NEPA Environmental Assessment

Broadband Technology Opportunities Program Statewide Fiber Optic Network

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Prepared For:

Frank Monteferrante, Ph.D.
Environmental Compliance Specialist
National Telecommunications and Information Administration
Broadband Technology Opportunities Program
1401 Constitution Avenue NW
Washington, DC 20230

On Behalf Of:

Connecticut Department of Information Technology
101 East River Drive
East Hartford, CT 06108

Prepared By:

Fuss & O'Neill EnviroScience, LLC
146 Hartford Road
Manchester, CT 06040

Project No. 20101361.A1E

FUSS & O'NEILL

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Acronyms and Abbreviations

ACOE	U.S. Army Corps of Engineers
ASCE	American Society of Civil Engineers
BMPs	best management practices
BTOP	Broadband Technology Opportunities Program
CAAA	Clean Air Act Amendments
CAI	Community Anchor Institution
CBRA	Coastal Barrier Resources Act
CBRS	John H. Chafee Coastal Barrier Resources System
CEN	Connecticut Education Network
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CO	carbon monoxide
CO_2	carbon dioxide
CTDOT	Connecticut Department of Transportation
CPBI	Connecticut Public Broadcasting, Inc.
CPSSDN	Connecticut Public Safety Services Data Network
CTDEP	Connecticut Department of Environmental Protection
DOIT	Connecticut Department of Information Technology
DPS	Connecticut Department of Public Safety
DWS	Connecticut Department of Public Health, Drinking Water Section
EPA	U. S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FPPA	Federal Farmland Protection Policy Act
USFWS	U.S. Fish and Wildlife Service
GHG	greenhouse gas
NAAQS	National Ambient Air Quality Standards
NDDB	Natural Diversity Data Base
NHPA	National Historic Preservation Act of 1966
NO_2	nitrogen dioxide
NPL	National Priorities List
NRCS	Natural Resources Conservation Service
NTIA	National Telecommunications and Information Administration
NWI	National Wetlands Inventory
OLISP	Office of Long Island Sound Programs
OSET	Connecticut Office of Statewide Emergency Telecommunications
PM2.5	particulate matter 2.5 microns or smaller in diameter
PM10	particulate matter ten microns or smaller in diameter
POP	Point of Presence
POP2	Second Point of Presence
PSAPs	Public Safety Answering Points
RCRA	Resource Conservation and Recovery Act
RCSA	Regulations of Connecticut State Agencies
RGGI	Regional Greenhouse Gas Initiative
ROW	Rights-of-Way
SCELs	Stream Channel Encroachment Lines
SHPO	State Historic Preservation Office

Acronyms and Abbreviations

SIP	State Implementation Plan
SO_2	sulfur dioxide
TCNS	Tower Construction Notification System
THPO	Tribal Historic Preservation Officer

Executive Summary

E.1 Introduction

The National Telecommunications and Information Administration has awarded a grant to the Connecticut Department of Information Technology (DOIT), through the Broadband Technology Opportunities Program, for upgrades to and expansion of Connecticut's existing broadband infrastructure to improve public safety, library, and educational services across the state. DOIT has partnered with the Connecticut Department of Public Safety (DPS), the Connecticut Education Network (CEN), and Connecticut Public Broadcasting, Inc. The proposed project involves locations throughout the entire State of Connecticut, with installation of new fiber and upgraded connections in all 169 municipalities in the State.

The proposed project consists of upgrades to approximately 5,990 fiber miles over approximately 1,627 route miles of existing (on-net) fiber optic lines and installation of an estimated 880 miles of new (off-net) fiber optic lines, directly connecting approximately 660 community anchor institutions (CAI) (public safety facilities, K-12 schools, libraries, and two community colleges) to the statewide fiber optic network. These CAIs fall within the purview of the following three major entities/existing programs within the State:

- Connecticut Public Safety Services Data Network (CPSSDN)
- Connecticut Education Network (CEN) – Expanded Connectivity
- Connecticut Department of Information Technology second Point of Presence (POP2) Installation

E.2 Purpose and Need

As described below, the purpose of the proposed project is to put broadband infrastructure in place to meet clearly-defined needs for public safety, library, education, and network resiliency in Connecticut.

