

Broadband Infrastructure Inventory Study for Lewis County NY

April 1, 2021



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The information in this report was gathered for the exclusive use of Lewis County and the Development Authority of the North Country for the purposes of analysis and planning.

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Broadband Infrastructure Inventory Study for Lewis County NY

March 26, 2021

1. Introduction

Broadband access has become one of the foundational resources that allows a community to compete and thrive in the 21st century. Infused into all aspects of our social and economic life, broadband connects computers, cell phones, television, and most modern communications.

Broadband powers emails, Internet searches, social media, online shopping, and information management. It enables business, education, medicine, government, and public safety to perform their functions efficiently. It is a critical component of economic development and a community's ability to attract and retain industry. Recent surveys show high-speed broadband is now as important to job creation and business locations as good transportation and skilled labor.

Telecommunications infrastructure and broadband service have transformed the way people, public organizations, and companies communicate, educate, work, and live. Broadband, and the fiber optic backbones that support it, have undeniably become the "interstate highway" of the 21st century.

The use of broadband service is becoming ubiquitous. By 2023, North America will have 345 million Internet users (92 percent of regional population), up from 328 million (90 percent of regional population) in 2018.¹

Broadband is today considered infrastructure as critical as roads, electricity, and water. Inadequate broadband has become a barrier to community growth, competitiveness, and economic development. This has led to something called "The Digital Divide." DANC in partnership with Lewis County has commissioned this study in part to understand its rural area broadband capacity, as well as explore opportunities for possible broadband expansion to help the County overcome this Digital Divide.

1.1 The Digital Divide

On Feb 8th, 1996, the Federal Communications Commission (FCC) created the Telecommunications Act to establish competition and facilitate growth in the telecommunications industry, which previously had been a government-regulated monopoly.

After the Telecommunications Act, telephone companies called Competitive Local Exchange Carriers ("CLECs") emerged and were able to provide consumers with a choice of services. During this period other

non-traditional telecommunications companies such as cable TV providers, network providers, and wireless providers (both cellular and fixed wireless) began to offer competitive broadband services to participate in the explosive growth of the Internet.

Over twenty-five years have passed since the 1996 Telecommunications Act, which succeeded in creating competition and increased availability of broadband access. Despite that success, a technology gap has occurred between communities that have access to affordable broadband service and those that do not. This division, known as the Digital Divide, has split communities into broadband “haves” and “have nots.”

Much of the rural area is less densely populated, with poor accessibility to broadband or lower incomes. Local counties and cities want to develop future potential but unfortunately do not show a return on investment for broadband providers.

In many instances, the difference between areas that have access to broadband service and those that do not can be less than a mile, but the cost to overcome this short distance can be more than a resident or business can afford.

Despite the increased need for broadband service, rural areas of the country still rely largely on copper-based infrastructure such as the incumbent telephone companies’ unshielded twisted pair copper wire or satellite connections for broadband connectivity.

Unfortunately upgrading copper’s limited bandwidth to the high bandwidth capacity of fiber has not been an area of focus for the telecommunications industry. This is due mainly to the high cost of installing fiber and the low population densities of rural areas that create lengthy return on investment models. Furthermore, the incumbent broadband providers are reluctant to invest in expensive telecommunications infrastructure upgrades, which do not show profitability.

Much of the infrastructure in place today in these areas has been in operation for more than 50 years. The majority of the telecommunications industry is focusing elsewhere, with investment dollars being spent in high growth areas such as tier 1 and tier 2 cities, where fiber cable is densely installed. Comparable to the lack of electricity in rural areas of this country before the National Rural Electrification Act of 1936, many areas in New York State are being rapidly left behind.

1.2 Efforts to Close the Digital Divide

There are federally subsidized programs to expand local incumbent provider broadband such as the Connect America Fund (also known as CAF), Rural Digital Opportunities Fund (RDOF) and the USDA ReConnect program. However, as broadband is not a publicly regulated service, like telephone service, there are no obligations for the provider to make new broadband investments in unprofitable areas.

Two of the initiatives driving broadband expansion into the rural communities of New York State include the 2016 Charter Communications/Time Warner Cable merger and the “New NY Broadband (grant) Program”.

As part of the approval of the Charter Communications/Time Warner Cable merger, New York State required the newly merged company, now known as Spectrum, to expand services to 145,000 households statewide by 2020. Ultimately, delays in Spectrum construction resulted in a revised schedule requiring

the network expansion to be completed by September 30, 2021.² This requirement, intended to help expand the availability of broadband service, will reach many homes but not all.

Over the past few years and coincident with the Charter/Time Warner merger, New York State has offered three rounds of grant funding to support the deployment of broadband to unserved and underserved residences and businesses of New York State.

To date, over \$10.6M has been invested in broadband expansion in Lewis County through the New NY Broadband Program. Since 2015, three broadband providers have been awarded grants in Lewis County, Frontier Communications, Hughes Network Systems, and Verizon. Their respective investment and grant awards are listed below in Table I.³

New New York Broadband Grant Awards in Lewis County NY					
Awardee	State Grant	Total Investment	Locations	Pct. of Locations	Pct. of Investment
Frontier Communications	\$5,314,197	\$8,559,712	1,697	44.0%	65%
Hughes Network Systems, LLC.	\$616,141	\$1,214,400	2,086	54.5%	28%
Verizon	\$296,590	\$856,339	57	1.5%	7%
Total	\$6,226,928	10,630,451	3,840		

TABLE 1 NEW YORK BROADBAND GRANT AWARDS IN LEWIS COUNTY NY

A graphical representation of the census blocks awarded grant funding by the New NY Broadband Grant program is shown in Figure 1. The census blocks awarded also represent the blocks to which Spectrum did not commit to expand its service as part of the merger agreement approved by New York State.

Of the 3,840 locations in Lewis County covered by the New NY Broadband Grant, 54.5% of the locations are being addressed via satellite service. Unfortunately, satellite service can be impacted by weather and has high latency, which can be detrimental to Voice Over IP, gaming, and video services. Also, satellite service is relatively expensive with capped data usage. Once the cap is surpassed for the month, speeds are throttled down.

Communities today increasingly compete to become a “Gigabit Community,” which is the new Gold Standard for areas that want to attract the people, jobs, businesses, and investments of the future.

Community involvement toward this goal enables the development of mutually beneficial partnerships involving organizations such as counties, cities, electric companies, alternative broadband providers, and more, enabling new investments in broadband infrastructure.

These organizations have the ability to make long-term investments to improve their communities, and the Digital Divide is being bridged by communities that are willing to plan and cooperate to reach their growing broadband needs.

According to NYS the entire County is now served by sufficient broadband. The federal government however does not recognize current generation satellite service as served. With that said, the FCC is awarding next generation satellite service to satellite companies through its RDOF Grant program.

As documented in this Inventory of Broadband Infrastructure report, Lewis County is underserved in many rural areas in which a grant has been awarded to satellite providers. A map of the County's broadband supporting infrastructure illustrating this statement is contained later in this report.

In 2020 and 2021, the world moved into lockdown to protect against the spread of the COVID-19 virus. This caused a major shift in the way we perform critical tasks including work from home (video conferencing and collaboration, virtual private network access to company systems), learning from home (video conferencing and collaboration and access to e-learning platforms), telemedicine (video conference with healthcare professionals and access to healthcare systems).

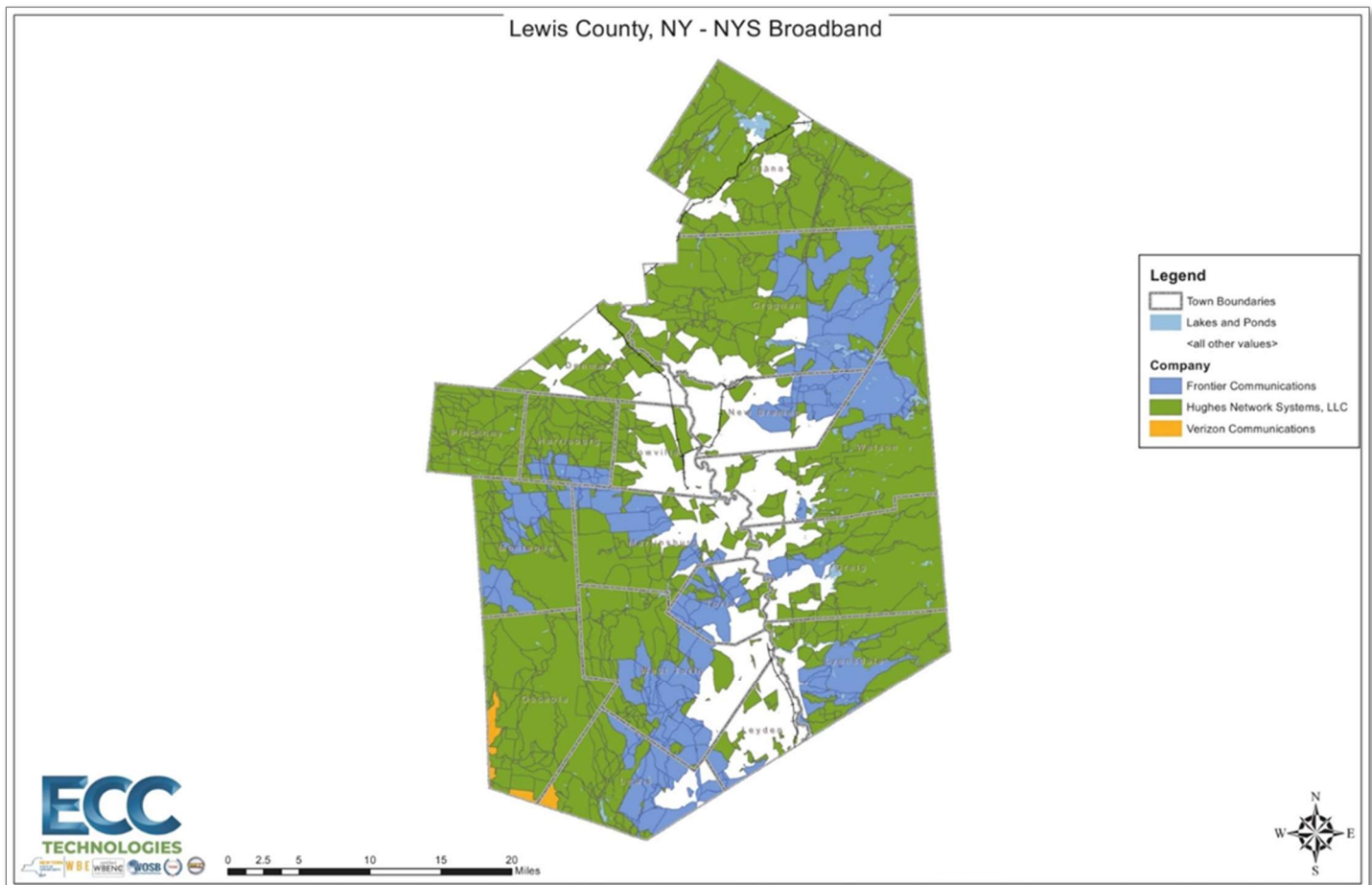


FIGURE 1 LEWIS COUNTY – NEW NY BROADBAND GRANT FUNDING AWARD AREAS ROUNDS 1, 2 & 3⁴

Covid also had personal impacts including shopping (ordering food and items for delivery or curbside pickup) and entertainment (video streaming, online gaming, social media). Fixed broadband traffic increased up to 60%, voice traffic increased up to 130% and Wi-Fi calling increased up to 80%.⁵

