consistent with the values maintained in the Provider Information database and consistent across multiple Reporting Periods.
- Use Template Processing Sets when loading a new Submittal, or Copy and Paste another Submittal’s Processing Set. Chances are the processing will be similar enough that it will be faster to start with some pre-defined Processes.
- Right clicking any Process on the Process Mapping Canvas brings up a context menu which allows the user to change the configuration of inputs and/or outputs to the Process. Only composition allows you to add inputs, only decomposition denies adding outputs. All Processes allow you to delete them. Deletion can also be accomplished by selecting the input or output on the Process and pressing the “Del” (delete) key.

Rules Tab Overview

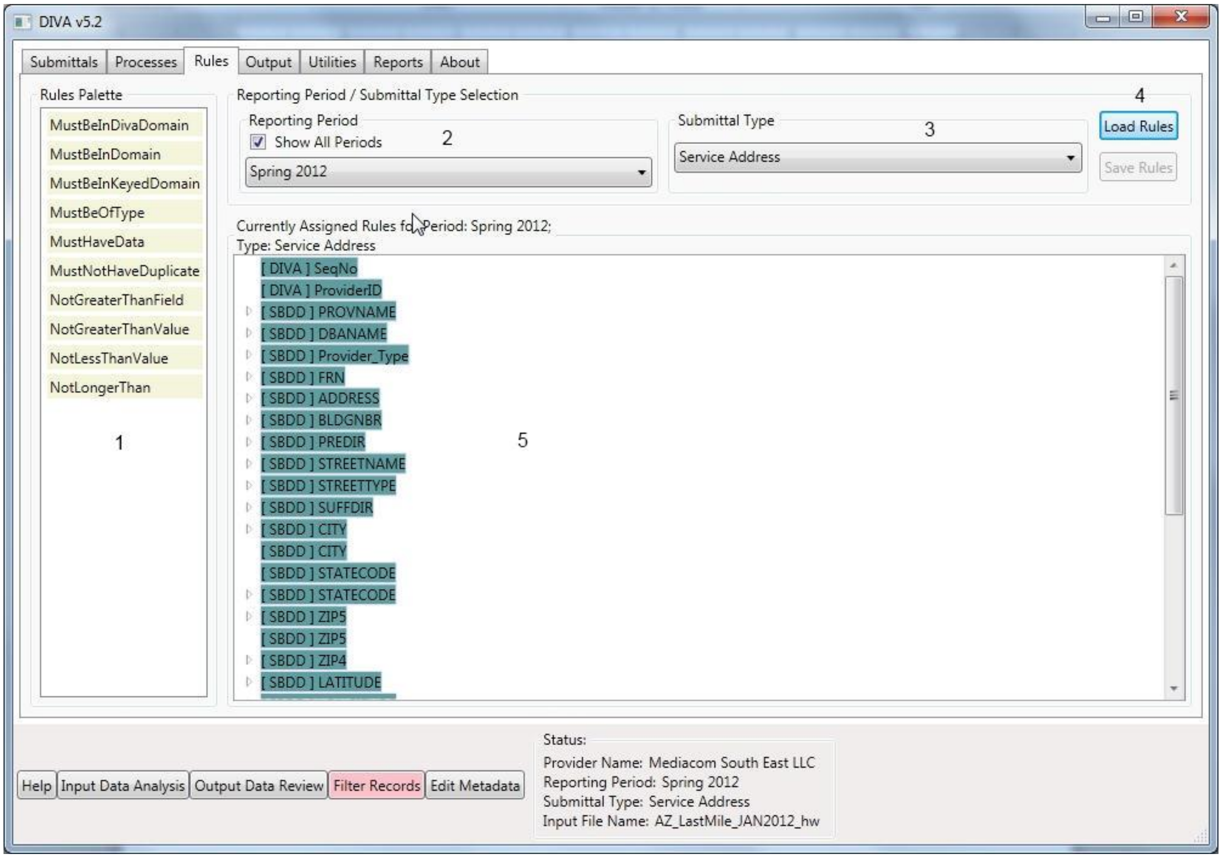
The Rules tab is where a user can review the Rules that are imported during the "SBDD XML Import" process. The user may also assign more Rules, modify (configure) existing Rules, or remove Rules. Rules are how DIVA implements Data Verification and Data Validation for Output Field values.

It is vital that the user understands that Rules are assigned to Template Output Fields. Template Output Fields are unique for each Period-Type (e.g., for Spring 2012 Census Block reporting). Each Input File that is identified with a Submittal (and there must be at least one) will have a corresponding set of Output Fields created; one Output Field for each Template Output Field. The Rules that are in effect for a Template Output Field affect every Output Field that is created from it. Because of this, all Submittals of a particular Period-Type will have the same set of Rules applied to each of them.

Obviously, this will not be true if the user processes some Submittals and then changes the Rules. Therefore, careful consideration should be given at the start of the Reporting Period, after SBDD geodatabase import, as to which Rules should be added or removed, and how they should be configured. **For consistency, when Rules are modified, previously processed Provider data should be re-processed and checked for consistency with these modified Rules**. DIVA makes it easy to rapidly review any previously processed data.

Because Rules are assigned to Template Output Fields, it is not necessary to have an active (selected) Submittal, or even any defined Submittals for a Reporting Period, in order to access and modify the Rule Set for a Period-Type. All that is required is that the SBDD geodatabase be imported for the Reporting Period. Nor is it required that a Rule Set be loaded on this tab before they are applied (the results of Rule application are seen in the Output Tab). They will automatically be applied because the Output Field is tied to the Template Output Field from which it was derived

In the image below are numeric keys to the discussion that follows. More detailed information can be found by following the hyperlinks.

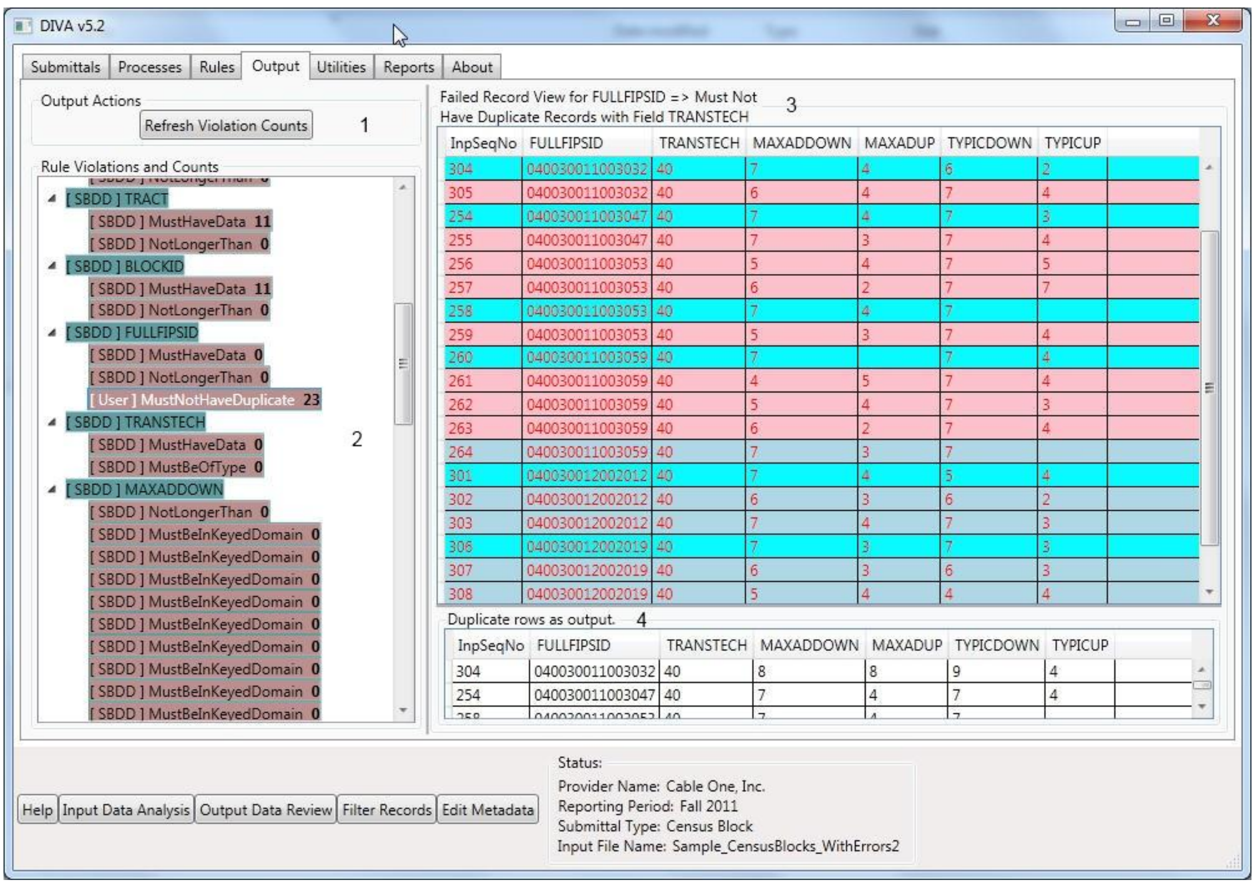


Key	Control	Description
1	Rules Palette area	A list of rule types that can be applied by dragging and dropping them onto the Output Fields shown in the "Currently Assigned Rules" area.
2	Reporting Period pull-down list	This pull-down list displays the current Reporting Period or all of the Reporting Periods defined in DIVA if the "Show All Periods" box is checked.
3	Submittal Type pull-down list	Each of the eight NTIA approved Submittal Types are listed in this menu.
4	Load Rules button	Loads the Rule set for the selected Period-Type.
5	Currently Assigned Rules area	Displays the Rules that have been assigned to each Template Output Field of a Period-Type (and, thus, each Output Field of a Submittal).

Output Tab Overview

The Output tab is where a user reviews and evaluates the results of applying Rules to values in the Output Fields. Users click the “Refresh Violation Counts” button to update the violation counts (apply the Rules). Rules and their violation counts are shown in a tree-view grouped under the Output Field to which they apply. Double-clicking on any Output Field will toggle the expansion / contraction of the tree view. Double-clicking on any given Rule that shows an error displays details on that error in the “Failed Record View”. Depending on the Rule, additional information may be displayed in the Extra Data panel below the “Error Record View” area.

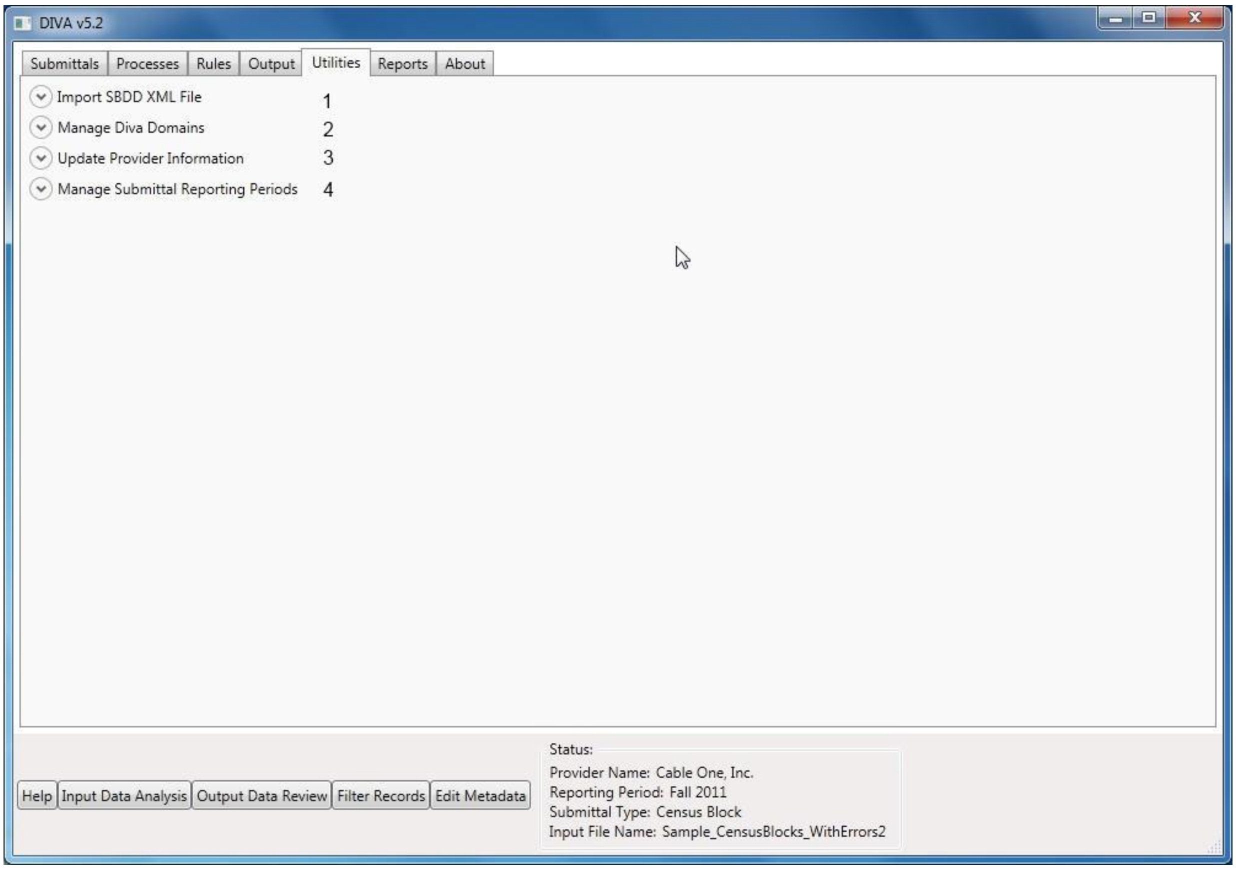
In the image below are numeric keys to the discussion that follows. More detailed information on each entry can be found by following the hyperlink in the table.



Key	Control	Description
1	Refresh Violations Count button	Click this button to update the record violation counts in the "Rules and Violation Counts" area. Be sure Processes have been applied prior to refreshing violation counts by clicking on the "Processes" tab first.
2	Rules and Violation Counts area	Displays the results of applying Rules to the Output Fields of the active Submittal. Any number greater than or equal to zero is the error count. A "-2" indicates that the Rule is not configured and therefore cannot be evaluated. A "-1" indicates that there is no data in the Output Field to be evaluated. Either the Output Field is not connected to a data source on the Processes tab or there is no data in the connected data source. *Note: There is a "splitter" line between the Output Actions / Rule Violations and Counts panels and the Failed Record View / Extra Data panels. The user may click and drag this line to change the panel area sizes in the window.*
3	Error Record View	Displays rows which have an error in the Output Field for the Rule that has been selected and double-clicked in the "Rules and Violation Counts" area.
4	Duplicate Rows as Output area	This area is used to display either details about the "MustNotHaveDuplicate" error type or the Domain values for domain rule types. For duplicate rules It displays the record(s) that will be added after compositing the duplicates into a single record based on user-defined parameters. *Note: There is a "splitter" line between the Failed Record View and the Extra Data areas. The user may click and drag this line to change the panel area sizes in the window.*
4	Domain Table Display Area	This area is used to display either details about the "MustNotHaveDuplicate" error type or the Domain values for domain rule types. For domain rule types, it will display the domain table when the user clicks on a domain Rule. *Note: There is a "splitter" line between the Failed Record View and the Extra Data areas. The user may click and drag this line to change the panel area sizes in the window.*

Utilities Tab Overview

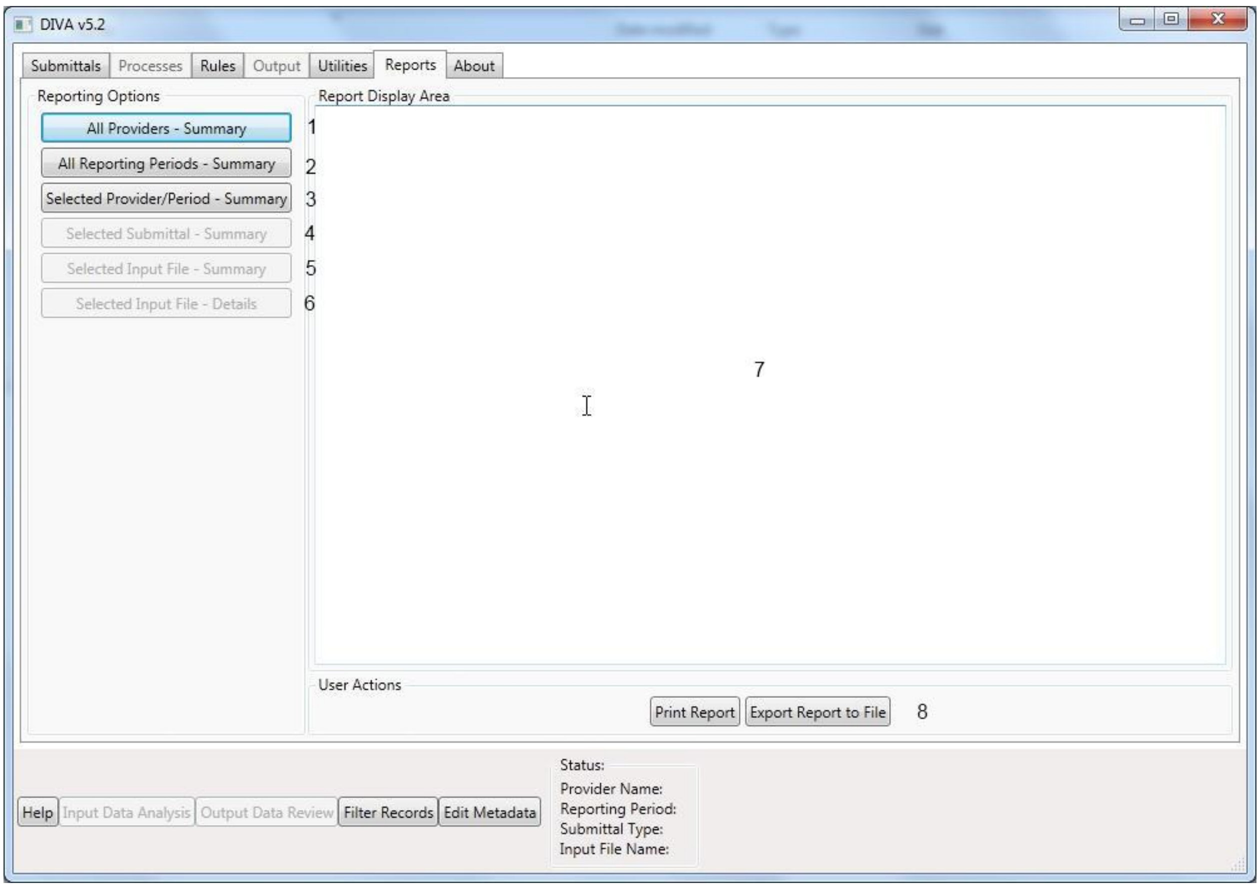
The Utilities tab is where a user configures various aspects of DIVA to keep it current with new information. In the image below are numeric keys to the discussion that follows. More detailed information on each utility can be found by following the hyperlinks.



Key	Control	Description
1	Import SBDD XML File	Import an XML workspace document that describes an SBDD geodatabase schema and domain tables. This need only be done once for each Reporting Period.
2	Manage DIVA Domains	Import a text, Excel or DBF containing DIVA Domain values.
3	Update Provider Information	Import a text, Excel or DBF containing Provider identification and status information. The field names in the source file must match exactly with those that DIVA expects.
4	Manage Submittal Reporting Periods	Add or remove Reporting Periods, or remove all data for a Reporting Period.

Reports Tab Overview

The Reports tab is where a user selects from a menu of pre-configured reports and either prints or exports them. Note that in the illustration below, some report options are greyed out. This is because no Submittal has been selected on the Submittals tab. More detailed information on each report and control can be found by following the hyperlinks in the summary table.



Key	Control	Description
1	All Providers Summary button	Displays a list of information about each Provider currently loaded into DIVA. Use the "Update Provider Information" button on the "Utilities" tab to update this information.
2	All Reporting Periods Summary button	Displays a list of information about each Reporting Period currently defined in DIVA. Use the "Manage Submittal Reporting Periods" button on the "Utilities" tab to update this information. This report will include all notes recorded by the user on the left-hand side of the "Edit Metadata" dialog.

Key	Control	Description
3	Selected Provider/Period Summary button	Displays a list of information about the active Provider and Reporting Period, including a list of the Period-Types (Submittal Types) defined for the Reporting Period and the number of existing Submittals for that Period-Type. *Note that the Submittal count can only be 0 (none defined) or 1 (a Submittal exists). For brevity, only Period-Types that have a Submittal count of 1 are displayed.*
4	Selected Submittal – Summary button	Displays a summary of the active (selected) Submittal, including summary information about each of its Input Files (inaccessible if no active Submittal).
5	Selected Input File – Summary button	Displays more detailed information about the active (selected) Input File of the active (selected) Submittal on the Submittals tab(inaccessible if no active Submittal). Information will be displayed about each Output Field of the Input File followed by a "chain of data flow" that shows the Output Field's connected Process, any Process Fields connected to that Process, any Processes connected to those Process Fields, etc., until the ultimate Data Source (which may be a Process or an Input Field) is listed. After the "chain of data flow" into the Output Field, a list of the Rules that apply to this Output Field is displayed along with the number of current Rule violations.
6	Selected Input File – Details button	Same as "Selected Input File – Summary" – except that additional details are given. Some Processes will have additional information given, e.g., for the Translation Process, all translated From and To values will be displayed. For Rule listings that have a violation count greater than 0, all violating records will be listed (for brevity, this includes just the record number ["InpSeqNo" field] and the Output Field's value). This report can be very long if there are excessive Rule violations, so the Summary version should be checked before generating this report.
7	Report Display area	The area in which the various reports are displayed. Scroll bars will automatically appear if necessary.
8	User Actions area	Allows the user to either print the file to a printer or export it to a text file.
9	Print Report button	Prints the information in the Report Display area to a printer selected by the user (invokes a standard Window's Printer dialog box).

Key	Control	Description
10	Export Report to File button	Exports the information in the Report Display area to a file, in plain text format, as selected by the user (invokes a standard Window's File Save dialog box).

About Tab Overview

The About tab gives general information about DIVA, its current version number, contact information, acknowledgements for other code uses and the licensing information for that code. There is no other functionality for this tab.

Functionality Details

This section describes in detail how to perform key operations in DIVA.

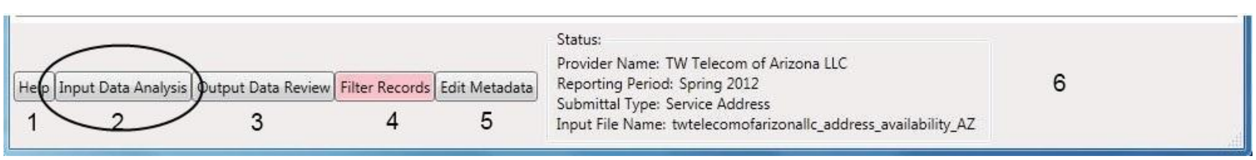
Status Bar Functions

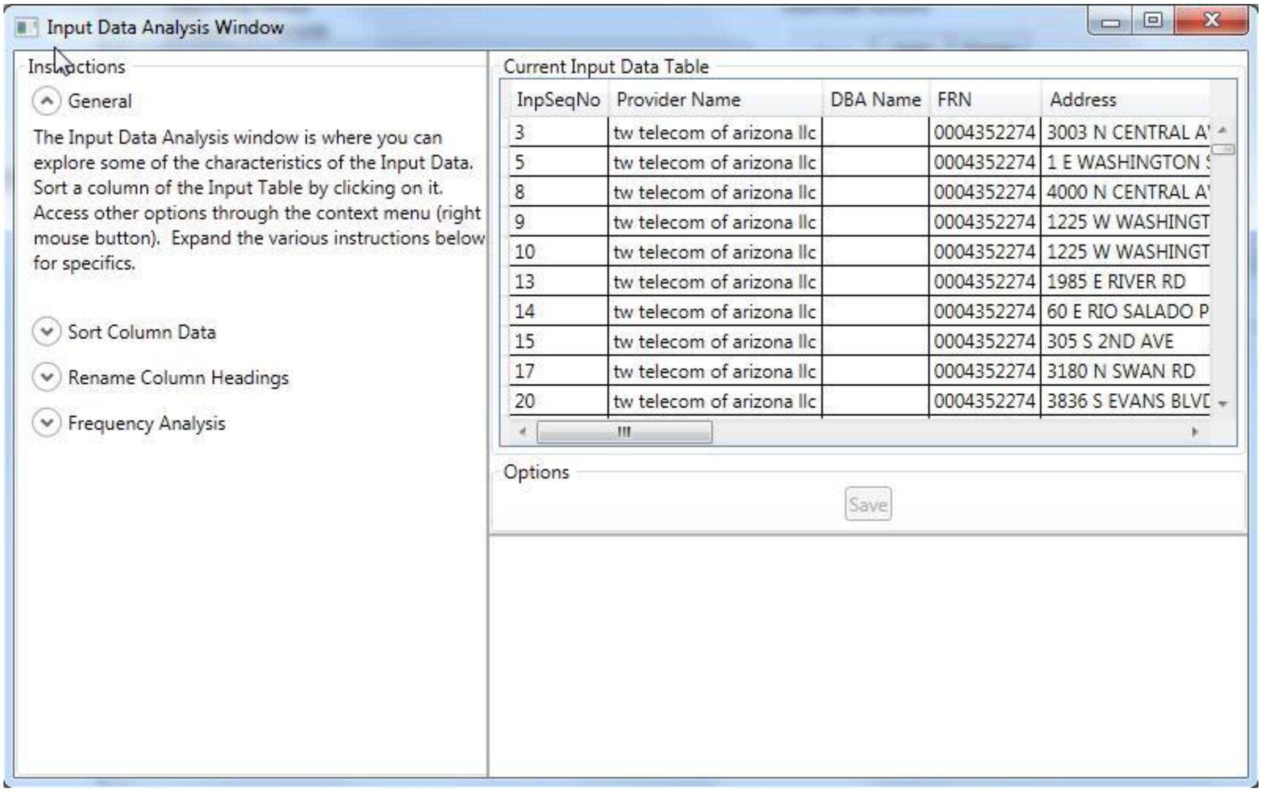
Input Data Analysis button (Status Bar, "Input Data Analysis" button) – the Input Data Analysis window shows the contents of the active Input File for the active Submittal. It offers a number of features for evaluating the data that has been loaded, including sorting and frequency analysis. It also has its own Help window which offers guidance on the use of its features.

Note: a Submittal must have its data loaded (not just created) before the Input Data Analysis Window can be accessed.

Note: This window is not a "modal" window; <u>it may be left open</u> while other operations are performed in DIVA. The user may minimize the window or may click the "Input Data Analysis" button to "toggle" this window in and out of view.

Note: The user <u>must explicitly close this window</u>, by clicking the red "X" icon in the window's upper right, before selecting another Submittal. If it is left open, it will continue to display the originally selected Submittal's data, not the currently active Submittal's data.

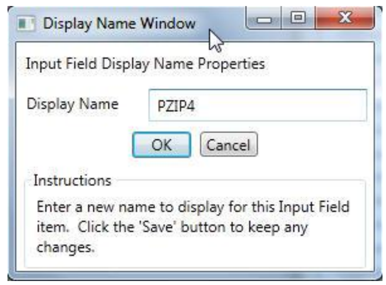




Key	Control	Description
1	Instruction Panel	Instructions to guide users on how to understand and use the Input Data Analysis Window. Note: there is a "splitter" line between the Instructions and the rest of the window which can be dragged to change the amount of the window allocated to each panel. Dragging the line all the way to the left will completely hide the instructions, but the splitter line is still there so that the instructions may be redisplayed at any time.

<table>
<tr><th>Key</th><th>Control</th><th>Description</th></tr>
<tr><td>2</td><td>Header Row Context Menu, “Rename the Header”</td><td>
Right Click on any column header and select “Rename the Header”

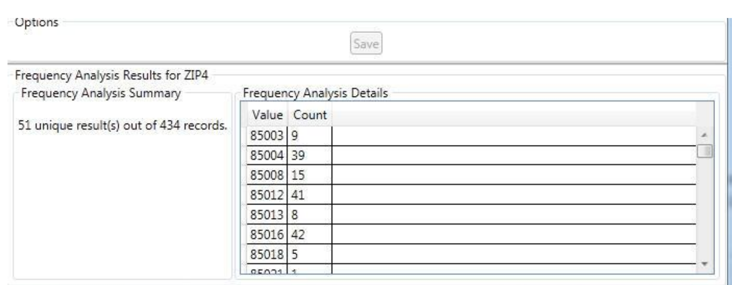
Type in a new Display Name and click “OK” to save changes and dismiss the dialog. Click “Cancel” to exit without saving.



Note: You can use spaces in the Display Name. This string is just an alias and does not become an actual database field name.

Note: Upon clicking “OK” which dismisses the dialog and returns you the Input Data Analysis Window, you must click the “Save” button immediately below the table display in order to have Display Name changes be saved permanently (i.e. so you will see them the next time you select the Submittal).
</td></tr>
<tr><td>2</td><td>Header Row Context Menu, “Do Frequency Analysis”</td><td>
Right Click on any column and select “Do Frequency Analysis” optin

The results of the Frequency Analysis are shown in its display area. On the left side, a summary of the number of unique values for the analyzed field (column) and total number of records in the Input File is displayed. On the right side, a detailed table of the analysis results is shown, with each unique value listed along with the frequency count.



