



DATA DEVELOPMENT & VALIDATION METHODOLOGIES WHITE PAPER

Commonwealth of Pennsylvania State Broadband Initiative (SBI) Broadband Mapping Project

**NTIA Data Submittal
April 1, 2013**

Baker

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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 an internet service provider (ISP) fits the definition of a broadband provider as per the NOFA, the following is a summary of our findings:

288 Total Investigated ISPs

114 Total Confirmed Broadband Service Providers (unique Provider/DBAs combinations)

94 Broadband Service Providers who Supplied Data (unique Provider/DBAs combinations)

26 Total Confirmed Broadband Service Resellers

4 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 outreach form has been developed to secure the proper information and to minimize the resource commitment required by the reseller.

| BROADBAND SERVICE PROVIDER INFORMATION | |
|--|---|
| <i>***Please fill out one form per DBA and / or Technology of Transmission***</i> | |
| Provider Name: | |
| Doing Business As (DBA) Name (if applicable): | |
| FCC Registration Number (FRN) (if applicable): | |
| Website Address: | |
| Do you own transmission equipment, including middle mile, for your service area or for any part? (Termed 'Broadband Primary Provider' in FAQ's) | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| If you answered Yes, please indicate this coverage area by county, municipality, or zip code and a map will be provided for you to further define your coverage area. | |
| If you answered No, please indicate the Carriers you contract with to provide your company's broadband coverage. (Termed 'Broadband Reseller' in FAQ's) | |
| Do you resell broadband services for the entire area of each carrier above? | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| If No, then please indicate your reseller coverage area(s) by county, municipality, or zip codes and a map will be provided for you to further define your reseller coverage area: | |
| Technology of Transmission: (one per form) | |
| <input type="checkbox"/> Asymmetric xDSL (ADSL) | <input type="checkbox"/> Symmetric xDSL (SDSL) |
| <input type="checkbox"/> Cable Modem - DOCSIS 3.0 | <input type="checkbox"/> Other Copper Wireline |
| <input type="checkbox"/> Cable Modem - Other | <input type="checkbox"/> Optical Carrier / Fiber to the End User |
| <input type="checkbox"/> Terrestrial Fixed Wireless - Unlicensed | <input type="checkbox"/> Terrestrial Fixed Wireless - Licensed |
| <input type="checkbox"/> Terrestrial Mobile Wireless | <input type="checkbox"/> Electric Power Line |
| <input type="checkbox"/> Satellite | <input type="checkbox"/> Other |
| Speed Tiers: What is the Maximum Broadband advertised speed ? | |
| Maximum Advertised Downstream Speed | <input type="checkbox"/> Greater than 768 kbps and less than 1.5 mbps |
| | <input type="checkbox"/> Greater than 1.5 mbps and less than 3 mbps |
| | <input type="checkbox"/> Greater than 3 mbps and less than 6 mbps |
| | <input type="checkbox"/> Greater than 6 mbps and less than 10 mbps |
| | <input type="checkbox"/> Greater than 10 mbps and less than 25 mbps |
| | <input type="checkbox"/> Greater than 25 mbps and less than 50 mbps |
| | <input type="checkbox"/> Greater than 50 mbps and less than 100 mbps |
| | <input type="checkbox"/> Greater than 100 mbps and less than 1 gbps |
| Maximum Advertised Upstream Speed | <input type="checkbox"/> Greater than or equal to 1 gbps |
| | <input type="checkbox"/> Less than or equal to 200 kbps |
| | <input type="checkbox"/> Greater than 200 kbps and less than 768 kbps |
| | <input type="checkbox"/> Greater than 768 kbps and less than 1.5 mbps |
| | <input type="checkbox"/> Greater than 1.5 mbps and less than 3 mbps |
| | <input type="checkbox"/> Greater than 3 mbps and less than 6 mbps |
| | <input type="checkbox"/> Greater than 6 mbps and less than 10 mbps |
| | <input type="checkbox"/> Greater than 10 mbps and less than 25 mbps |
| | <input type="checkbox"/> Greater than 25 mbps and less than 50 mbps |
| | <input type="checkbox"/> Greater than 50 mbps and less than 100 mbps |
| | <input type="checkbox"/> Greater than 100 mbps and less than 1 gbps |
| | <input type="checkbox"/> Greater than or equal to 1 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.