Broadband service is lacking in many areas of the County. People in the County have been enduring the social distancing and self-isolation. The situation has brought to light the importance of remote healthcare, learning and work locally. The COVID-19 pandemic has exposed the nation's persistent broadband issues including availability, affordability, and speed of service exponentially.

As many people are quarantined in their homes, lack of access in rural areas is getting unprecedented attention with newly announced grant programs from both federal and state agencies. In 2015, the FCC set the standard for broadband access at 25Mb/s download by 3Mb/s upload.

A new standard of 100Mbps download is being discussed among industry analysts. Four US Senators called upon the Biden Administration to establish a “21st century definition of high-speed broadband” of 100Mb/s both download and upload. The FCC is likewise supporting a new standard above the current one.⁶

Also, as shown in the study’s mapping information, pockets of areas across the County would benefit from additional service and competition. Information in this report can be used to help Lewis County lessen the Digital Divide.

Figure 2 represents the FCC 477 data set that identifies those census blocks reporting at least 10 Mb/s download and 1Mb/s upload speeds (light green areas) and areas with at least 25Mb/s download by 3Mb/s upload speeds (dark green).

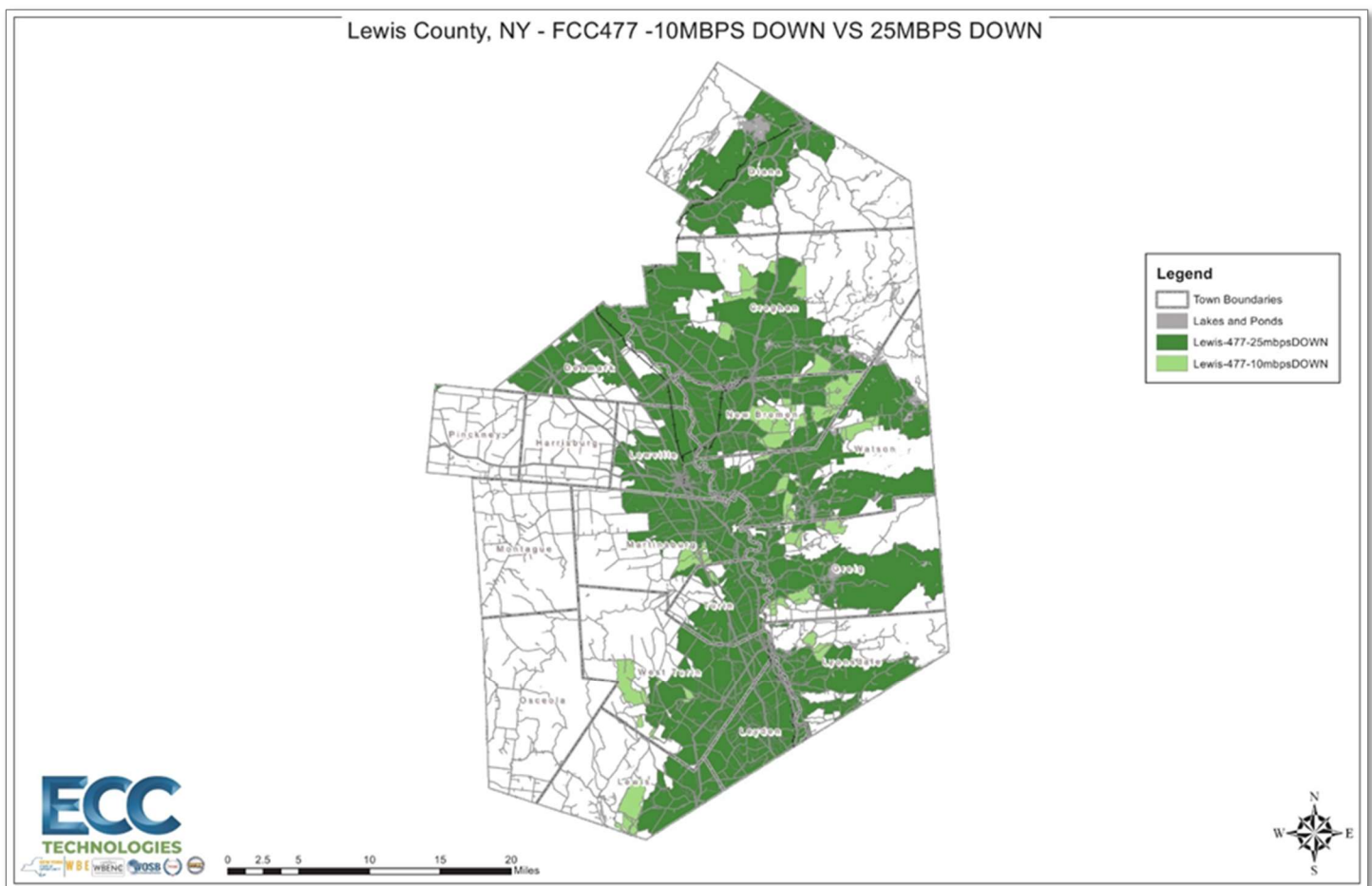


FIGURE 2 FCC 477 CENSUS BLOCKS REPORTING AT LEAST 25MBPS/3MBPS AND 10MBPS/1MBPS⁷

The two award winners in Lewis County were Frontier and Space Exploration Technologies Corporation, or as it is better known SpaceX. The second auction date has not been set.

The green areas represent awarded areas to SpaceX. SpaceX will be launching and utilizing next generation low earth orbit satellites to provide at least 25/3 Mbps service. This new service is known as Starlink and is currently in beta testing.

The Starlink website states speeds will be between 50Mb/s and 150Mb/s. However, a clear line of site between the Starlink dish and the satellite needs to be available. Unlike terrestrial fixed wireless services, weather can impact the performance of the connection.⁹

The award amount is paid out to the winner bidding as yearly installments over a 10-year period. Under the RDOF rules the service provider that wins the award has 3 years to complete 40 percent of their build and 6 years to complete the full build out.

There is concern, because the program allowed competitors to continuously underbid each other, to maintain or gain market share. Many areas saw a “race to the bottom” that will potentially produce unsustainable business models.

Many fear that some of the companies that will take the money will not be able to construct the system they have committed to build. In January of this year, a letter signed by 160 Senators and House Representatives urged the FCC to be fastidious with its review and confirm that the winners can deliver on their respective system build out commitments.¹⁰

1.3 Areas of Potential Eligibility for USDA ReConnect Grant

ECC reviewed the rules of Round 1 and 2 of the USDA ReConnect grant program. Based on this review, the NY State Broadband grant awarded to HughesNet satellite were eligible for funding. However, the USDA, in its analysis of satellite services, does not view current generation satellite service as a viable broadband service due to usage caps and latency issues inherent with the service.

“Sufficient access to broadband means any rural area in which households have fixed, terrestrial broadband service delivering at least 10 Mbps downstream and 1 Mbps upstream,” was the definition applied by the USDA ReConnect Funding Opportunity Announcement. “Mobile and satellite services will not be considered in making the determination of sufficient access to broadband.”¹¹

Therefore, if future ReConnect Grant rounds are consistent with the first two rounds, areas in Lewis County that were awarded to HughesNet by New York State could be eligible for grant consideration. Like the RUS based USDA ReConnect grant program, the FCC RDOF grant program also did not consider census blocks served by current satellite service as being served.

The Federal RUS programs consider satellite-based broadband as a potential solution “...if the proposed project is proposing to fund terrestrial-based facilities for satellite broadband services, the plans offered to subscribers may not cap bandwidth usage. Furthermore, RUS must determine that the service plans offered to subscribers within the service area are reasonable.”¹²

RDOF grant awards were made to SpaceX through their Starlink satellite broadband service in small areas of Lewis County. It is expected these areas will no longer be eligible for Federal grant dollars. However,

there are still many rural areas of the County that may qualify for the federal ReConnect grant program if the requirements of the program remain the same in future rounds.

The map below, Figure 4, represents the RDOF award areas overlaid on the NYS Broadband grant award areas. The sections colored green representing the HughesNet awarded areas are the first areas to investigate to explore for potential funding opportunities.

All areas that were considered served before the grants (white area) and all areas that have new FTTH services (Frontier and Verizon) are not eligible for ReConnect grants. Also, the census blocks where RDOF grants were awarded to SpaceX counts as served by the USDA ReConnect program.