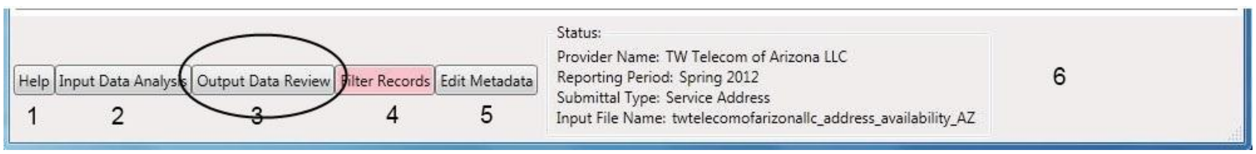
Note: There is a “splitter” line between the Data <u>Table</u> and the Frequency Analysis Results areas. The user may click and drag this line to change the viewing area sizes
</td></tr>
</table>

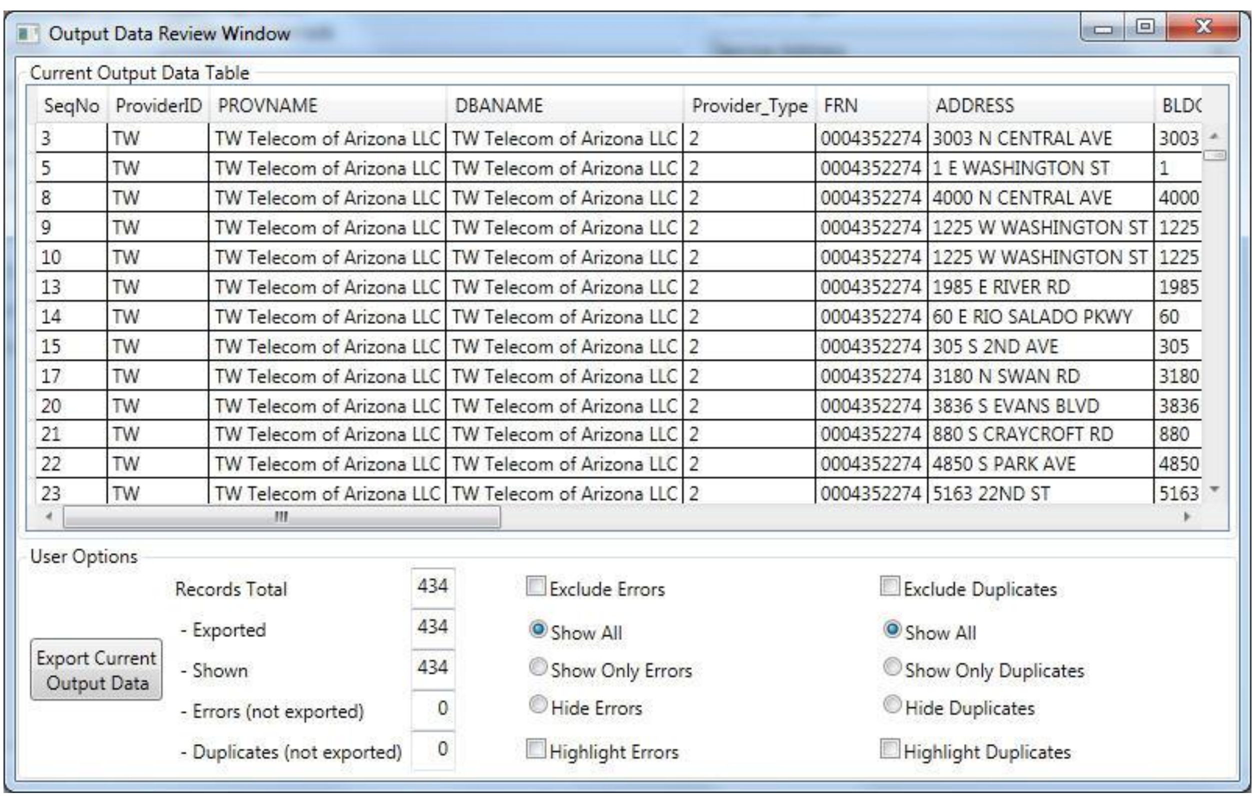
Key	Control	Description
		in the window. *Note: Clicking on the header column of the results table will sort the entries. Thus, by clicking on the Count header, you can sort the results by the Count value in ascending order. Clicking again will sort the values in descending order.*
3	Save button	Saves any changes made to the header row (column) names.
4	Display area	The area where the “Do Frequency Analysis” output (table) is shown when that menu option is selected.
5	Cancel Menu control	Click on the red x in the upper right corner of the “input Data Analysis Window” to dismiss it. *Note: no matter what you do in this window, the source Input File is not changed.*

Output Data Review button (Status Bar, "Output Data Review" button) – the "Output Data Review" button opens the "Output Data Review Window" which shows the results of applying [Processes] to the values in the Input Fields and [Rules] to the values in the Output Fields of a Submittal. This window offers information about the processed file and options to apply before exporting it to a text file.

Note: This window may be left open while other operations are performed in DIVA. The user may minimize the window or may click the "Output Data Review" button to "toggle" this window in and out of view.

Note: The user must explicitly close this window, by clicking the red "X" icon in the window's upper right, before selecting another Submittal. If it is left open, it will continue to display the originally selected Submittal's data, not the currently active Submittal's data.



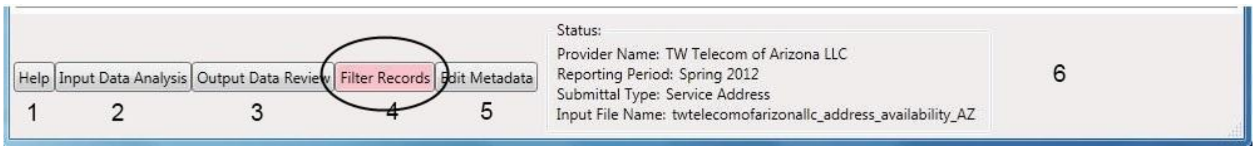


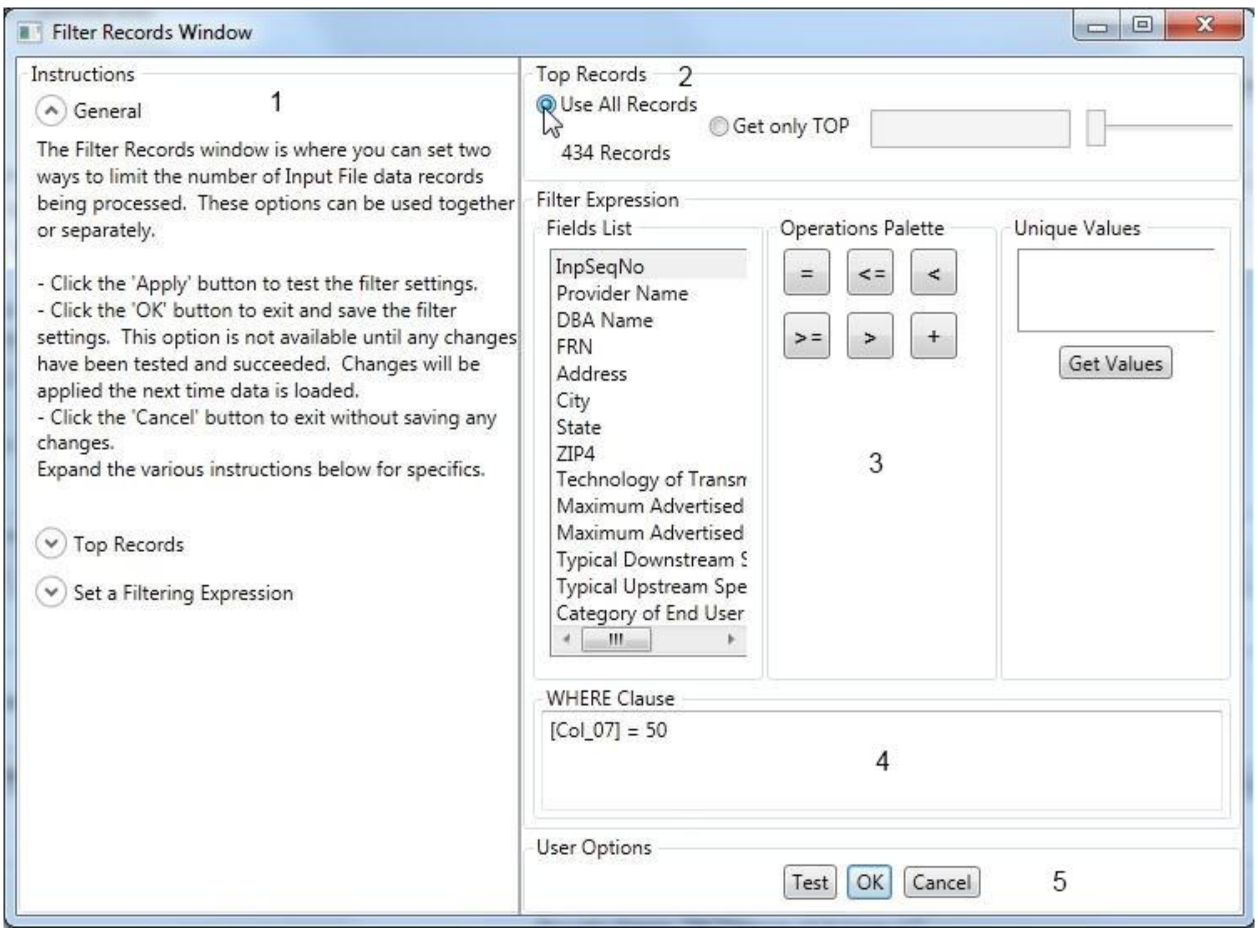
Key	Control	Description
1	Export Current Output Data button	Opens a dialog box where the user can specify the output location and file name for data that will be exported. Export only works on records visible in the “Current Output Data Table” control and only produces delimited text files.
2a	Records Total text box	Total records in the active Submittal. This number reflects any Filters the user has applied.
2b	Exported text box	The number of records that will be exported when the “Export Current Output Data” button is clicked.
2c	Shown text box	The number of records being displayed in the “Current Output Data Table” section of the window. This number reflects any errors or duplicates the user has chosen to exclude using the checkboxes in this area.
2d	Errors (not exported) text box	The number of records with an error that will not be exported. This number will differ from the Total Records, only if the user has checked the “Exclude Errors” box in the “Errors Column”.
2e	Duplicates (not exported) text box	The number of duplicate records that will not be exported. This number will differ from the Total Records, only if the user has checked the “Exclude Duplicate” box in the “Errors Column”.
3a	Exclude Errors checkbox	Check this box to exclude errors from the export file.
3b	Show All radio button	Show all records, including those with errors.
3c	Show Only Errors radio button	Show only records that have been flagged with an error.
3d	Hide Errors radio button	Show only records that have NOT been flagged with an error.
3e	Highlight Errors check box.	Check this box to highlight error rows so they can more easily be seen.
4a	Exclude	Check this box to exclude duplicate records from the export file.

Key	Control	Description
	Duplicates checkbox	
4b	Show All radio button	Show all records, including those with duplicates.
4c	Show Only Duplicates radio button	Show only records that have been flagged as duplicates.
4d	Hide Duplicates radio button	Show only records that have NOT been flagged as duplicates.
4e	Highlight Duplicates checkbox	Check this box to highlight duplicate rows so they can more easily be seen.

Note: Errors and duplicates are two separate concepts and mutually exclusive when displaying in this window. If a record is both a duplicate and an error, it will be flagged as an error first and will remain that way until the other rule violation(s) is/are fixed. Only then will its duplicate status be considered.

Filter Records Window (Status Bar, "Filter Records" button) – the "Filter Records" window allows users to define a subset of data contained in a Provider Input File for further processing. Filters affect how many records are loaded from a Provider's Input File as well as any data that has been loaded into DIVA using the Load button on the Submittals Tab. Filters do not change the input data in any way.





Key	Control	Description

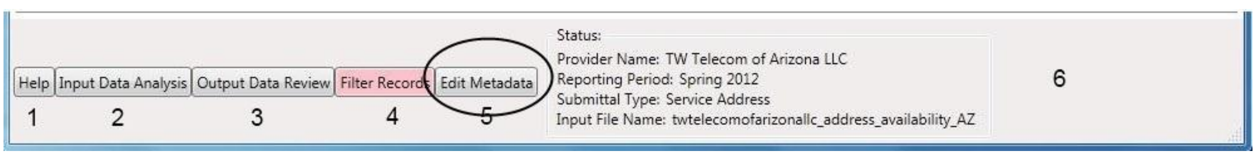
Key	Control	Description
1	Instruction panel	Instructions to guide users on how to understand and use Filters. Note: there is a “splitter” line between the Instructions and the rest of the window which can be dragged to change the amount of the window allocated to each panel. Dragging the line all the way to the left will completely hide the instructions, but the splitter line is still there so that the instructions may be redisplayed at any time.
2	Top Records Selection area	Filter by selecting the top N rows per user specification. Click the “Use All Records” radio button to use the entire data set. Click the “Get only TOP” radio button to set the number of records to be retrieved. Type the number of records to be retrieved into the text entry box next to this radio button OR use the slider bar control to adjust the record number. Note that this Filter can be applied before data is initially loaded. If that is the case, then the number of rows that may be user-specified is between 4,000 and 40,000 (DIVA has no way of knowing how many records are in the Provider’s data set at this time, so this is completely arbitrary). Setting this filter before data loading does not affect loading all of the Provider’s data; it merely affects how many of those records will be initially available for processing. After data loading, the number of records is limited to 10% to 60% of the total number of records. Note: setting a filter (clicking “OK”) has no immediate effect on the Submittal data currently loaded into DIVA for processing. The user must switch to another Submittal (or Input File of the current Submittal, if there is one) and then back to this Submittal (or Input File) for the filtering to take effect. Note: close the Input Data Analysis and / or Output Data Review Windows before re-loading the data to have them properly reflect the change.

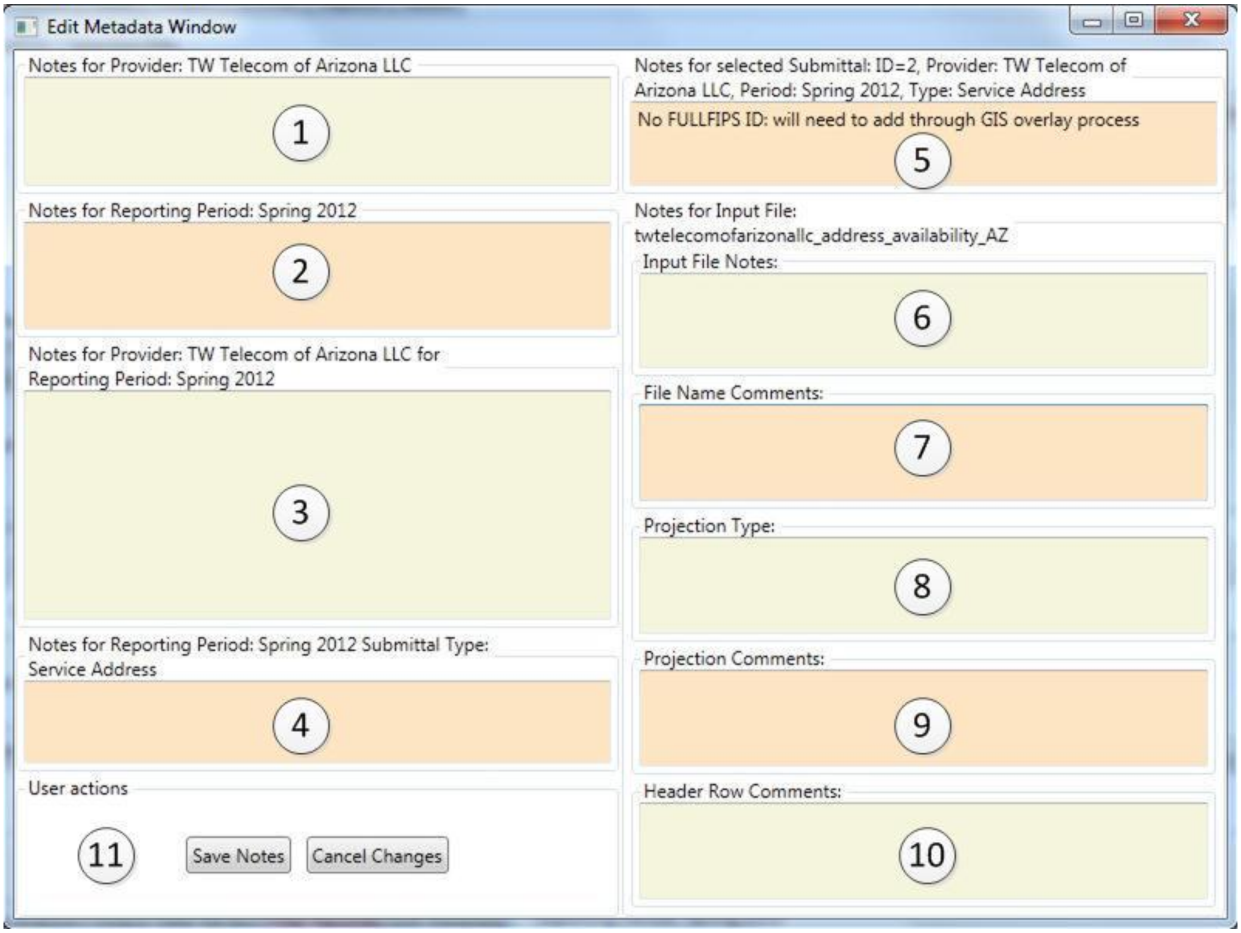
Key	Control	Description
3	Filter Expression area	Use the controls in this area to build an SQL “Where” Expression to filter records: a. A list of fields from the active Input File is presented on the left side in the “Fields List”. Double-clicking a displayed field name will add it to the “WHERE Clause” expression building panel. b. An “Operations Palette” is presented in the middle from which a user can select operators for the expression (e.g. less than). Clicking one of the buttons will add that operation to the “WHERE Clause” expression at the current insertion point. c. A “Unique Values” box is shown on the far right. A user may wish to see the unique values present in the field chosen from the “Fields List” to help build an expression. Clicking the “Get Values” button will retrieve a (sorted) list of unique values for the currently selected Field in the Fields List. d. The “WHERE Clause” area (see #4 below) shows the query expression as it is being built.
4	Where Clause area	This is the “Where Clause expression building panel. It is where the user can see the query expression being built. It is an area in which the user can also directly edit the query expression.
5	User Options	The “User Options” area is where the “WHERE Clause” filter expression is tested (“Test” button) and then accepted/applied (“OK” button) or canceled (“Cancel” button). **Expressions must be tested before they can be applied** (the “OK” button will not be activated until the expression is successfully tested).

Edit Metadata button (Status Bar, "Edit Metadata" button) – the Edit Metadata window provides a place for users to record notes about the active Provider (general comment), the active Reporting Period (general comment), the active Provider for the active Reporting Period (general comment), the active Period-Type (determined by the active Reporting Period / active Submittal Type combination; general comment), the active Submittal (specific comment) and / or the active Input File for the currently active Submittal (numerous specific comments).

To enter a comment about a Provider, for example, that Provider must be the active (selected) Provider. Thus the metadata targets in this window are dependent on the context of what is currently selected in the Submittals Tab. If there is no active Submittal, then the Submittal and Input File entry panels will be inaccessible.

Users can choose to save their work or cancel without saving any changes. The information entered into this form is available for viewing by re-opening this window or through one or more reports on the "Reports" tabbed dialog.





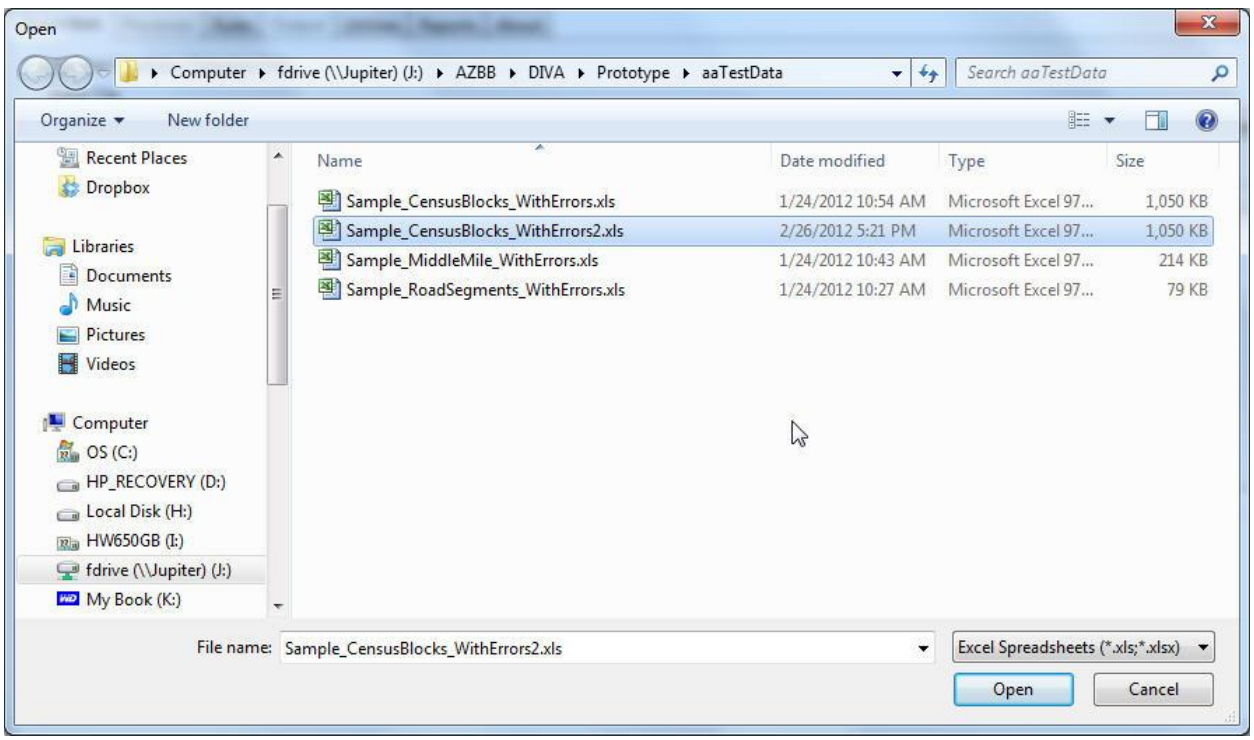
Key	Control	Description
1	Notes for Provider text box	Enter notes pertaining to the Provider (not specific to any Reporting Period or Submittal Type). For example, “Provider X generally submits data in CAD format and we need to contact them ahead of time to ask for shapefiles.” A comment in the Provider metadata panel will show up in all reports for that Provider, no matter what the Reporting Period is or what Submittal is selected for that Provider.
2	Notes for Reporting Period text box	Enter notes pertaining to the Reporting Period (not specific to any Provider or Submittal Type). For example, “In the Spring 2012 Reporting Period we began to send Verification Packages to all Providers even if they did not submit for that Period. We re-sent them a package from a previous Reporting Period.”

Key	Control	Description
3	Notes for Provider for Reporting Period text box	Enter notes for the selected Provider for the selected Reporting Period (not specific to any Submittal Type). Use this panel to record metadata that applies to a Provider for all data submitted during the Reporting Period. This is a good place to record general questions to follow-up with the Provider, as well as overall processing notes. A comment in this panel will show up in all Submittal and / or Input File related reports for that Provider / Reporting Period combination.
4	Notes for Reporting Period and Submittal Type text box	Use the Period-Type panel to record SBDD geodatabase-related metadata as this information will show up for every Submittal of that Period-Type for every Provider. This is a good place to record additional Rules that have been added for that Period-Type and why they were added.
5	Notes for selected Submittal text box	Enter notes specific to the active Submittal. For example, “No FULLFIPSID; we will have to obtain through overlay process.”
6	Notes for Input File text box	Enter notes specific to the Input File associated with the selected Submittal. For example, “The source file was not in column-row format and had to be transformed by TSSW using Excel.”
7	File Name Comments text box	Enter notes specific to the Input File’s data source file name. For example, “File Name indicates a Census Block delivery, but it really is an address submittal as well.”
8	Projection Type text box	Enter the projection. This only applies to shapefile submittals.
9	Projection Comments text box	Enter any comments about the projection. For example, “The Census Block shapefile was delivered in WGS 84 while the Roads were in UTM Zone 12.”
10	Header Row Comments text box	Enter any comments about the header row in the Provider delivery. For example, “No header row; TSSW had to guess as to which column mapped to the proper SBDD field.”
11	User Actions buttons	Click “Save Notes” to exit and save your changes. Click “Cancel Changes” to exit without saving edits.

Submittals Tab Functions

Select an Input File (Submittals Tab, "Input File" control, "Browse" button) – the "Browse" button opens a file-browser dialog which lets the user navigate to any area on their network to select an Input File for further processing.

Click on the Browse button located on the Input File control of the Submittals Tab and the Open file dialog appears



Key	Control	Description
1	Folder pane	Use the folder pane to browse to the folder on your system or network where the Provider source file is located.
2	File pane	Use the file pane to select the the Provider source file.

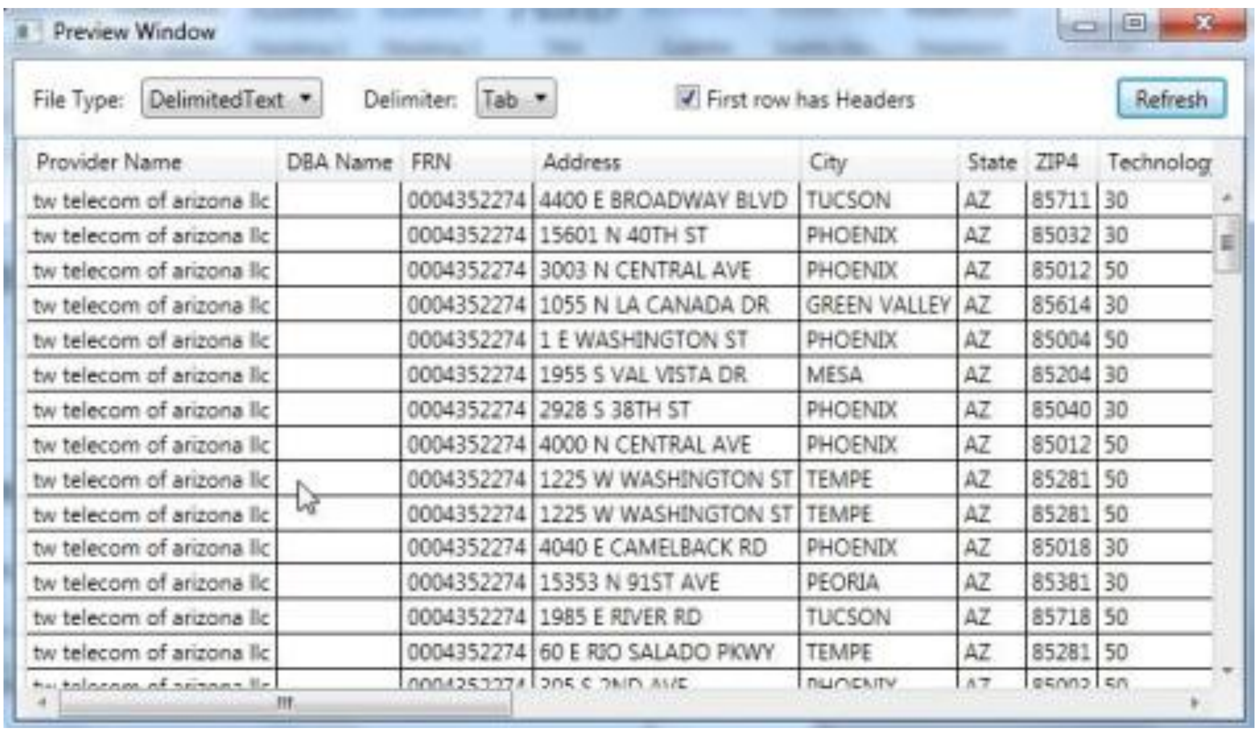
3	Filename text box	Displays the name of the selected file.
4	File Type Pull-down	Set the File Type pull-down to match the type of Input File for which you are browsing. Only delimited text, DBF and Excel file types are supported by DIVA.
5	User Option buttons	Click the "Open" button after selecting the desired file or double-click on the desired file to select it. The file-browse dialog is dismissed and the user is returned to the DIVA submittals tab, with the path and file name now showing in the Input File text box. Click the "Cancel" button to dismiss dialog without selecting a file.

Special Note on Processing Shapefiles

DIVA is not designed to process shapefiles. However, users can load the DBF portion of a shapefile, transform its data, and then join the output text file back to the original shapefile. Users cannot change record count from the source or the join operation will not be valid. See "Processing Shapefiles" for further details.

Preview an Input File (Submittals Tab, "Input File" control. "Preview" button) – the Preview Window is a common control called from a number of different places in DIVA. This is simply a preview function and neither affects the source file being previewed, nor loads the source data into DIVA. Its purpose is to let the user preview a source file prior to loading it into a DIVA table. If major problems are encountered, the user can then take appropriate steps to modify the source file, filter the number of in-coming records or to perform other tasks to ensure the Input File will be loaded into DIVA cleanly.

Click on the Preview button located on the Input File control of the Submittals Tab and the "Preview Window" opens. (Note: for performance reasons, this window only displays the first 100 records of the Provider's data set. This setting is not user-controllable).

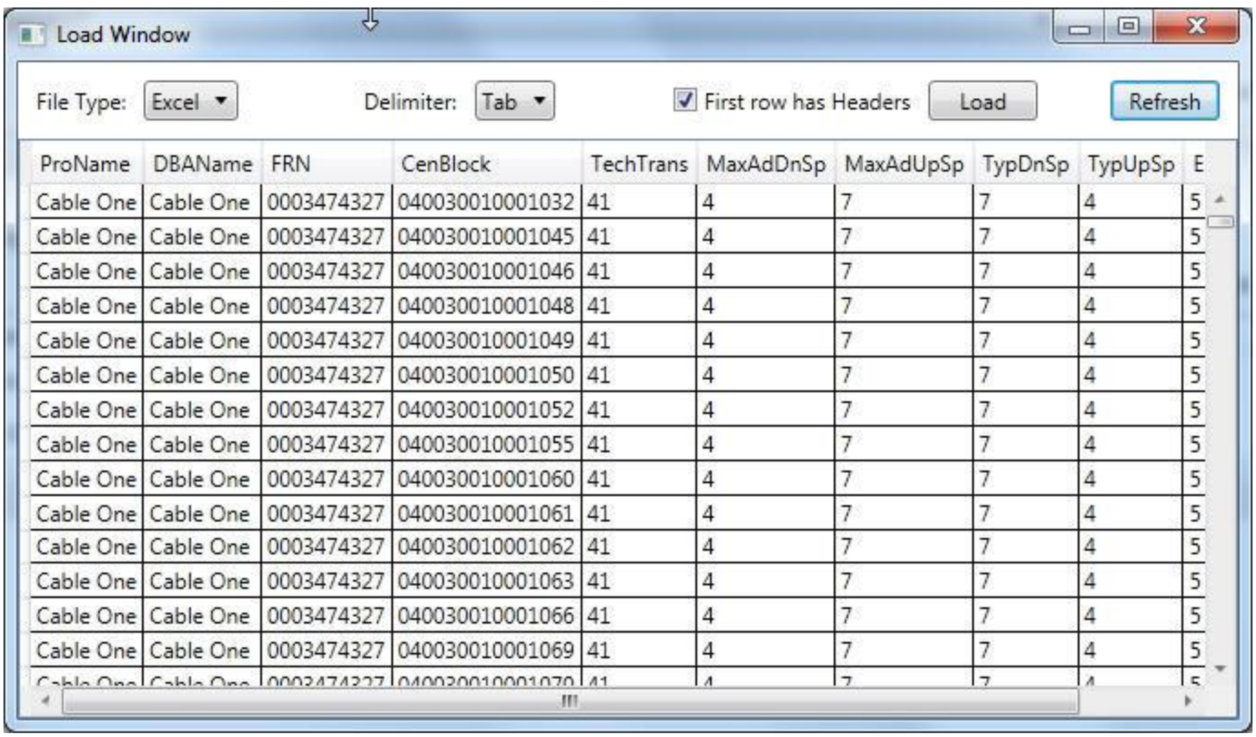


Key	Control	Description
1	File Type pull-down	Set the File Type pull-down to match the type of Input File for which you are browsing. Only delimited text, DBF and Excel file types are supported by DIVA.
2	Delimiter pull-down	If you are opening a delimited text file, then you must select the appropriate delimiter from this pull-down menu. When opening DBF or Excel files this option has no effect.