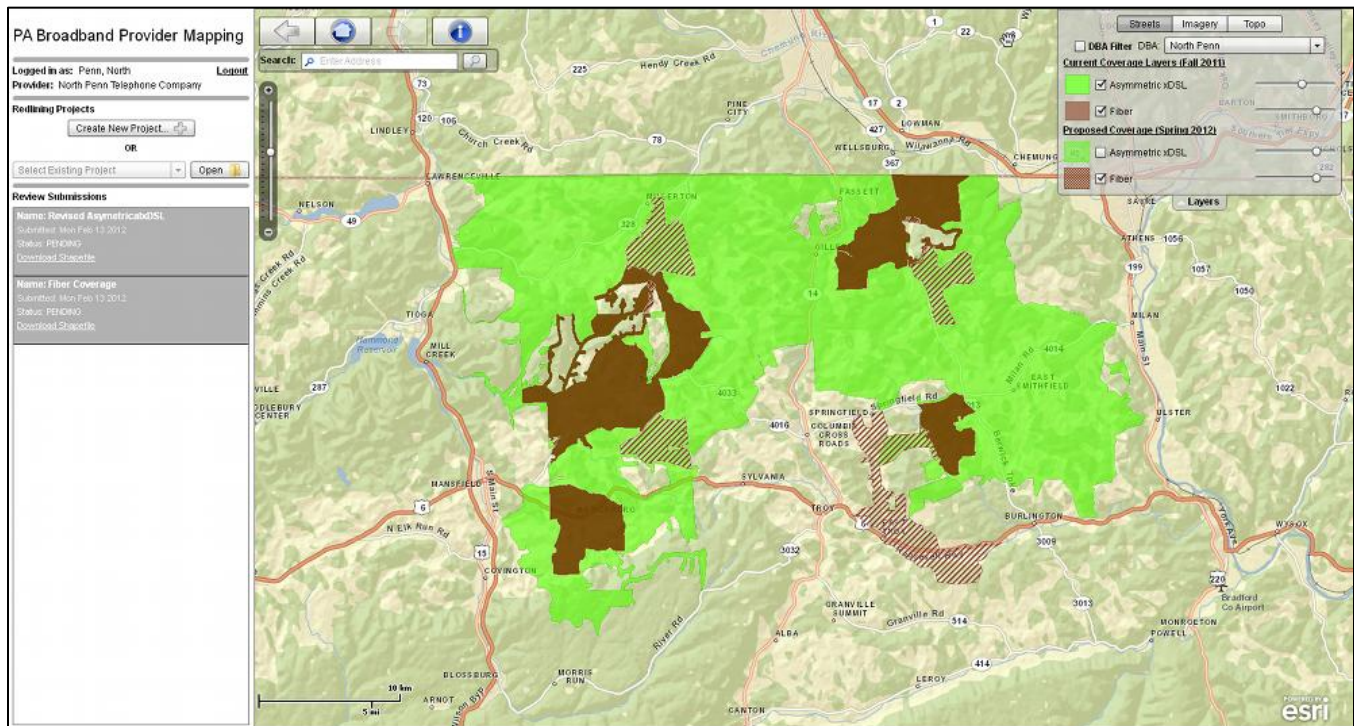


Figure 3 Provider Data Update Webportal –View/Edit Coverage Map Environment

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.

Provider Outreach Tracker - Verizon Pennsylvania & Verizon North

State: PA
 Provider Name: Verizon Pennsylvania & Verizon North
 FRN: 0003273505
 Provider Type: Active Provider
 Technology Type: 10 - Asymmetric xDSL; 50 - Optical Carrier/Fiber to the End U
 Website:
 Comment:

Created at 6/26/2012 9:55 AM by Kammer, Richard
 Last modified at 6/26/2012 10:55 AM by Kammer, Richard

| Contact Type | Contact Name |
|--------------|---------------|
| Business | Keefe Clemons |
| Technical | Laura Shine |

POT Contact Info - Keefe Clemons

Provider ID: 522
 Contact Type: Business
 Contact Name: Keefe Clemons
 Email: keefe.b.clemons@verizon.com
 Phone: 212-321-8136
 Fax:
 Address: 140 West St., 27th Floor
 City: New York
 State: NY
 Zip: 10007

POT Communication Log - New Item

Topic: Broadband Data Outreach
 Date: 9/21/2012
 Communication Type: Telephone
 Provider Contact: Keefe Clemons
 BB Team: Vicki Munn
 Log: The provider has approved the aggregated data posted to the PA Broadband Data Update Portal.

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 $\Rightarrow 2$ 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.

USAC -CAI Web Scraping

To enhance the CAI inventory, a web scraping tool has been developed to automatically query the USAC public website, <http://www.slforms.universalservice.org/DRT/Default.aspx>, in a batch mode and extract school and library CAI data for Pennsylvania. This extracted information supplements the CAI data collected by the other methods.