Connecticut Public Safety Services Data Network

The existing stand-alone legacy network infrastructure systems that Connecticut public safety agencies utilize minimally met the bandwidth requirements for current use and are grossly inadequate for near- or long-term projected future data transmission requirements and the current data network will not provide next generation 911 functionality (CTDPS, 2007). Furthermore, the lack of resiliency in some areas is a significant issue that affects Connecticut's ability to respond quickly and continuously throughout the state in the event of local, regional, or statewide emergencies. Consequently, there is a clearly identified a need to construct a new integrated data network to allow for additional connectivity between first responder sites across the state.

The Proposed Action would utilize approximately 2,000 miles of on-net fiber and 240 miles of newly provided fiber with the purpose of connecting 108 existing Public Safety Answering Points (PSAPs), three Department of Public Safety administrative buildings, the DOIT data

center, and an estimated 435 public safety-related locations (firehouses, public safety, first responders, etc.) to the CPSSDN via dedicated fiber optic cabling.

Connecticut Education Network – Expanded Connectivity

The Connecticut Education Network (CEN) was America's first statewide K-12 and higher education network to be built exclusively using state-of-the-art fiber optic connections. The CEN provides access to the Internet, the next generation Internet2, iCONN - Connecticut's research engine, and thousands of other resources exclusively targeted to students, teachers, researchers, and administrators in Connecticut's education institutions.

Within the CEN system, there is a need to address the "digital divide" that still plagues rural and lower socio-economic areas within Connecticut where public Internet access is limited or nonexistent and provide equal-opportunity access for Connecticut students, teachers, administrators, and library users. The purpose of the Proposed Action as it relates to the CEN is to provide improved access to broadband Internet connectivity, including network equipment and user support, to Connecticut's K-12 school districts, colleges and universities, and public libraries that do not currently directly connect to the existing CEN fiber backbone and face two major limitations: limited bandwidth capacity and lack of fiber redundancy.

This component of the Proposed Action would meet the need to enable expansion of CEN's fiber optic footprint, bringing 100 megabits per second (Mbps) service to at least 120 of CEN's partner facilities in Connecticut that currently lack this level of connectivity. In addition to the installation of new fiber, the Proposed Action would also address the need for additional capacity and provide redundancy through the installation of necessary hardware and CEN user support via the DOIT Help Desk and 24/7 Network Operations Center. This would provide equal-opportunity access to Connecticut students, teachers, administrators, and library users, directly addressing the "digital divide" that still plagues rural and lower socio-economic areas within Connecticut where public Internet access is limited or nonexistent.

DOIT POP2 Installation

DOIT provides network access and information technology (IT) service for all Connecticut state government through a single POP. This single POP presents a potential risk to public safety, health, critical infrastructure/key resources, and economic impacts in the event of a failure in the private carrier networks or catastrophic loss of the State's data center and there is a need to address the vulnerability and develop resiliency and redundancies to ensure continuity of operations.

The purpose of this component of the Proposed Action is to reduce the potential risks associated with a network outage by addressing the development of a second location (i.e. second point of presence or POP2) for the State's identified critical data circuits, which would be located within an existing State facility. By creating an alternate POP, the service that DOIT provides to state government and critical assets would be uninterrupted even when faced with major catastrophic events.

E.3 Proposed Action

The primary activity associated with the Proposed Action is placement of new aerial fiber upon existing utility poles within existing transportation rights-of-way (ROW) or the pulling of new fiber through existing conduit systems at network locations. Based on initial site reviews, it is anticipated that no new poles or conduits would be necessary; however, in the event of such activities, potential impacts are assessed in this Environmental Assessment. In addition, the Proposed Action includes the actual connection to the subject CAI sites.