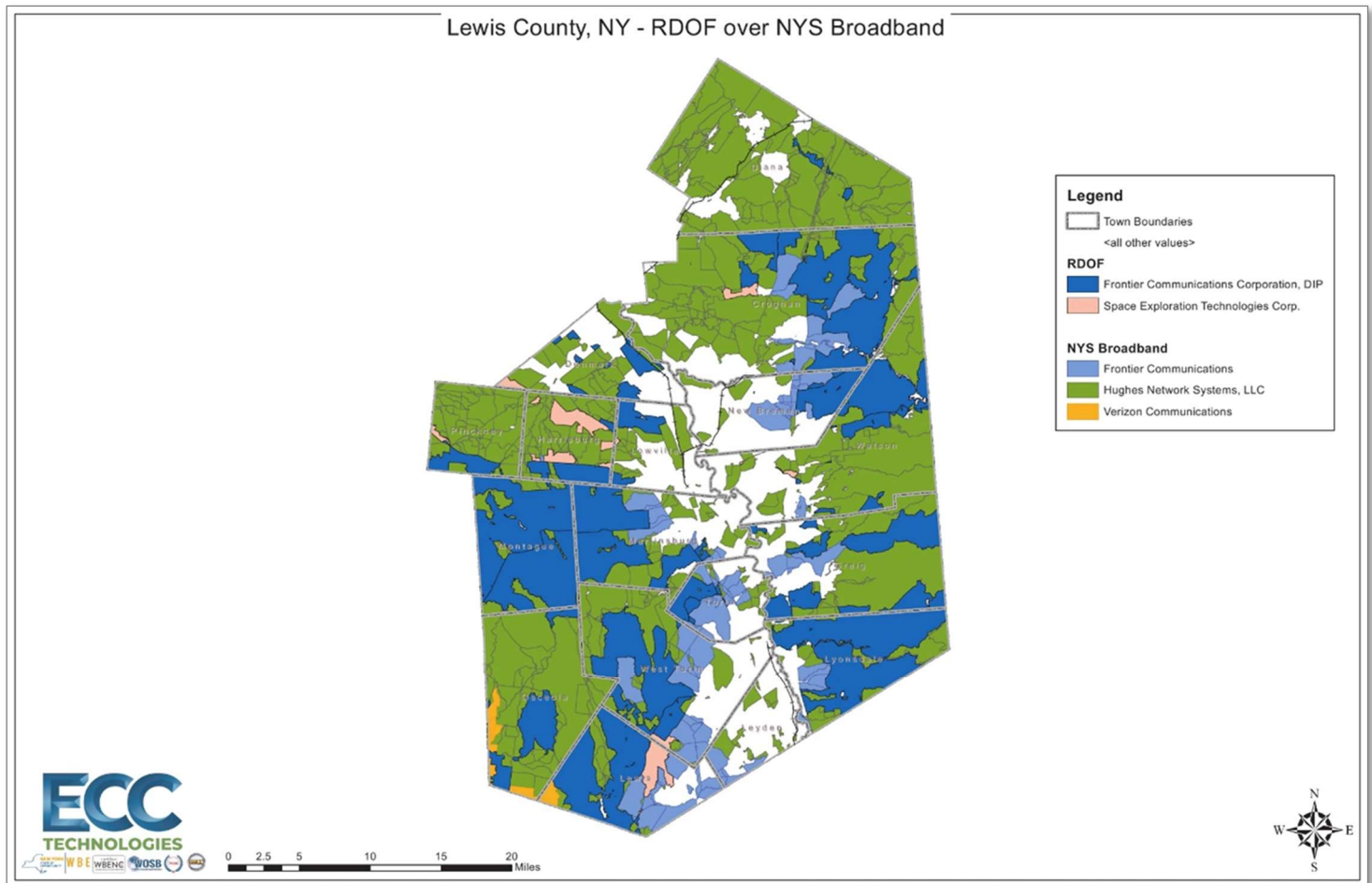


FIGURE 4 FCC RDOF AWARDS OVERLAID ON NYS BROADBAND GRANT AWARDS

2. Commission of the Study

In September of 2020, the Development Authority of the North Country (DANC) contracted with ECC Technologies, Inc. (ECC) to perform a telecommunications study by conducting an inventory of existing fiber optic, coaxial assets and other broadband supporting infrastructure within Lewis County, NY.

The purpose of the study is to accurately identify areas of the County that are lacking in broadband infrastructure. In addition, the data collected from this effort will be able to be used in the next steps to develop a technological solution to address the lack of broadband in unserved and underserved areas of the County, and to obtain partners and funding to address these issues.

The inventory project included a field inventory of the County's existing broadband infrastructure, namely the fiber optic, coaxial cable, and tower infrastructure. ECC's OSP team drove the roads in the County and to the extent possible, physically identified and documented the County's existing broadband infrastructure.

As per the agreed upon scope of work, ECC did not drive the villages in the County including Lowville as our focus was on the rural areas of the County. The ECC team obtained County maps from the County's GIS Department, and along with the field data gathered, created maps of the County's infrastructure into an ESRI GIS database.

This general infrastructure report documents our findings. The County will be described in terms of existing fiber, coaxial and tower infrastructure, and potential fiber and wireless based broadband access. ECC has identified the different broadband providers in the area and describes their current levels of fiber infrastructure. ECC has created maps documenting, to the extent possible, fiber and tower infrastructure.

These maps consist of the following information, and will serve as the foundation to overlay future County Initiatives:

- Fiber optic cabling
- Coaxial cabling
- Central Office and remote terminals
- Wireline boundaries
- Wireless tower and water tower sites

At the end of this task, the inventory and accompanying maps created will not only show where fiber-based broadband exists today but give insight into areas that need additional infrastructure for the expansion of broadband services. Critical broadband access/telecommunications infrastructure information will be disclosed that will lay the foundation for broadband improvement plans.

The information compiled by ECC Technologies is presented in the following pages of this report. Much of this information has also been placed into an interactive electronic geographic information system (GIS) database and provided to DANC. This database tool consists of interactive mapping elements that can be

used to identify and locate the major telecommunications resources within the area for economic development and County planning purposes.

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2.1 Research Methodology

To gather the information required for the study, ECC researched the major telecommunications providers listed below and performed field surveys, whereby an ECC engineer travelled the rural (outside towns and cities) roads in the County to identify and document outside plant (OSP) infrastructure. The following were identified:

1. Wireline Providers
 - a. Incumbent Local Exchange Carriers (ILECs)
 - b. CATV Cable TV/Modem Service Providers
 - c. Competitive Local Exchange Carriers (CLECs)
 - d. Network Services and Dark Fiber Providers
2. Communications Towers

Secondary research utilized publicly available databases managed by federal and state agencies and information purchased from telecom industry database research organizations to complete the inventory. Primary research was conducted by outside plant personnel field surveys for fiber optic and coax route identification via aerial and underground markers, networking equipment and tower locations.

The towers in the County were visited and digitally documented. ECC also obtained telecommunications industry data publicly available from the following Federal, State, and local organizations: the FCC, PSC, and Lewis County. Other resources included certain databases to which ECC has access, telecommunications industry research companies, telecommunications provider websites, and telecommunications industry professionals.

ILEC's are no longer marking their buried fiber cables as "Buried Fiber Cable." All new installations are simply being marked as "Caution: Buried Cable." This is being done to avoid giving competitors the locations where the ILECs are expanding/deploying new fiber services.

2.2 GIS Mapping/Database

All infrastructure information discovered in the inventory phase has been integrated into a GIS model developed for and provided to DANC. This GIS database will be administered, stored, and updated by DANC staff to ensure security and continuity of the resource.

The GIS database of information was developed to support broadband and economic development initiatives. This information will be used by DANC and the Lewis County Planning Department for County and local level use. The maps included in this report represent the area's fiber optic cable, coaxial cable and vertical asset infrastructure documented in this study.

3. Broadband Infrastructure Overview

This section is an introduction to the major providers and different types of infrastructure used in the County to deliver broadband service. A summary map that shows the available and important infrastructure is also included.

The broadband providers in Lewis County are delivering service to homes, businesses, and other organizations at varying degrees of access, performance, and cost. The infrastructure in use by the industry include landlines consisting of copper, coaxial, fiber optic, or wireless based technology utilizing strategically placed towers and satellite.

3.1 Wireline Infrastructure – Copper, Coaxial, and Fiber Optic

Wire line infrastructure includes telephone and cable TV cables, which are either buried in the ground or attached aerially to utility poles. Wire line cables can be twisted pairs of copper wire, coaxial, or fiber optic cable.

The wireline infrastructure for the County is primarily owned and operated by incumbent local exchange carriers Frontier and Verizon and cable provider Spectrum Communications, Crown Castle (in Lowville only) and Mohawk Networks (in Harrisville and Lowville only) which are fiber-based providers per the FCC 477 report.

Digital Line Subscriber (DSL) Service.

Traditional telephone copper cable is still the most used infrastructure serving homes and businesses across the County. Copper cable is used by the telephone companies to connect Central Offices to end users for the purpose of providing traditional voice and data services, typically referred to as broadband.

Copper cable has a very limited capacity for broadband service and is usually the reason why advanced telecommunications services are not available in certain areas. Copper based DSL service speed is limited by the distance from the home to the Central Office or Remote Terminal, the condition and diameter of the copper wire, and the restrictive performance qualities inherent to the wire itself.

The majority of residential telephone service in Lewis County is supplied by copper cable that consists of numerous pairs of unconditioned twisted pair (UTP) copper wires. In an effort to provide a faster service over existing copper lines, the telephone carriers have developed digital services called DSL, or “digital subscriber line” technology, which is considered by some a low-end form of broadband.

ADSL uses an ordinary UTP line to deliver bandwidth services of up to 24Mbps service (and sometimes more), depending on the type of ADSL and the distance from the point of equipment. Since its introduction into the telecommunications industry, ADSL has become a very popular service for the incumbents because it requires only the addition of new end equipment and not the replacement of cable, which is very expensive.

Another type of DSL being deployed is VDSL2 which can provide a sum of downstream and upstream speeds of up to 200Mbps. A drawback of the technology, however, is that it requires that customers be within three cable miles of the DSL equipment, and even that is no guarantee of service for a number of reasons.

CATV/Coaxial Cable

The cable TV (CATV) provider (Spectrum) utilizes Data Over Cable Service Interface Specification (DOCSIS) over a hybrid fiber optic/coaxial cable network to provide high quality video, high speed data, and voice services to their customers.

In most cases the fiber provides a connection from the signal origination, referred to as the headend, to a node which converts optical signals to electric. From the node, the signal is sent to the customer site via coaxial cable. The high-performance characteristics of coaxial cable supports the transmission of telephone, video, and data.