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

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

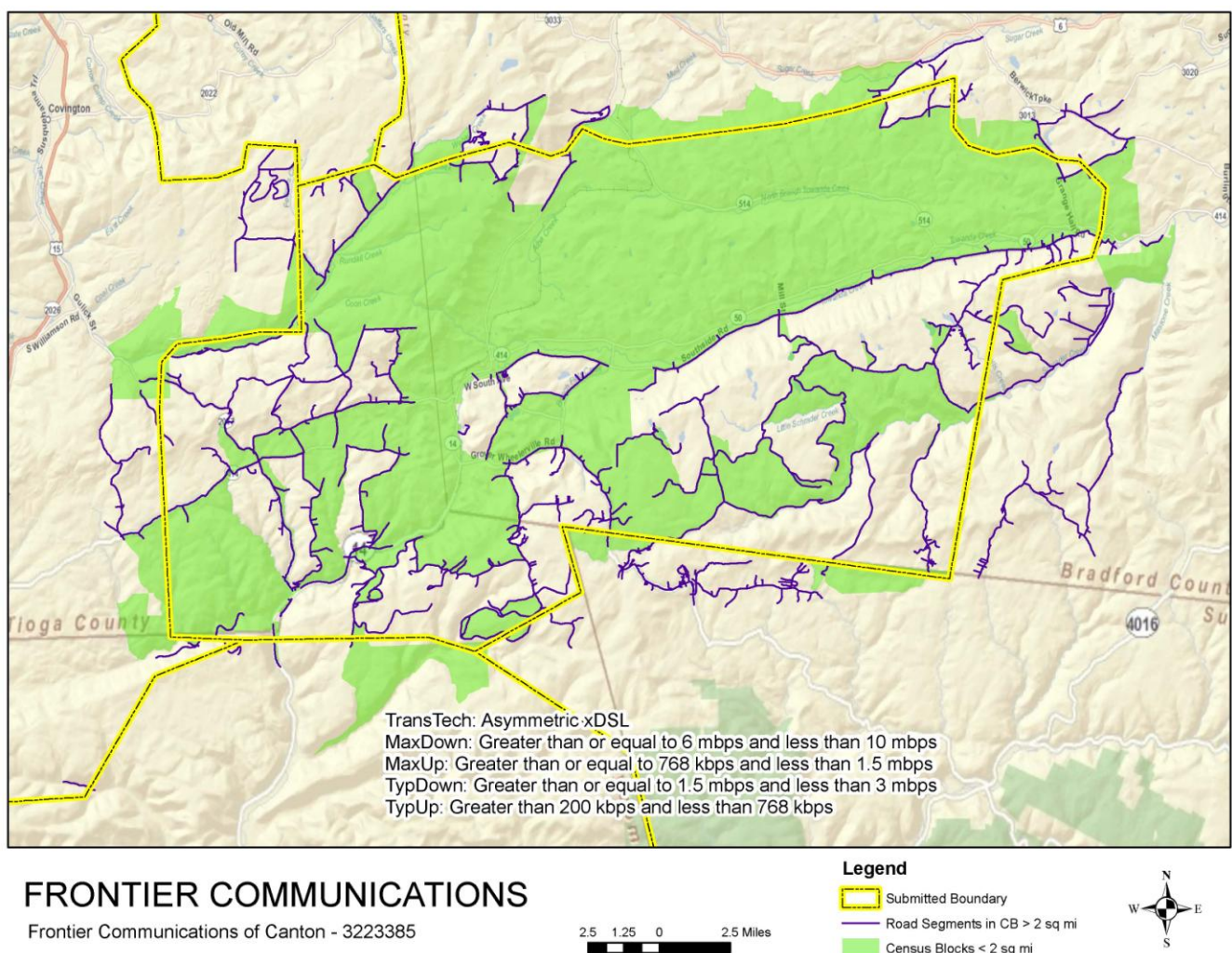


Figure 5 Provider Map

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
- census 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: $\text{MOD}(\text{"FID"}, 2) = 0$.

This will select every other record.

The planned census block field locations are shown in Figure 6.

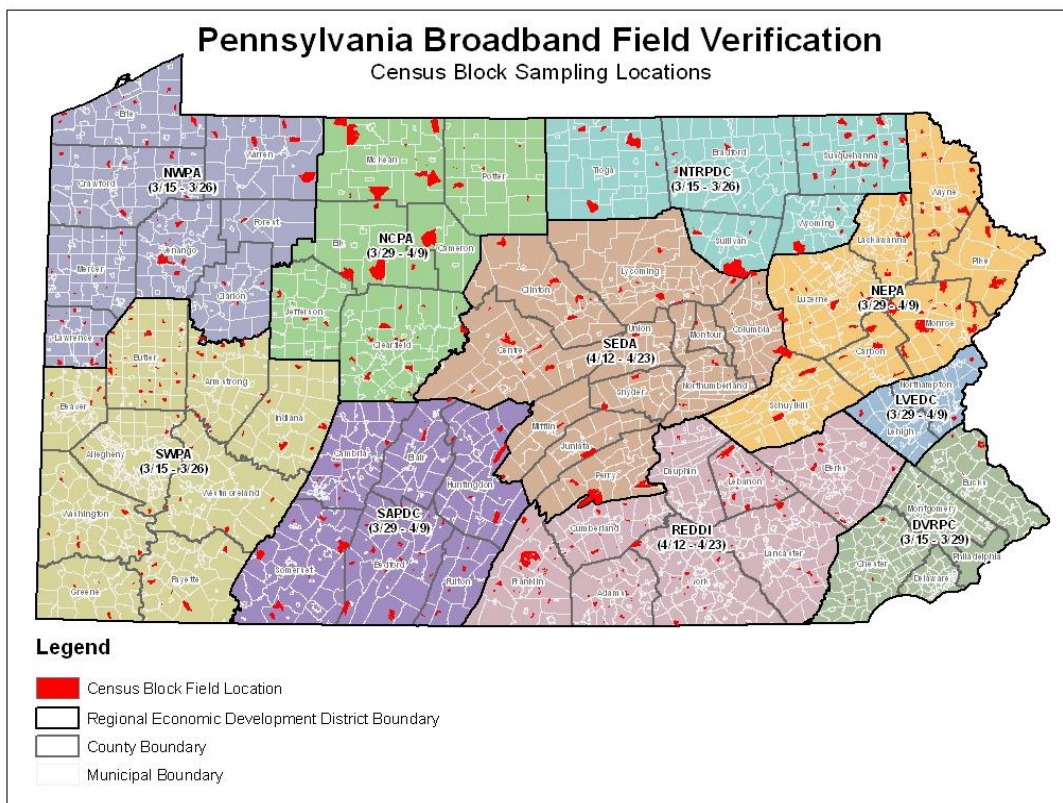


Figure 6 Planned Field Verification Census Block Locations

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.