At current off-net locations where fiber is to be installed, the project would result in a single additional cable added to the "communication space" on existing utility poles along existing transportation ROW. The cable that encloses the fiber is less than an inch in diameter (between 0.51 and 0.73 inches), and it is black so that it is similar in appearance to the utility lines and equipment that are already present on the existing utility poles. No repeater cabinets or similar equipment enclosures would be mounted to any pole or support structure. In underground installations, the aerial fiber runs down the pole and then routes inside the existing underground conduit that is located next to the pole.

DOIT's contractor will be responsible for making application requests to the applicable pole/conduit owner to install new fiber. In the event the owner determines a pole or conduit needs to be replaced, such work and any associated activities will be conducted by the owner and its contractors and not DOIT or its contractor.

No construction activity (i.e., new or replacement poles/conduits or ground disturbance), other than installation of new fiber, is proposed along the existing or proposed fiber optic network segments. A splice connection would be made where a proposed fiber segment meets an existing fiber segment by installing a splice enclosure on the line or using an existing splice enclosure if one exists near the proposed connection. In the upgrades to an estimated 5,990 fiber miles, the existing lines would be "activated" - a signal would run through the existing inactivated on-net lines.

Although it is anticipated that the entire project would be aerial, using existing utility poles and ROW, underground using existing conduit, or existing conduit systems associated with bridge crossings, there may be an occasional need for replacement of a utility pole. This need would be determined by the owner/operator of the pole when an application is made by a lessee to affix additional fiber or cable. Utility poles are typically replaced by the owner/operator when they have deteriorated or when they have insufficient capacity to accept additional utilities. When replacing a pole due to deterioration or to accommodate a newly proposed fiber cable, it is standard practice to remove the existing pole and place a new pole in the same hole. If the existing pole cannot be removed, then an alternative method is to auger a new hole as close to the existing pole as is practical, place the new replacement pole, transfer the affected infrastructure to the new pole and then remove the existing pole, most commonly by cutting it above the surface and leaving the buried segment in place.

As mentioned before, the vast majority of the proposed network is aerial (approximately 99.4%), using infrastructure that is already in place, and only a very small portion would be underground using existing conduit systems. It is estimated that only 5.5 miles of the

approximately 880 miles of new fiber is planned for installation within existing conduits. Therefore, damaged or crushed conduit is not anticipated on this project. However, in the event that crushed or damaged underground conduit is encountered, the conduit owner would be contacted by DOIT's contractor and attempts would be made to free the blockage. If the conduit owner is unsuccessful, an alternate route may be selected using existing aerial locations or other existing underground conduits. Based on initial site reviews, installation of new underground conduit is not anticipated to be necessary to make final connections to a particular CAI site.

In the event that DOIT's contractor or subcontractor has to perform installation of new or replace poles/conduits and ground disturbance is necessary, continued consultation with the Connecticut Department of Environmental Protection (CTDEP), the U.S. Army Corps of Engineers (ACOE), the U.S. Fish and Wildlife Service (USFWS), the State Historic Preservation Office (SHPO), potentially affected Native American tribes, and other applicable resource agencies would occur. In these specific cases, DOIT has established project protocols in the event that ground disturbance is required.

DOIT has contracted with Fibertech Networks (Fibertech) to install and lease the underlying fiber backbone of the network. Once the construction is completed, DOIT would continue to be responsible for operation of the fiber network, as well as maintenance of the network through a lease agreement. DOIT would also arrange for additional future connections to the network.

E.4 Alternatives Considered

No Action Alternative

Under the No Action alternative, the Proposed Action would not be implemented. The purpose and need for the project would remain unmet as there is currently no identified alternative funding source(s) for the three key programs of the Proposed Action. While the No Action alternative would result in no impacts to natural or cultural resources, it would exacerbate the existing "digital divide" and would over time create breakdown to the existing networks and reduce capacity. As a result, there would be negative impacts to socioeconomic resources and human health and safety.

Implementation of the CPSSDN would be delayed indefinitely, leaving 911 first responder sites unconnected to the CPSSDN and relying on outdated and insufficient connections, and in some cases no connectivity at all, to support life-critical operations. This would impact an estimated 25,000 police officers, firefighters, and supporting staff members throughout the State of Connecticut. The related negative effect would be continued inadequate or unavailable connectivity to support the public health and safety mission of 911 first responders.