The CATV provider utilizes cable modem technology, which uses a single coaxial cable TV connection to a customer location to support the simultaneous transmission of voice, TV programming, and Internet. In Lewis County broadband access is available in central populated areas via this hybrid fiber/coaxial infrastructure installed by the incumbent cable TV provider.

Dark Fiber

Dark fiber is the term used in the industry to describe fiber optic strands (in the cable) that are leased or sold to the customer or end user without services delivered over them. Unlike fiber from a service provider, the end user must light and operate the fiber strands with their own electronics.

This type of fiber is typically used to connect multiple locations together over an end user's private network. The advantage of dark fiber is that the end user has control over the type of technology and network used, however the end user is also responsible for operation and maintenance of the infrastructure.

3.2 Central Offices (CO's)

The Central Office is a building, typically made of brick or concrete block, which the incumbent telephone company uses to place and operate voice, data, and video switching equipment. The equipment used in the local Central Office determines the level and availability of services within a certain area or "wire boundary" which is the extent to which the wires leaving the CO can reach.

Frontier has four and Verizon has two central offices located in the County and two and three respectively located outside of the County but providing service to border areas.

3.3 Utility Poles

Utility poles and telephone poles are generally owned by one of the following organizations: the local power companies, the incumbent telephone companies, or the municipal entities including villages and cities. Utility poles are used to carry electric power lines and telecommunications cables. The electrical

power lines are generally located at the top of the pole and the telecommunication lines are attached on the sides.

To be compliant with the National Electric Code (NEC), there must be 40" separation between a telecommunication line and a power line on the pole. The area on the pole where the telecommunication cable resides is known as the communications space or "comm space." Usually, aerially mounted fiber cable is tagged with an orange, blue, or yellow label so it is easily identified for maintenance or repair.

All poles have a limited number of telecommunications lines they can carry. These lines are attached to the pole, one on top of the other. Therefore, a taller pole can accept more lines than a shorter one. Once lines are installed on a pole, adding a new line can require moving existing lines to make space for the new one.

In the construction process of adding a new cable, moving the existing lines, or replacing a pole to make room for another is called "Make Ready" work.

The majority of poles in Lewis County are owned by National Grid, a utility company, and telephone companies Frontier and Verizon.

3.4 Water and Wireless Tower Structures.

Wireless technologies are the fastest growing segment of the telecommunications industry. Wireless infrastructure supports cell phones, pagers, personal digital assistants (PDAs), mobile data terminals, messaging, and Internet services. Wireless antennas or access points are located on wireless towers, tall buildings, and even water towers throughout the County. In some instances, the wireless infrastructure installed can offer connectivity in areas where landline infrastructure cannot.

Wireless bandwidth technologies are developing at a rapid pace. Hybrid solutions that are using fiber as the backhaul and wireless as the "last mile" are being tested and installed across the country. Using fiber cable to get close to the customer, new and emerging wireless technologies are bridging the gap by providing high bandwidth service over the last mile costly link to the customer home.

These new hybrid systems can provide speeds of 50Mbps and more. Cellular companies and wireless Internet service providers (WISPs) are beefing up their networks in preparation for new wireless technologies that will allow them to connect to customers in rural environments.

The key to wireless providers accessing rural areas is the availability of fiber infrastructure and vertical assets where the provider can place their antennas. Even the incumbent telephone companies are beginning to take notice. AT&T is now using wireless technologies as a way to bring high bandwidth to homes in rural areas.¹³

AT&T'S Fixed Wireless Internet promises to bring speeds in excess of 10Mbps down and 1Mbps up. However, based on the current FCC definition of broadband access, which is 25Mbps downstream and 3Mbps upstream, this would not be considered ideal.

5G Mobile / Cellular Technology

Fifth generation cellular technology (5G) promises high speed data rates (promising over 100mbps in very short distances) that are supported by a large number of antennas covering a given area. On October 27,

2020, the FCC established the 5G Fund for Rural America which will make up to \$9 billion available to bring 5G mobile broadband service to rural areas.

The federal government plans to auction off \$9 billion in 2 phases in the coming years.¹⁴ Since 5G is dependent on many vertical assets to mount antennas on, it will be interesting to see the types of solutions the cellular companies will have for rural areas.

Many of the wireless towers in Lewis County have cellular equipment installed on them to provide cell phone-based coverage. The service coverage of a typical cellular equipped tower can be anywhere between one and ten miles depending on the equipment in use, how the equipment is set up, terrain, and the height of the towers.

Cellular service is limited in bandwidth and is charged on a “data cap” rate, limiting the Mbps used per month, which equates to very expensive data plans for Internet usage. Because of these two factors, it is generally not considered a viable small business and home form of Internet access at this time.

There are 55 wireless tower structures and one water tower identified either through field inspection, GIS database research, registered with the FCC data base or through data provided by the County. Of all the tower sites identified, there are 24 wireless towers registered on the FCC website.

The majority of the towers are located alongside major roadways and population centers, with the highest concentration of towers installed in and around Lowville and the southwestern area of the County. According to County staff, the County owns eight Public Safety towers and co-locates on two other towers for its communications radio system. Based on the FCC information, the County has registered three towers in Lowville, one in Redfield and one in Harrisville.

The height of the registered towers ranges from 38 to 305 meters with the majority being in the 50-to-100-meter range. Owners of the FCC-registered wireless towers in the County are shown in Table 2.

FCC Registered Towers in Lewis County, NY	
Owner Name	Towers
Allphase Telecommunication Consulting, Inc.	1
American Towers, LLC	1
Carroll, Philip	1
Communication Enhancement, LLC	1
The Flack Broadcasting Group, Inc.	1
Lewis County, NC	5
NY State Dept. of Environmental Conservation	1
Nextar, Inc.	1
Pinnacle Towers, LLC.	1
Power Authority of the State of New York	1
SBA Towers, IX, LLC	1
SBC Tower Holdings, LLC	1
St. Lawrence Valley ETV Council, Inc.	5
St. Lawrence Seaway RSA Cellular Partnership	1

TABLE 2 VERTICAL ASSETS IN LEWIS COUNTY

A map showing the locations of all wireless towers in the County appears below. Fiber optic transport is important as a high bandwidth backhaul to wireless last mile services.

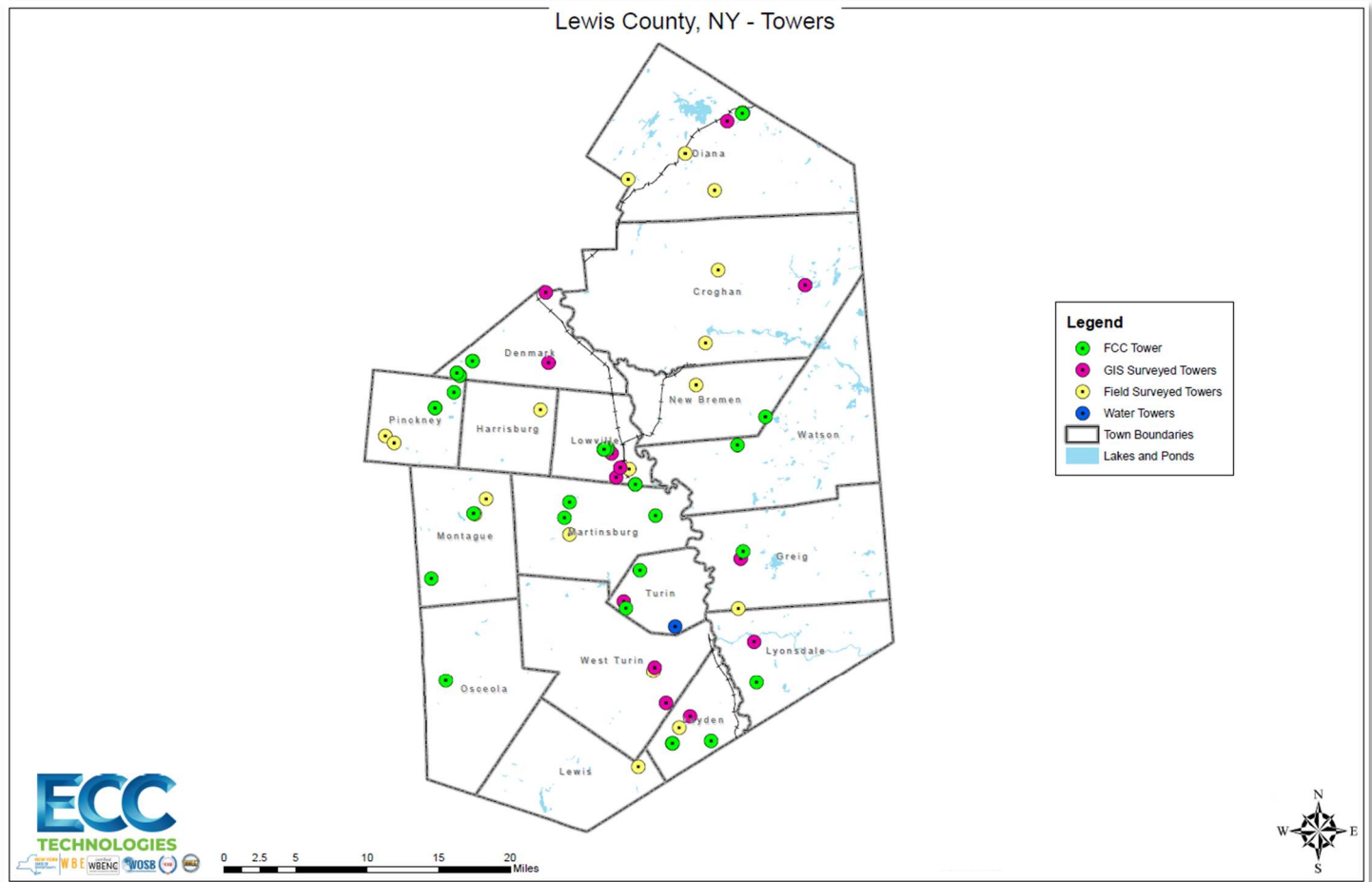


FIGURE 5 LEWIS COUNTY TOWERS

As part of the field study, ECC OSP personnel took pictures of towers in the County. Below are examples of two vertical structures in Lewis County. These pictures are linked to the GIS mapping information and are important to Wireless Internet Service Providers (WISPs) and others as they highlight availability of vertical assets that could support the installation of access point equipment. This information will be provided electronically to DANC.