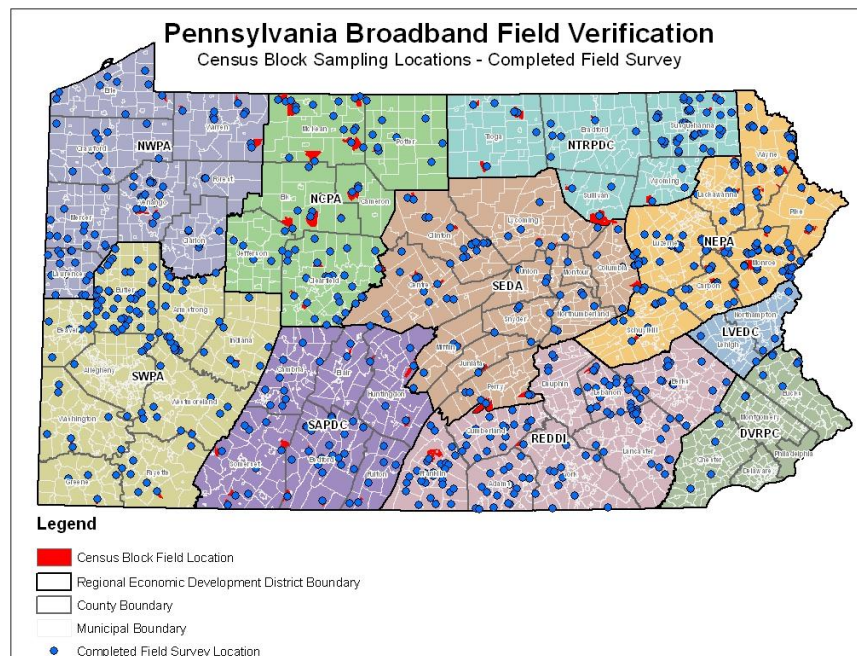


Figure 7 Completed Field Verification Locations

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 (\leq or > 2 sq. mi.). This data is exported into an ArcGIS data format. The American Roamer wireless service area data is already in an 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.

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.

The SEAS comparison is a three-part validation process:

Comparison of the collected validation source against

Figure 8 SEAS

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... |  |

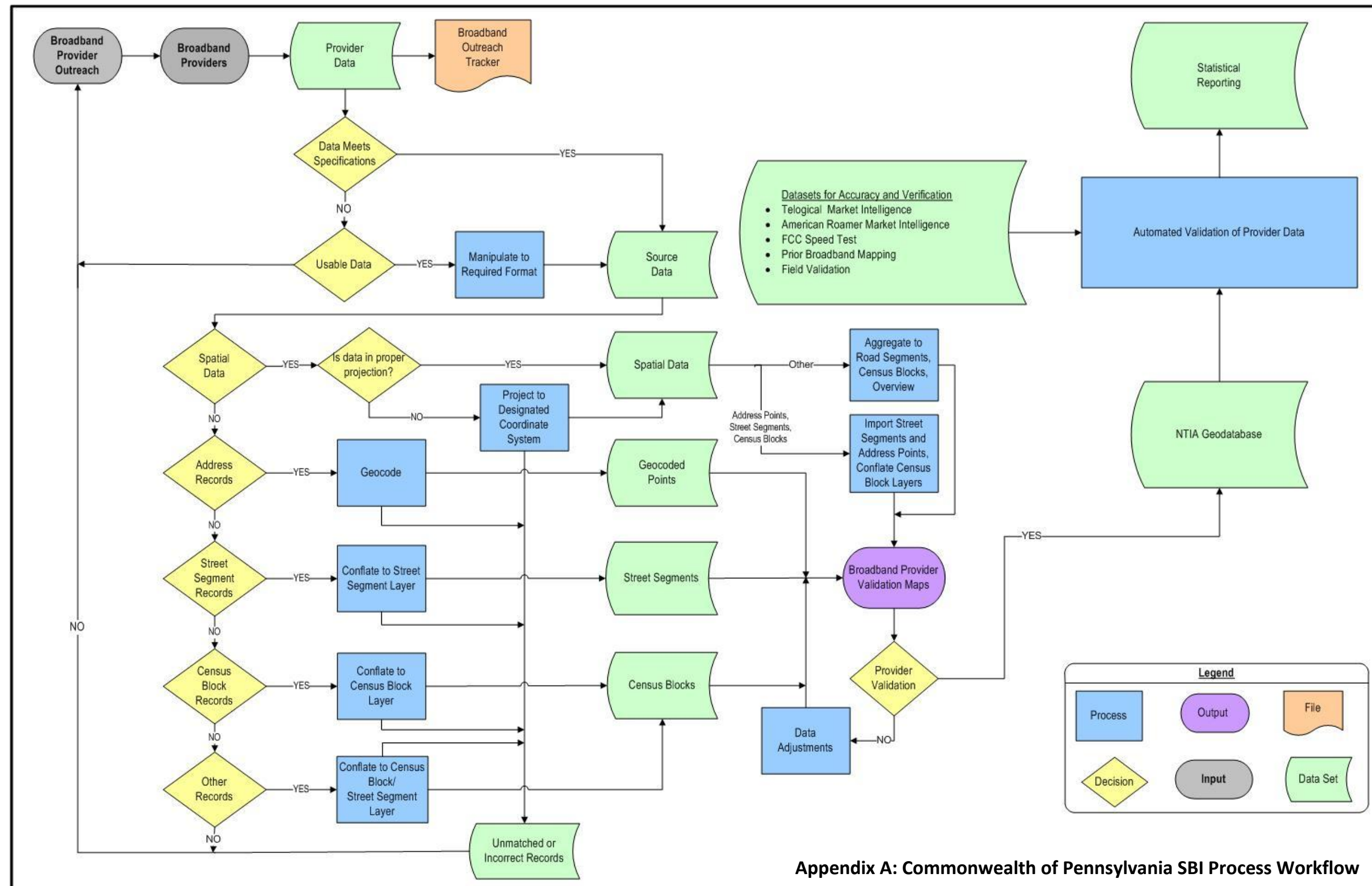
The matched percentage for the records for each provider are summarized and then divided by the total count of the records to create the final matched percentage for the specific provider. These percentages are included in DataPackage.xls on the Provider Table tab in the Comments column.