Key	Control	Description
3	First Row has Header checkbox	Click the “First Row Has Headers”, toggling the checkbox to match the structure of your Input File regarding the presence of a header row. If your file does not have a header row (column names), and this box is left unchecked, DIVA will name the columns in sequency (e.g., “Col01”, “Col02”, etc.)
4	Refresh button	Click this button to load the file or refresh that file display after making changes.
5	Column Headings	Double-click any column header to toggle the table sorting in ascending or descending order of values in that column.
6	Table Display area	This area displays the first 100 records of the source file. This display is a preview of how the file will look when you actually load the data.
7	Dismiss Window	The red “X” in the upper right corner is used to dismiss the “Preview Window”

Load an Input File (Submittals Tab, "Load Button") – the Load button copies in records from the current Input File into an internal DIVA table. This step is required before any further processing can be accomplished.

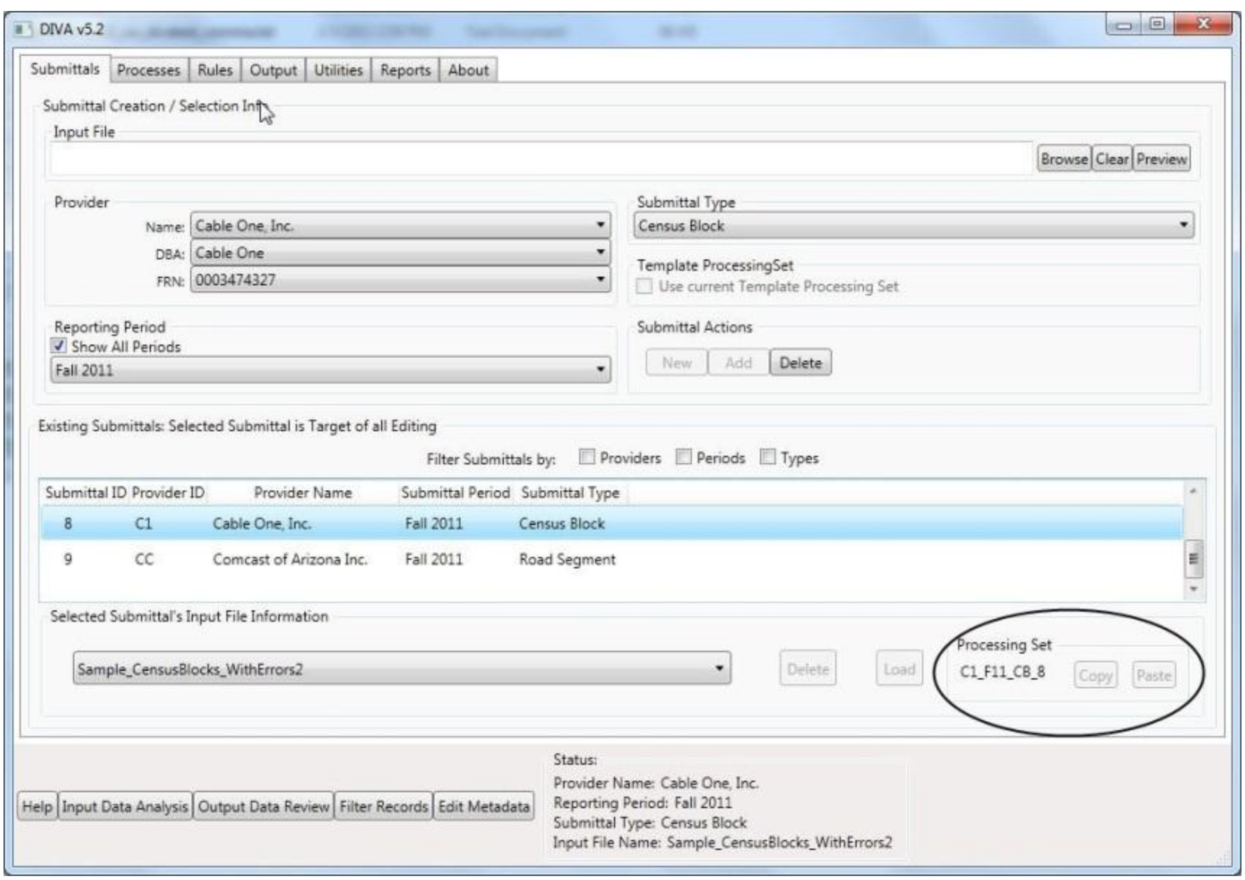
Click on the Load button on the Submittals tab and the Load Window opens. This dialog is very similar to the "Preview Window" previously discussed, but with the option to load the data into DIVA.



Key	Control	Description
1	File Type pull-down	Set the File Type pull-down to match the type of Input File for which you are browsing. Only delimited text, DBF and Excel file types are supported by DIVA.
2	Delimiter pull-down	If you are opening a delimited text file, then you must select the appropriate delimiter from this pull-down menu. When opening DBF or Excel files this option has no effect.

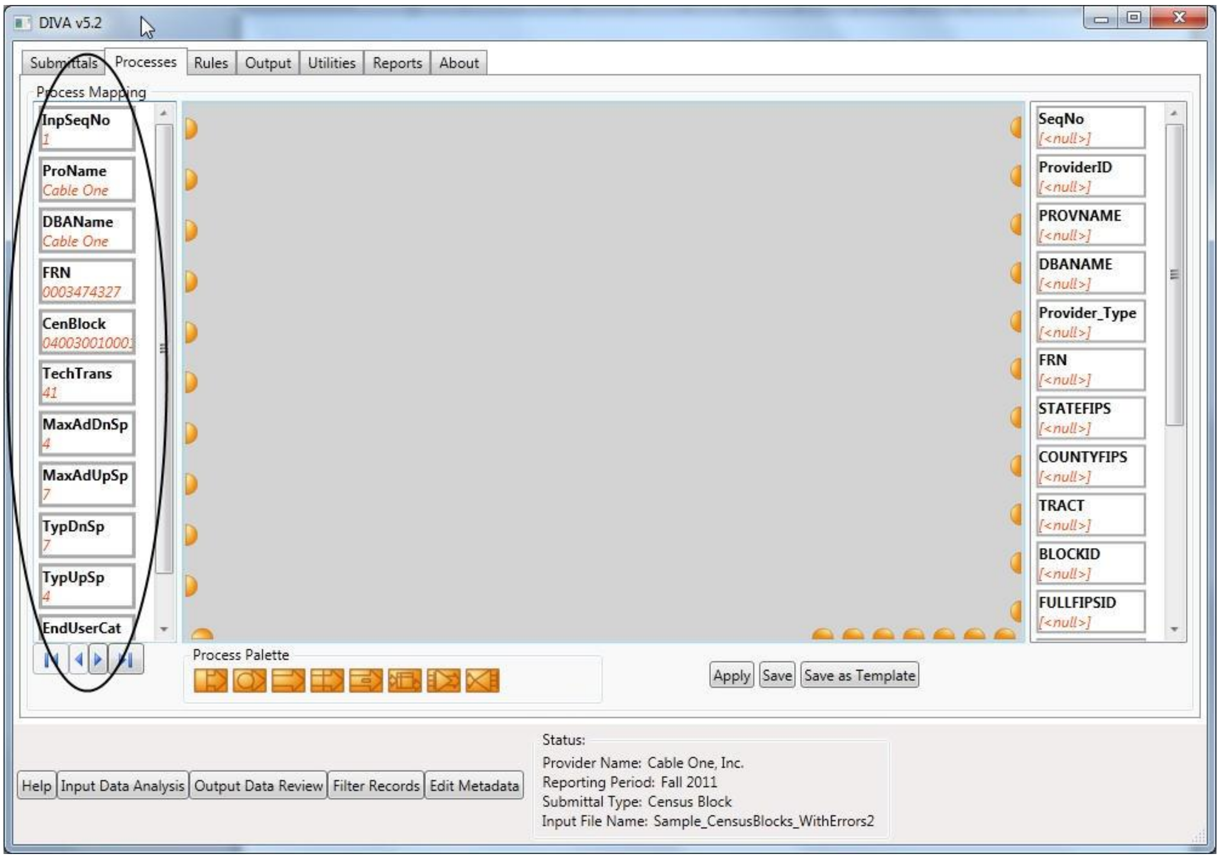
Key	Control	Description
3	First Row has Header checkbox	Click the “First Row Has Headers”, toggling the checkbox to match the structure of your Input File regarding the presence of a header row. If your file does not have a header row (column names), and this box is left unchecked, DIVA will name the columns in sequency (e.g., “Col01”, “Col02”, etc.)
4	Load button	Click this button to load the data into DIVA.
5	Refresh button	Click this button to load the file or refresh that file display after making changes.
6	Column Headings	Double-click any column header to toggle the table sorting in ascending or descending order of values in that column.
7	Table Display area	This area displays the first 100 records of the source file. This display is a preview of how the file will look when you actually load the data.
8	Dismiss Window	The red “X” in the upper right corner is used to dismiss the “Preview Window”

After the data is loaded you will see the name assigned to the Input File’s Processing Set in the “Processing Set” area of the Submittals tab.



Processes Tab Functions

Input Fields List (Processes Tab, list) – The list of Input Fields as read from the Provider Input File.



- Each “box” in the list represents one Input Field. The name assigned to that Field is shown in bold typeface and the value it has for the current Input File record is shown in red below it.

- If there was not a header row in the Input File, the Fields will be named “Col_00”, “Col_01”, etc.; if there was a header row, then the Field names will have the values obtained from that header row. In any case, the first Field will always be named “InpSeqNo”; it is the sequential “record number” that DIVA automatically creates and assigns during data loading so that the user can reliable cross-reference DIVA data with the original Provider’s data set information.

- The Input Field names in the list will reflect any changes a user may have made using the "Input Data Analysis" window. The user may also change the Input Field names here. Double clicking on the Input Field "box" will produce a dialog box where the existing name may be edited or replaced.

- If the Input Field list is longer than can be displayed on the screen, a scroll bar is shown and the half-connectors will arrange themselves along the bottom or top of the Process Canvas, depending on the position of the scroll bar. The User may use the scroll bar to the right of the Input Field List to see these hidden Input Fields, or make the DIVA window large enough to display all of them (which may not be possible if there are a large number of Input Fields).

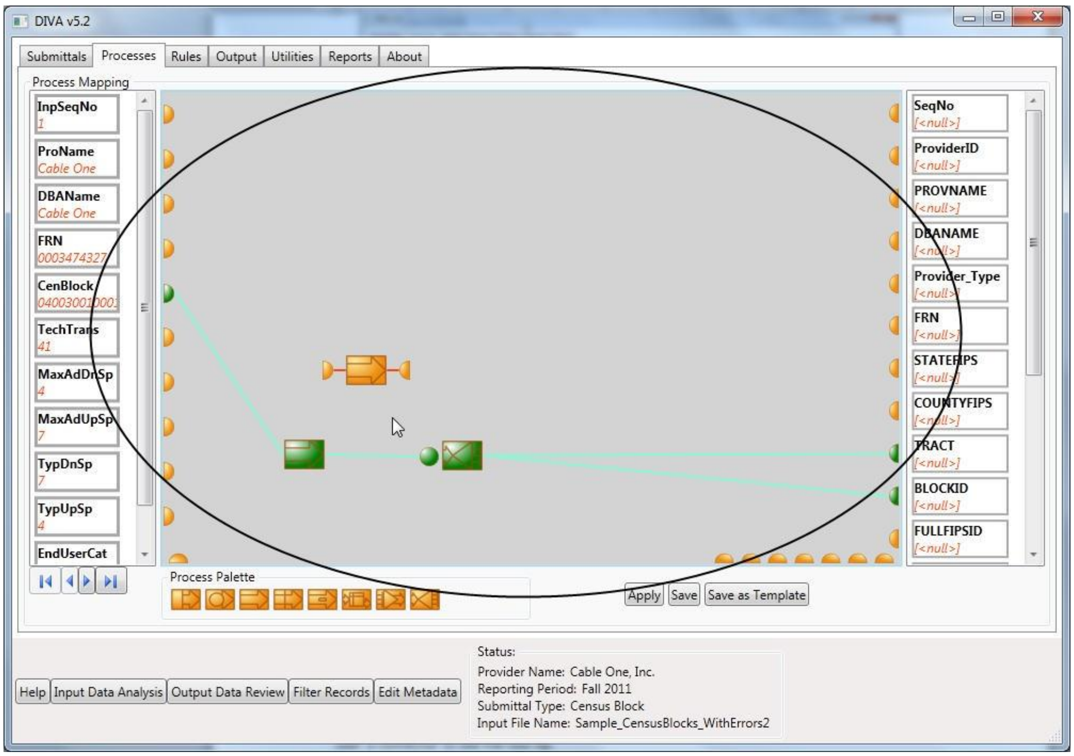
- The orange half-connectors along the left side of the Process Mapping Canvas correspond to the Input Field with which they are adjacent; they represent data "sources" and are used to connect (link) a Process with the Input Field. A data source (or input) is a half-circle with its arc to the right.

- The color of the connector will change depending on its status with regard to the "flow" of data. If data is "flowing" out of the (associated) Input Field, due to its connection to a Process, then the connector will turn green.

- The color of the connector will also change depending on its status as an "eligible" target when the user is dragging an Input Process Field. If it is "eligible" to have the Input Process Field dropped on it, then it will turn dark blue. If dropping the Input Process Field would result in a connection, then it will turn a light blue (as will the dragged Input Process Field).

- There is a "splitter" line separating the Input Fields List from the Process Mapping Canvas. Click and drag this line left, or right, to decrease, or increase, the displayed width of this list.

Process Mapping Canvas (Processes Tab, "Process Mapping Canvas") – The Process Mapping Canvas is where a user manipulates Processes and creates linkages (connections) between Input Fields and Output Fields. A Process is created by "dragging" a Process from the "Process Palette" and dropping it onto the "Process Mapping Canvas". Each Process will have Input Process Field(s) and / or Output Process Field(s) attached to it when created (the type and number depend on the particular Process). These Input / Output Process Field(s) are used to connect Processes with Input Fields and Output Fields or with other Processes through Process Fields.



In the example above, a Copy Process has been dragged and dropped onto the Process Mapping Canvas. The orange rectangle represents the Process, its Input Process Field is to its left (the half-circle with arc facing right) and its Output Process Field is to its right (the half-circle with the arc facing left); each of these is connected to the Process with a red connection line. The symbol shown in the Process' rectangle is a clue to what type of process it represents. The green colored Input Field (half-circle on the left side), Processes (rectangles), Process Field (circle) and Output Fields (half-circles on the right side) show data "flowing" from one data source to two data sinks. Note that the Process Field (the circle) is required to link two Processes together.

General Rules for using the Process Mapping Canvas

- A Process is created by "dragging" a Process from the "Process Palette" and dropping it onto the "Process Mapping Canvas".
    - In the case of Decomposition Processes, a dialog box will be displayed for the user to specify which type of Decomposition Process is to be created. Note that all Decomposition Processes have the same symbology; the user can identify the Decomposition Process from its "tool tip" (see below).

- A Process can be connected by dragging an Input or Output Process Field (shown as orange half-circles with a connecting red line) to an eligible target and dropping it there. Eligible targets are shown in dark blue when the user starts the dragging operation. Both the target and the dragged Field will turn light blue when they are eligible to be connected; dropping only has an effect when both are light blue (otherwise, the user is simply dropping the Field back on the canvas). The results of dropping on an "eligible target" depends on the nature of the target:

    - If an Input Process Field is dropped on a data source (an Input Field's connector), then the Input Process Field disappears and the connecting line attaches directly to the Input Field's connector. In addition, the Input Field's connector will turn dark green, the connecting line will turn light green, and the Process will turn dark green to indicate that data is now "flowing" from the data source.

    - If an Output Process Field is dropped on a data sink (an Output Field's connector), then the Output Process Field disappears and the connecting line attaches directly to the Output Field's connector. In addition, if the connecting line is light green (has data "flowing" into it), then the Output Field's connector will turn dark green.

    - If an Input Process Field is dropped on an Output Process Field (or vice versa), then both will disappear and be replaced by a Process Field represented by a small circle. The respective connecting lines will now connect to this Process Field. If the incoming connecting line is light green, then the Process Field will turn dark green and the outgoing connecting line will turn light green (these color changes will "flow" down the connectors, Processes, etc., until an end is reached).

    - An Input Process Field can be dropped on eligible Process Fields (circles). If a Process Field is eligible for a drop, then it will turn dark blue when the Input Process Field is being dragged (and light blue when a drop would result in a connection). Output Process Fields can never be dropped on a Process Field (it can have only one source of input data).

    - Only Input and Output Process Fields can be "dragged and dropped" to create data connections.

- Connected items turn from orange to dark green to give the user visual feedback that a proper connection has been made and data will flow between the green elements.

- Connectors (Input / Output Process Fields; half-circles), Process Fields (circles) and Processes (rectangles) can be selected and moved individually, or as a group by pointing and clicking for individual elements or dragging a box around multiple elements. The use of the control and shift keys as part of the selection process has the expected behavior of adding / removing items from the selection set. Elements in the selection set will have a "dotted line" shown around them.

- Processes can be connected in any allowed order to get the desired transformation of data (e.g., a string of simple decomposition processes may be required to decompose a complex string). DIVA will not permit creation of "circular" relationships; this is enforced by limiting eligible targets for dragged items.

- Processes cannot be connected directly to each other. Connections are always made to Fields (Input, Output or Process). You cannot drop a Process on anything (there are no eligible targets). You cannot drop a connector on a Process; it is never an eligible target.

- Data sources (when the half-circle arc is on the right) may have multiple connection lines running from them; that is, you may attach many connectors to a data source. Data sources can feed many Processes.

- Data sinks (when the half-circle is on the left) can have only one connection line running into it; it can receive data from only one source.

- Process Fields (circles) are the only way to connect two Processes. The Process Field is always a data sink (half-circle on the left) because it is receiving data from some Process. It is always a data source (half-circle on the right) because it is providing data to some Process. **A Process Field can only exist between two Processes;** they are only needed when Processes need to be connected to each other. They are automatically created when an Input Process Field is dropped on an Output Process Field (or vice versa).

- Processes can be disconnected by right-clicking on a Field (an Input, Process, or Output) and choosing "Detach" from the context menu. If there are multiple connections (i.e., multiple connection lines) on the Field, then <u>all</u> are disconnected (detached).

- Process can be deleted by selecting and then pressing the "Del" (delete) key or selecting "Delete" from the right-click context menu. Only Processes can be deleted. Multiple Processes can be deleted at one time by selecting several at once. Deleting a Process has no effect on Input Fields or Output Fields (you cannot delete these), although it may disconnect them from data "flow".

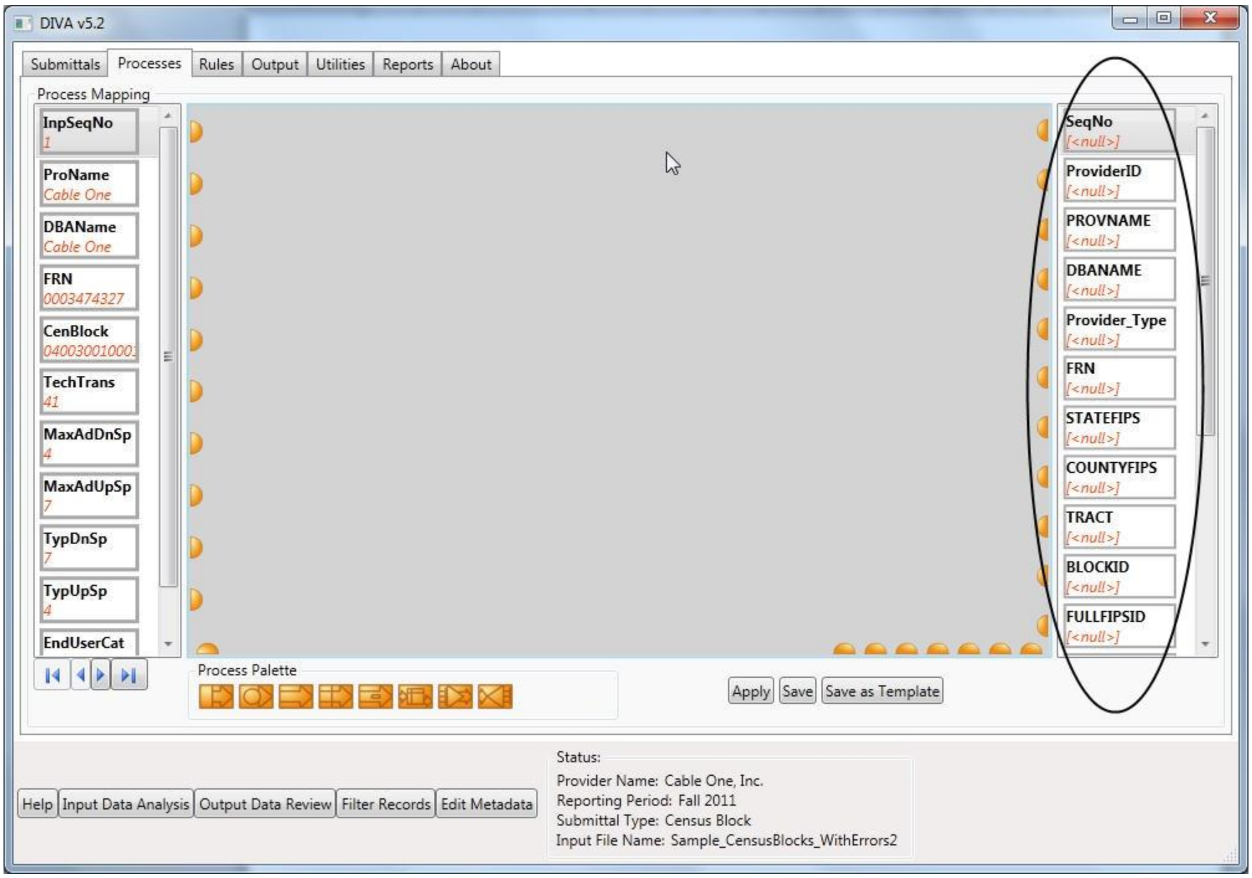
- Processes have a varying number of Input Process Fields (half-circle on the right) and Output Process Fields (half-circle on the left). Some Processes (Constant Value and Provider Value) have no Input Process Fields in which case they serve as a data source themselves. The Composition Process allows for the addition (and removal) of Input Process Fields, but the user can never reduce this below the minimum number of two.

- All Processes have at least one Output Process Field; Decomposition Processes have several (one for each decomposition “part”). All Processes, except Decomposition Processes, allow for the addition (and removal) of Output Process Fields, but the user can never reduce their number below one.

- Some Processes require the user to do some configuration before they have any effect. Configuration is done by double-clicking on the Process. A dialog box specific to that Process will then be displayed. Some Processes (Copy, Copy With Default) have no configuration options; double-clicking on these has no effect.

- “Tool tips” (pop-up text) are available to help users understand how to connect Processes. Just place the mouse (“hover”) over a connector or a Process to see the tool tip.

Output Fields List (Processes Tab, list) – The list of Output Fields as read from the SBDD geodatabase schema for the current Reporting Period and Submittal Type (Period-Type).



- Each “box” in the list represents one Output Field. The name assigned to that Field is shown in bold typeface and the value it has for the current Input File record, as transformed by the Processes, is shown in red below it. In the illustration above, no Processes have been defined; therefore all values in the Output Fields are null.

- The user can see the effect of the assigned Processes on data transformation by examining these values. The values can be changed by adjusting the Processes as needed.

- The name assigned to each Output Field in this list is not editable; they come from the SBDD geodatabase and are the NTIA-approved field names (or, in the case of DIVA-related Output Fields, from the standard field names assigned by the DIVA design team).

- The orange half-connectors along the side of the Process Mapping Canvas correspond to the Output Field with which they are adjacent; they represent data "sinks" and are used to connect (link) a Process with the Output Field. A data sink (or output) is a half-circle with its arc to the left. Unlike Input Fields, Output Fields cannot have more than one connection to Processes. It is likely that one to several Output Fields will have no connections as the data is not present in the Input File and cannot be filled in using one of the Processes that generates values (i.e., Provider Value Process).

- If the Output Field list is longer than can be displayed on the screen (i.e., a scroll bar is shown), then these orange half-connectors will arrange themselves along the bottom (or top, depending on the position of the scroll bar). The User may use the scroll bar to the right of the Output Field List to see these hidden Output Fields, or make the DIVA window large enough to display them all of them (which may not be possible if there are enough Output Fields).

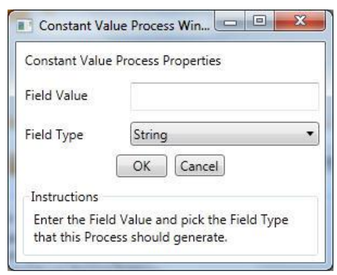
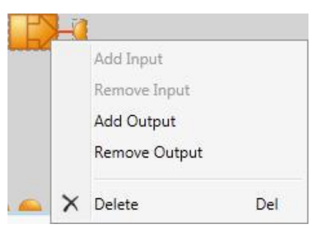
- The color of the connector will change depending on its status with regard to the "flow" of data. If data is "flowing" into the (associated) Output Field, due to its connection to a Process, then the connector will turn green.

- The color of the connector will also change depending on its status as an "eligible" target when the user is dragging an Output Process Field. If it is "eligible" to have the Output Process Field dropped on it, then it will turn dark blue. If dropping the Output Process Field would result in a connection, then it will turn a light blue (as will the dragged Output Process Field).

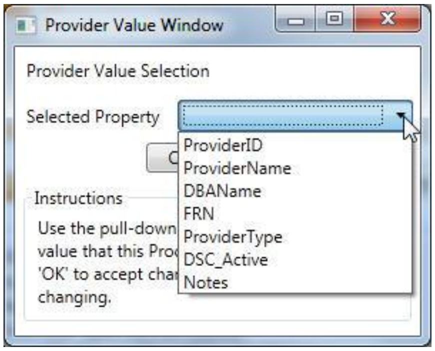
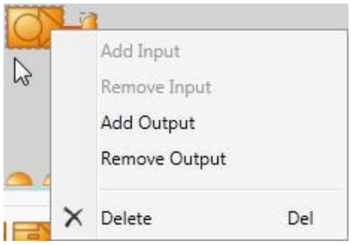
- The area below the Output Fields List is used to display any "Row" Processes that may exist.

- There is a "splitter" line separating the Output Fields List from the Process Mapping Canvas. Click and drag this line left, or right, to increase, or decrease, the displayed width of this list.

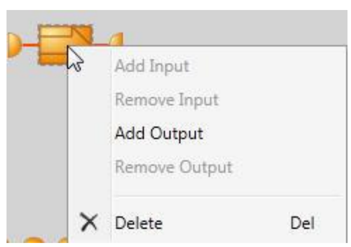
Constant Value Process (Processes Tab, Process Palette) – Used to create a user-defined constant value. This Process is useful when there is no Input Field to provide data for a required Output Field. A good example of this is the numeric code for End User required in recent versions of the SBDD geodatabase. It is rare that a Provider submits this value and the Constant Value Process can be used to put in the appropriate value (e.g. a "5" representing "Other"), when a user does not have any other information.

Action	Result
Drag and drop the Constant Value Process onto the Process Canvas from the Process Palette	The control appears on the canvas and is ready to be configured. By default, it will have one Output Process Field; others may be added. It will never have an Input Process Field as it serves as its own data source.
Double-click the Constant Value Process	A configuration dialog box is opened. The user types in a value and specifies the value's type (e.g. string). 
Right-click the Constant Value Process on the Process Mapping Canvas	May add or remove outputs. The constant value can be sent to one or more Output Fields or Processes. 

Provider Value Process (Processes Tab, Process Palette) – Used to create a constant value based on a specific Provider attribute. This Process is useful to ensure that values for Provider ID, Provider Name, DBA Name, FRN and Provider Type (Output Fields required by most Period-Types) are standardized from a table imported into DIVA

Action	Result
Drag and drop the Provider Value Process onto the Process Mapping Canvas from the Process Palette	The control appears on the canvas and is ready to be configured. By default, it will have one Output Process Field; others may be added. The Process box will be orange, until the user configures its properties.
Double-click the Provider Value Process	A configuration dialog box opens which allows the user to select the field in the Provider Information Table for the active Provider that will populate the Output Field. 
Right-click the Provider Value Process on the Process Mapping Canvas	May add or remove outputs. The constant value can be sent to one or more Output Fields or Processes. The number can never be reduced below one. This means that a single Provider value can be directed to one or more Output Fields and/or Processes. 

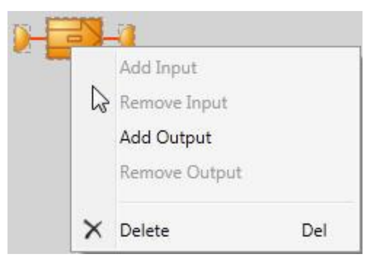
Copy Process (Processes Tab, Process Palette) – this Process populates an Output Field or Process by copying the value of the Input Field or Process.

Action	Result
Drag the Copy Process onto the Process Mapping Canvas	The control appears on the canvas and is ready to be configured. It will be orange, until the user connects its input side to an Input Field or another Process and its output side to an Output Field or another Process.
Double-click the Copy Process	Note that there is no configuration dialog for this Process. Just drag, drop and connect. No transformative process is applied other than to cast the Provider value into the field type of the Output Field
Right-click the Copy Process on the Process Mapping Canvas	May add or delete outputs. 