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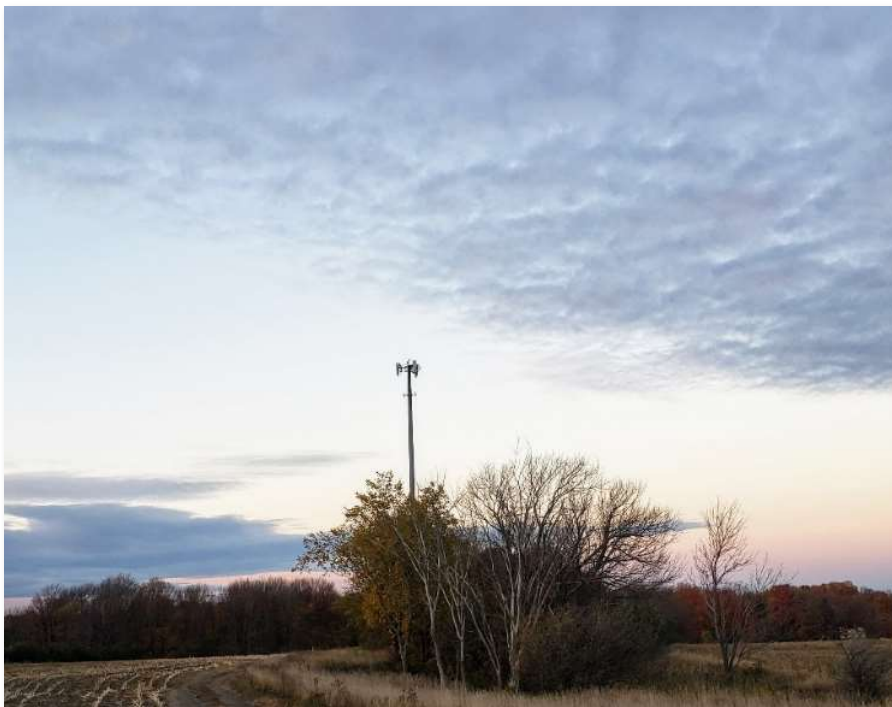


FIGURE 6 MONOPOLE TOWER



FIGURE 7 LATTICE TOWER

4. Telecommunications Inventory

This section of the report is an inventory of the telecommunications service providers and their supporting landline and wireless infrastructure in Lewis County. The data collected includes all relevant service providers including the incumbent service providers, the competitive service providers, the wide area network providers, and others.

Additional information is also included on specific provider infrastructure including fiber, wireline boundaries, Central Office locations, and wireless towers.

4.1 Telecommunications Service Providers in the County

Voice, video, and data services are provided to the County residents and businesses by a variety of companies using a range of technologies and infrastructures. Services can be provided over copper wire, coaxial cable, fiber optic cable, wireless technologies, and via satellite.

The incumbent telephone company, or ILEC (incumbent local exchange carrier) and the incumbent cable TV providers are the primary owners of telecommunications infrastructure within the County. There are also a couple CLECs (Competitive Local Exchange Carriers) focused on businesses only, three satellite providers, and a number of cellular companies.

Each of these providers uses different methods of delivering services to their customers, resulting in varying speeds and reliability. Typically, fiber provides the fastest, most reliable speeds, while coax, copper wire, wireless, and satellite provide the lowest and least reliable.

Copper wire is an older technology with limitations inherent to its structure; wireless speed and reliability are dependent on distance from the infrastructure and clear line of site; satellite can be compromised by weather or obstacles like foliage. These factors are important to bear in mind when determining whether businesses and residents truly have adequate access to effective Internet services.

4.2 ILECs, CLECs, and Region Wide Area Networks

A local telephone company or **incumbent local exchange carrier (ILEC)** is responsible for development and maintenance of the cabling and switching equipment needed to deliver local telephone and other telecom related services to the communities. The major ILECs providing service within the County are Verizon and Frontier (formerly Citizens).

Figure 8 is an ILEC map showing provider territory and Central Office locations in the County.

Frontier.

Frontier is headquartered in Norwalk, Ct. Frontier has a regional office in Norwich, NY. Frontier is the incumbent telephone company for the central and eastern areas of the County, which represents about

three quarters of the County. Frontier has six Central Offices that serve the County, four of which are inside the County and one outside. According to their website and the FCC 477 database, Frontier can provide DSL based Internet service that ranges from 1 to 115 Mbps down and .128 to 5 Mbps depending on customer location, as well as phone and TV service (DISH).

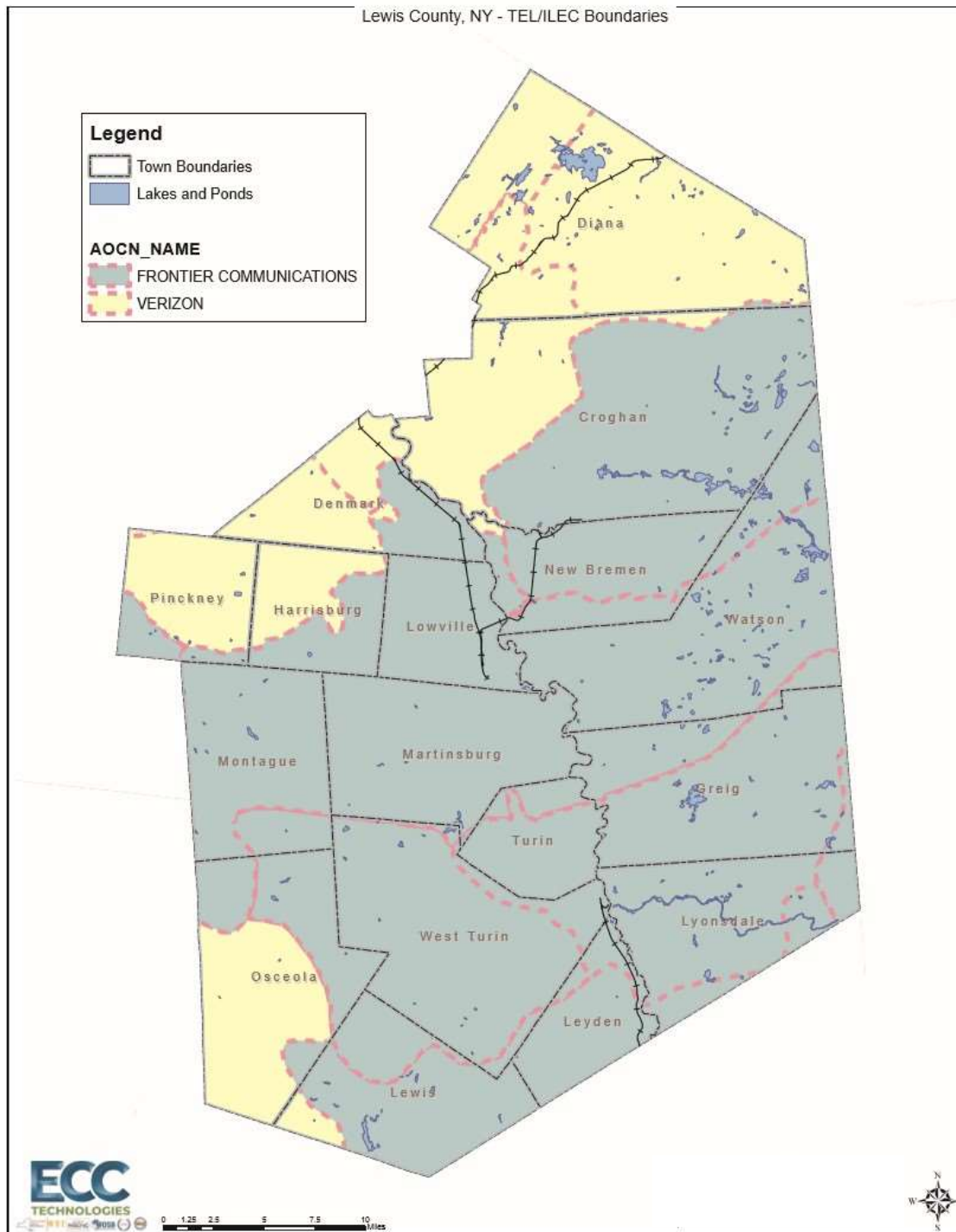


FIGURE 8 LEWIS COUNTY ILEC BOUNDARY MAP

According to the New NY Grant website, Frontier has received over \$5.3M in state grant funds to provide FTTH service in previously underserved areas of the County. In Table 3 below is a chart that lists the grant awards, total investment, and number of homes to be served by Frontier in Lewis County.

New NY Grant Awards to Frontier by Township			
Location	State Grant	Total Investment	Locations Addressed
CROGHAN	\$864,301	\$1,392,151	276
GREIG	\$90,814	\$146,277	29
HARRISBURG	\$209,812	\$337,950	67
LEWIS	\$429,019	\$691,032	137
LEYDEN	\$59,499	\$95,836	19
LYONSDALE	\$585,595	\$943,233	187
MARTINSBURG	\$278,706	\$448,918	89
MONTAGUE	\$360,125	\$580,063	115
NEW BREMEN	\$501,044	\$807,044	160
TURIN	\$350,731	\$564,931	112
WATSON	\$801,670	\$1,291,271	256
WEST TURIN	\$782,881	\$1,261,006	250

TABLE 3 NEW NY GRANT AWARDS TO FRONTIER BY TOWNSHIP¹⁵

Provider levels of service for non-residential customers are based on tariffed rates, Individual Case Basis pricing (ICB) and Service Level Agreements (SLAs) and are not reflective of what may be shown on their website. Also, installation of services charges may apply and can be a one-time charge or bundled into the monthly recurring cost.

Verizon.

Verizon's corporate headquarters is in New York City with a regional business office located in Syracuse, NY. Verizon offers voice, data services, DSL, cloud services and managed network services to the businesses and residents in their area of the County. According to their 477 reporting, Verizon provides DSL services of 1.5 to 15 Mbps depending on customer location.