Similarly, under the No Action alternative, an estimated 120 CAIs (i.e., K-12 school districts, colleges, and public libraries) that are included in the proposed CEN connectivity expansion would continue to face the limitations associated with limited bandwidth capacity and lack of fiber redundancy for an indefinite period of time. This would result in a negative impact to teaching, learning, and research at educational institutions and research and career development

at public libraries that are proposed to be added to the CEN. Consequently, socioeconomic impacts associated with education and employment may result from the No Action alternative.

Potential risks associated with a network outage would also remain in the absence of a POP2 connection for the State's identified critical data circuits, as is proposed under the Proposed Action. Lack of redundancy represents a potential impact to public health and safety and economic resources due to the network access and information technology services provided by DOIT's POP that facilitate the State's government operations.

Alternatives Considered But Eliminated From Further Discussion

Other alternatives to the Proposed Action that were considered included a network with a different (i.e., smaller) scale, a network using a different configuration or underground and aerial installation, and a wireless network.

Different Scale Alternative

The proposed network is designed to meet the project purpose and need by optimizing the use of available infrastructure and adding new fiber only where necessary. Although a less extensive network could be implemented, that alternative would fail to address all three critical components of the Proposed Action. Consequently, this alternative was eliminated from further consideration due to its inability to meet the purpose and need.

Different Aerial and Underground Configuration Alternative

Different configurations of aerial and underground installations were also considered. The Proposed Action, as conceived in the Preferred Alternative, is nearly entirely aerial, with only an estimated 5.5 miles of new fiber installation in existing conduit. An alternative network that relies solely on aerial installation is infeasible given the realities of the existing utility infrastructure, land use, and topography and was eliminated from further consideration.

An alternative that utilizes more underground conduit may be able to adequately address the project purpose and need, but would introduce more uncertainty, potential delay, and possible environmental impact into the installation process since the discovery of crushed conduit cannot be reasonably assessed prior to the construction phase. Consequently, an alternative network configuration that uses more underground conduit was eliminated from further consideration due to the increased potential for construction delays and environmental impacts compared to the Preferred Alternative.

Wireless Network Alternative

A wireless network alternative could address some elements of the project purpose and need but would be unable to provide the capacity or speed needed to fully meet the purpose and need. In addition, the installation of wireless infrastructure would require ground disturbance. Unlike the Preferred Alternative, which uses existing ROWs, development of a wireless network typically requires disturbance of undeveloped areas for necessary site improvements and construction of access roads. Consequently, a wireless network was eliminated from further consideration due to its inability to fully meet the purpose and need, and its greater potential for ground disturbance and associated environmental impacts.

E.5 Summary of Impacts

The Proposed Action would have no significant adverse environmental impacts as compared to the baseline condition (No Action). Impacts are primarily associated with the project construction and would be minimized or mitigated through measures described in the Environmental Assessment. Environmental impacts are presented in *Table ES-1*.

Table ES-1. Summary of Environmental Impacts

Resource Category	Impact Evaluation
Noise	• Temporary construction-related noise during daytime hours • Not anticipated to exceed current traffic-related noise • No significant direct impacts • No indirect or secondary impacts
Air Quality	• Temporary traffic disruption may cause increased motor vehicle exhaust • Temporary emissions from construction equipment • No new stationary sources • No significant direct impacts • No indirect or secondary impacts
Climate, Greenhouse Gases and Global Warming	• Minor, short-term increase of GHG emissions resulting from construction • GHG emissions do not exceed presumptive effects threshold • No significant direct, indirect or secondary impacts

Geology and Soils	• No direct or indirect conversion of farmland
	• No significant direct impacts in the absence of ground disturbance
	• In the event of ground disturbance:
	  o Limited to previously disturbed areas
	  o Small, previously-disturbed areas would be disturbed at any one time
	  o Erosion and sedimentation best management practices would be followed
	  o Disturbed areas would be restored to preconstruction condition
	• No indirect or secondary impacts, regardless of ground disturbance