Copy with Default Process (Processes Tab, Process Palette) – this Process populates an Output Field or Process with a default value as defined in the active SBDD database, where the input values are either null or blank.

Action	Result
Drag the Copy with Default Process onto the Process Mapping Canvas	The control appears on the canvas and is ready to be configured
Double-click the Copy with Default Process	Note that there is no configuration dialog for this Process. The value is determined by the default value contained in the SBDD geodatabase.
Right-click the Copy with Default Process on the Process Mapping Canvas	Note that no configuration options are available for this Process. The User cannot specify multiple input or output fields.

Make Negative Process (Processes Tab, Process Palette) – this Process inverses the sign of the value coming from a Input Field or Process.

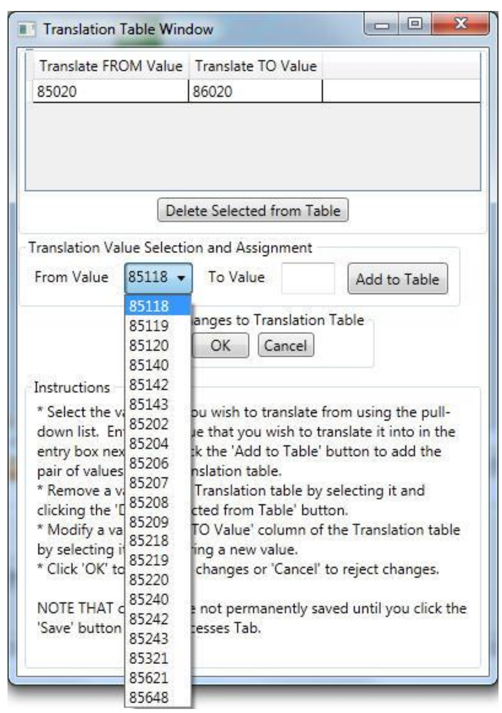
Action	Result
Drag the Make Negative Process onto the Process Mapping Canvas	The control appears on the canvas and is ready to be configured.
Double-click the Make Negative Process	Note that there is no configuration dialog for this Process.
Right-click the Make Negative Process on the Process Mapping Canvas	Add or remove an output connection. 

Translation Process (Processes Tab, Process Palette) – this Process is used to translate one or more values from an Input Field or Process into another value in the Output Field.

<table>
<tr><th>Action</th><th>Result</th></tr>
<tr><td>Drag the Translation Process onto the Process Mapping Canvas</td><td>The control appears on the canvas and is ready to be configured.</td></tr>
<tr><td>Double-click the Translation Process</td><td>

A configuration dialog window opens which allows the user to map values from the data source (either an Input Field or a Process Field) to new values in the data sink (either an Output Field or a Process Field).

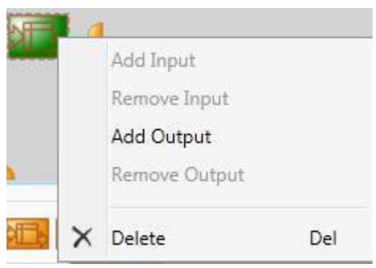
In the illustration below the value of “85020” is mapped to “86020” and is shown in the top part of the “Translate Table Window”.



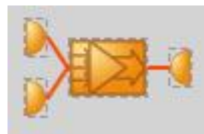
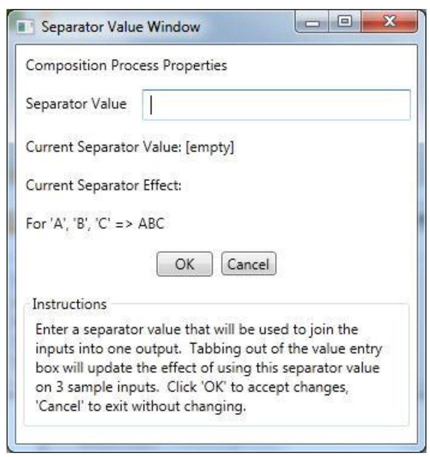
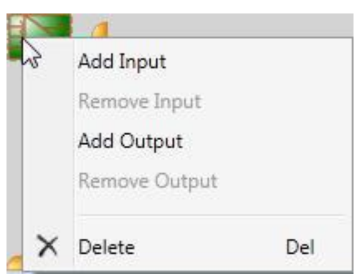
The unique list of values shown in the “From Value” pull-down list comes from the data source (the Input Field or Process Field) to which the Translate Process is attached.

Input values are mapped by typing a new value into the “To Value” text box and then clicking the “Add to Table” button. The user must click the “OK” button in the “Save

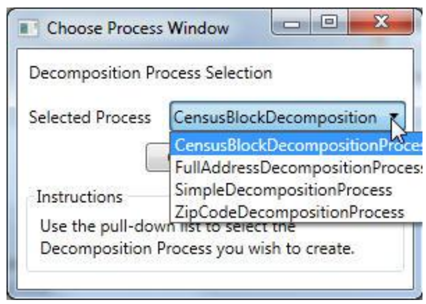
</td></tr>
</table>

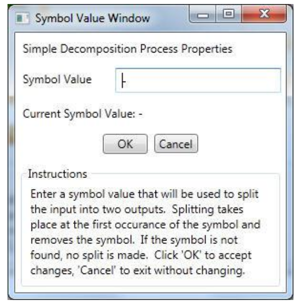
	Changes to Translation Table" area or click "Cancel" to exit without saving changes since the last Save. Values which are <u>not</u> translated are simply copied from the data source to data sink.
Right-click the Translation Process on the Process Mapping Canvas	Add or remove an output connection. 

Composition Process (Processes Tab, Process Palette) – this Process is used to combine values from two or more Input Fields or Processes into a single Output Field.

Action	Result
Drag the Composition Process onto the Process Mapping Canvas	The control appears on the canvas and is ready to be configured. By default, two input connectors are provided, but more can be added (see below) 
Double-click the Composition Process	A configuration dialog opens which allows the user to specify a separator value to be placed between the appended Input Field values. 
Right-click the Composition Process	Add or remove both input and output connections. 

Decomposition Process (Processes Tab, Process Palette) – this Process is used to parse values from a single Input Field or Process into two or more Output Fields or Processes.

Action	Result
Drag the Decomposition Process onto the Process Mapping Canvas and choose the decomposition type.	A dialog appears on the canvas and asks the user to specify the type of Decomposition Process to use:  **Census Block** – Decomposes a full census block ID into its four component parts (State, County, Tract and Block). There are one input and four output connectors provided. This is fixed and cannot be changed from the context menu. Tool Tips on the output connectors guide user as to which of the four parts of a full Census ID it should be connected. **Full Address** –The full address decomposition process is not active at the current release. **Simple** – Parses a string into two parts based on a user-defined symbol (e.g. a space). There are one input and two output connectors provided. This is fixed and cannot be changed from the context menu. Multiple parsing can be accomplished by chaining multiple simple decomposition Processes together. **Zip Code** – Parses a nine-digit zip code string into a five-part and four-part string. There are one input and two output connectors provided. This is fixed and cannot be changed from the context menu.

Double-click the Decomposition Process	**Simple** – Only the Simple decomposition type has a configurable dialog. Type the character on which the string will be parsed into the "Symbol Value" text box. The current value is displayed immediately below. 
Right-click the Decomposition Process	None of the decomposition process types are configurable from the context menu

Saving a Template Processing Set (Processes Tab) – the "Save as Template" button saves the active Processing Set to a Template Processing set, overwriting any pre-existing set for the current Period-Type. No GUI is involved, but there are some things to be aware of regarding these templates.

Doesn't make sense to copy between Reporting Periods due to potential changes in Output Fields. That is why this option only works within a single Reporting Period

Users can choose which set of Processes to apply within the same Reporting Period. This can be done in one of two ways. A Template Processing Set can be applied when a new Input File is created or it can be copied and pasted from an existing Processing Set to another Processing Set at any time. The workflow for each is listed below:

Applying to a New Submittal

[HW: write this up and include screen dump(s)]

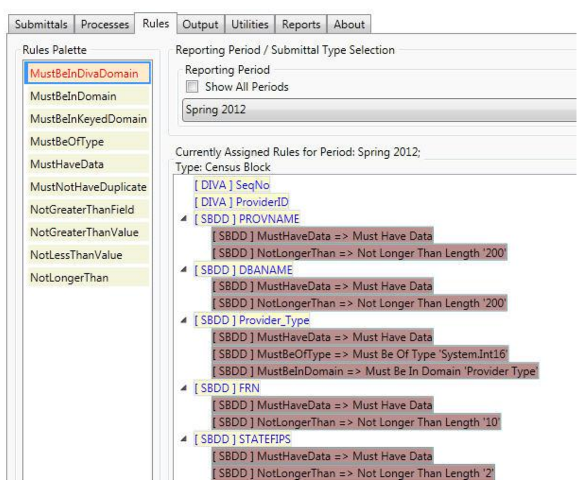
Copying and Pasting a Template Processing Set

[HW: write this up and include screen dump(s)]

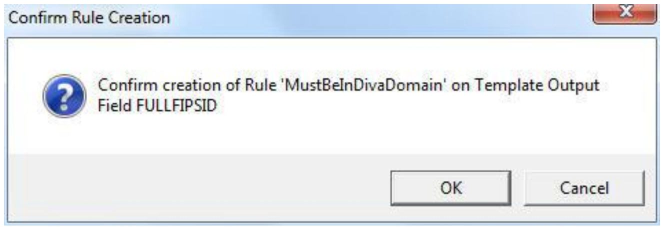
Rules Tab Functions

Using the Rules Palette Area (Rules Tab, "Rules Palette" control) – A list of Rule types that can be applied to the Template Output Fields by dragging and dropping them onto the Template Output Fields shown in the "Rule Summary Area".

- As the user clicks on each rule type in the Rules Palette, the Output Fields that can accept that rule type are highlighted in blue.



- When the Rule is dropped on a valid Output Field, the user is prompted whether this is what should be done. Click "OK" or "Cancel".



- Rules can be removed from an output field by right-clicking and selecting “Delete”. This includes Rules imported from the SBBD database. Be careful, there is no “Undo”.

- Following is a summary of each rule type. More detailed information on how to configure each rule can be found by clicking on the hyperlinks.

  - Must Be In Diva Domain – The value in the Output Field must be in a DIVA domain.

  - Must Be In Domain – The value in the Output Field must be in an SBDD-defined domain.

  - Must Be In Keyed Domain – The value in the Output Field must be in an SBDD-defined keyed domain.

  - Must Be Of Type – The value in the Output Field must be of a certain type. This rule type applies only to numeric fields.

  - Must Have Data – The value in the Output Field must not be empty strings or null values. There must be a value present.

  - Must Not Have Duplicate – The value in the Output Field must not result in a duplicate row.

  - Not Greater Than Field – The value in the Output Field must not be greater than the value of those in another user-specified Output Field.

  - Not Greater Than Value – The value in the Output Field must not be greater than a user-specified value.

  - Not Longer Than – The value in the Output Field must not exceed a user-defined number of characters. This rule type applies only to character fields, not numeric fields.

Using the Currently Assigned Rules Area (Rules Tab, "Rules Palette" control) – A display of the Rules assigned to each Template Output Field of a Submittal, as well as a place to drag and drop new Rules onto Template Output Fields, configure existing Rules, or remove Rules. As discussed in the introduction to the Rules tab, this area is used to assign or remove rules from the Template Output Fields and therefore any change you make here now apply to any Submittal that uses the same Template Output Field. Therefore, if a user makes changes here, they should re-run previous Submittals again to see how the new rule applies to them.

- At a minimum, the Rules for the Output Fields of a Submittal's Input File will be those imported from the SBDD geodatabase. Remember that these will be stored on the Template Output Fields, so they will automatically apply to all Output Fields for that Period-Type. Additional Rules may be assigned by dragging a rule type from the "Rules Palette" and dropping it on a Template Output Field.

- There are some restrictions on which Rule types may be placed on which Template Output Fields. For example, a Rule type that only works with character (string) field cannot be dropped on a numeric field. If a Rule from the palette is valid for a given Template Output Field, the cursor will change to a small box with an arrow as the user drags it over the Output Field Name. Otherwise, the cursor will display as a circle with a bar through it. In addition, at the start of the "drag" operation, all eligible target Template Output Fields will change color to indicate that they will accept the Rule "drop".

- There are also some restrictions, depending on the Rule, as to the number of the Rules that can be assigned to a Template Output Field. For example, the "Must Have Data" Rule can only be assigned to each Template Output Field one time. If a Rule has been dragged from the palette and there are no eligible targets, a dialog box will inform the user of that fact and the Rule will be made inaccessible.

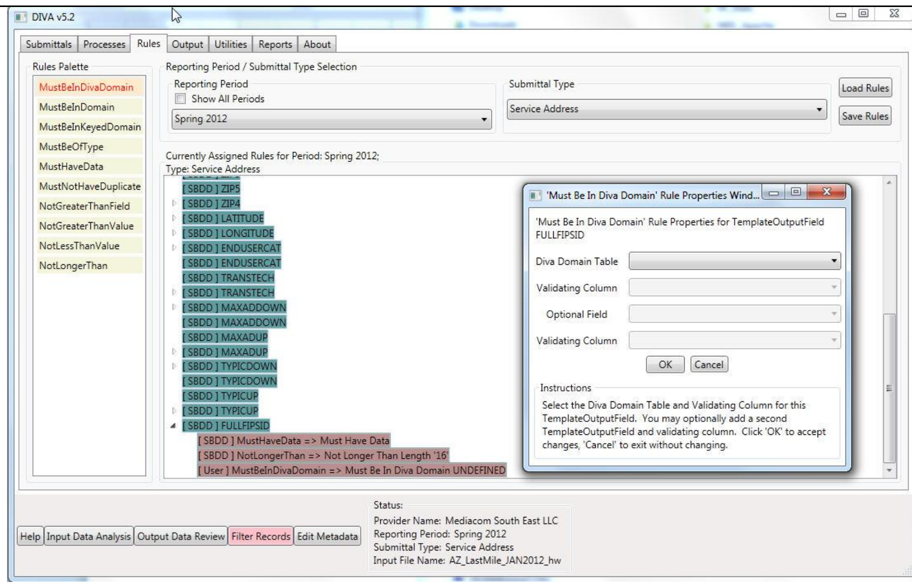
- By default the rules are collapsed and all that shows in the "Currently Assigned Rules" area are the Template Output Fields for the Submittal. Rules can be viewed for a given Template Output Field by double-clicking the field name. All the fields can be expanded to show their rules by double clicking the top-most Template Output Field in the list. Double-clicking again will collapse the expanded nodes and open the collapsed nodes.

- Rules may be deleted from a Template Output Field by right-clicking on the rule and selecting the "Delete" option, or by clicking on the Rule (selecting it) and then pressing the "Del" (delete) key.

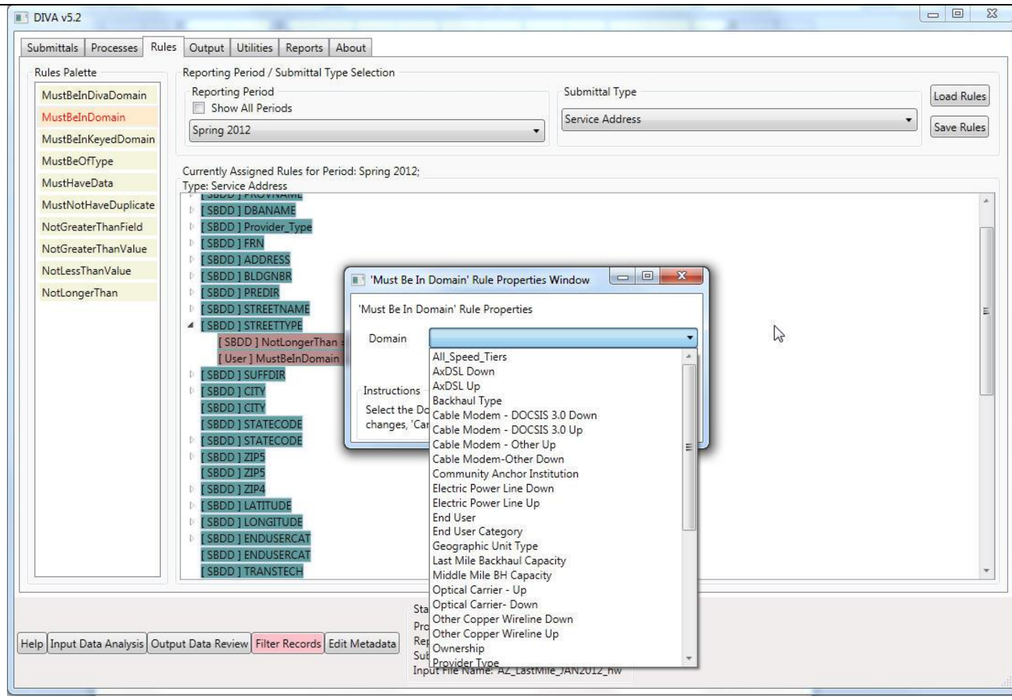
- The MustNotHaveDuplicate Rule can only be applied once. After it is applied, that Rule choice will be greyed out in the palette.

- If any Rule no longer has eligible targets, that Rule will be de-activated (greyed out) in the palette. To re-activate it, you must delete at least one occurrence of that Rule.

MustBeInDIVADomain Rule (Rules Tab, "Rules Palette" control) – allows users to apply their own domains to Output Field values. These domains are called "DIVA Domains" to distinguish them from the domains imported from the SBDD geodatabase.

Action	Result
Import one or more domains from the "Utilities" tab.	A domain table must be imported into DIVA before it will be available to be used in a Diva Domain rule. This procedure is documented in the "Manage DIVA Domains" section of this User Manual.
Drag and drop the Rule onto the target field	When the "drag" of a Rule is initiated from the Rules Palette, the acceptable Template Output Field targets will change color. As noted, DIVA has certain restrictions on the number and types of Rules that can be assigned to various Template Output Fields.
Double-click the Rule under the Output Field to Configure	 • When the Rule is first placed under an Output Field, the text "UNDEFINED" will appear next to it. This means the user must configure the rule before it can be applied. • Select the imported domain from the "DIVA Domain Table" pull-down. • Select the field in the imported domain table that has the domain value from the "Validating Column" pull-down. • Optionally select an additional Template Output Field and a validating column from this DIVA Domain table; this allows the user to check the validity of two Template Output Fields against the same table (e.g. check both Census Block ID and Census Block area values simultaneously). • Click "OK" to apply the domain, or "Cancel" to exit without applying the domain.

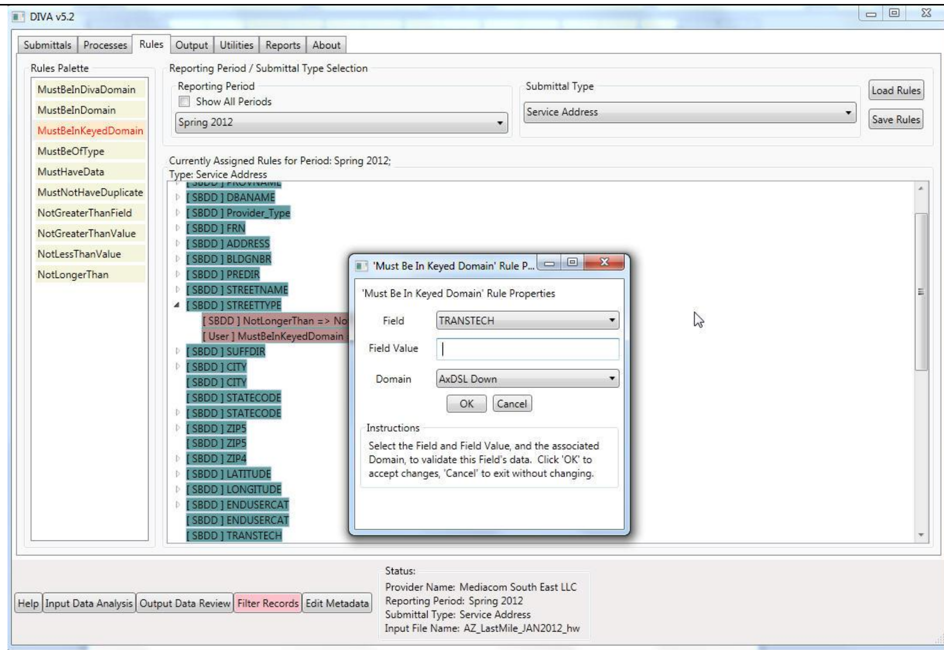
MustBeInDomain Rule (Rules Tab, “Rules Palette” control) – allows users to apply an SBDD-generated domain to Output Field values. These domains are called “Domains” to distinguish them from the “DIVA Domains” imported by users from local source tables. This rule type allows users to apply any existing SBDD Domain to any compatible Output Field, whether it makes sense or not. It is likely this rule type will not be applied very often, if at all, but it is another tool DIVA users have to help validate Provider data.

<table>
<tr><th>Action</th><th>Result</th></tr>
<tr><td>Drag and drop the Rule onto the target field</td><td>When the “drag” of a Rule is initiated from the Rules Palette, the acceptable Template Output Field targets will change color. As noted, DIVA has certain restrictions on the number and types of Rules that can be assigned to various Template Output Fields.</td></tr>
<tr><td>Double-click the Rule under the Output Field to Configure</td><td>

- When the Rule is first placed under an Output Field, the text “UNDEFINED” will appear next to it. This means the user must configure the rule before it can be applied.
- Select the SBDD domain from the “Domain” pull-down.
- Click “OK” to apply the domain, or “Cancel” to exit without applying the domain.</td></tr>
</table>

MustBeInKeyedDomain Rule (Rules Tab, "Rules Palette" control) – allows users to apply an SBDD-generated Keyed Domain to Output Field values. These domains are called "Domains" to distinguish them from the "DIVA Domains" imported by users from local source tables. This rule type allows users to apply any existing SBDD Keyed Domain to any compatible Output Field, whether it makes sense or not. It is likely this rule type will not be applied very often, if at all, but it is another tool DIVA users have to help validate Provider data.

<table>
<tr><th>Action</th><th>Result</th></tr>
<tr><td>Drag and drop the Rule onto the target field</td><td>When the "drag" of a Rule is initiated from the Rules Palette, the acceptable Template Output Field targets will change color. As noted, DIVA has certain restrictions on the number and types of Rules that can be assigned to various Template Output Fields.</td></tr>
<tr><td>Double-click the Rule under the Output Field to Configure</td><td>



- When the Rule is first placed under an Output Field, the text "UNDEFINED" will appear next to it. This means the user must configure the rule before it can be applied.
- Double-click the Rule to open the configuration dialog
- Select the Output Field containing the key value which will be used to look up the appropriate values in the Domain
- Type in a key value found in the Output Field which will be used to look up the appropriate values in the Doman
- Select the appropriate SBDD Domain from the "Domain" pull-down.
- Click "OK" to apply the domain, or "Cancel" to exit without applying the domain.

</td></tr>
</table>

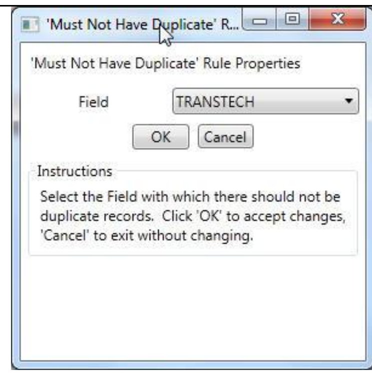
MustBeOfType Rule (Rules Tab, "Rules Palette" control) – allows users to check the Output Field value type. This rule is only valid for numeric Output Fields.

Action	Result
Drag and drop the Rule onto the target field	When the "drag" of a Rule is initiated from the Rules Palette, the acceptable Template Output Field targets will change color. As noted, DIVA has certain restrictions on the number and types of Rules that can be assigned to various Template Output Fields.
Double-click the Rule under the Output Field to Configure	There are no configuration options for this rule.

MustHaveData Rule (Rules Tab, "Rules Palette" control) – allows users to check the Output Field for empty or null value. If found, the Rule throws an error.

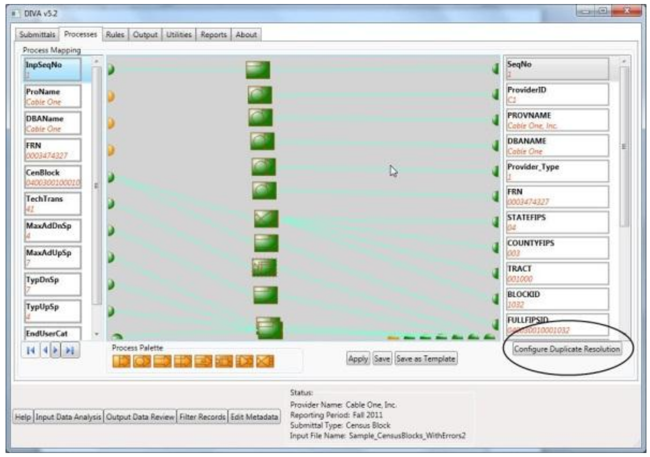
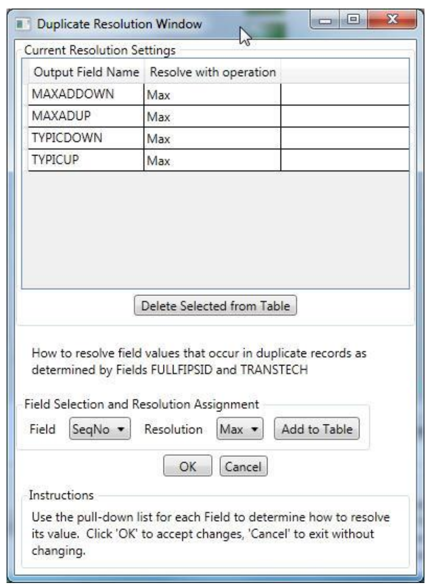
Action	Result
Drag and drop the Rule onto the target field	When the "drag" of a Rule is initiated from the Rules Palette, the acceptable Template Output Field targets will change color. As noted, DIVA has certain restrictions on the number and types of Rules that can be assigned to various Template Output Fields.
Double-click the Rule under the Output Field to Configure	There are no configuration options for this rule.

MustNotHaveDuplicate Rule (Rules Tab, “Rules Palette” control) – allows users to check Output Fields for values that would result in a duplicate row. This is a very different type of Rule than all the others. It operates across rows and not on a column or column(s), exclusively.

<table>
<tr><th>Action</th><th>Result</th></tr>
<tr><td>Drag and drop the Rule onto the target field</td><td>When the “drag” of a Rule is initiated from the Rules Palette, the acceptable Template Output Field targets will change color. As noted, DIVA has certain restrictions on the number and types of Rules that can be assigned to various Template Output Fields.</td></tr>
<tr><td>Double-click the Rule under the Output Field to Configure</td><td>


The target field on which the “MustNotHaveDuplicates” Rule was dropped was the census block ID (FULLFIPSID), so that part of the configuration is done.
This dialog is asking for a second field, the one that contains the value that should not repeat. In this case the user specified the technology type (TRANSTECH) from the pull down meaning that for any unique FULLFIPSID, there cannot be two identical TRANSTECH values.

</td></tr>
</table>

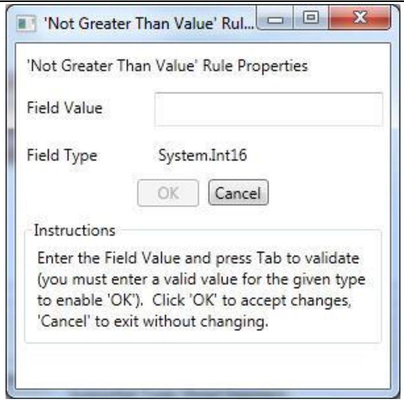
Action	Result
Go to the “Processes” tab and click on “Configure Duplicate Resolution” button.	 • Clicking on the “Configure Duplicate Resolution” button opens the dialog below.  • Using the pull-down lists at the bottom of the dialog, specify how each of the field values for duplicate records should be handled. • In the example above, each of the four speed fields is told to take the maximum value found in any of the duplicate records and to use that for the final value in the single combined record that will be created.

NotGreaterThanField Rule (Rules Tab, "Rules Palette" control) – the value in the Output Field must not be greater than the value in another user-specified Output Field.

Action	Result
Drag and drop the Rule onto the target field	When the "drag" of a Rule is initiated from the Rules Palette, the acceptable Template Output Field targets will change color. As noted, DIVA has certain restrictions on the number and types of Rules that can be assigned to various Template Output Fields.
Double-click the Rule under the Output Field to Configure	 • Select the "not greater than field" from the pull-down list. The values in this field must be less than the values in the rule field or the record is flagged as an error.

NotGreaterThanValue Rule ***(Rules Tab, "Rules Palette" control)*** -- the value in the Output Field must not be greater than a user-specified value.

Action	Result
Drag and drop the Rule onto the target field	When the "drag" of a Rule is initiated from the Rules Palette, the acceptable Template Output Field targets will change color. As noted, DIVA has certain restrictions on the number and types of Rules that can be assigned to various Template Output Fields.