The Verizon territory covers the northern and southwestern most area of the County. This area represents about one quarter of the County. They offer services from their 2 Central Offices (CO's) in the County, and 3 outside the County. According to their FCC report, Verizon offers DSL services of 15 Mbps in most areas and faster speeds in a small area in the southwest where it offers fiber to the home.

Below, Table 4, shows funds awarded to Verizon through the New NY Grant. The table shows Verizon's committed investment and the number of homes to be serviced.

New NY Grant Awards to Verizon by Township			
Location	State Grant	Total Investment	Locations Addressed
OSCEOLA	\$275,777	\$779,981	53

TABLE 4 NEW NY GRANT AWARDS TO VERIZON BY TOWNSHIP¹⁵

The table at the end of this section describes the telecommunications services currently available at each of the ILEC's Central Offices with exchange numbers. These services are supported by the switch technology at the location of the Central Office and may or may not be available to a customer within the exchange. The service is dependent upon the cabling infrastructure available and the distance from the serving Central Office. The service information is based on the provider's 477 reporting as of June 2019.

Central Office	Copper	Fiber	Future RDOF Awarded Fiber
Frontier	DSL	FTTH	FTTH
Croghan	115 Mbps	n/a	Up to 1 GB
Lowville	115 Mbps	n/a	Up to 1 GB
Constableville	115 Mbps	n/a	Up to 1 GB
Lyons Falls	115 Mbps	n/a	Up to 1 GB
Adams (out of County)	115 Mbps	n/a	Up to 1 GB
Boonville (out of County)	115 Mbps	n/a	Up to 1 GB
Verizon	DSL	FTTH	
Harrisville	15 Mbps	n/a	n/a
Black River (out of County)	15 Mbps	n/a	n/a
Carthage (out of County)	15 Mbps	n/a	n/a
Copenhagen	15 Mbps	n/a	n/a
Camden (out of County)	15 Mbps	n/a	Up to 1 GB

TABLE 5 LEWIS COUNTY CENTRAL OFFICES WITH SERVICES

FCC Form 477-based services information was reported by carriers prior to the award of the fiber to the home grants. Since the providers have committed to 1 Gigabit service, that bandwidth speed will be available in the future, or already is offered in those select areas. With the RDOF awards, Frontier has up to six years to complete their builds.

Further information regarding services in the area are listed at the end of this section.

On the following page is an ILEC map showing the two main providers' fiber infrastructure and Central Offices. Central Offices, or COs as they are better known, are typically brick buildings that house the telephone company voice switches and local network equipment. Based on this map, the general availability and level of Internet service provided by the ILECs can be made. ***As with all the outside plant (OSP) field generated maps, this map is considered highly confidential information and should not be copied or distributed.***

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Lewis County, NY - TEL/ILEC Boundaries with RTs & COs

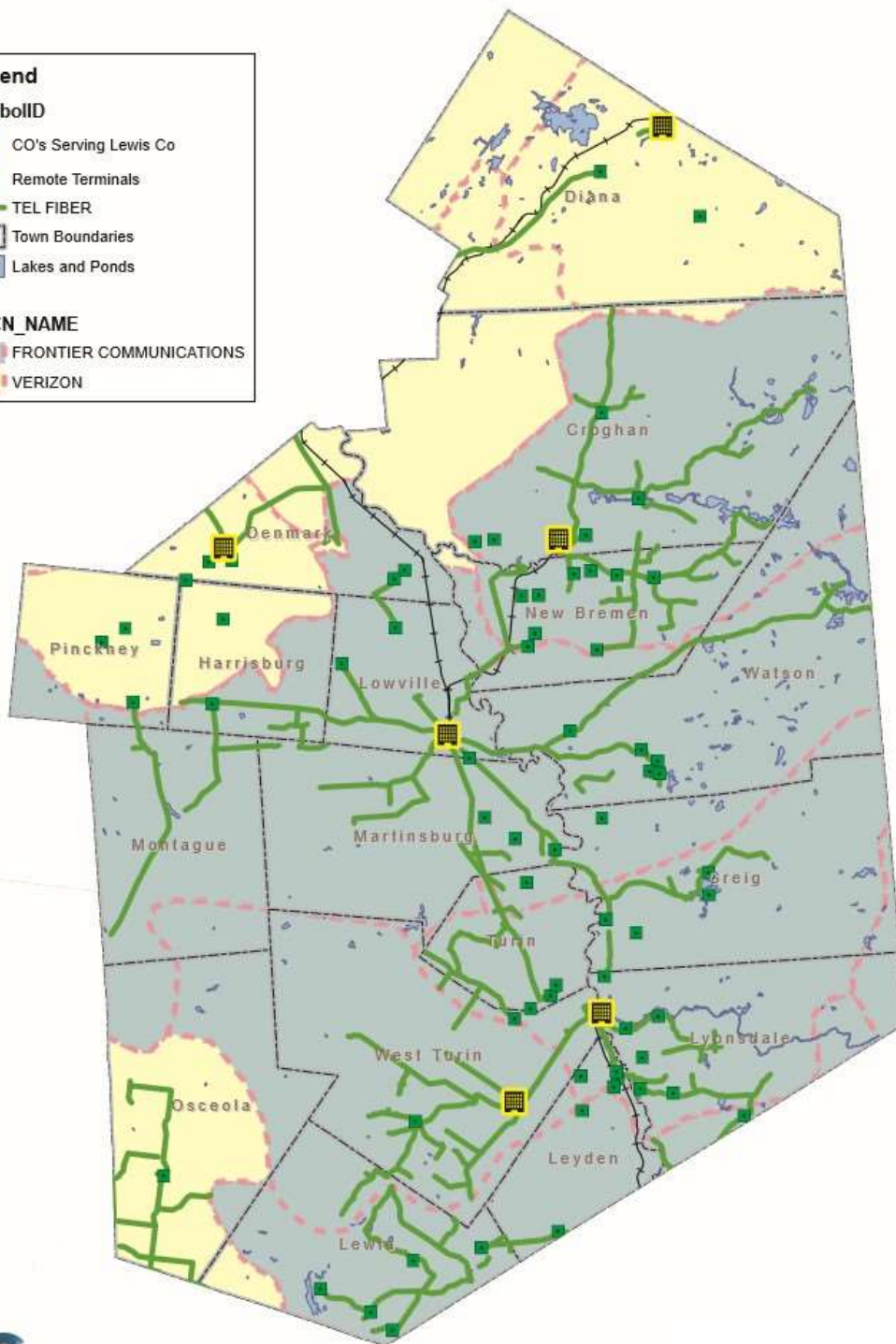
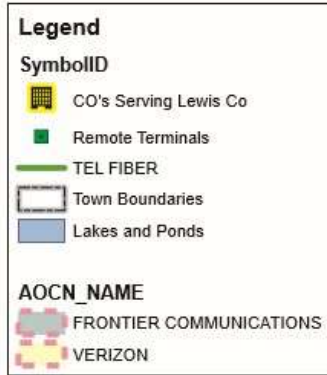


FIGURE 9 ILEC BOUNDARIES, CENTRAL OFFICES AND REMOTE TERMINALS.

Telephone Company Fiber Routes and Fiber to the Home Areas

The map in Figure 10 is based on the recent grant awards to Frontier and Verizon. This illustrates the fiber to the home installs which have been identified in a number of areas in the County. These installations are primarily in the Frontier areas; however Verizon has a small footprint in the bottom southwest corner of Osceola, where they have built FTTH. For these areas, fiber based last mile infrastructure allows for any future level bandwidth service an end user might require.

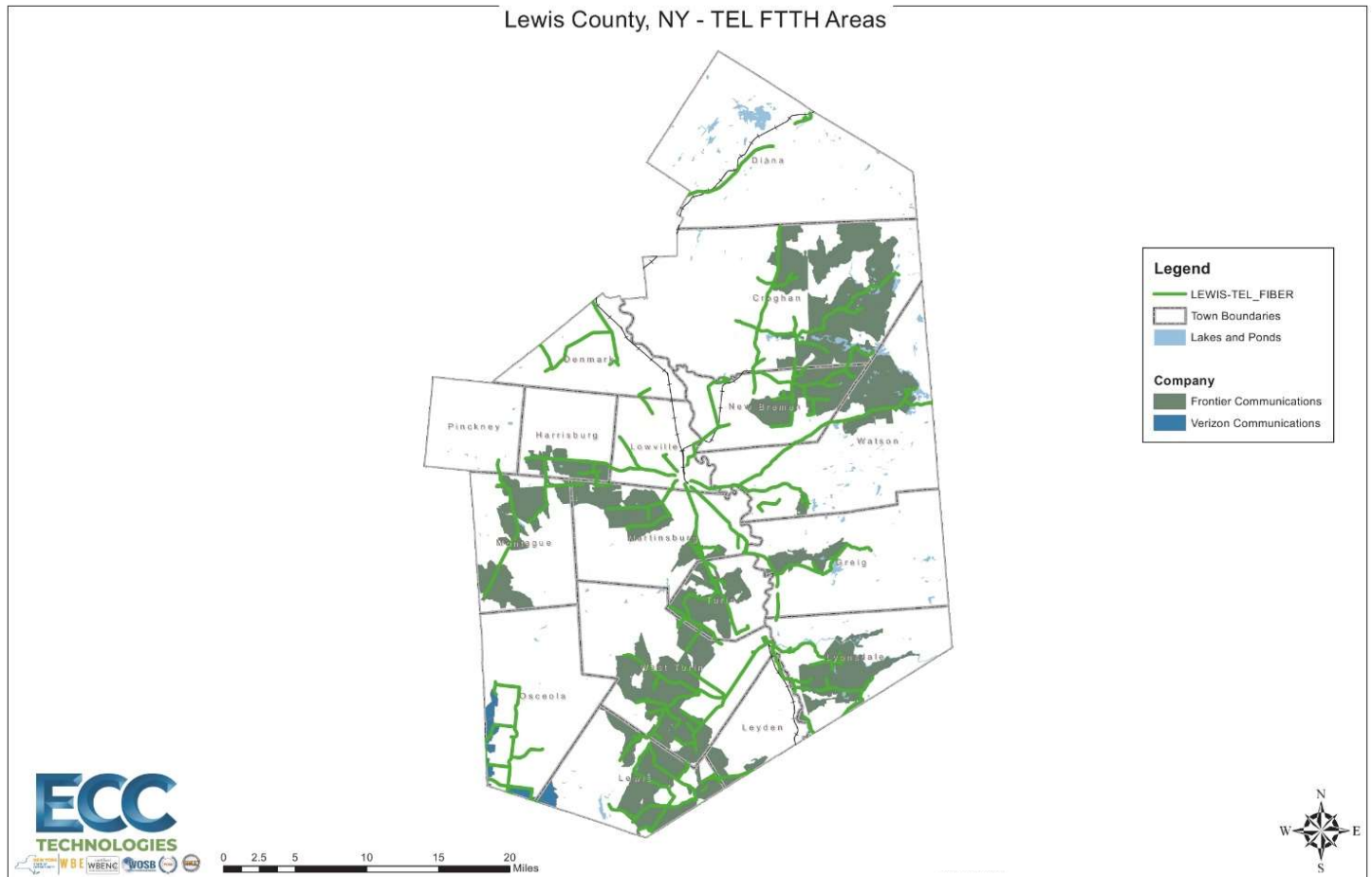


FIGURE 10 TELEPHONE COMPANY FTTH AREAS IN LEWIS COUNTY

Competitive Local Exchange Carriers (CLECs)

CLECs are telephone companies created to compete with the Incumbent Local Exchange Carriers (ILECs). CLECs arose as a result of the Telecommunication Act of 1996, which was intended to promote competition among long distance and local phone service providers.