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

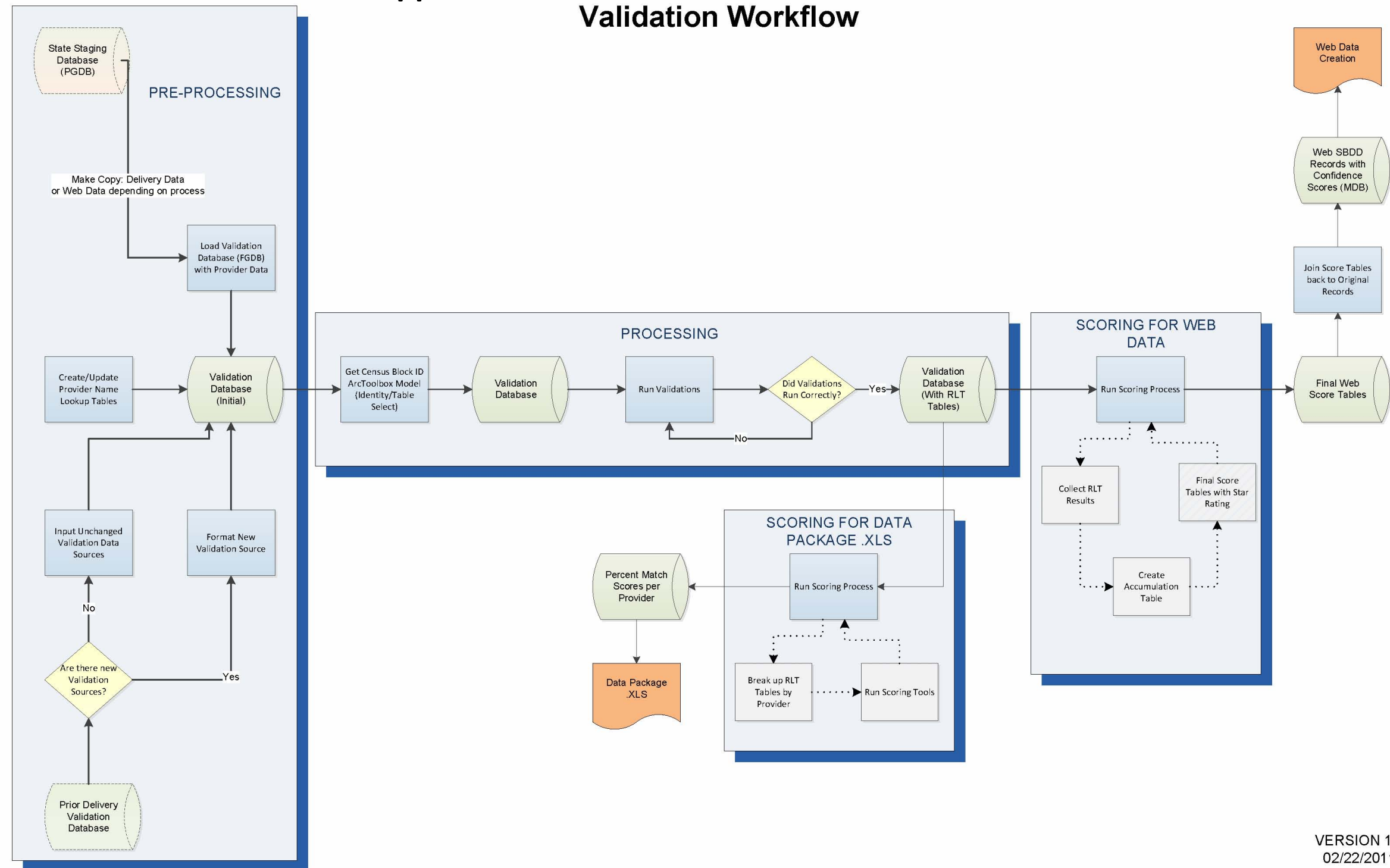
With each semi-annual NTIA data submittal, changes and corrections documentation is provided. Significant changes in a provider's status or data, corrections to previously supplied data, providers supplying data for the first time, etc. are specified by Provider name in the Changes and Corrections document.