Table ES-1. Summary of Environmental Impacts

Resource Category	Impact Evaluation
Water Resources	• No significant direct or indirect impacts in the absence of ground disturbance • In the event of ground disturbance: o Industry-standard best management practices for pole replacement, conduit repair/replacement, and cable installation. o Adherence to applicable permit conditions for wetlands, watercourses, and flood hazard zones to minimize impacts o Connecticut Department of Public Health Drinking Water Section to be notified and best management practices followed for new underground conduit in public water supply source water areas o Approval by EPA for ground disturbance more substantial than a pole replacement within Sole Source Aquifer areas • No impact to scenic rivers since fiber installed inside existing conduit
Biological Resources	• No significant direct, indirect or secondary impact to wildlife or vegetation • All work within existing transportation ROWs • No federally-listed endangered or threatened species or associated habitat present in the project area • Some proposed fiber optic lines within areas identified as habitat for several state-listed endangered, threatened or special concern species • Management measures to minimize potential impacts to state-listed species for any work on fiber line segments within areas of concern identified by CTDEP Natural Diversity Data Base (NDDB) Program: o Lane closures and restricted access to roadside vegetation o Time-of-year restrictions on construction • In the event of ground disturbance within a mapped NDDB area: o Submit a new NDDB Review Request o Follow management recommendations • In the event that a bird nest is encountered on a structure (bridge or utility pole) and must be disturbed to install fiber: o Confirm bird species by a wildlife biologist or ornithologist o File an application for a take permit with the USFWS o Removal of inactive nests of migratory birds would require consultation and possible approval by USFWS

Table ES-1. Summary of Environmental Impacts

Resource Category	Impact Evaluation

Historic and Cultural Resources	• No significant direct or indirect impacts in the absence of ground disturbance
	• In the event of ground disturbance beyond a five-foot radius of existing utility poles or underground conduits, procedure to minimize impact:
	  o Notification to SHPO and THPO, if necessary
	  o Assessment by qualified archaeological consultant
	  o SHPO and THPO comments and recommendations to be followed
	• SHPO, Mashantucket Pequot and Mohegan Indian Tribes have determined no adverse effect if ground disturbance protocol followed
	• If earth disturbing activities uncover cultural materials (i.e., structural remains, historic artifacts, or prehistoric artifacts), work shall cease and interested Tribes, the SHPO, Connecticut State Archaeologist, and NTIA to be notified immediately

Aesthetic and Visual Resources	• No significant direct, indirect or secondary impacts • Fiber is either in place or being added to existing "communication space" on poles or in conduits in transportation ROWs
Land Use	• No significant direct impacts • Minor temporary impacts during fiber installation • Work within existing transportation ROWs will not alter land use • No indirect or secondary impacts
Infrastructure	• No significant direct, indirect or secondary adverse impacts • Project utilizes existing transportation and utility infrastructure • No anticipated impact to waste disposal services due to limited construction and demolition waste • Beneficial impact to broadband communication infrastructure • Benefit to critical infrastructure/key resources
Socioeconomic Resources	• No significant direct, indirect or secondary adverse impacts • No disproportionate impacts to Environmental Justice populations • Significant improvement to reducing the "digital divide" • Anticipated direct and indirect economic benefits, including creation of approximately 1,200 jobs

Table ES-1. Summary of Environmental Impacts

Resource Category	Impact Evaluation
Human Health and Safety	• No significant direct, indirect, or secondary impacts • Contact with hazardous waste unlikely and only in event of ground disturbance • No known health issues associated with fiber optic cable • Worker safety standards and procedures adhered to • Beneficial impact to public health and safety due to CPSSDN creation and POP2 installation
Cumulative Effects	• Minor cumulative effect to utility infrastructure. The addition of the cable to the utility pole will result in less available space for future cables and lines on existing poles. • Beneficial cumulative impacts to public health and safety and socioeconomic resources.