The term is used to differentiate between new or potential competitors and established local exchange carriers. ECC identified two CLEC type companies with facilities in Lewis County, NY. These CLECs include: Crown Castle, and Mohawk Networks.

A CLEC that provides **regional wide area network** services is a company that either owns or leases fiber infrastructure in each area to connect customers to provide customer point to point internal communications or Internet access.

These companies typically target customers such as school districts or healthcare organizations that have multiple locations in a spread-out area. This type of provider can also provide access to another service provider, which is referred to as middle mile access or wholesale backhaul.

Crown Castle.

Crown Castle is a national fiber and wireless company headquartered in Houston, TX. They own over 40,000 towers and 80,000 miles of fiber across the country. Crown Castle is a fiber-based service provider that provides Internet, data center, cloud and voice services to enterprise and carrier customers.

They provide services to small and large businesses as well as government, public safety, healthcare, education, and carriers/service providers. Their offerings include Dedicated Internet Access, Ethernet, Cloud Services, and dark fiber in individual case basis.

According to their FCC 477 filing report, Crown Castle provides 1 Gb/s fiber-based services in the town of Lowville to businesses only. They provide coverage in only 3 percent of that area, which means they have a small number of customers in the County.

North Country Broadband.

The Saint Regis Mohawk Tribe owns Mohawk Networks LLC, with the corporate office located in Bombay, NY, and is also part of the company called Akwesasne TV. Mohawk Networks is focused on fiber based high speed Internet service to Akwesasne (which is federally recognized as the St. Regis Mohawk Reservation) and the surrounding communities.

North Country Broadband, LLC, is an off-territory subsidiary company of Mohawk Networks LLC serving customers in the North Country through its wireless network. In Lewis County both fiber and wireless based services are offered for business and residential. According to their FCC 477 filing they have fiber offered at 100 Mbps and fixed wireless customers in Lowville and fixed wireless at 50 Mbps to residential customers in Harrisville.

In 2017, the New NY Broadband Program as part of its Phase 2 of the New NY broadband grant program, awarded Mohawk Networks \$6.4 million to provide high-speed wireless based broadband service to 3,623 locations, including 3,000 in Lewis County.

After receiving the award, Mohawk Networks determined the actual cost to build its system expansion was much greater than originally projected. As a result, Mohawk Networks later declined and returned the award.

After the Mohawk Network situation was settled, in the summer of 2019 the state Broadband Program office provided Frontier with \$6M of the original award to provide high speed fiber-based internet to 1,916 locations that were to be provided by Mohawk Networks, 1,600 of which are in Lewis County. At the time Frontier estimated it would cost \$5,010 per home to build out the fiber to the home service.¹⁷

FirstLight.

FirstLight has a small presence in the County and are only connecting a few cell towers together via fiber. As of the date of the FCC 477 last report they are not providing CLEC based services in the County.

The map below represents the Competitive Local Exchange Carriers' fiber routes identified in Lowville during the field study.

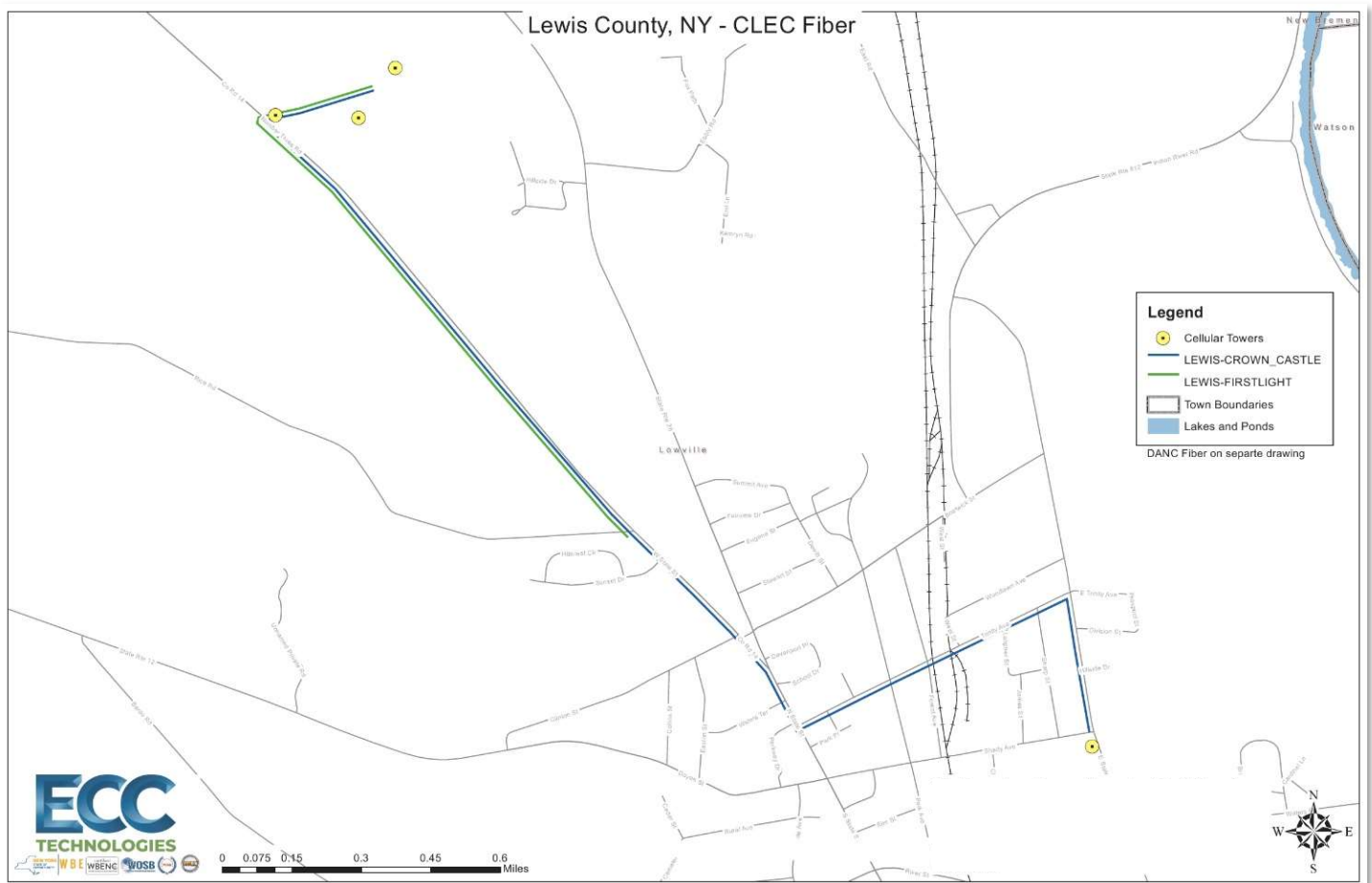


FIGURE 11 CLEC FIBER MAP IN LOWVILLE NY

4.3 Cable Provider

Cable providers, like all service providers, will typically build and provide new service where they deem it profitable. Should a company or residential customer purchase a service in an outlying area, and be willing to pay for the install, the cable provider will expand access, providing service along that new route to businesses and residents. Cable providers offer their service via fiber optic or coaxial cable. **Spectrum Communications** (formerly Charter) is the sole cable TV provider in the County.

Spectrum Communications provides competitive services to the incumbent's DSL service in areas that it has fiber and coaxial cable infrastructure. Spectrum operates a hybrid fiber/coaxial-based network

system in the County, which gives them the capability to provide dedicated business-based fiber services of ethernet, voice, video, managed services, and high bandwidth residential service over coaxial cable.

According to their FCC filing, Spectrum provides residential triple play services of voice, Internet and cable TV at prices starting at \$99 in the area. Speeds of 940Mbps are offered to both residential and business customers. Business service packages start at 200Mbps and include business voice services with no contracts.

A map showing Spectrum's fiber and coaxial infrastructure is shown below. Both fiber and coax can be used to provide broadband service. Based on this map, the general availability and level of Internet service provided by the Cable Television (CATV) provider can be made.