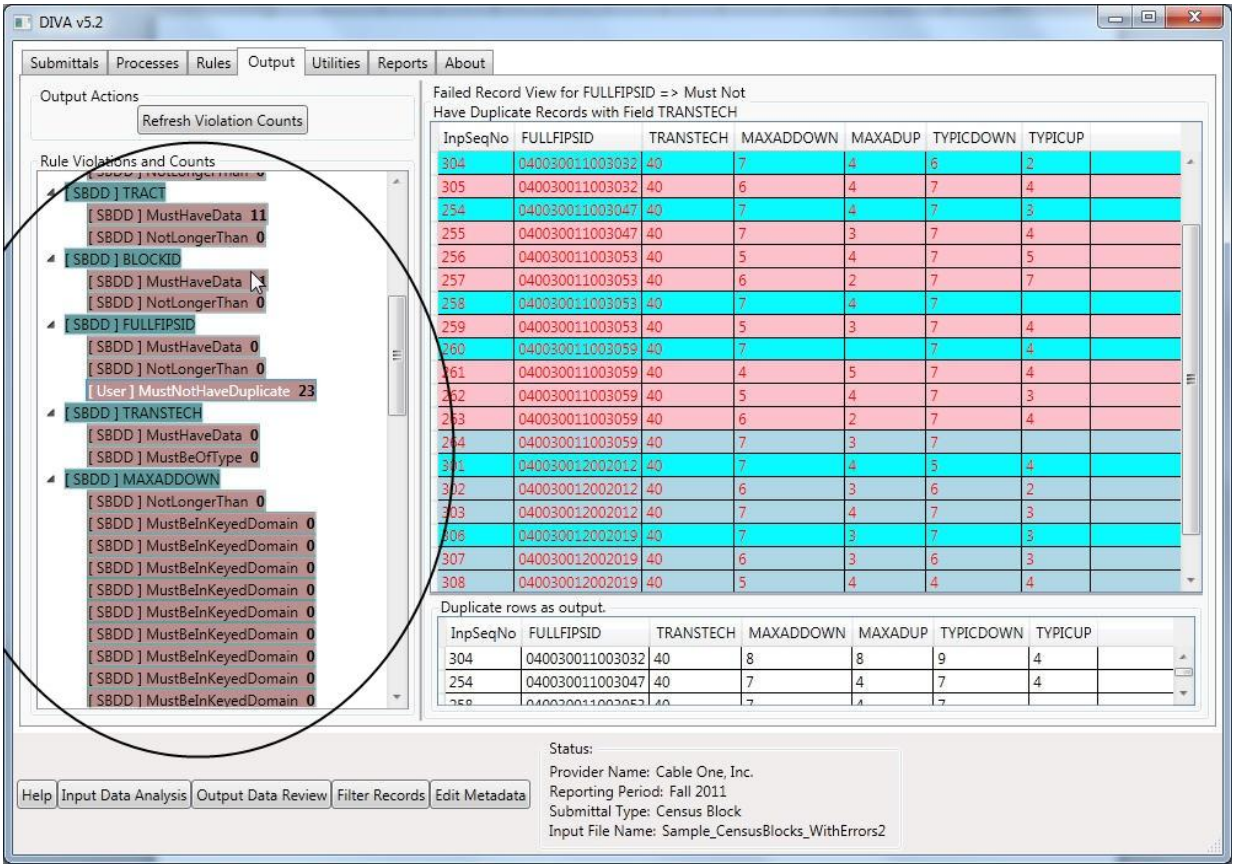
Action	Result
Double-click the Rule under the Output Field to Configure	 • Type in the "Not Greater Than Value" and press tab key to validate. Select "OK" to accept or "Cancel" to exit without setting/changing the value.

NotLongerThan Rule ***(Rules Tab, "Rules Palette" control)*** – the value in the Output Field must not exceed a user-defined number of characters. This rule can only be applied to character (string) fields.

Action	Result
Drag and drop the Rule onto the target field	When the "drag" of a Rule is initiated from the Rules Palette, the acceptable Template Output Field targets will change color. As noted, DIVA has certain restrictions on the number and types of Rules that can be assigned to various Template Output Fields.
Double-click the Rule under the Output Field to Configure	 • Type in the "Not Longer Than" value and click "OK" to accept or "Cancel" to exit without setting/changing the value.

Output Tab Functions

Rule Violations and Counts area (Output Tab) - Displays the results of applying Rules to the Output Fields of a Submittal.



- This is a list of Output Fields with each Rule that has been assigned to the associated Template Output Field shown underneath it. The number of Rule violations (errors) is shown to the immediate right of each Rule.

- By default, the Rules under each Output Field are not visible, having been collapsed under each Output Field. The user can toggle the visibility of rules by double-clicking on the Output Field. The visibility of all rules can be toggled by double-clicking on the top-most Output Field in the list.

- Each Rule has either "[SBDD]" or "[User]" listed before the Rule name. This reflects whether the Rule was added as part of the SBDD XML Importoperation or subsequently by the user.

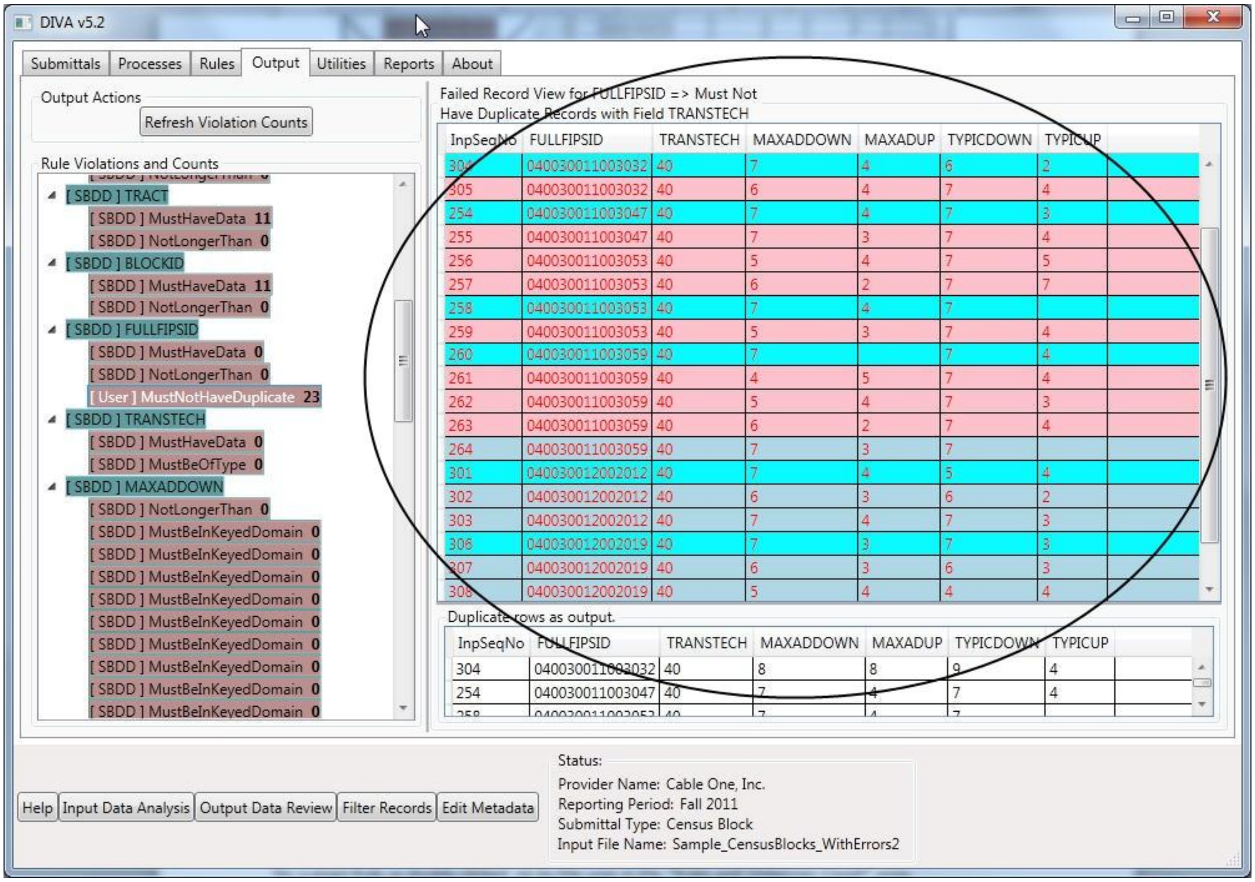
- Placing and holding (“hovering”) the mouse over any Rule will display the more informative Rule description as a tool-tip.

- A Rule violation count of “-2” indicates that the Rule is not configured and therefore cannot be evaluated. Rules are configured on the Rules Tab.
- A Rule violation count of “-1” indicates that there is no data in the Output Field to be evaluated. Either the Output Field is not connected to a data source on the Processes tab or there is no data in the connected data source.

- More information about errors can be displayed by double-clicking on a Rule that is showing one or more errors. The “Failed Record View” will be populated with the rows that were flagged with errors in the Output Field.

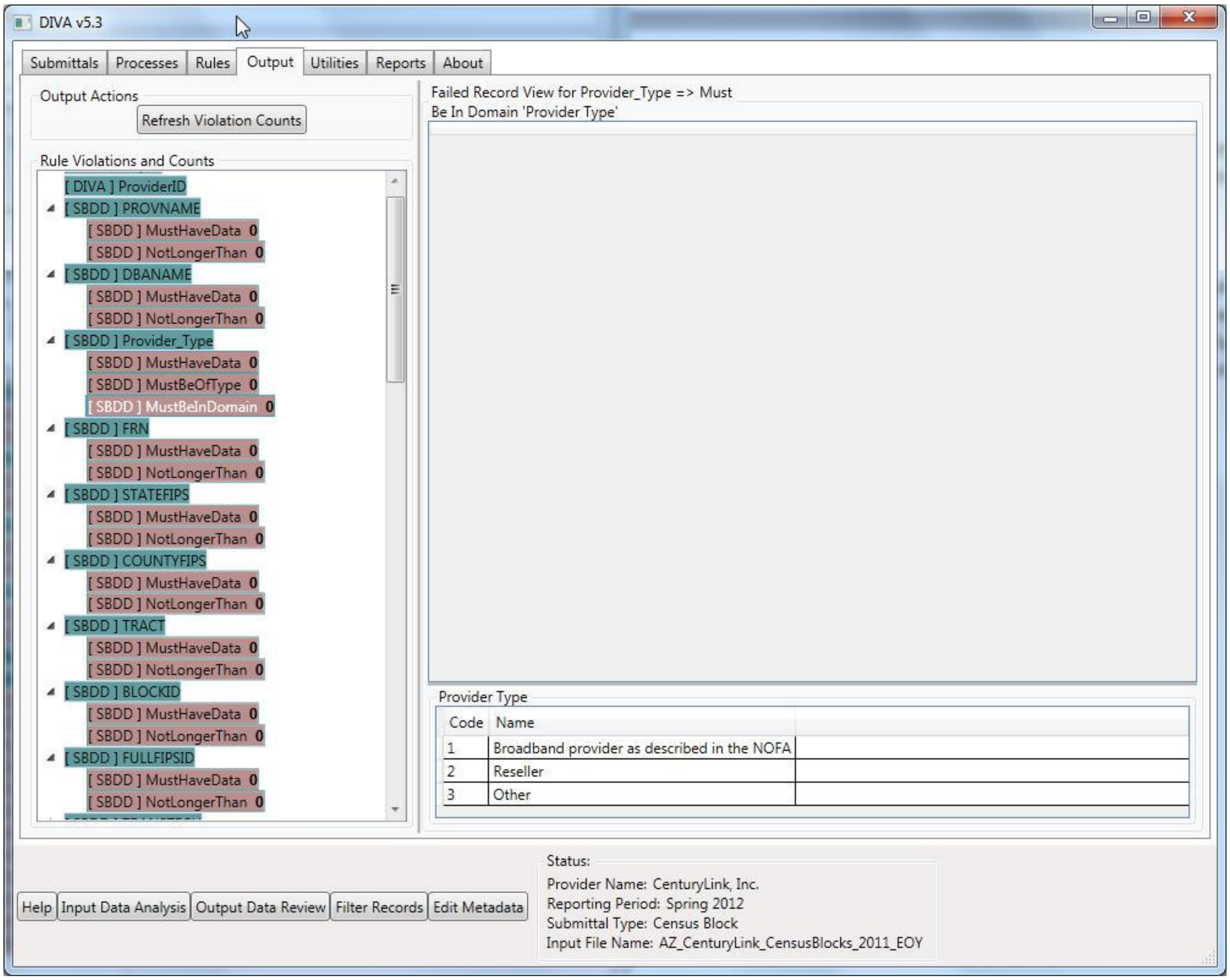
- Users work iteratively, adding/deleting/editing Processes, Rules and Filters until zero errors are achieved or the errors that remain are acceptable. For example, there may be no address information and no way to get it, so those Output Fields will always show errors in the MustHaveData rule.

Failed Record View area (Output Tab) – Displays the rows which have an error in the Output Field for a Rule which has been double-clicked on by the user in the "Rules and Violations Count" area.



- This display will change somewhat depending on the error type being displayed.
  - In the illustration above, "MustNotHaveDuplicates" errors are being displayed with records that have errors being shown in red. The first non-error record of each duplicate set (if there is one) will be shown in cyan (light blue); this record will be exported (however, not necessarily with the values shown in this panel). Subsequent non-error records of each duplicate set of records will be shown in darker blue; these will not be exported.
  - The rows that will be exported from DIVA are shown in the Extra Data panel (labeled, in this case, with "Duplicate Rows as output"). There will be one record here for every record in the above panel that is in cyan. However, their values have been adjusted in accordance with the settings of the "Resolve Duplicate" Process (on the Processes Tab, below the Output Fields List). In this example, the "Resolve Duplicate" Process is set to resolve values by selecting the maximum value of each of the four speed fields.

Domain Table Display area (Output Tab) – Displays the values in the domain table for a Rule which has been double-clicked on by the user in the “Rules and Violations Count” area.



In the illustration above, “MustBeInDomain” rule has been clicked with the result that (a) the rule changes to white font and (b) the domain table for that rule is being displayed below the “Failed Record View” area. The “Failed Record View” is blank in this case, because no records violated the domain Rule

Utilities Tab Functions

Import SBDD XML File (Utilities tab, "Import SBDD XML File" control)

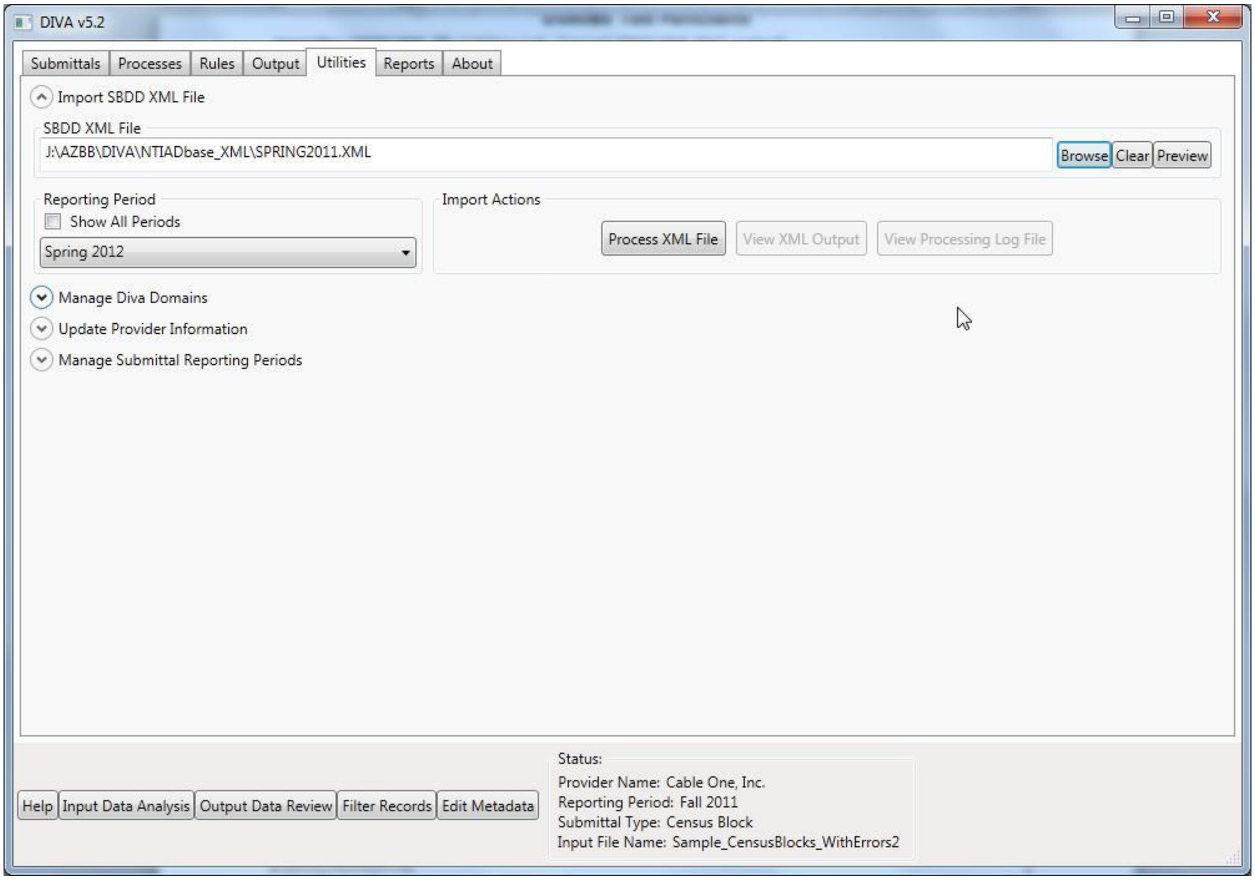
The "Import SBDD XML File" control allows the user to import a file (text, dbf or Excel) containing SBDD database schema and domain values into a DIVA table.

THIS STEP MUST BE PERFORMED FOR A GIVEN REPORTING PERIOD BEFORE ANY OTHER PROCESSING CAN TAKE PLACE.

This step creates the definitions for most Template Output Fields (DIVA has some extended fields for various SBDD feature classes which are added by DIVA automatically) and imports the Rules for them by processing the SBDD domains.

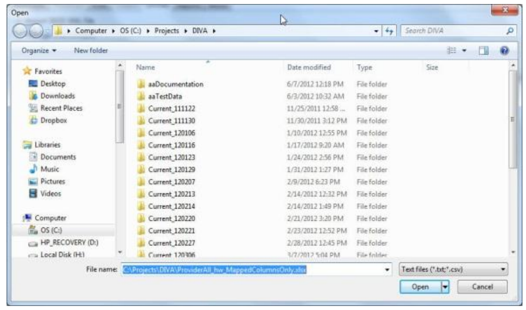
A pre-cursor step for this function is to use ArcCatalog to export a workspace XML document from an SBDD geodatabase.

Click on "Import SBDD XML File" section of Utilities Tab and the "Import SBDD XML File" area expands:



Key	Control	Description
1	"SBDD XML File" text box	Displays the path and file name to the SBDD XML file.

<table>
<tr><th>Key</th><th>Control</th><th>Description</th></tr>
<tr><td>2</td><td>Browse
button</td><td>Click on the “Browse” button and the browse dialog box opens:

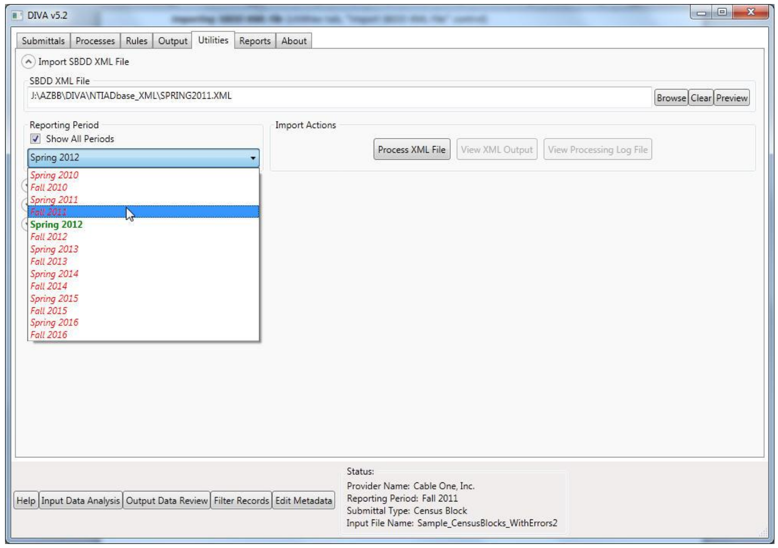


Choose the file type filter at the bottom of the Browse dialog to match the file type (extension) of your Provider information file.

Select the source file and click “Open” on the file dialog box. The browse dialog goes away and you will be back to the Utilities tab with the pathname and file to your source file now showing in the “SBDD XML File” text box.</td></tr>
<tr><td>3</td><td>Clear
button</td><td>Clears the value in the “SBDD XML File” text box. Does not delete the XML file or unload a previously loaded XML file. It just clears the text box.</td></tr>
<tr><td>4</td><td>Preview
Button</td><td>Opens the DIVA “Preview Window” which has been previously discussed.</td></tr>
</table>

<table>
<tr><th>Key</th><th>Control</th><th>Description</th></tr>
<tr><td>5</td><td>Reporting Period

area</td><td>
Click on the “Reporting Period” pull-down menu and the list of Reporting Periods is displayed. The currently active Reporting Period is shown in green while the rest of them are in red font.



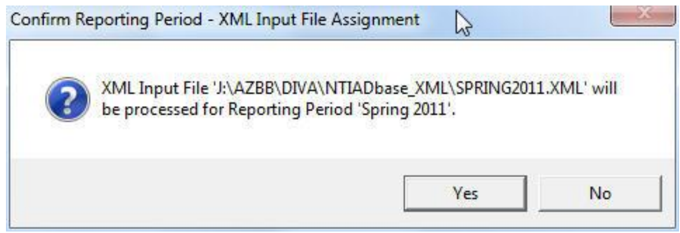
Select the appropriate Reporting Period from the pull down list for the selected XML Import File. The active Reporting Period is shown in green font.

If an XML file for a given Reporting Period has already been imported, the “Process XML File” button will be inactive.

The selection of the Reporting Period and the source XML file can be done in any order.

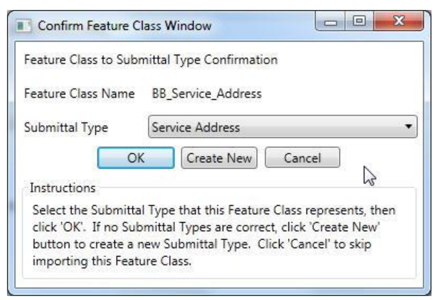
Note: the pull down list can be managed (to a certain extent) from the “Manage Submittal Reporting Periods” area on the “Utilities” tab.
</td></tr>
</table>

<table>
<tr><th>Key</th><th>Control</th><th>Description</th></tr>
<tr><td>6</td><td>Process XML button</td><td>
Click the “Process XML” button” and the “Confirm Reporting Period – XML Input File Assignment” dialog appears.



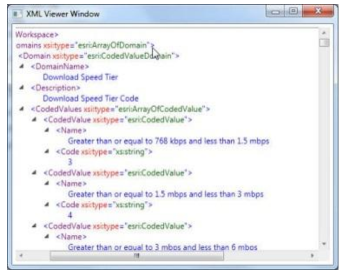
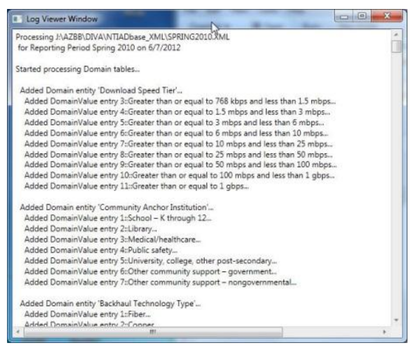
If the file matches the Reporting Period, click “Yes”; otherwise click “No” and repeat the previous step.

Follow the dialogs to confirm that the SBDD feature class is being properly associated with the Submittal Type.



Use the Submittal Type pull-down to select the matching Submittal Type for the current Feature Class Name. DIVA will attempt to find the best match for you by matching the feature class and Submittal Type names.

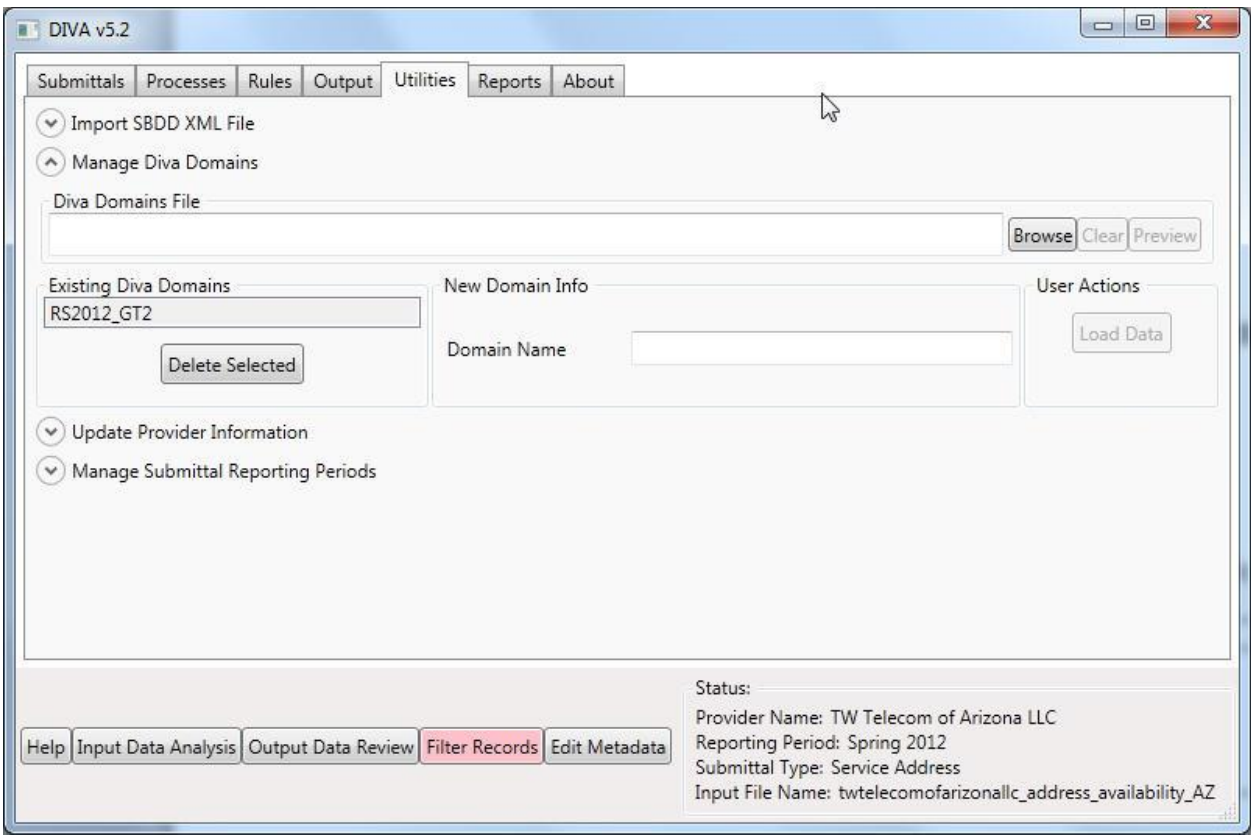
Note: there will be one “Confirm Feature Class” dialog for each SBDD-defined feature class. The user will be asked to click “OK” twice, once to confirm the mapping as in the second illustration above and then again on a simple confirm dialog. It is faster to use the return key on the keyboard instead of clicking OK with the mouse.
</td></tr>
</table>

Key	Control	Description
7	View the XML Output button	Click on the View the XML Output Button and the “XML Viewer” window opens:  Click to expand one node of the tree view; double click on a branch to expand all nodes nested below it. This is only used if you need to confirm something about the XML import.
	“View Processing Log File” button	Click on the “View Processing Log File” button and the “Log Viewer” window opens:  This is only used if you need to confirm something about the XML import process.

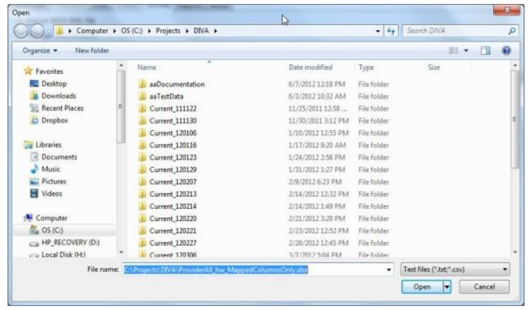
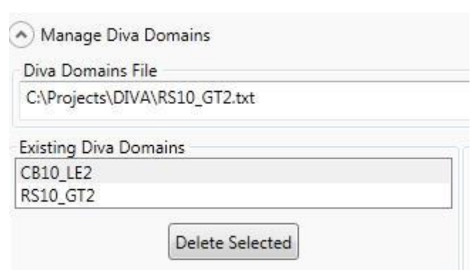
Manage DIVA Domains (Utilities tab, "Manage DIVA Domains" control)

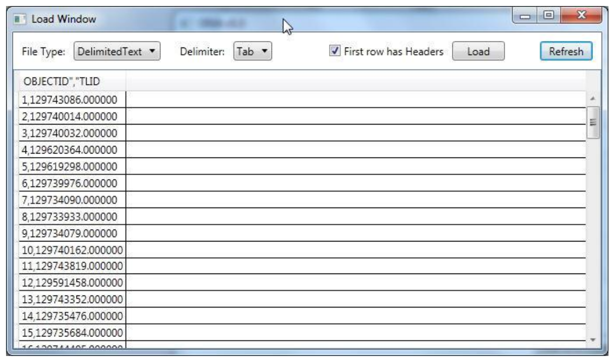
The "Manage DIVA Domains" control allows the user to import into a DIVA table a file (text, dbf or Excel) containing domain values. The imported domain table can then be referenced in a "Must Be in DIVA Domain" Rule from the "Rules" tab.

Click on "Manage DIVA Domains" section of Utilities Tab and the area expands



Key	Control	Description
1	"Diva Domain File" text box	Displays the path and file name to the SBDD XML file.

Key	Control	Description
2	Browse button	Click on the “Browse” button and the browse dialog box opens:  Choose the file type filter at the bottom of the Browse dialog to match the file type (extension) of your domain file type. Select the source file and click “Open” on the file dialog box. The browse dialog goes away and you will be back to the Utilities tab with the pathname and file to your source file now showing in the “Diva Domain File” text box.
3	Clear button	Clears the value in the “Diva Domain File” text box. Does not delete the source file or unload a previously loaded domain file. It just clears the text box.
4	Preview button	Opens the DIVA “Preview Window” which has been previously discussed.
5	Existing DIVA Domain area	If the domain import was successful (Step 7), you will see the new domain name you provided in a previous step in the will appear under the “Existing DIVA Domains” area.  From here, you can select and delete and existing domain, as well

Key	Control	Description
6	New Domain Info area	Assign the domain a name in the “Domain Name” text box and then load the data (see next step)
7	Load Data button	The “Load Data” button becomes active after the user has selected a “Diva Domain File” in the previous steps and assigned a “Domain Name”. Click the “Load Data” button” and the “Load” window opens:  Like all DIVA Preview Windows, only the first 100 records of the source file will be shown. If the source is a text file, be sure to set the proper file delimiter in the “Delimiter” pull down menu at the top of the window. The “First row has headers” checkbox must be checked if the first row is column names. To populate the window with records from the source file or to se changes you made in this window, click the “Refresh” button in the upper right corner. To load the data, click the “Load” button at the top of the dialog.