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

| Filling Company DBA | Filling Company Name | Status |
|---|--------------------------------|--------------------------------------|
| 1USA.COM | 1USA.COM | Not a Broadband Provider or Reseller |
| 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 | AboveNet | Not a Broadband Provider or Reseller |
| Access Northeast | Access Northeast | Not a Broadband Provider or Reseller |
| Advanced Mobile Group | | Not a Broadband Provider or Reseller |
| AllCoNet | | Not a Broadband Provider or Reseller |
| Alteva Communications | Alteva Communications | Not a Broadband Provider or Reseller |
| Altius Broadband | Altius Broadband | Not a Broadband Provider or Reseller |
| American Digital Online Services, Inc. (ADOS) | | Not a Broadband Provider or Reseller |
| American Telephone Company LLC | American Telephone Company LLC | Not a Broadband Provider or Reseller |
| Antietam Cable | Antietam Cable | Not a Broadband Provider or Reseller |
| Bandwidth.com | | Not a Broadband Provider or Reseller |
| Broadband.com | | Not a Broadband Provider or Reseller |
| Budget Prepay, Inc. D/B/A Budget Phone, Inc. | | Not a Broadband Provider or Reseller |
| BullsEye Telecom, Inc. | BullsEye Telecom, Inc. | Not a Broadband Provider or Reseller |
| BurstNET | | Not a Broadband Provider or Reseller |
| Buytelco, Inc. | | Not a Broadband Provider or Reseller |
| Cablesat | | Not a Broadband Provider or Reseller |
| Cavalier Telephone LLC | Cavalier Telephone LLC | Not a Broadband Provider or Reseller |
| Cellular One of NEPA (Northeast Pennsylvania) | | Not a Broadband Provider or Reseller |
| Charter Internet | | Not a Broadband Provider or Reseller |
| CIMCO Communications, Inc. | CIMCO Communications, Inc. | Not a Broadband Provider or Reseller |
| Cincinnati Bell Inc. | | Not a Broadband Provider or Reseller |
| Citynet Holdings, LLC | Citynet Holdings, LLC | Not a Broadband Provider or Reseller |
| Clearview Partners | Clearview Partners | Not a Broadband Provider or Reseller |
| Community TV Systems Inc | Community TV Systems Inc | Not a Broadband Provider or Reseller |
| Computer Central | Computer Central | Not a Broadband Provider or Reseller |
| CONXX | CONXX | Not a Broadband Provider or Reseller |
| Cpudirect Networks, LLC | Cpudirect Networks, LLC | Not a Broadband Provider or Reseller |
| Delmarva T1 | | Not a Broadband Provider or Reseller |
| Detwiler Communications Inc | Detwiler Communications Inc | Not a Broadband Provider or Reseller |
| Digital Connections, Inc. | | Not a Broadband Provider or Reseller |
| DISH | DISH | Not a Broadband Provider or Reseller |

| Filling Company DBA | Filling Company Name | Status |
|---|------------------------------------|--------------------------------------|
| DSLBroker.com | | Not a Broadband Provider or Reseller |
| Dubois Communications Inc | Dubois Communications Inc | Not a Broadband Provider or Reseller |
| Ducom, Inc. | Ducom, Inc. | Not a Broadband Provider or Reseller |
| EA Media | EA Media | Not a Broadband Provider or Reseller |
| East Palestine Internet | East Palestine Internet | Not a Broadband Provider or Reseller |
| Eduro Networks, LLC | Eduro Networks, LLC | Not a Broadband Provider or Reseller |
| Entelegant Solutions, Inc. | | Not a Broadband Provider or Reseller |
| Global Crossing North America, Inc | 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 | Herr Cable | Not a Broadband Provider or Reseller |
| Hotwire Communications, Ltd. | Hotwire Communications, Ltd. | Not a Broadband Provider or Reseller |
| Immix Wireless | Keystone Wireless, LLC | 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 | JB Cable | Not a Broadband Provider or Reseller |
| Leap Wireless International, Inc. | Leap Wireless International, Inc. | Not a Broadband Provider or Reseller |
| LightEdge Solutions, Inc. | LightEdge Solutions, Inc. | Not a Broadband Provider or Reseller |
| Line Systems, Inc. | Line Systems, Inc. | Not a Broadband Provider or Reseller |
| MediaFLO | Qualcomm | Not a Broadband Provider or Reseller |
| Metropolitan Telecommunications | Metropolitan Telecommunications | Not a Broadband Provider or Reseller |
| Milestone Communications Inc. | Milestone Communications Inc. | Not a Broadband Provider or Reseller |
| Millheim TV Transmission Company | Millheim TV Transmission Company | Not a Broadband Provider or Reseller |
| MTT First | MTT First | Not a Broadband Provider or Reseller |
| Near You Networks | Near You Networks | Not a Broadband Provider or Reseller |
| NEPAwireless | NEPAdate.com Ventures, LLC | Not a Broadband Provider or Reseller |
| One-Stop Communications of PA Inc. | | Not a Broadband Provider or Reseller |
| OpenRange Communications | OpenRange Communications | Not a Broadband Provider or Reseller |
| Optical Telecommunications Inc. | | Not a Broadband Provider or Reseller |
| PAETEC Communications, Inc. | PAETEC Communications, Inc. | Not a Broadband Provider or Reseller |
| PAOnline | PAOnline | Not a Broadband Provider or Reseller |
| PenTeleData Limited Partnership I | PenTeleData Limited Partnership I | Not a Broadband Provider or Reseller |
| Phoenix Cable Incorporated | Phoenix Cable Incorporated | Not a Broadband Provider or Reseller |
| PNG Telecommunications | | Not a Broadband Provider or Reseller |
| Presque Isle Technology Solutions | | Not a Broadband Provider or Reseller |