Tips for Managing DIVA Domains:

- Do not load large tables if avoidable. This will significantly slow performance when applying these domains through rules. So, for example, if you need to check for valid Census block ID values, you can create and load a table based only on Census Blocks less-than-or-equal-to 2 square miles. There is no need to include all the larger Census Blocks in the domain table.

Update Provider Information (Utilities tab, "Update Provider" control)

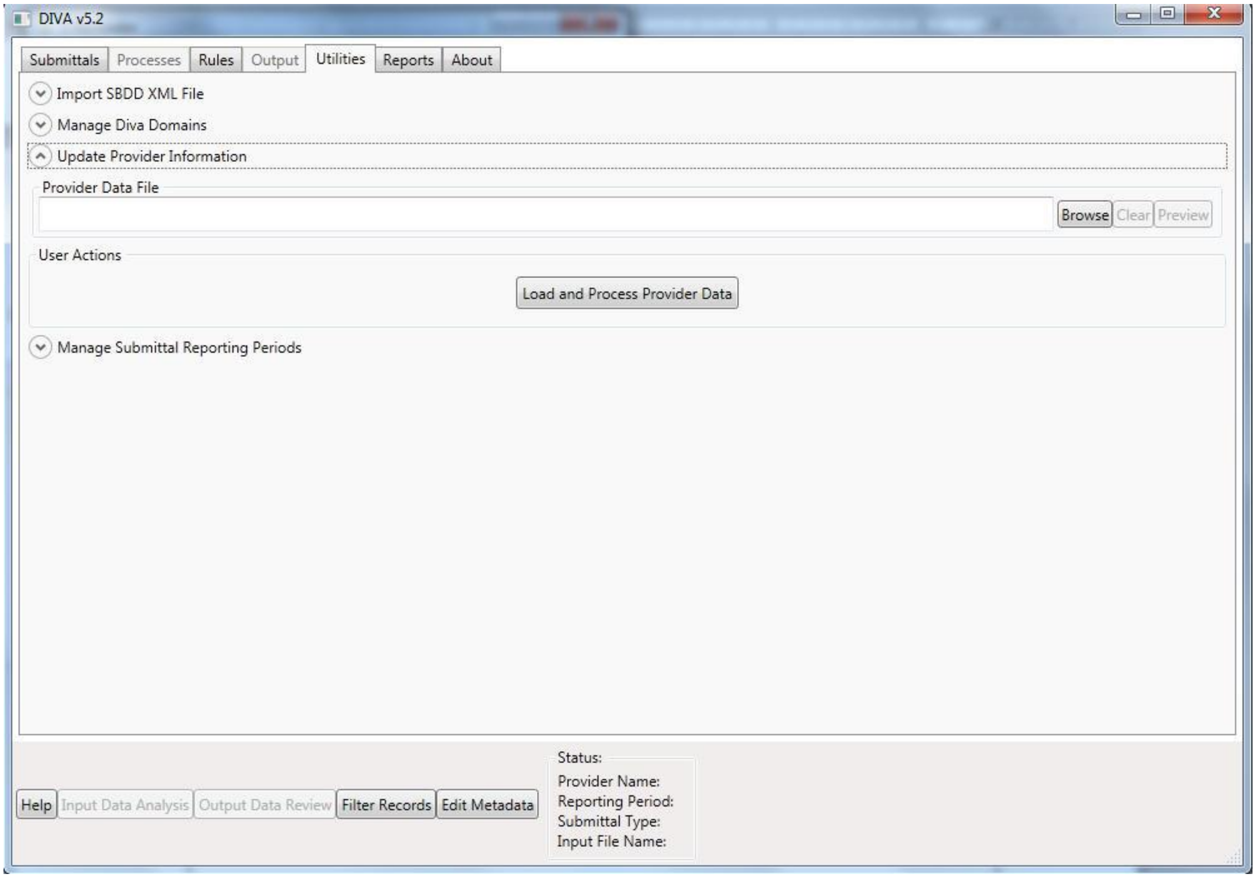
The "Update Provider Information" control allows the user to import a file (text, dbf or Excel) containing Provider identification and status information into a DIVA table. In the Arizona Broadband Project, this file is a spreadsheet maintained by the telecommunication consultants and uploaded to a wiki page. The information in the spreadsheet includes a two-character ProviderID value which is used internally to track Providers, as well as SBDD fields for Provider Name, DBA Name and FRN.

Users may need to pre-Process the file containing the new Provider Information. The source file must have a header row and the field names must match the following DIVA file names exactly (case and spaces, included).

ProviderID	PROVNAME	DBAName
FRN	ProviderType	DSC_Active
Notes		

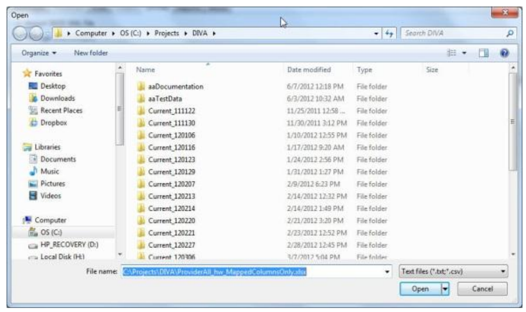
There can be additional fields or even missing fields (e.g. Notes), but DIVA must find an exact match on the header row for each column it imports.

Click on "Update Provider Information" section of Utilities Tab and the "Update Provider Information" area expands.


DIVA v5.2
Submittals
Processes
Rules
Output
Utilities
Reports
About
Import SBDD XML File
Manage Diva Domains
Update Provider Information
Provider Data File
Browse
Clear
Preview
User Actions
Load and Process Provider Data
Manage Submittal Reporting Periods
Help
Input Data Analysis
Output Data Review
Filter Records
Edit Metadata
Status:
Provider Name:
Reporting Period:
Submittal Type:
Input File Name:

<table>
<tr><th>Key</th><th>Control</th><th>Description</th></tr>
<tr><td>1</td><td>“Provider Data File” text box</td><td></td></tr>
<tr><td>2</td><td>Browse

button</td><td>Click on the “Browse” button and the browse dialog box opens:

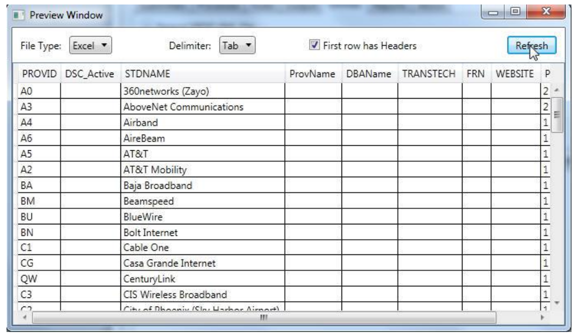


Choose the file type filter at the bottom of the Browse dialog to match the file type (extension) of your Provider information file.

Navigate to and select the source file and click “Open” on the file dialog box. The browse dialog goes away and you will be back to the Utilities tab with the pathname and file to your source file now showing in the “Provider Data File” text box.</td></tr>
<tr><td>3</td><td>Clear

button</td><td>Clears the value in the “Provider Data File” text box.. Does not delete the source file or unload a previously loaded Provider information file. It just clears the text box.</td></tr>
</table>

<table>
<tr><th>Key</th><th>Control</th><th>Description</th></tr>
<tr><td>4</td><td>Preview Button</td><td>
Click on “Preview” button and the “Preview Window” opens:



Like all DIVA Preview Windows, only the first 100 records of the source file will be shown.

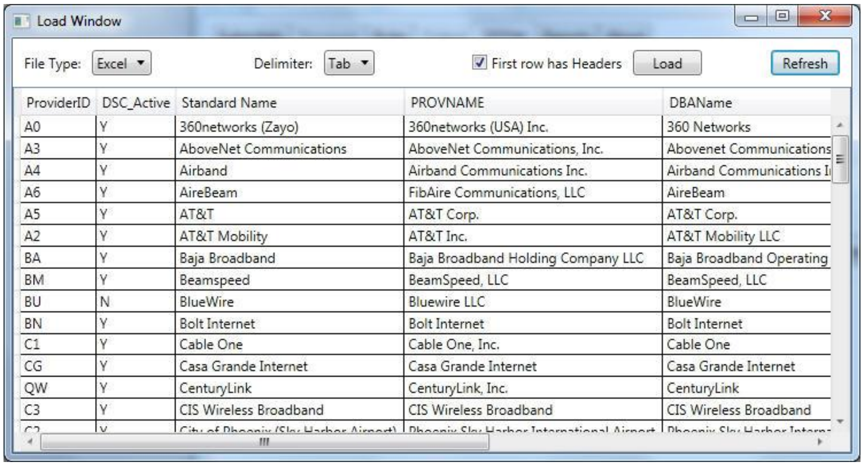
Be sure the “File Type” pull down reflects the extension of the source file.

If the source is a text file, be sure to set the proper file delimiter in the “Delimiter” pull down menu at the top of the window.

The “First row has headers” checkbox must be checked and the header row must have column names that exactly match what DIVA expects, or the import will not work. See the first step in this process for the list of valid header row names

To populate the window with records from the source file, click the “Refresh” button in the upper right corner.

Dismiss the “Preview” window by clicking the red “x” in the upper right corner of the dialog.
</td></tr>
</table>

<table>
<tr><th>Key</th><th>Control</th><th>Description</th></tr>
<tr><td>5</td><td>Load and Process Provider Data button</td><td>
Click on the “Load and Process Provider Data” and the “Load Window” opens:


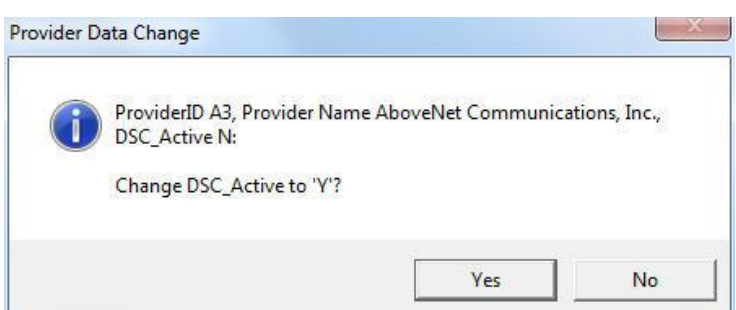
Like all DIVA Preview Windows, only the first 100 records of the source file will be shown.

If the source is a text file, be sure to set the proper file delimiter in the “Delimiter” pull down menu at the top of the window.

The “First row has headers” checkbox must be checked and the header row must have column names that exactly match what DIVA expects, or the import will not work. See the first step in this process for the list of valid header row names

To populate the window with records from the source file, click the “Refresh” button in the upper right corner.

To load the data, click the “Load” button at the top of the dialog.

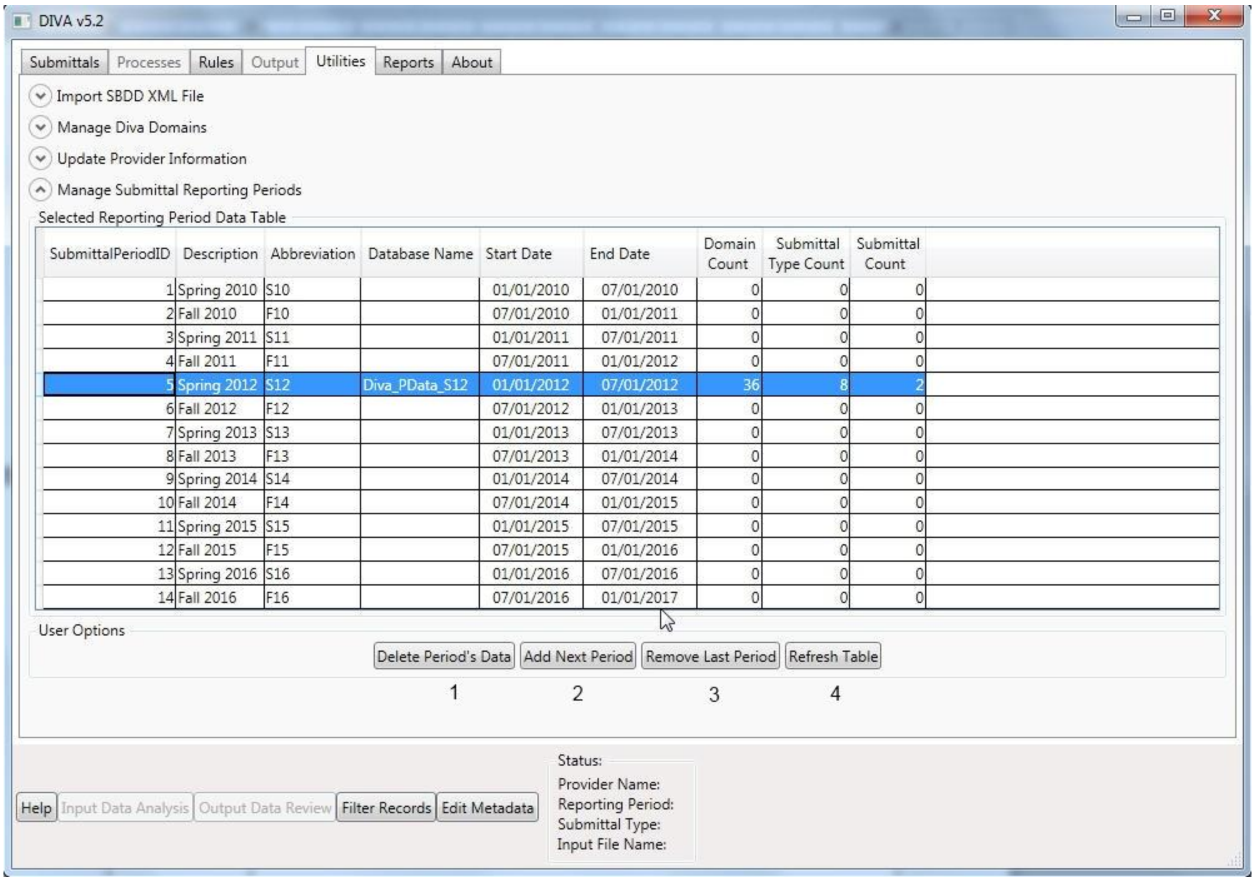
Assuming there are changes since the last version, a dialog will appear that asks you to confirm or reject each change since the last version.


</td></tr>
</table>

Manage Submittal Reporting Periods (Utilities tab, "Manage Submittal Reporting Periods" control)

The "Manage Submittal Reporting Periods" control allows the user to add or delete Reporting Periods but not change any of the descriptive or date attributes.

Click on "Manage Submittal Reporting Periods" section of Utilities Tab and the "Manage Submittal Reporting Periods" area expands. Below are explanations of the "Manage Submittal Reporting Periods" control. Explanations of the buttons are keyed by number.



Key	Control	Description
1	Delete Period's Data button	Users can delete a Submittal Period's data which removes all database entries related to the Reporting Period.
2	Add Next Period button	Adds the next Submittal Reporting Period to the bottom of the table.

Key	Control	Description
3	Remove Last Period button	Removes the last Submittal Reporting Period from the bottom of the table.
4	Refresh Table button	Shows changes made to the table.

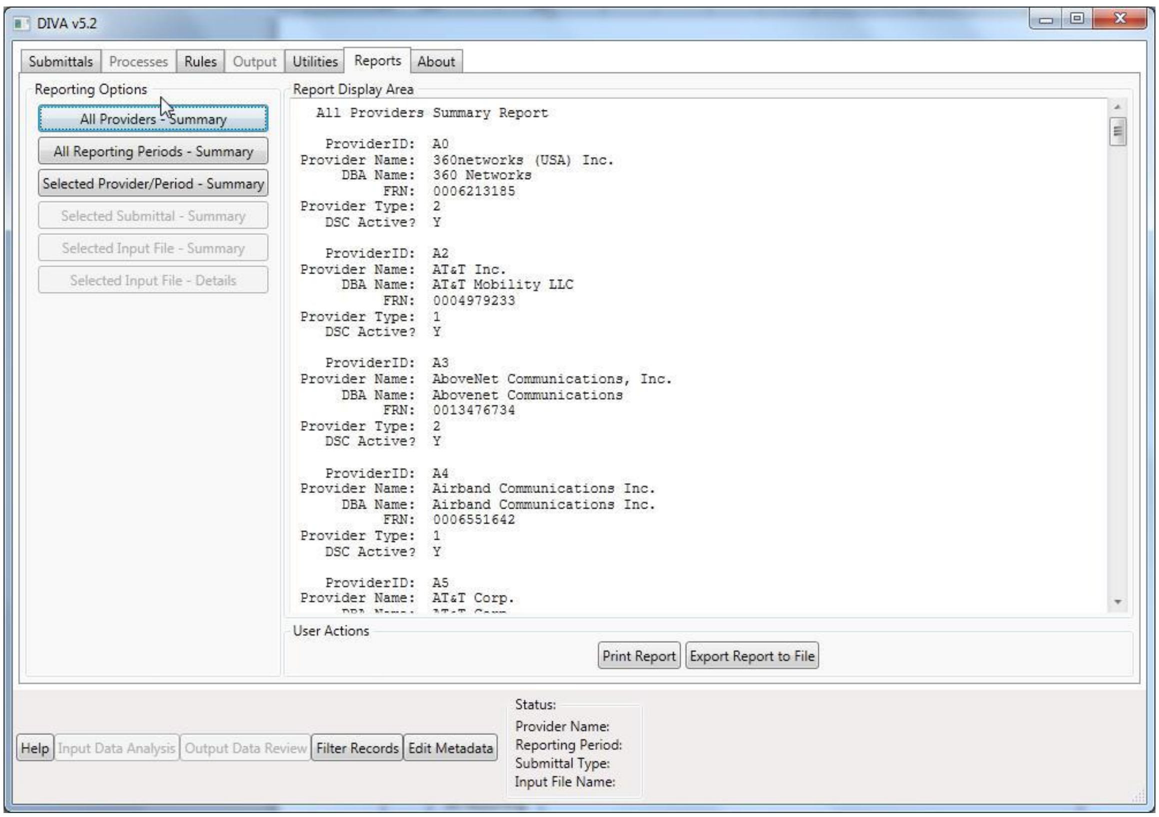
This control also shows some information about SBDD XML files that have been imported by the user. In the example above, only Spring 2012 SBDD information has been imported which entailed 36 domains covering 8 Submittal Types. In addition, the numbers of Submittals that have been created are displayed in the "Submittal Count" column.

Each Submittal Period has a 6-month window of time, though the Submittal Date is in the middle of that window. This allows changes to the Submittal Period data before the system clock closes access to a Submittal Period.

Reports Tab Functions

Reporting Option "All Providers - Summary" (Reports tab, button)

Creates a summary listing of current Provider information as imported into DIVA from the "Update Provider Information" utility.



Provider information consists of:

- ProviderID value – internal user-defined two-character identifier to uniquely identify Providers; it is not part of the SBDD database schema. This value, along with other Provider information, derives from imported Provider information. This value is used to create Provider-specific Input File data table names and Processing Set names.

- Provider Name value – the NTIA-required Provider Name attribute. This value is used in the first drop-down list in the Provider area on the Submittals tab.

- DBA Name value – the NTIA-required DBA Name attribute. This value is used in the second drop-down list in the Provider area on the Submittals tab.

- FRN – the NTIA-required FCC Registration Number attribute. This value is used in the third drop-down list in the Provider area on the Submittals tab.

- Provider Type value – the NTIA-required Provider Type attribute; this uses an SBBD-defined standard code.

- DSC_Active value – a Y / N entry that indicates whether this Provider is active in terms of providing data sets. This is a code developed by the AZBB team (not part of the SBDD database schema).

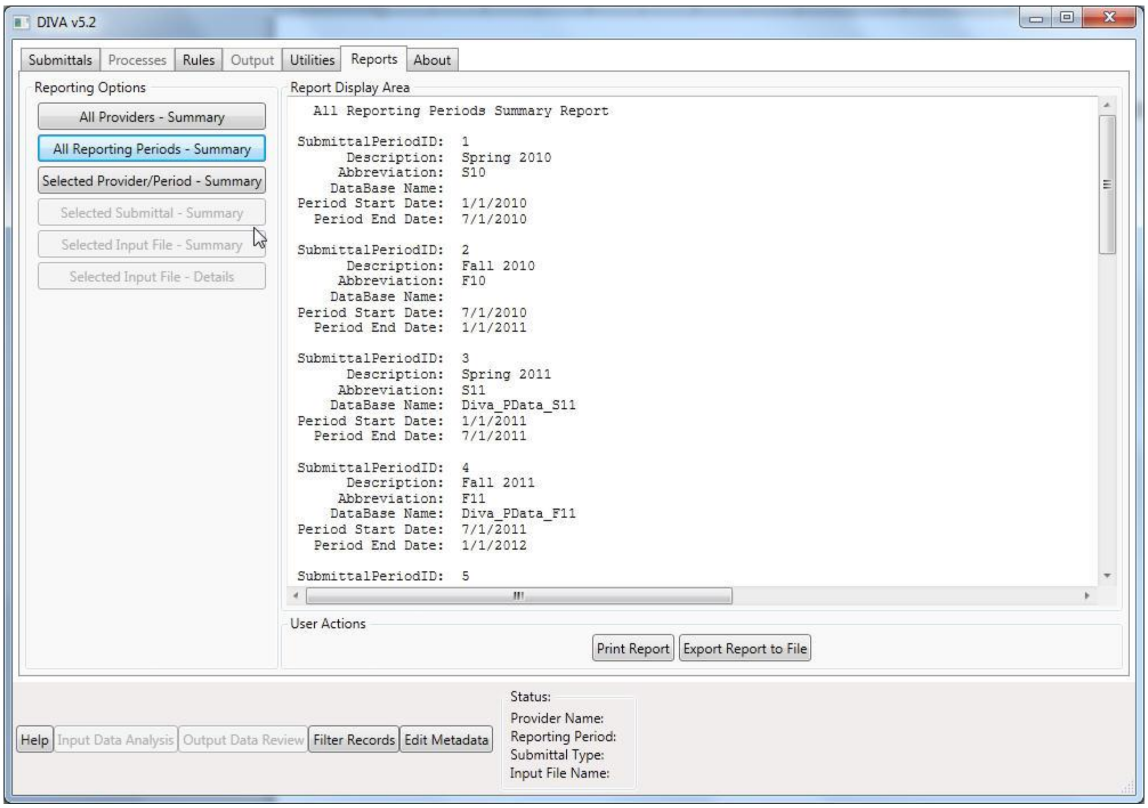
- Notes – user-added Provider-specific metadata (from Edit Metadata Window"); only appears if there is a note (not part of the SBDD schema)..

- Reporting Period Notes – user-added Reporting Period-specific metadata attached to this Provider (from Edit Metadata Window"); only appears if there is a note (not part of the SBDD schema)..

This set of data, except "Reporting Period Notes", is repeated in other reports. When it is, rather than describing each reported field again, we will simply note "Provider information".

Reporting Option "All Reporting Periods – Summary" (Reports tab, button)

Creates a summary listing of current Reporting Period information as currently stored in DIVA. The user may modify this using the "Manage Submittal Reporting Periods" utility. If a Reporting Period shows values for "Database Name", it means that the SBDD geodatabase for that Period has been imported into DIVA using the "Import SBDD XML File" utility.



Reporting Period information consists of:

- Submittal Period ID – an internal identifier created by DIVA (not part of the SBDD schema).
- Description – a short description of the Submittal Period (not part of SBDD schema). This value is used in the Reporting Period drop-down list on the Submittals tab.
- Abbreviation – an abbreviated description of the Submittal Period (not part of the SBDD schema). This value is used to create Provider-specific Input File data table names and Processing Set names.
- Database Name – the DIVA name for the SQL Server database created for each Reporting Period using the "Importing SBDD XML File" button on the "Utilities" tab (not part of SBDD schema).
- Period Start Date – the starting date of the Reporting Period. These are defined based on the date of the data to be reported in the original NTIA reporting instructions (i.e. December 31 and June 30 of each year). The Reporting Period start date is the day after that date.

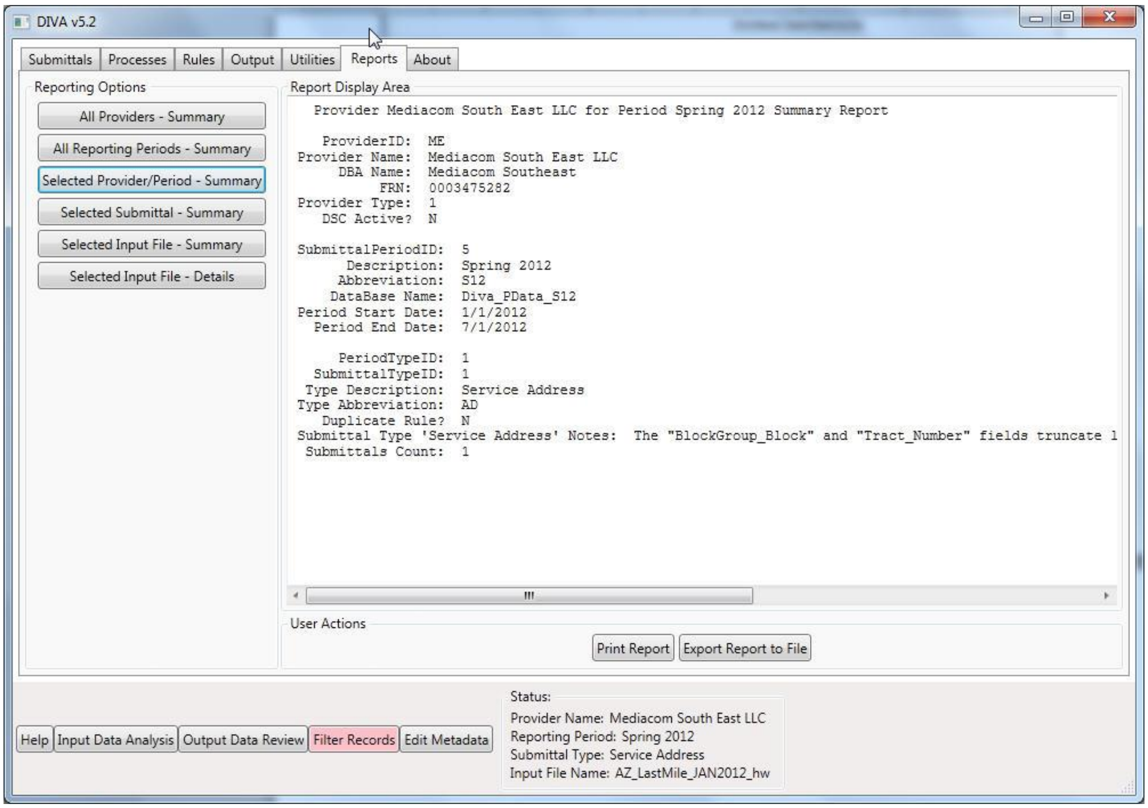
- Period End Date – the ending date of the Reporting Period. These are defined based on the date of the data to be reported in the original NTIA reporting instructions (i.e. December 31 and June 30 of each year). The Reporting Period end date is the day before the next Reporting Period's Start Date.
- Notes – user-added Reporting Period-specific metadata (from Edit Metadata Window"); only appears if there is a note (not part of the SBDD schema).
- Provider Notes – user-added Provider-specific metadata attached to this Reporting Period (from Edit Metadata Window"); only appears if there is a note (not part of the SBDD schema).

Note that the Period End Date has nothing to do with the date that the NTIA requires information be submitted. The start and end dates are chosen so that there is no "gap" or "overlap" in the Reporting Periods.

This set of data is repeated in other reports. When it is, rather than describing each reported field again, we will simply note "Reporting Period information". Note that the "Provider Notes" entry will be labeled differently so as to indicate both the Provider and Reporting Period.

Reporting Option "Selected Provider/Period – Summary" (Reports tab, button)

Creates a summary listing of information about the active Provider and the active Reporting Period.



Provider / Period information consists of:

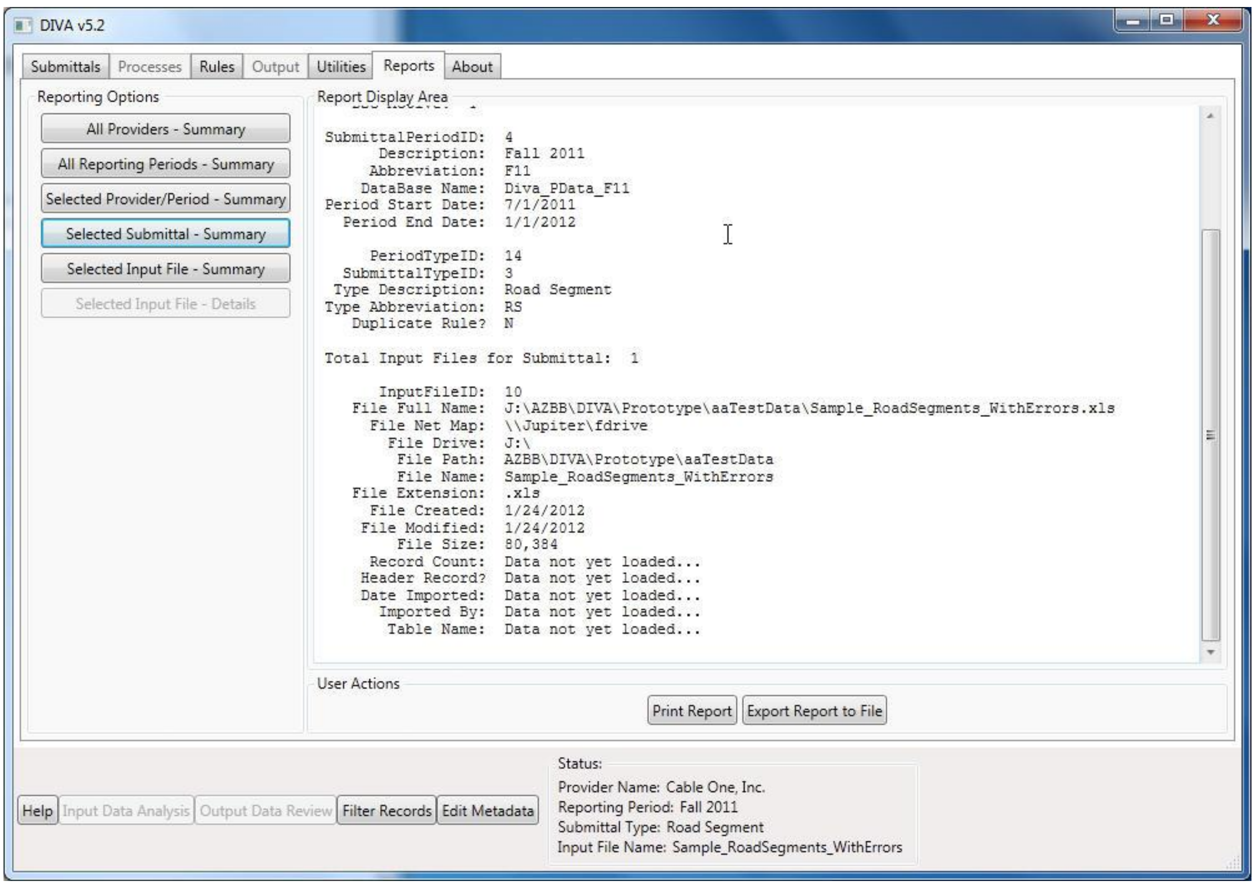
- Provider information.
- Reporting Period information.
- For each Period-Type in this Reporting Period (i.e. for each Submittal Type defined):
  - Period Type ID – an internal Period-Type identifier created by DIVA (not part of the SBDD schema).
  - Submittal Type ID – an internal Submittal Type identifier created by DIVA (not part of the SBDD schema).
  - Type Description – a short description of the Submittal Type (not part of SBDD schema). This value is used in the Submittal Type drop-down list on the Submittals tab.
  - Type Abbreviation – an abbreviated description of the Submittal Type (not part of the SBDD schema). This value is used to create Provider-specific Input File data table names and Processing Set names.
  - Duplicate Rule? – a Yes/No field indicating whether a "Must Not Have Duplicate" Rule has been assigned to any Template Output Field associated with this Period-Type. Used for DIVA internal processing (not part of the SBDD schema).