| Filling Company DBA | Filling Company Name | Status |
|------------------------------------|--|--------------------------------------|
| Qwest Communications Company, LLC | Qwest Communications International | Not a Broadband Provider or Reseller |
| RealLinx | RealLinx | Not a Broadband Provider or Reseller |
| Reliance Globalcom Services, Inc. | Reliance Globalcom Services, Inc. | Not a Broadband Provider or Reseller |
| Retel TV Cable | Retel TV Cable | 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 |
| SkywayUSA | Skyway | Not a Broadband Provider or Reseller |
| Snip Link LLC | Snip Link LLC | Not a Broadband Provider or Reseller |
| Somerfield Cable TV | | Not a Broadband Provider or Reseller |
| Southside TV | Southside TV | Not a Broadband Provider or Reseller |
| Stage 2 Networks, LLC | | Not a Broadband Provider or Reseller |
| Steel City Broadband | | 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. | tw telecom inc. | Not a Broadband Provider or Reseller |
| TWR Communications | | 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 | Valley Cable Systems | Not a Broadband Provider or Reseller |
| Ward Communications | Ward Communications | Not a Broadband Provider or Reseller |
| Westfield Community Antenna Assoc. | Westfield Community Antenna Assoc. | Not a Broadband Provider or Reseller |
| Whitefence | | Not a Broadband Provider or Reseller |
| Wireless PA Internet Access | Wireless PA Internet Access | Not a Broadband Provider or Reseller |
| Xand | | Not a Broadband Provider or Reseller |
| Zampelli Electronics | Zampelli Electronics | Not a Broadband Provider or Reseller |
| ACC Business | Affiliate of AT&T | Other |
| Fisk Internet Services, LLC | Affiliate of Getwireless.net, Inc. | Other |
| Jefferson County Cable | Affiliate of Blue Devil Cable TV, Inc. | Other |
| Pencor Services, Inc. | Affiliate of Blue Ridge Communications | Other |
| Prescient Worldwide | | Other |
| Shentel | Affiliate of Sprint | Other |
| Susquehanna Communications | Affiliate of Comcast Cable Communications, LLC | Other |
| American Telecharge, Inc. | | Potential |
| BCN Telecom, Inc. | | Potential |

| Filling Company DBA | Filling Company Name | Status |
|---|--|-----------|
| BetterWorld Telecom, LLC | | Potential |
| Broadband Dynamics, LLC D/B/A Diversified | | Potential |
| Broadband National | | Potential |
| Broadstar, LLC | | Potential |
| Broadview Networks Holdings, Inc. | Broadview Networks Holdings, Inc. | Potential |
| Broadvox | | Potential |
| Business Automation Technologies, Inc. d/b/a Data Network Solutions | | Potential |
| C Spire Wireless | | Potential |
| Cambria Connected | | Potential |
| Cooperative Communications, Inc. | | Potential |
| Country Cable TV | | Potential |
| Covista Communications, Inc. | | Potential |
| CTI Networks, Inc. | | Potential |
| cyberMIND | | Potential |
| DCT Telecom Group, Inc. | | Potential |
| DirecTV | DirecTV | Potential |
| DSCI Corporation | | Potential |
| DSL Extreme | | Potential |
| DSLOPTIONS | | Potential |
| DynaLink Communications, Inc. | | Potential |
| Earthlink | | Potential |
| Easton Telecom Services | | Potential |
| EasyStreet Online Services | | Potential |
| Ernest Communications, Inc. | | Potential |
| FSN Broadband LP | | Potential |
| Full Service Computing Corp | Full Service Computing Corp | Potential |
| ICON Technologies Inc. | ICON Technologies Inc. | Potential |
| Indigo Wireless | | Potential |
| Interglobe Communications, Inc. | | Potential |
| KINBER | | Potential |
| LaunchNet | | Potential |
| Layer Four Solutions, LLC | | Potential |
| LocalNet Corp | | Potential |
| Lumos Networks | Lumos Networks (formerly Ntelos Media) | Potential |
| Master Vision Cable | | Potential |

| Filling Company DBA | Filling Company Name | Status |
|---|------------------------------------|-----------|
| Matrix Business Tech | Matrix Business Tech | Potential |
| Meriplex Communciations, Ltd | Meriplex Communciations, Ltd | Potential |
| Nitel, Inc. | Nitel, Inc. | Potential |
| Pennsylvania Cable Network | | Potential |
| PulseNet | PulseNet | Potential |
| Purecom | | Potential |
| Raystown Wireless | Raystown Wireless | Potential |
| SkyPacket Networks | | Potential |
| StarTec Global Communications | StarTec Global Communications | Potential |
| SureWire Internet | | Potential |
| Telefonica USA, Inc. | Telefonica Data Corp SA | Potential |
| Transbeam Inc. | Transbeam Inc. | Potential |
| U.S. Cellular | U.S. Cellular | Potential |
| United Online (NetZero/Juno) | | Potential |
| Zayo Bandwidth Northeast, LLC | Zayo Bandwidth Northeast, LLC | 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 |
| BackWoods Wireless | BackWoods Wireless | 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 |
| Broad Sky Networks | Broad Sky Networks | Provider |
| Brockway TV Inc | 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 |

| Filling Company DBA | Filling Company Name | Status |
|---------------------------------------|---|----------|
| 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 |
| 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 |
| Cricket Communications, Inc. | Leap Wireless International, Inc. | Provider |
| DBSi | DBSi | Provider |
| DEPOSIT TELEPHONE COMPANY, INC. | TDS TELECOM | Provider |
| Double Dog | Double Dog | Provider |
| EagleZip.com | EagleZipCom LLC | Provider |
| Evenlink | Evenlink | Provider |
| First Telecom Services, LLC | First Telecom Services, LLC | 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 |
| 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 | Hydrosoft Internet | Provider |
| ICDC Wireless Inc. | ICDC Wireless Inc. | Provider |
| In the Stix Broadband, LLC | In the Stix Broadband, LLC | Provider |
| Innernet, Inc. | Innernet, Inc. | Provider |
| Interlync Internet Sevices, Inc. | Interlync Internet Sevices, Inc. | Provider |
| Ironton Telephone Co | Ironton Telephone Co | Provider |
| KCnet | Keystone Community Network, Inc. | Provider |
| Kuhn Communications | Kuhn Communications | Provider |
| Lackawaxen Telephone Co | Lackawaxen Telephone Co | Provider |
| Lantek | Lantek | Provider |

| Filling Company DBA | Filling Company Name | Status |
|--|---|----------|
| Laurel Highland Telephone Company | Laurel Highland Telephone Company | Provider |
| Level 3 Communications, LLC | Level 3 Communications, LLC | Provider |
| MAHANNOY & MAHANTANGO TELEPHONE COMPANY | TDS TELECOM | Provider |
| Marianna and Scenery Hill Telephone Company | FairPoint Communications | Provider |
| Matrix Telecom, Inc. (TRINSIC, powered by Matrix) | | Provider |
| MegaPath Corporation | MegaPath Corporation | Provider |
| Metrocast Cablevision | Metrocast Cablevision | Provider |
| MetroCast Communications | Gans Communications, LP | Provider |
| Navpoint Internet | Navpoint Internet | Provider |
| Netcarrier Telecom, Inc. | Netcarrier Telecom, Inc. | Provider |
| Netconex | Netconex | Provider |
| Nittany Media, Inc. | Nittany Media, Inc. | Provider |
| Noroc Broadband | Noroc Broadband LLC | Provider |
| North Penn | North Penn | Provider |
| One Communications | One Communications | Provider |
| PaCLEC Corporation | PaCLEC Corporation | Provider |
| Palmerton Telephone Co | Palmerton Telephone Co | Provider |
| Pennsylvania Telephone Co | Pennsylvania Telephone Co | Provider |
| Pitcairn Cable | Pitcairn Cable | Provider |
| Pymatuning Indep. Tel. Company | Pymatuning Indep. Tel. Company | Provider |
| QCOL, Inc | QCOL, Inc | Provider |
| RCN and RCN Business Services | RCN Telecom Services of Philadelphia, Inc. | Provider |
| RCN and RCN Business Services | RCN Telecom Services, Inc. | Provider |
| 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 |
| Smoothstone IP Communications | 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 Technical Services | StarLinX Technical Services | Provider |

| Filling Company DBA | Filling Company Name | Status |
|--|--|----------|
| Sti Wireless | 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 | Telnes Broadband | Provider |
| The North-Eastern Pennsylvania Telephone Company | The North-Eastern Pennsylvania Telephone Company | Provider |
| Time Warner Cable | Time Warner Cable LLC | Provider |
| T-Mobile | T-Mobile USA, Inc. | Provider |
| Towerstream Corporation | Towerstream Corporation | Provider |
| USA Choice Internet | 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 |
| Wave2Wave Communications | Wave2Wave Communications, Inc. | Provider |
| Wavecrazy | Wavecrazy | Provider |
| West Side Telecommunications | West Side Telephone Company | Provider |
| Western PA Internet Access | | Provider |
| WestPANet | WestPANet | Provider |
| WildBlue Communications, Inc. | ViaSat | Provider |
| Windstream | Windstream Pennsylvania, Inc | Provider |
| Wire Tele-View Corp. | Wire Tele-View Corp. | Provider |
| World ConnX | World ConnX | 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 |
| Airespring, Inc. | Airespring, Inc. | Reseller |
| ALs Satellite | ALs Satellite | Reseller |
| Beacon Technologies | Beacon Technologies | Reseller |
| Computer Solutions, Inc. | | Reseller |
| Cyberonic Internet Communications, Inc. | | Reseller |
| Drizzle | | Reseller |
| Hans Cedardale Satellite Inc. | Hans Cedardale Satellite Inc. | Reseller |
| IPNS | | Reseller |

| Filling Company DBA | Filling Company Name | Status |
|----------------------------------|------------------------------|----------|
| Juno Online Services, Inc. | | Reseller |
| NetZero, Inc. | | Reseller |
| New Edge Network, Inc. | Earthlink | Reseller |
| New Edge Network, Inc. | New Edge Holding Company | Reseller |
| Reliable ISP Solutions "RISP" | | Reseller |
| Satellite Internet Broadband | Satellite Internet Broadband | Reseller |
| Telefonica USA | | Reseller |
| TOAST.net | TOAST.net | Reseller |
| Tracon Telecom | | Reseller |
| Virtuallycheap Internet Services | | Reseller |