- Notes – user-added Period-Type-specific metadata (from Edit Metadata Window”); only appears if there is a note (not part of the SBDD schema).
- Submittals Count –the number of Submittals defined for the current Provider / Period-Type. Since there can only be one such Submittal (which may have several Input Files) for each Period-Type, this number will always be one. If there are none, then that Period-Type will not be reported (for brevity).

The set of data listed under Period-Type, except “Submittals Count”, is repeated in other reports. When it is, rather than describing each reported field again, we will simply note “Period-Type information”.

Reporting Option "Selected Submittal – Summary" (Reports tab, button)

Displays a summary of the active Submittal (button is inaccessible if no active Submittal). This report includes information about a single Submittal including a summary of the information about each of its Input Files, which includes record counts, the date imported, imported by etc. If the data for a Submittal has not yet been loaded, some of the Input File information will not be available ("Data not yet loaded…" is displayed as shown in the image below).



Submittal information consists of:

- Provider information.
- Reporting Period information.
- Period-Type information.
- Total Input Files for Submittal – the number of Input Files that are associated with this Submittal; the count must be at least one.
- For each Input File of this Submittal:
    - Input File ID – an internal Input File identifier created by DIVA (not part of the SBDD schema).

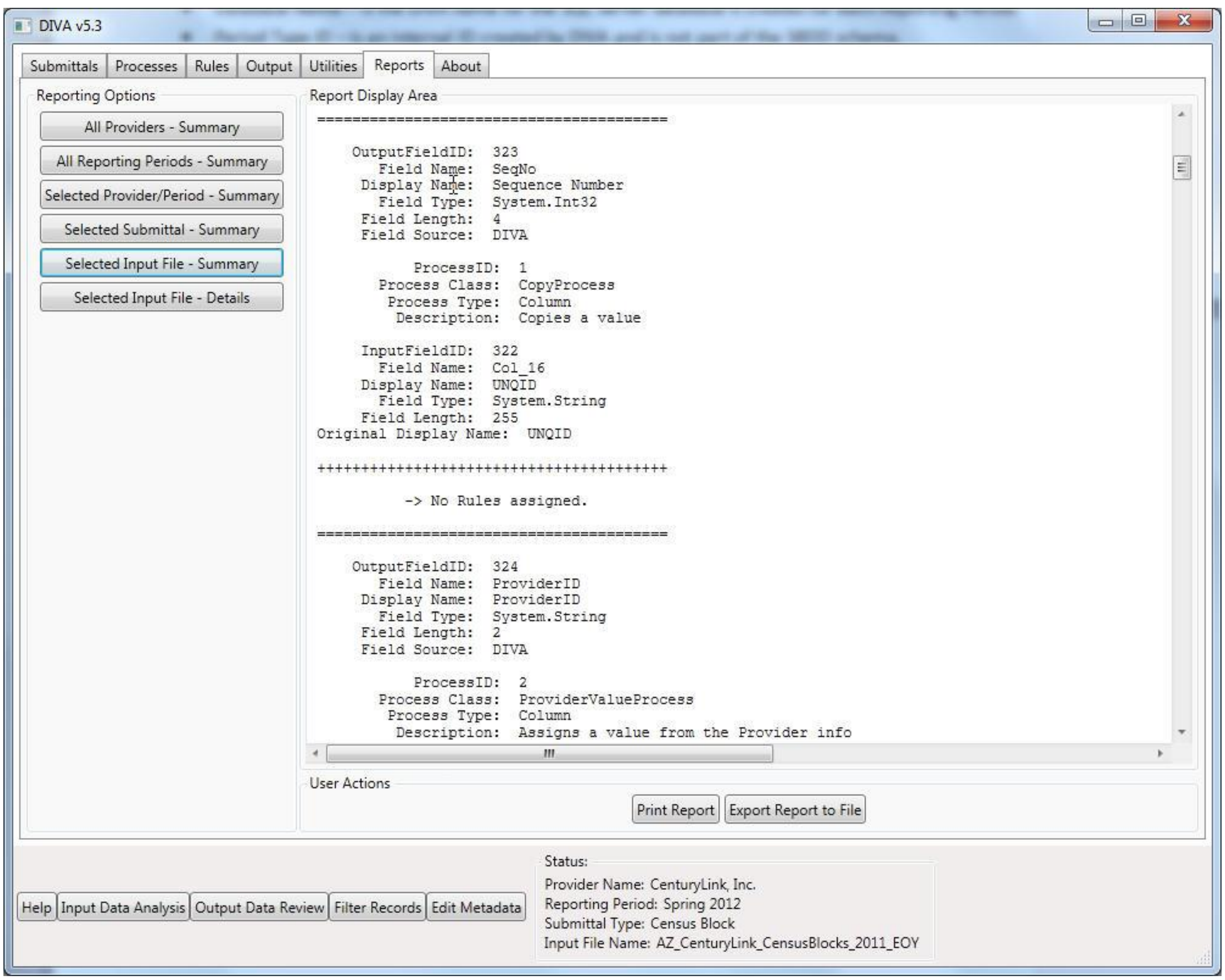
- File Full Name – the original complete file name, including path, of the Provider's data set that was loaded into DIVA for processing (not part of the SBDD schema); this is the "source file".
- File Net Map – if the drive letter portion of the File Full Name was a network mapping (share), then the value of that mapping is shown here (not part of the SBDD database schema).
- File Drive – the drive portion of the File Full Name (not part of the SBDD schema).
- File Path – the path portion of the File Full Name (not part of the SBDD schema).
- File Name – the file name portion of the File Full Name (not part of the SBDD schema).
- File Extension – the file name extension portion of the File Full Name (not part of the SBDD schema).
- File Name Comment – user-added File Name metadata (from Edit Metadata Window"); only appears if there is a comment (not part of the SBDD schema).
- File Created – the date that the source file was created (not part of the SBDD schema).
- File Modified – the date that the source file was last modified (not part of the SBDD schema).
- File Size – the size of the source file in bytes (not part of the SBDD schema).
- Record Count – the number of data records in the source file (not part of the SBDD schema). This is the number of records that are available for processing in DIVA; it excludes the count of the header record, if there was one.
- Header Record – a Y / N entry indicating if the data was loaded into DIVA with the "First row has Headers" checkbox checked. As explained in data loading, checking this box tells DIVA to use the values in the first record of the source file as the names of the Input Fields (data columns) and not to load it as data records for processing (not part of the SBDD schema).
- Header Record Comment – user-added Header Record metadata (from Edit Metadata Window"); only appears if there is a comment (not part of the SBDD schema).
- Date Imported – date that the source file's data was loaded into DIVA (not part of the SBDD schema).
- Imported By – the Window's user name of the person who loaded the data into DIVA (not part of the SBDD schema).
- Table Name - the name of the SQL data table and database that the data was loaded into (not part of the SBDD schema). This name is a combination of the Provider ID, Reporting Period's Abbreviation, Submittal Type's abbreviation and the Input File ID. See Appendix D for further details.
- Notes – user-added Input File-specific metadata (from Edit Metadata Window"); only appears if there is a note (not part of the SBDD schema).
- Projection Type – user-added Projection Type metadata (from Edit Metadata Window"); only appears if there is an entry (not part of the SBDD schema).
- Projection Note – user-added note regarding the projection type metadata (from Edit Metadata Window"); only appears if there is a note (not part of the SBDD schema).

The set of data listed under Input File is repeated in other reports. When it is, rather than describing each reported field again, we will simply note "Input File information".

Reporting Option "Selected Input File – Summary" (Reports tab, button)

Creates a summary listing of the active Input File for the active Submittal (button is inaccessible if no active Input File). It adds Input File-specific information regarding the Output Fields of the Input File and the Process that is the source of data to each Output Field. It traces the "flow" of data "upstream", through possible Process Fields and additional Processes until it reaches a data source, which is either an Input Field or a Process. It also lists all of the Rules that are attached to this Output Field along with a count of Rule violations. Accuracy in this report depends on the user having first visited the Processes tab and then the Output tab, clicking the "Refresh Violation Counts" button on that tab. Failure to do so will result in inaccurate reporting of error counts.

Since a Row Process (i.e., Resolve Duplicate Process) cannot be attached to any Output Field, the information regarding this Process is added at the end of the report.



Input File (summary) information consists of:

- Provider information.
- Reporting Period information.
- Period-Type information.
- Input File information.
- For each Output Field of the Input File (a double-dashed line separates each entry):
  - Output Field ID – an internal Output Field identifier created by DIVA (not part of the SBDD schema).
  - Field Name – the name of the field as specified in the SBDD schema. The Field Name is what is shown in the "tool tip" when you hover the mouse over the Output Field in the Processes tab.
  - Display Name – the alias of the field as specified in the SBDD schema.
  - Field Type– the field's data type as specified in the SBDD schema but translated into a .NET data type.
  - Field Length– the field's length as specified in the SBDD schema if the Field Type is a string; otherwise, the field's length depends on the .NET data type.
  - Field Source – "SBDD" indicates that the field was specified in the SBDD schema; "DIVA" indicates that the field was added by the DIVA development team. Remember that all Output Fields derive from Template Output Fields and these are defined during the SBDD XML Import operation.

- For the Process connected to the Output Field (only one is possible):
  - Process ID – an internal Process identifier created by DIVA (not part of the SBDD schema).
  - Process Class – the type of the Process, e.g. "TranslationProcess" (not part of the SBDD schema).
  - Process Type – the type of the Process (not part of the SBDD schema). Only "Column" type Processes can be listed here.
  - Description– a short description of the Process (not part of the SBDD schema). The Description is what is shown in the "tool tip" when you hover the mouse over the Process in the Processes tab.
  - If the Process is a Constant Value Process:
    - Constant value set – the value that will be assigned to this Output Field for <u>every</u> record (not part of the SBDD schema).
    - Constant value type – the data type assigned to the value during user-configuration of the Process (not part of the SBDD schema).
    - Because this Process serves as a data source, no further "tracing" to find additional Processes is done.
  - If the Process is a Provider Value Process:
    - Provider attribute – the property (attribute) of the Provider (e.g., "ProviderType") whose value will be assigned to this Output Field (not part of the SBDD schema). This is set during user-configuration of the Process.
    - Provider value set – the value of the Provider's attribute that will be assigned to this Output Field for <u>every</u> record (not part of the SBDD schema).
    - Provider value type – the data type of the specified Provider attribute (not part of the SBDD schema).
    - Because this Process serves as a data source, no further "tracing" to find additional Processes is done.

- The data source(s) for each Process may be either a Process Field or an Input Field. If there are multiple sources, they will be listed consecutively (although they may be interspersed with Processes, etc., as the data flow is "traced" from Output Field back to Input Field)
- For each connected Process Field:
  - Process Field ID – an internal Process Field identifier created by DIVA (not part of the SBDD schema).
  - Field Name – the name of the field as assigned by DIVA (not part of the SBDD schema).
  - Display Name – the display name of the field as assigned by DIVA (not part of the SBDD schema). The Display Name is what is shown in the "tool tip" when you hover the mouse over the Process Field in the Processes tab.
  - Field Type– the field's data type (not part of the SBDD schema). Typically this is left blank.
  - Field Length– the field's length (not part of the SBDD schema). Typically this is left blank.
  - The Process connected to the Process Field (only one is possible) and any further elements as data flow are "traced" back to source(s).

- For each connected Input Field:
  - Input Field ID – an internal Input Field identifier created by DIVA (not part of the SBDD schema).
  - Field Name – the name of the field as assigned by DIVA (not part of the SBDD schema). This will be either "InpSeqNo" for the field that holds the sequential record number or a name of the form "Col_##" where"##" is a two digit integer starting at 0 (e.g., "00", "01", etc.). Field names are automatically assigned by DIVA during data loading depending on the position of columns in the user's data source file.
  - Display Name – the display name of the field as assigned by DIVA (not part of the SBDD schema). The Display Name is what is shown in all of the displays of Input Fields. It will be the same as the Field Name if no header record was specified during data loading <u>or</u> the value found in the header record for that field <u>or</u> a user-specified value (set in Input Data Analysis window or in the Input Fields list on the Processes tab).
  - Field Type– the field's data type (not part of the SBDD schema). This will always be string except for the "InpSeqNo" field, in which case it is Int32.
  - Field Length– the field's length (not part of the SBDD schema). This will always be 255 except for the "InpSeqNo" field, in which case it is 4.
  - Original Display Name – the display name of the field as originally assigned by DIVA (not part of the SBDD schema). The It will be the same as the Field Name if no header record was specified during data loading <u>or</u> the value found in the header record for that field in the header record.
  - An Input Field is a data source so tracing stops at this point (although there may be additional Input Fields to list, or previous "tracings" to complete).

- For each Rule attached to an Output Field (Rule listings are separated from the first part of the Output Field listing by a row of plus signs):
  - Rule ID – an internal Rule identifier created by DIVA (not part of the SBDD schema).
  - Rule Type – the type of Rule (not part of the SBDD schema). This will always be "Column" for all rules listed with an Output Field.

- Rule Description – the description shown in the Rules tab along with the Rule name (not part of the SBDD schema). The Description is what is shown in the "tool tip" when you hover the mouse over a Rule violation count in the Output tab.
- Rule Source– the source for the Rule. It will be "SBDD" if it was created as part of the SBDD XML Importoperation or "User" if it was assigned by the user on the Rules tab.
- Violation Count – the number of errors for (violations of) this Rule since the last "Refresh Violations Count" button click. A value of "-2" indicates that the Rule has not been configured (for user-assigned Rules); a value of "-1" indicates that there is no data to check (no data source attached to the Output Field).

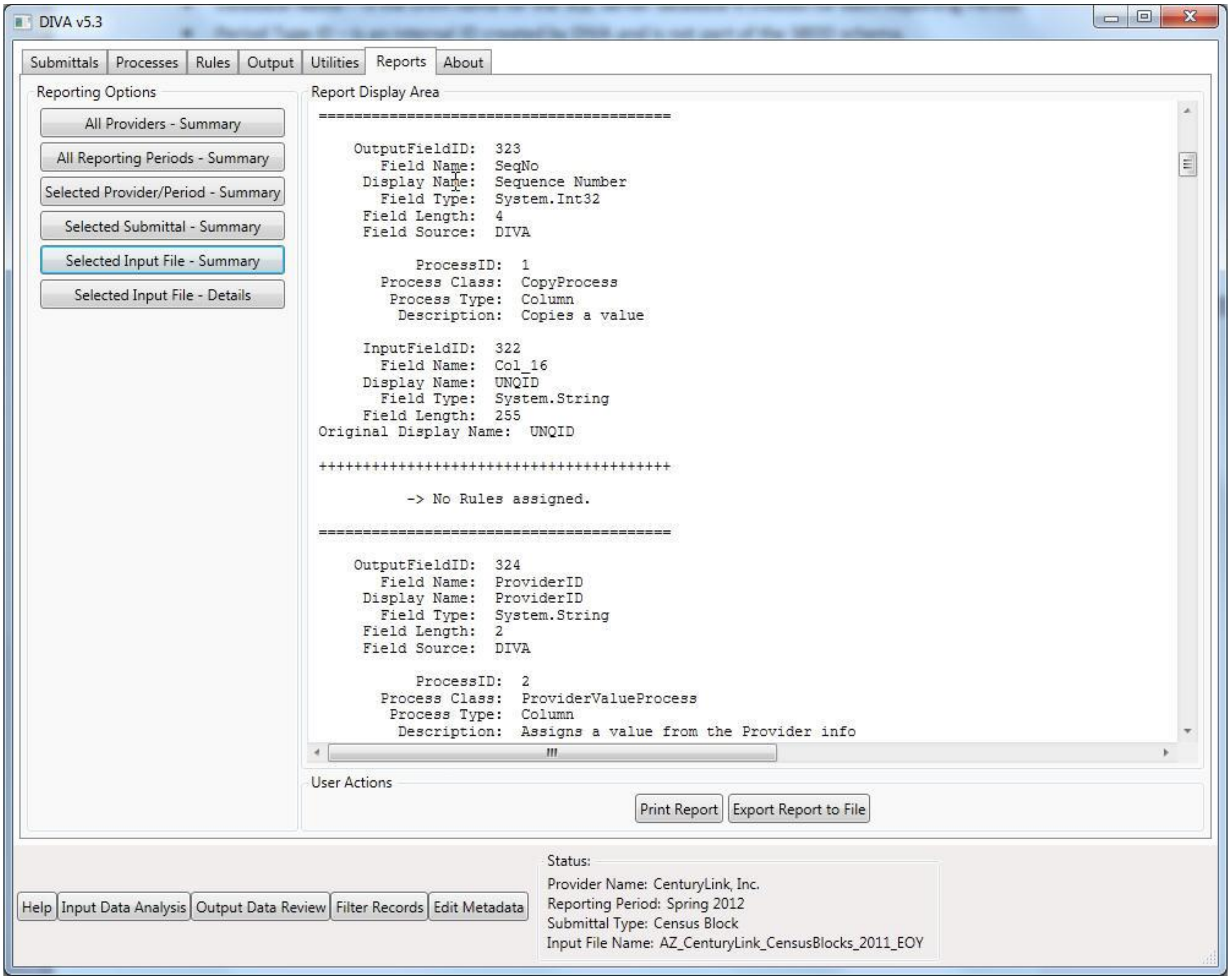
- The set of data listed after Output Field is repeated in the "details" version of this report. It will be referenced there as "Output Field information".

- The final entries after all Output Fields have been listed are the Row Processes associated with Row Rules. There is currently only one Row Rule ("MustNotHaveDuplicate"), so there is only one Row Process ("ResolveDuplicate") to list. This will only be present if this Rule has been assigned on the Rules tab to this Period-Type.
  - Process ID – an internal Process identifier created by DIVA (not part of the SBDD schema).
  - Process Class – the type of the Process, e.g. "ResolveDuplicateProcess" (not part of the SBDD schema).
  - Process Type – the type of the Process (not part of the SBDD schema). Only "Row" type Processes can be listed here.
  - Description– a short description of the Process (not part of the SBDD schema).
  - Decider Field #1 – the first Output Field used to determine if a duplicate exists.
  - Decider Field #1 – the second Output Field used to determine if a duplicate exists.
  - Repeated for each Output Field that is having its value resolved in the case of duplicates existing is a statement giving the name of the Output Field and how the resolution is to be made (currently either "Max value" or "Min value").

The set of data listed above is repeated in the "details" version of this report. It will be referenced there as "Resolve Duplicate information".

Reporting Option "Selected Input File – Details" (Reports tab, button)

Creates a summary listing of the active Input File for the active Submittal (button is inaccessible if no active Input File). It adds some additional detailed information to the "Input File – Summary" report discussed previously.



Input File (details) information consists of:

- Provider information.
- Reporting Period information.
- Period-Type information.
- Input File information.
- Output Field information augmented with (additional information is bracketed with single-dashed lines):
  - Translation values – under the Translation Process, if present, the detailed "From" and "To" values (user-assigned in the configuration dialog box) are listed.
  - Rule violations – under each Rule that has a violation count greater than 0 will be listed each violating record. This essentially is a listing of what appears in the "Error Record View" panel on the Output tab.
- Resolve Duplicate information.

Sample Workflow

DIVA is an event driven application meaning that the user can control in large part what action is performed and when; therefore, the workflow below is only one of many possible paths for processing a file. This workflow is grouped into actions that are non-Reporting-Period specific, and Period specific. Within the Period specific workflow are General Operations (generally performed once) and Provider Operations (performed one-to-many times for each Provider). This workflow assumes you have opened DIVA and are ready to begin processing for a new Reporting Period.

<u>Non-Reporting-Period Specific</u>

1. Import Provider Information – only if there have been changes since the last Reporting Period. It is important that the ProviderID never change from version to version of the Provider Information table.

2. Import DIVA Domains – only if you have a need to validate values in a field that is not already covered in one of the imported SBDD or DIVA domains. For example, you may want to check each Provider's County FIPS codes against a table of valid codes in your State.

<u>Reporting Period Specific – General Operations</u>

3. Maintain Reporting Periods – the only time this will be necessary is when the standard list of Reporting Periods is exhausted and you need to add another one to the end of the list.

4. Import the SBDD XML Files - this is how DIVA enforces the SBDD rules built into the domains in the SBDD database for each Reporting Period. THIS STEP MUST BE PERFORMED FOR EACH REPORTING PERIOD FOR WHICH DATA WILL BE PROCESSED. If you are not sure which Reporting Periods have been imported, you can use the "Manage Submittal Reporting Periods" function on the Utilities tab to see which ones have a value in the "Database" column. Note that DIVA will not let you import a given Reporting Period twice.

5. Assign/Modify/Delete Rules – the SBDD import function will automatically assign Rules to the Template Output Fields for a Period-Type which means there will already be SBDD-defined rules that will attach to every Output Field for every Submittal type you will process. You can assign your own Rules or even delete the imported SBDD rules. Be careful though. Once you delete a rule for a Period-Type it is deleted for every subsequent Provider for that the Period-Type. It also means any Provider you have processed prior to the delete was checked against that rule but any going forward will not be. This goes for adding new rules after one or more Providers have already been processed. You may want to avoid this inconsistency.

Reporting Period Specific – Provider Operations

6. Pre-process Provider Input Files – DIVA is designed to handle Input Files in a row –column structure and the user must verify and modify them to meet this criteria.

7. Import a Provider Input File –
    a. Select an Input File – browse to and select an Input File for loading.
    b. Preview the selected Input File. – you do this as the very first step to see what you have.
    c. Filter Records - as needed based on evaluation from the Input File preview.
    d. Load the selected Input File – loads data from Input File into an internal DIVA table.

8. Analyze the Loaded Data – use DIVA tools to better understand the data in the Input File and help you make choices for subsequent processing.

9. Define and Save Processes – apply transformation Processes to values from the Input Fields to values in the Output Fields. On the "Processes" tab
    a. Be sure to use a "Copy" Process to save the value of DIVA input field, "InpSeqNo" to DIVA Output field, "SeqNo". This will give you a way to tie Input and Output records together. In the case of shapefile processing, use "SeqNo" to capture a unique identifier from the Input file for later use in joining the clean DIVA text file back to the shape.
    b. Use "Provider Value" processes to populate the provider identification Output Fields. This will help ensure that the final NTIA deliverable is consistent with the official project view of provider identification. Do note in the metadata (later to be copied to the QA spreadsheet) if there is a discrepancy between the Provider-submitted values and the ones that result from the "Provider Value" process. You can quickly spot errors by comparing the values in the Input Field list with those that show up in the Output Field list after Processes are connected and applied.
    c. Be sure to "Apply" and "Save" your Processes regularly so you do not lose your work.
    d. Do not hesitate to use the "Input Data Analysis" button from the Status Bar any time you need to better understand values in Input Fields and therefore the correct process to apply to transform these values to Output Fields. For example:
        i. The Input Field "TransTech" may be displaying a valid NTIA code, "10" but you are not sure if every record in the Input File is a "10." Open the "Input Data Analysis" window and run a "Do Frequency" to see every unique value for "TransTech" in the Input File.
        ii. You are not sure if the Census Block identifier is unique or whether there are multiple records for some Census blocks. A "Do Frequency" will give you a "Count" field on which you can sort to see if there are any values greater than 1.
    e. If this set of processes seems generic enough to be applied to the same Submittal Type from subsequent Providers in this Reporting Period, then click the "Save as a Template" button.

10. Load, Evaluate and Modify the Rules – use the "Rules" tab to "Load", inspect and edit as needed the rules that will be applied to the current Submittal. In this sample workflow, we suggest you do this step early on; however, after working with the data through the establishment of Processes, you may gain insight into new Rules that should be applied.
    a. On the Rules tab, choose the "Reporting Period" and "Submittal Type" from the pull down menus that correspond to the active Submittal and click the "Load Rules" button.
    b. Evaluate the Currently Assigned Rules - double click on the topmost Output Field to expand each Output Field to reveal the Rules nested under each one. Double click on any Rule you wish to evaluate and/or edit; right-click and select "Delete" from the context menu to delete a Rule.
    c. Add a new Rule by dragging and dropping a Rule Type onto a field in the "Currently Assigned Rules" area and then configuring it appropriately.

11. Apply the Rules and Look for Errors – use the "Output" tab to see where Output Field values are not congruent with the Rules.
    a. Click the "Refresh Violation Counts" button – depending on the number of and type of Rules, and the number of records in the Input File, this may take 20 to 30 seconds or more to complete.
    b. Use the "Rules Violations and Counts" area to evaluate the result of applying Processes on the Output Fields - double-click the topmost Output Field in the "Rules Violations and Counts" area to reveal each Rule and the error count immediately to the right of each Rule.
    c. Evaluate the errors - click on each Rule that has an error count greater than zero. Details on the error will appear in the "Failed Record View" area.
    d. Based on your evaluation of errors, adjust the Filters, Export Options, or Processes and add, delete or modify Rules to eliminate or reduce the number of errors.

12. Use the Output Data Review Window – use the controls on this window to sort and filter errors and gain insight into why errors are occurring.
    a. Adjust the Filters, Export Options, or Processes and add, delete or modify Rules to eliminate or reduce the number of errors.
    b. Export the Data – to a delimited text file format. From here you can process the data onto the GIS layers for creation of the NITA submittals.

13. Create/Edit Metadata – click on the "Edit Metadata" button in the "Status Bar" area at any time to make notes about Reporting Periods, Providers, Provider Types, and more. This data can be output to reports and used to help fill in the QA Sheets used for each Provider

14. Generate Reports – click on a report type button to display various levels of detail for the current Reporting Period, Provider, Submittal Type, etc. Information from these reports, including metadata the user has captured using the "Edit Metadata" button, can be cut and pasted into the Provider QA worksheet.

Notes on Desired Functionality and Bugs

As with any software project, not all design targets were fully achieved or met in the way we anticipated. In addition, the process of developing DIVA gave us some good ideas for functionality that was not in the original project scope or budget. Fortunately, DIVA provides a framework on which additional functionality can be added. The source code is available to the BB community and is well-documented.

Things that don't and won't work:

- Compatibility with 32-bit OS: The specification in the original User Needs was that DIVA run in a 32-bit Windows operating system (Win 7 or XP). However, very large source files (1 million records or so) cannot be processed as DIVA does all data processing in memory (for speed) and 32-bit versions of the OS run out of addressable memory space.

Some ideas for additional functionality:

- Add a "drill-down" capability to the Output Data Review Window so that a user can see all of the errors affecting a record. The Output tab shows the errors one Rule at a time, making it difficult to see that one record may be violating multiple rules.
- Add some "intelligence" to the Process Mapping canvas so that graphics gracefully respond to re-sizing the DIVA GUI, adjusting their layout in a "proportional" manner.
- Right-click, copy and paste a process in the Process Mapping Canvas, rather than having to drag a new process from the Process Palette each time.
- More fully develop the "Full address decomposition" Process. This was not included in the current version due to budget priorities. And Arizona does not submit address data to NTIA per the original NDA's signed with each Provider.
- Modify the Object Data Model (ODM) so that Providers are treated like Submittal Types. By that we mean create a Period-Provider entity so that the "state" of each Provider for each Reporting Period could be retained. This would prevent some problems with users changing Provider ID values between Reporting Periods and allow us to track the history of Provider information changes.
- Sort columns as numbers, rather than text. You will notice that when you sort columns in any of the Preview or Analysis windows, the values sort as text. This is because DIVA treats <u>all data</u> as strings. Rules that check if data is an integer type, for example, do this <u>without</u> changing the data from a string.

No non-trivial programs are ever error free. We have done extensive testing of DIVA, but no doubt bugs remain. Please inform us of any that you might encounter.

Please share code enhancements with us and the DIVA community.

Glossary

active – the currently selected attributes: Provider, Reporting Period, Submittal Type, Submittal and / or Input File. An existing Submittal is made active by clicking on it in the “Existing Submittals” list in the Submittals tab (this list is the table on the bottom panel of the Submittals tab); this Submittal will then be highlighted in that list. Activating a Submittal will synchronize the drop-down lists in the upper panel of the Submittals tab with this selection; thus the active Provider, Reporting Period and Submittal Type will be shown. The first Input File of the Submittal will become active; the Input File drop-down list will be synchronized to show that Input File. Making any choice in the upper panel active (selecting a Provider, Reporting Period and / or Submittal Type) will activate the matching Submittal if it exists. If it does not exist, then a new Submittal may be created for it once an Input File is selected. Creating the Submittal (with the “New” button), will create it and make that Submittal active. If a Submittal has more than one Input File associated with it, a different Input File may be made active (using the Input File drop-down list) without changing the active status of any of the other attributes. Thus “active” is synonymous with “selected”.

Column (or Data Column) – a particular reported, or added, attribute of a data set when viewed as a data Table. The definition of the data values in this column remains constant throughout the Table, although the actual values vary by the Record or Row.

Column Process – a Process that is applied to all values in a particular data column (data source Field). All Processes that are manipulated on the Process Mapping Canvas are Column Processes.

Column Rule – a Rule that applies to all values in a particular data table column, that is, to an Output Field in all rows of the data table. Column Rule violations are corrected by adjusting Processes (creating, linking, configuration, removing) on the Process Tab.

Data Set – a file containing Provider-specific information, submitted to the State during a Reporting Period. Typically, this data set will be a text file, a spreadsheet file, or an ESRI Shapefile. DIVA requires that data sets be in a table-oriented format and handles only specific types of delimited text formats, Excel spreadsheets (in either .xls or .xlsx formats), or DBF formatted data tables. Provider submittals that do not meet formatting requirements require some pre-processing; see Appendix B for details.

Data Sink – a Field that serves as a target for the output of a Process. All Output Fields serve as data sinks. Process Fields that connect Processes may not serve as a data sink since, by definition, they are allowed only one connecting line (one connection leading in) and that line is already assigned by the creation of a Process Field from an Input Process Field and an Output Process Field.

Data Source – a Field that serves as the source of data (input) for a Process. All Input Fields serve as data sources. Process Fields that connect Processes also serve as data sources for the Processes they feed into.

Data Validation – the process of checking a data value against another data value. Validation implies that knowledge outside of that data value is needed, that is, that another data source is involved. For example, checking a data value against a Domain of allowed values is a form of data validation.

Data Verification – the process of checking a data value without using another data value. Verification implies that knowledge outside of the checked data value is not needed, that is, that what needs checking is intrinsic to the data value itself. For example, checking that a data value is of a particular type (e.g., an integer value) does not require checking another data value and is thus a form of data verification.

Default Value – a value for an Output Field that will be entered if a Provider fails to report (specify) a value. Default values are specified in the SBDD Geodatabase.

DIVA Domain – a domain imported by the DIVA user which is not part of the SBDD database domains. An example of a DIVA Domain might be a list of valid Census Block ID's. This is not specified in the SBDD data model, but is useful for validating a Provider's list of Census Blocks. Users import DIVA Domains from the "Utilities" tab.

Keyed Domain – a domain whose scope is determined by the value in a key field. In the latest SBDD model, the speed fields are in a domain keyed off of the value contained in the Technology of Transmission field. This means that each Technology Type will have its own range of permissible speed values.

Domain – a set of values that are used to validate data.

Field – an entity that can contain provider reported data. A Field is always of some particular type: Input Field, Template Output Field, Output Field, Process Field, Input Process Field or Output Process Field.

Input Field – a data source for DIVA processing. The Input Fields for a particular Input File are created, and their values populated, based on the data fields (or "columns") in a Provider's submitted data set (the Input File).

Input File – the internal DIVA equivalent of a Provider-submitted Data Set. An Input File, once associated with a Submittal, still needs to be "loaded", that is, have the data set's data values transferred into the internal storage database table that will be used for all processing. The actual Provider's data set is never altered by DIVA.

Input Process Field – an "unconnected" Data Source Field for a Process. These will show up as one or more orange half circles with the arc facing left on the left side of a Process when it is dragged onto the Process Canvas. Not all Processes will have an Input Process Field(s).

Output Field – a target field (Data Sink) for DIVA processing. The Output Fields are either specified by the SBDD geodatabase for a given Reporting Period or added by DIVA designers to hold information that may not be part of a final SBDD feature class. This additional, non-SBDD information was deemed critical by the DIVA designers to post-DIVA GIS processing. Output Fields have their data values populated by transforming Input Field values using the Processes that a DIVA users specifies.

Output Process Field – an "unconnected" data sink Field for a Process. These will show up as one or more orange half circles with the arc facing right on the right side of a Process when it is dragged onto the Process Canvas. All Processes will have an Output Process Field(s).

Period-Type – a composite of the Reporting Period and Submittal Type. Because the reporting requirements for a particular Submittal Type may change each Reporting Period, this composite allows us to attach those specific requirements (attributes) to this particular Reporting Period / Submittal Type combination.

Process – an operation in DIVA that transforms data from an Input Field to an Output Field. DIVA has eight Processes that a user can apply to data. These are "Constant Value", "Provider Value", "Copy", "Copy with Default", "Make Negative", "Translation", "Composition", and "Decomposition". Each of these Processes is explained in detail in the "Functional Detail" section of this documentation.

Process Field – an intermediate data "storage" that DIVA uses to link (couple) Processes together when the connection is not directly to an Input or Output Field.

Processing Set – a collection of Processes defined for a particular Submittal. Processes are defined on the Processes tab of the DIVA GUI. A Processing Set is specific to a Provider, Reporting Period, Submittal Type and an Input File

Provider – a Broadband services Provider as defined by the NTIA. These may be primary providers or resellers.

Record (or Data Record) – see Row.

Reporting Period – an NTIA established reporting period for submittal of State broadband data. There are two reporting periods per year, Fall (October 1st) and Spring (April 1st). In DIVA, there is a 6-month window assigned to each of these periods. The Fall reporting period spans July 1 to December 31 while the Spring period runs from January 1 to June 31. Only the Reporting Period that has a date range matching the current system date will be considered The "Reporting Period" pull down list can be modified using the "Manage Submittal Reporting Periods" function found on the "Utilities" tab.

Row (or Data Row) – a particular instance of all reported, or added, attribute values of a data set when viewed as a data Table. The definition of the data values in this Row is set by the definition of the Columns of the Table. Each Row corresponds with a single observation of the values for the defined Columns and the order that the values have in the Row corresponds with the order of the defined Columns. A (Data) Record is synonymous with a (Data) Row.

Row Process – a Process that is applied to certain user-assigned Output Field values on particular data rows. The nature of the Row Process defines how particular data row groups are obtained, and the user-assigned Output Fields have their values determined from that particular data row group. There is, at present, only one Row Rule in DIVA ("Must Not Have Duplicate").

Row Rule – a Rule that applies to values in more than one column (Output Fields) across two or more rows of the table. Row Rule violations are corrected by configuring a specific Process (which is not user-creatable; it is created automatically by the existence of the Row Rule) on the Process Tab.

Rule – a Rule expresses a criterion that an Output Field's values must meet in order not to be flagged as an error (a Rule violation). DIVA has 10 pre-defined Rules that are classified according to their data Verification or Validation type, and their Column or Row type. These rules, in alphabetical order, are:

- MustBeInDivaDomain: Validation, Column.
- MustBeInDomain: Validation, Column.
- MustBeInKeyedDomain: Validation, Column.
- MustBeOfType: Verification, Column.
- MustHaveData: Verification, Column.
- MustNotHaveDuplicate: Validation, Row.
- NotGreaterThanField: Validation, Column.
- NotGreaterThanValue: Validation, Column.
- NotLessThanValue: Validation, Column.
- NotLongerThan: Verification, Column.

Rules are automatically created during the SBDD XML Importoperation for a given Reporting Period (for all Submittal Types of that Period). These Rules can be reviewed and modified (or removed), and additional Rules assigned by users (from the “Rules Palette”) on the “Rules Tab”.

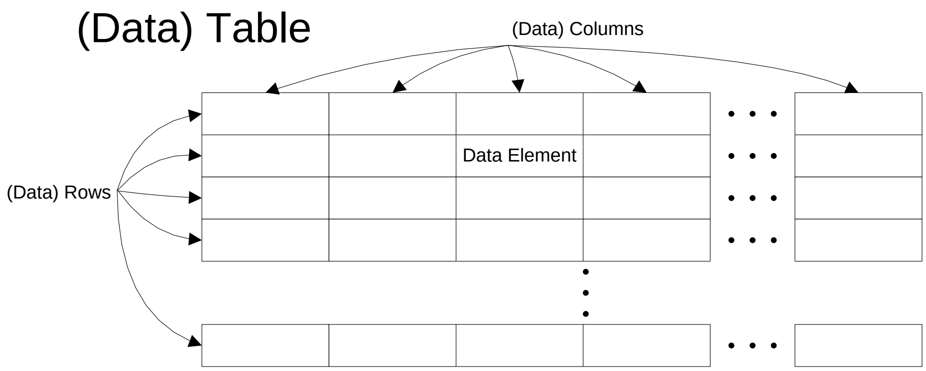
Rule Set – the collection of Rules that has currently exists for the Template Output Fields of a particular Period-Type, and thus for all Output Fields for all Input Files for Submittals of that Period-Type.

SBDD ArcGIS File Geodatabase – referred to, for short, as the SBDD Geodatabase, this is the format in which NTIA reporting requirements for a Reporting Period are defined.

Submittal – the Input File(s), Processes, Rules and other data and metadata that pertains to a specific Submittal Type for a specific Provider for a given Reporting Period.

Submittal Type – an NTIA defined database schema for submitting Provider broadband data to the federal government. As of Spring 2012, there are eight defined ESRI feature classes (“Service Address”, “Census Blocks”, “Road Segment”, “Last Mile”, “Middle Mile”, “Wireless Services”, “Service Overview” and “Community Anchor Institutions”.

Table (or Data Table) – a way of regularly arranging a collection of data elements, where each type of data (attribute), irrespective of instance, is a Column and each instance of all Columns is a Row. Spreadsheets provide a familiar way of creating a Table (but only if all cells in a column are of the same type). Databases are composed of groups of Tables. The number of Columns in the Table is fixed by the specification of the attributes that are included. The number of Rows in the Table varies depending on the number of instances (Records or observations) of data that the Table contains. An Input File must always be equivalent to a Data Table no matter what its file format may be.



Template Output Field – a specific attribute, either reported or added, for a Period-Type, which is the basis for creation of an Output Field for an Input File of a Submittal. Since all Submittals for a particular Period-Type have identical reporting requirements, it makes sense to specify these requirements once for each Period-Type. Then, when a particular Submittal is created (or, more specifically, the Input File for a Submittal is created), then the specific Output Fields for this Input File are created from the Template Output Fields. This allows for efficiency in data storage and processing, particularly with regard to Rules.

Template Processing Set – a Processing Set that is saved to act as a Template for a given Period-Type (Reporting Period / Submittal Type). A Template Processing Set is applied (if the check box on the Submittal's tab is checked) when the Processes tab is first visited after loading an Input File's data. If any Processes have been created for an Input File, then the Template Processing Set will be ignored. There can only be one Template Processing Set for each Period-Type. It is created from the Processes tab by saving the current (displayed) Processes and Process Fields (the Processing Set) as a Template; if a Template already existed, it will be replaced. Application of a Template Processing Set will result in a Processing Set that is exactly like the one that was saved (as the basis for the Template) except all Input Fields will be uncoupled (disconnected) and appropriate Input Process Fields will be substituted in their place. All Output Fields, however, will still be coupled. Any Provider Value Processes will be automatically updated to use the attribute values for the active Provider. Thus, the user simply needs to connect the Input Process Fields to this Input File's Input Fields, click "Apply" and "Save", and they're ready to proceed.

Appendix A: User Needs Analysis

DIVA development began with a list of user needs from which the functionality of DIVA was designed and implemented. It should be noted that this project was scoped in July 2010 based on the type and amount of Provider data the development team had seen to that point. As with any software development project, needs have changed somewhat over time. We have done our best to add features to DIVA that respond to insights we gained in subsequent submittals. Following is the original list of requirements.

Functional Area	Req. Number	Requirement
01 - General	1.10	The application should be designed and developed to **install** and run in Windows XP or Windows 7 (32 or 64 bit).
01 - General	1.20	The application should minimize or eliminate the need for third-party proprietary software that needs to be present on client workstations.
01 - General	1.30	The application should be updateable and configurable by non-programmers.
01 - General	1.40	The application should provide a means to store and recall configuration options for re-use with future input files.
01-General	1.50	The application should provide a means to configure field-specific rules, transformations or other processes that must be performed on each field in the Provider submittal to standardize the output to NTIA specifications.
01 - General	1.60	The application should record and report the results of major data translation and verification/validation operations in a metadata file that would be rendered as a report to the user.
01 - General	1.70	The application should allow the user to select from a set of pre-defined report templates and output formats that define the output of reports.
02 - Data Intake	2.10	The application should be capable of processing all NTIA-acceptable Provider submittal types, including address, road segments, census blocks, service areas and middle/last mile point datasets.
02 - Data Intake	2.20	The application should be able to read and process Excel, delimited text, shapefiles and KML format submittal files from Providers.

Functional Area	Req. Number	Requirement
02 - Data Intake	2.30	The application will be written to assume that input files contain data in a flat-file table schema regardless of the submittal's file type.
02 - Data Intake	2.40	The application should allow users to assign field names to the columns present in Provider submittals that do not contain header rows.
02 - Data Intake	2.50	The application should allow users to "map" the columns found in the Provider files to equivalent SBDD target fields in the SBDD geodatabase schema.
02 - Data Intake	2.60	The application should allow users to identify and document any non-SBDD standard fields for retention in the application's internal database.
02 - Data Intake	2.70	The application should [allow user to capture and] report metadata information which summarizes major items discovered during the initial intake of Provider files.
03- Data Validation	3.10	The application should be capable of "decomposing" a data column value into other data column values (e.g., parse an address into address elements) or "composing" a data column value from other data columns (e.g., assemble a geocodable address).
03- Data Validation	3.20	The application should check for consistency of the Provider Name, DBA Name and FRN in each record.
03- Data Validation	3.30	The application should check the validity and consistency of address information
03- Data Validation	3.40	The application should check the validity and consistency of City and Zipcode information
03- Data Validation	3.50	The application should check the validity and consistency of Census Block identifiers for both Census 2000 and Census 2010. blocks, including the proper area (<= 2 square miles; > 2 square miles)
03- Data Validation	3.60	The application should determine the format that the Min and Max address information has been submitted and standardize the informaiton to report out as AddMin and AddMax fields.

Functional Area	Req. Number	Requirement
03- Data Validation	3.70	The application should check for consistency in how the Speed, Technology and Spectrum Values are coded in a Provider submission.
03- Data Validation	3.80	The application should check for unique records across LocationID, EndUserCat, Spectrum and/or TechID fields
04 - Data Output	4.10	The application should be configurable to adjust to changes in the target NTIA geodatabase.
04 - Data Output	4.20	If the application encounters multiple records for the same technology type and user ID, the application should flag the records that represent the highest maximum download speed.
04 - Data Output	4.30	After processing the Provider input file, the application should output the processed data in a format that can be readily geocoded or joined to the latest NSGIC geodatabase.

Appendix B: Guidelines for Pre-processing Provider Data

Data submitted from Providers will occasionally be in a form or format that DIVA cannot process. For example, information may be broken up into multiple tabs by zip code. Or attribute information, such as Technology Type may be contained in the title of a table and not in the body of the data; or rows of data may be broken by labels indicating an attribute that applies only to the subsequent records. This type of data submittal must be placed into a consistent row-column format in order for DIVA to process it.

Processing Text Files

Open the text file in a text editor or other software that can read and write and ASCII delimited text file. Examine its structure and content. Ensure a clean row, column format and consistent delimiters on each row. Edit the file, as needed, to put the text in a regular format. Using a text editor that can show "hidden" characters, such as tabs and line feeds, is helpful. Notepad++ is one such editor; it is open source and freely downloadable from the Internet.

A user may also import the text file into Excel, Access or another database tool and clean the data there. The file must be saved (exported) in a format that DIVA can process (text, dbf or Excel)

Processing Excel Files

Open the Excel file and examine its structure and content. All data must be on a single tab, in a clean row and column format. At times, this may mean adding a column(s) and moving data from a table title (e.g. Technology Type Asymmetric DSL) into each record of the table (e.g. add a "TechID" column and calculate it to the SBDD value of 10). Save the Excel file in XLS or XLSX formats. Note: DVIA will do translation of values and you may want to wait to convert a textual description of an attribute (e.g. "Asymmetric DSL") to a value ("10") until you process in DIVA, as that conversion step will be preserved as part of the processing record.

Processing DBF Files

Open the DBF file in software that can read a DBF. Newer versions of Excel no longer read and write DBF files, but Access does. Examine its structure and content. All data must be on a single tab, in a clean row and column format.

Processing Shapefiles

DIVA does not read shapefiles, per se, but only the attributes stored in the DBF file. It is very easy to corrupt a shapefile by editing its DBF file separately. Therefore, we recommend that (1) you work on a copy of the DBF file and (2) add and unique identifier to the DBF file for later use in joining back to the original shapefile DBF.

To process the DBF's from shapefiles, do the following:

- First make a copy of the shapefile, then add and calculate a UNQID field = ObjectID field of the shapefile.
- Use the copied shapefile's DBF file as the DIVA Input File for the Submittal.
- On the Processes tab in DIVA, copy the UNQID Input Field to the InpSeqNo Output Field (using the Copy Process).
- After processing and exporting to a text file, use the InpSeqNo as a join field back to the UNQID field.

Processing MapInfo Files

Convert the MapInfo files into shapefiles using a freeware convertor. See the above "Processing Shapefiles" for further processing guidelines.

Processing Access Files

Open the Access file and export to a DBF, text or Excel format. Since Access files have to be structured as a database, there should be no other action required.

Appendix C: Object Data Model

A key architectural decision early in the DIVA development process was to use object-relational mapping (ORM) to persist DIVA programming objects. Microsoft's Entity Framework v4.1 (EF) was chosen based primarily on earlier decisions to do code-development using the .NET C# language and the Windows Presentation Foundation (WPF) for the GUI creation. Our "prototype-driven" development cycle made it easy to settle on the "Model-First" approach to using EF. The DIVA Object Data Model (ODM) is simply our class diagram done in EF format.

The version of the ODM for DIVA v1.0 is shown in Figure C-1 below. The following is offered as a short description in how to "read" the diagram. Refer also to the simpler version of this diagram, Figure 1, as you read this explanation.

DIVA entities (objects) are shown as "boxes". The name of the entity (e.g., Provider) is shown at the top of the box. Each entity (e.g., Provider) implies a collection of all such entities (e.g., Providers); the collection name is the same as the data table storing ("persisting") the attribute values with one row in the data table corresponding to one entity. The attributes, or properties, of each object are listed below the name. Note that there will always be at least one attribute, the ID attribute, for each entity. Below the properties are listed "navigational properties"; these are essentially the names of the other entities that are directly related to this object.

Relationships between entities are shown as dashed lines connecting the entities. The "multiplicity" of a relationship is shown by the number next to each end of the relationship "lines"; it is also implied by name assigned to the navigational property (e.g., InputFile has a navigational property named Submittal implying that it can only be related to one Submittal, while the Submittal has a navigational property named InputFiles implying that it can be related to more than one InputFile). Note that a "*" means "many" which means any number (including zero).

The Provider, Reporting Period and Submittal Type entities are "primary" in the sense that they do not depend on other entities (they are the "independent" dimensions of the Submittal "space"). Start with these primary entities when examining the ODM.

The ProviderPeriod entity is an association object linking Provider and Reporting Period. It exists to "host" the Notes attribute. The "multiplicity" shows that there can only be one ProviderPeriod entity at most for every Provider / Reporting Period combination (however, we do not have to have one if not needed to store the

Notes attribute). The "*" on the line next to the Provider means, for example, that a Provider might have many ProviderPeriods associated with it, but there can be only one for each Period (as shown by the other relationship line).

Similarly, the PeriodType entity is an association object linking ReportingPeriod and SubmittalType. It is needed to allow the definition of a SubmittalType (in terms of TemplateOutputFields, etc.) from one Reporting Period to another. The "multiplicity" shows that there can only be one PeriodType entity for every Reporting Period / Submittal Type combination (again, we do not have to have one if that Period / Type combination is not allowed).

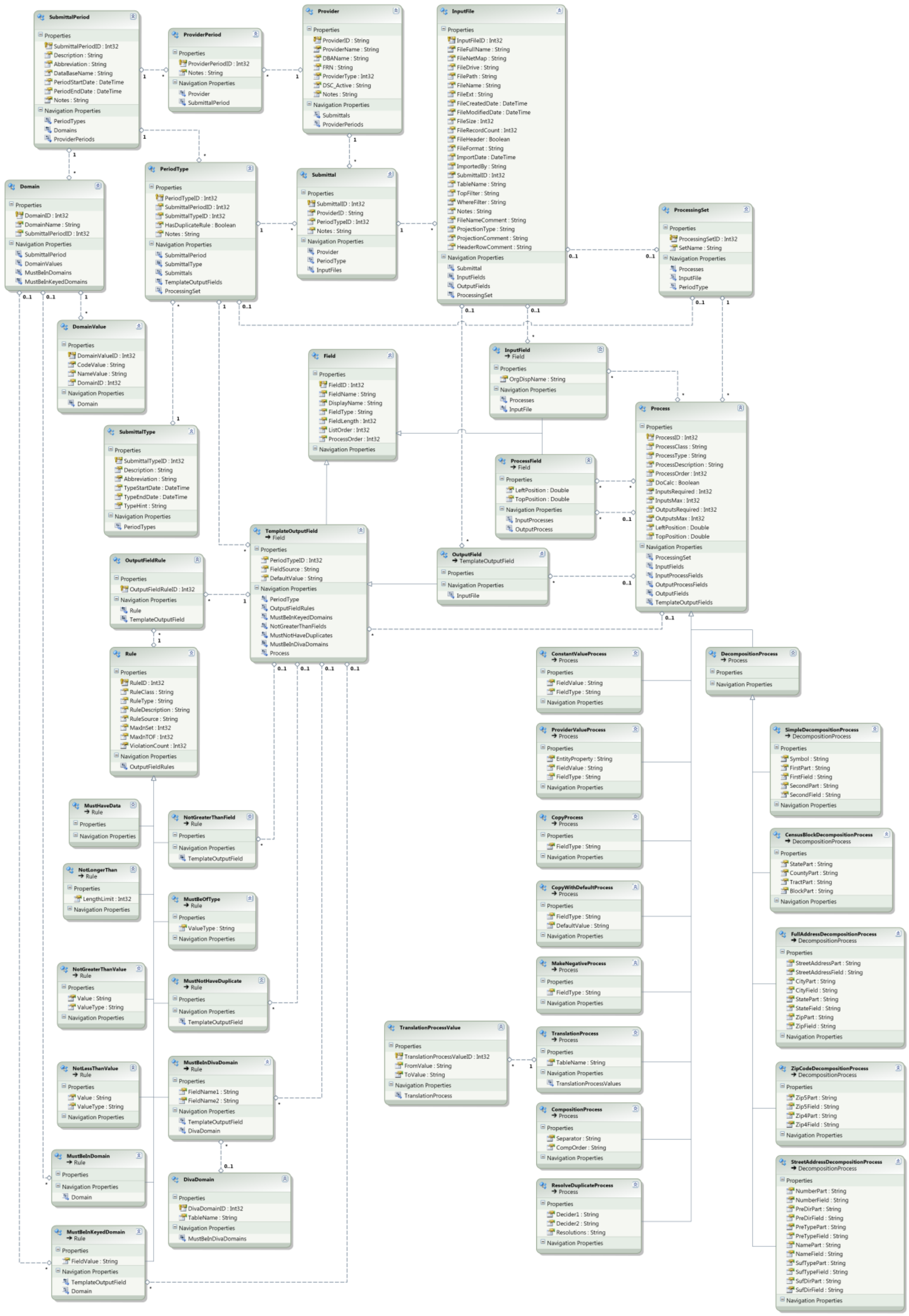


Figure C-1. DIVA v1.0 Object Data Model (ODM)

The TemplateOutputFields are related to the Period-Types; each may belong to only one Period-Type. As explained in the User Manual, these are created, along with the associated Period-Type, during the SBDD XML Importoperation.

There is a many-to-many relationship between Rule and TemplateOutputField entities. This is handled explicitly by creating an association entity called OutputFieldRule between them. There can only be one such OutputFieldRule for every Rule TemplateOutputField combination. This does not, however, prevent us from assigning more than one Rule of a particular type to a TemplateOutputField! We simply have to create a new OutputFieldRule to carry that association. Rules and OutputFieldRules are created, again, by the SBDD XML Importoperation; the user may add additional Rules to TemplateOutputFields on the DIVA Rules tab (an OutputFieldRule entity is automatically created by DIVA each time this is done).

The Submittal entity may only have one Provider and one PeriodType associated with it. The Submittal properties show another possibility. While we have the Provider as a navigational property, we also have the related ProviderID as an attribute of the Submittal. This is done merely for convenience in how we write code to “grab” related entities; we could simply use the navigational property if we wished.

The InputFile entity may only belong to one Submittal (the one on the relationship line next to the Submittal), but each Submittal may have many InputFiles (the “*” on the relationship line next to the InputFile). The ODM makes clear the large number of attributes that DIVA tracks regarding a Provider’s data set.

An InputFile has a ProcessingSet and a collection of InputFields and OutputFields associated with it. These are all created during data loading. Initially the ProcessingSet will be empty, but we will add to it Processes and their associated ProcessFields (if any) as they are created. The InputFields are DIVA’s way of getting a hold of the Provider’s actual data (which sits in another data table, not shown in the ODM). The OutputFields derive from the TemplateOutputFields. Because the Submittal is related to only one Period-Type, it has only those TemplateOutputFields to use in creating its OutputFields, and one OutputField is created for each TemplateOutputField.

In examining the ODM, you will see that there are no “multiplicity” numbers next to some of the lines coming into the TemplateOutputField, InputField and OutputField entities. Instead, there is a line that has a “triangle” on one end of it. These all lead, ultimately, to a Field entity. This is how EF handles “subtyping” objects. The Field entity is actually an “abstract” object; that is, we cannot create a Field object per se. An InputField is a *type-of* Field. A TemplateOutputField is a *type-of* Field. An OutputField, however, is a *type-of* TemplateOutputField. What this means is that an InputField, for example, not only has the properties and navigational properties shown in its box<u>, it also has the properties and navigational properties shown in the box of which it is a type</u> (the Field entity’s box). This allows for efficient storage of commonly shared attributes in the data tables that are used to save (“persist”) these entity attribute values.

A Process is related to a ProcessingSet. It is also, possibly, related to an InputField and / or an OutputField. The multiplicity values make clear that a Process may be related (connected to) more than one InputField, but only one OutputField. A Process may also be related to a ProcessField and this is shown with two relationship lines. One of these lines represents the InputProcessFields navigational property, the other the OutputProcessFields navigational property. It is this set of relationships that allows us to model the connections shown on the Processes tab that are created as we “link” Processes with InputFields and OutputFields, or other Processes through ProcessFields.

A Process is also an “abstract” object; we do not create a Process per se, but a particular *type-of* Process. The various Process entities are shown on the lines that descend from the Process entity. Note that the DecompositionProcess itself is an abstract Process and that we can only make the particular *type-of* DecompositionProcesses that are shown.

Similarly, a Rule is an “abstract” object; we can only make the *type-of* Rules that are shown. So the line leading out of Rules has a triangle on its end.

This takes us through the bulk of the diagram. A few items remain.

Note that the ProcessingSet has two lines leading out of it, each with “0..1” on both ends. This means zero or one related entities. One line leads to the InputFile entity; if this relation is “1” then the ProcessingSet belongs to the InputFile (it is a regular ProcessingSet) and the other relation line will be a “0”. The other line leads to the PeriodType entity; if this relation is “1” then the ProcessingSet belongs to the Period-Type (it is a TemplateProcessingSet) and the other relation line will be a “0”. That is, it has to be one or the other; it cannot be both. And there is no fundamental difference between these two. Note that the Process entity has similar lines leading to OutputField and TemplateOutputField, respectively. Again, a regular ProcessingSet will only have relations going to OutputFields, while a TemplateProcessingSet will only have relations going to TemplateOutputFields.

The Domain entity is attached to the ReportingPeriod entity. Thus, these are specific to a Reporting Period and the same Domains will be used for all Period-Types that are related to that Period (and, thus, all Submittals, Rules through TemplateOutputFields, etc.). The DomainValue entity is related to the Domain that it belongs to; each Domain may have any number of values but a DomainValue may only belong to one Domain.

The TranslationProcessValue is attached to the TranslationProcess. Each TranslationProcess may have many TranslationProcessValues, but each TranslationProcessValue may only belong to one TranslationProcess. This is where the From / To value pairs are stored for this Process.

Finally, the DivaDomain entity is attached to the MustBeInDivaDomain *type-of* Rule entity. The DivaDomain entity does not store its values in another entity (like the Domain does). Instead, it points to a data table that is stored in the DIVA database. The DivaDomain is not specific to a particular Reporting Period and can be used for all Periods if desirable.

Appendix D: Changes DIVA Makes in SQL Server

When DIVA is initially installed, a database named "DIVA" will be created. This database is used to "persist" (save) the state of all DIVA entities (objects). It is managed by Entity Frameworks v4.1 and not by explicit DIVA code. Because of this, you should think carefully before attempting to make any manual changes to DIVA's data tables and <u>never</u> do so without making a backup beforehand.

When an SBDD geodatabase XML file is imported, a new database will be created specific to that Reporting Period. These Period-specific names follow the pattern "Diva_PData_X##" where "X" is either "F" or "S" (Fall or Spring, respectively) and "##" is the two digit year.

When data is loaded into DIVA's internal storage, it will be placed in the database appropriate to the Reporting Period and will be given a name that matches the Processing Set's name. This name has the format "PP_RRR_SS_#" where "PP" is the two character ProviderID attribute value, "RRR" is the Reporting Period's Abbreviation attribute value, "SS" is the Submittal Type's Abbreviation attribute value and "#" is the integer value of the Input File's internal identifier. This name is guaranteed to always be unique.

The DIVA database can be backed up at any time. Usually, this would be done at the end of a Reporting Period before the start of the next Period's data processing. Restoring the database would thus return DIVA to the state it was in "between" these periods. Because the DIVA database is "uncoupled" from the Period-specific databases, no adjustment would be needed if restoration is done from such backups. Just delete the Period-specific database and re-import the SBDD geodatabase XML file.

Backing up and restoring DIVA during a Period is more complicated in that you need to ensure that only those data tables that should be in the Period-specific database are actually in it. This can be done by backing up the current Period's database at the same time that DIVA is backed up, and then restore it in synchronization with DIVA restorations.

The Period-specific databases themselves can be backed-up and then removed from SQL Server after a Period is closed and you have no further need of them (e.g., for reporting). They can be restored, if needed, for access to previous Periods.

The DIVA database grows in a fairly "linear" fashion (for each Reporting Period and Submittal added) and should remain relatively small over time. However, the Period-specific databases could be quite large depending on the size and volume of Provider-submitted data sets. In our experience, they tend to be quite a bit larger than the amount of data added to DIVA during the Reporting Period. The fact that they are "uncoupled" from DIVA greatly eases the "data management" problem.

Note that data tables loaded as DivaDomains are stored in the DIVA database, not a Reporting Period-specific database.