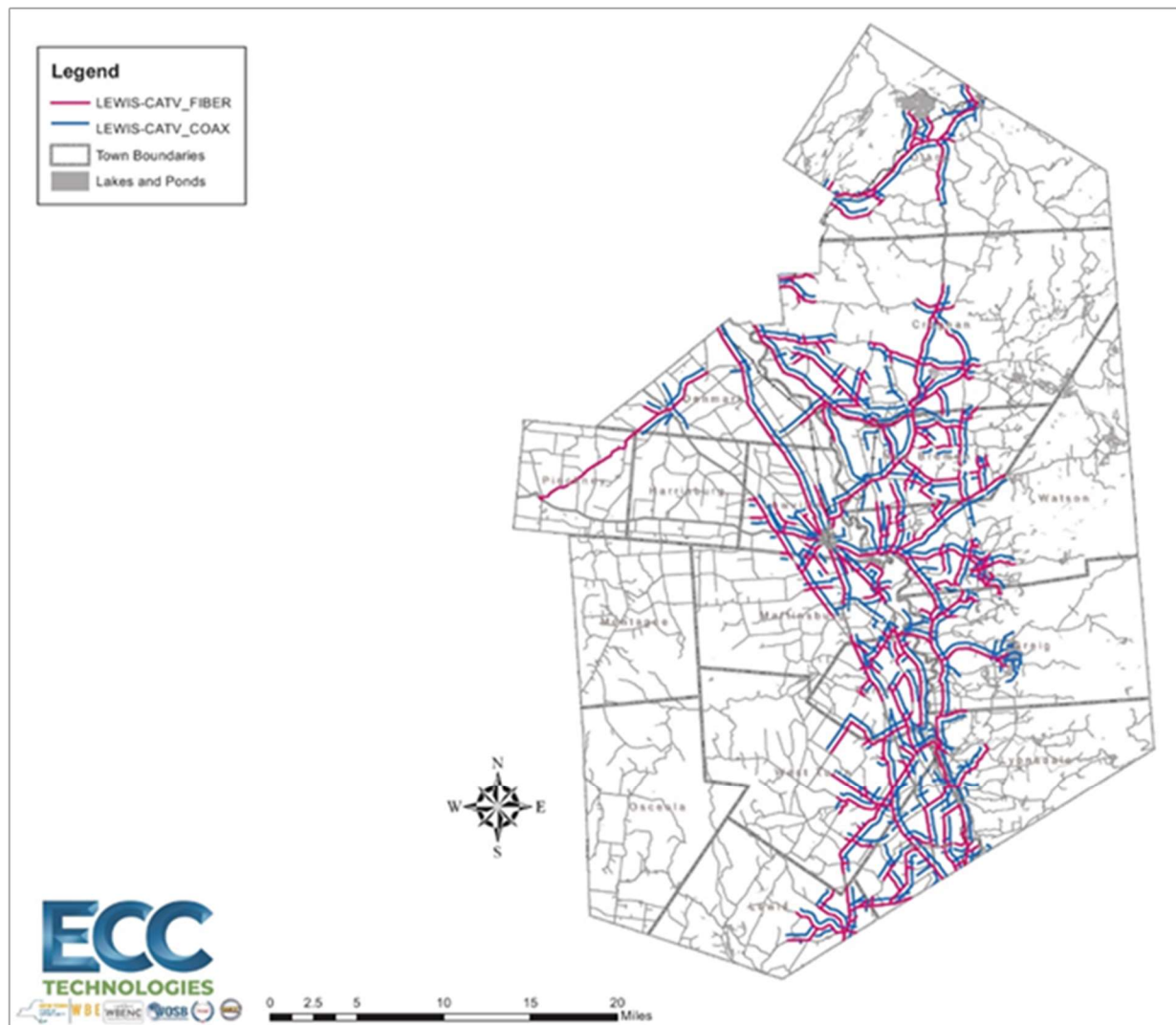


FIGURE 12 SPECTRUM CATV IN LEWIS COUNTY NY

As part of the Charter Communications/Time Warner Cable merger that formed Spectrum, New York State required Spectrum to expand its network to pass 145,000 unserved and underserved homes in rural areas of the State. As of July 19, 2019, Spectrum had expanded its service area to 65,000 of the required 145,000

homes. Though not made publicly available, Spectrum has been given until September 2021 to complete its expansion by the State of New York.¹⁸

As with all the outside plant (OSP) field generated maps, this map is considered highly confidential information and should not be copied or distributed.

4.4 Wireless Internet Service Providers (WISPs)

Mohawk Networks

As discussed previously in the CLEC section of this report, Mohawk Networks, through its subsidiary, North Country Broadband, provides wireless Internet service to residents. According to their 477-form submission, in Lowville they provide service in 23% of the area and in Harrisville it's 27% of the area. According to their website these services include up to 25 Mbps down and 10 Mbps up for \$69.98 per month, and a dedicated IP address are available for \$16.20.

King Street Wireless

King Street Wireless, L.P. is the only other fixed wireless provider identified in this study. They are located in Alexandria, VA and offer an advertised 1 Mbps 700 MHz based service with coverage throughout most the County. Due to its very limited bandwidth offering, King Street is not considered a viable broadband option in Lewis County at this time.

4.5 Satellite

Satellite providers use geostationary satellites orbiting the Earth at the same speed of the Earth's rotation, allowing them for all intents and purposes to maintain "fixed" position, to transmit signals from the Network Operations Center (NOC) to a satellite dish mounted on a business or residence.

According to their 477 reports, two satellite providers claim 100% residential coverage to Lewis County. HughesNet advertises speeds of 25Mbps by 3Mbps. Viasat lists speeds of up to 100 Mbps. As with all satellite providers, one of the greatest issues with service is latency, which is typically 0.5 seconds in length. This can prove problematic with VPN connections or when users are engaging in time sensitive activities, such as live online gaming.

Current NY Broadband Program funding will enable HughesNet to deploy its new Gen5 satellite broadband service, offering download speeds of at least 25 Mbps to the awarded Census Blocks. The grant-supported service area will have a monthly rate not to exceed \$60, with an installation fee not to exceed \$49. These are lower than the provider's current price offerings.

The HughesNet service plan has a monthly usage allowance. Exceeding the monthly allowance can result in slower service. But the service will not have additional charges. HughesNet has committed to the state to use its best efforts to deliver download speeds of 3 Mbps when a user's data plan has been exceeded, but with no guarantees.

On the next page is a chart that shows the NYS New NY Broadband grant and total investment. Also shown are the number of locations addressed or to be served by village of township.

Location	State Grant	Total Investment	Locations Addressed
Copenhagen	\$315	\$472	1
Croghan	\$74,970	\$165,117	320
Denmark	\$18,428	\$33,247	101
Diana	\$85,207	\$197,294	323
Greig	\$66,780	\$99,929	420
Harrisburg	\$52,447	\$120,664	220
Lewis	\$21,892	\$32,322	138
Layden	\$4,095	\$6,990	21
Lyonsdale	\$10,553	\$17,332	66
Martinsburg	\$22,208	\$39,031	141
Montague	\$23,468	\$46,119	123
New Bremen	\$4,253	\$39,244	146
Osceola	\$100,957	\$6,786	27
Pinckney	\$59,535	\$188,289	386
Turin	\$5,040	\$130,045	253
Watson	\$27,720	\$47,138	169
West Turin	\$15,278	\$34,541	80

TABLE 6 NEW YORK STATE AWARDS

4.6 Cellular Service Providers

There are three national cellular service providers with complete or partial coverage in Lewis County with varying connection speeds. The providers' website coverage maps for **AT&T Wireless**, **T-Mobile** and **Verizon Wireless** show they provide 4G LTE coverage.

Cellular providers use radio frequencies to complete phone calls, send text messages, and transmit data from the nearest cell tower to the phone in use. Antennas on the towers both transmit and receive signals from mobile phones.

Cellular signals can be impacted by distance of the phone from the tower, building wall thickness, hills, or other structures. Clear line-of-sight is not necessary for cellular service to work, but will increase call clarity and data transmission speed.

In addition to these traditional providers, Spectrum Mobile is a new cellular provider that uses Verizon's towers and relies on a network of Wi-Fi hotspots to keep costs low. However, to qualify for Spectrum Mobile the customer must have Spectrum internet service. US Cellular offers data and voice coverage in the County through a national partner and is therefore considered in the marketplace as a reseller but not as a facilities based provider.

In terms of 5G/4G coverage in the County, each respective provider’s website shows the following. AT&T has complete coverage with some 5G in the central area. T-Mobile has coverage in the central third of the County and spotty coverage elsewhere. Verizon has 4G coverage in most of the County with spotty coverage along the northeast border and in the southwest corner.

4.7 Regional Wide Area Networks – DANC

In 1985 the Development Authority was created by the New York State Legislature to develop and manage the infrastructure needed to help support Fort Drum, and to support the shared interests of Jefferson, Lewis, and St. Lawrence Counties. The Authority operates as a revenue-based public benefit corporation and is independent of state funding. DANC’s main office is in the Dulles State Office Building in Watertown, NY.

In 2003, DANC completed the initial build of what would become a large regional fiber system. This system connects school districts and colleges across the areas north of the NYS Thruway, to the Internet. The DANC fiber system is a carrier-class telecommunications network that connects this region to carrier collocation facilities in Albany, Syracuse, and New York City.

As can be seen in the map below, the fiber system consists of over 1,800 miles fiber and 31 Central Offices (COs). These CO are locations for cross connection of networks and provider equipment.

In addition to connecting the educational institutions, the fiber is also being made available to any type of service provider. The DANC fiber was built on an open access model and is available to any viable service provider.

According to its website, DANC provides lit services and dark fiber, including: TDM Services, Ethernet Services, Wavelength Services and Private Networks. DANC connects many anchor institutions across the region including over 100 healthcare facilities, approximately 70 schools, 40 libraries as part of the North Country Library System and more than 150 cell towers.

Category	TDM Services	Ethernet Services	Wavelength Services	Private Networks
Description	Traditional SONET based transport service including DS-1, DS-3, and OC-X service. Multiplexing and cross-connect service also available.	Ethernet transport service including 10 Mbps, 100 Mbps, 1Gbps, and 10 Gbps. Higher bandwidth available if required. Includes Virtual LAN service.	Offerings include 2.5 Gbps, 10 Gbps and 100 Gbps wavelengths.	Private networks are high-speed networks connecting multiple locations. Examples include FDRHPO telemedicine network, Jeff-Lewis BOCES, and St. Lawrence-Lewis BOCES.
Availability	Throughout the entire network.	Throughout the entire network.	Throughout the entire network.	Private networks are available anywhere and are based on the requirements of each customer.

TABLE 7 DANC SERVICE OFFERINGS

Although DANC limits its service offerings to those found in Table 7 above, DANC is willing to consider build out and maintenance of wireless or GPON infrastructure in partnership with other firms providing the Internet access, customer billing and support.

The current fiber system was completed years ago, with laterals, extensions, and new builds ongoing. In the map below the DANC fiber system is represented by the red line and the central offices are the yellow dots.

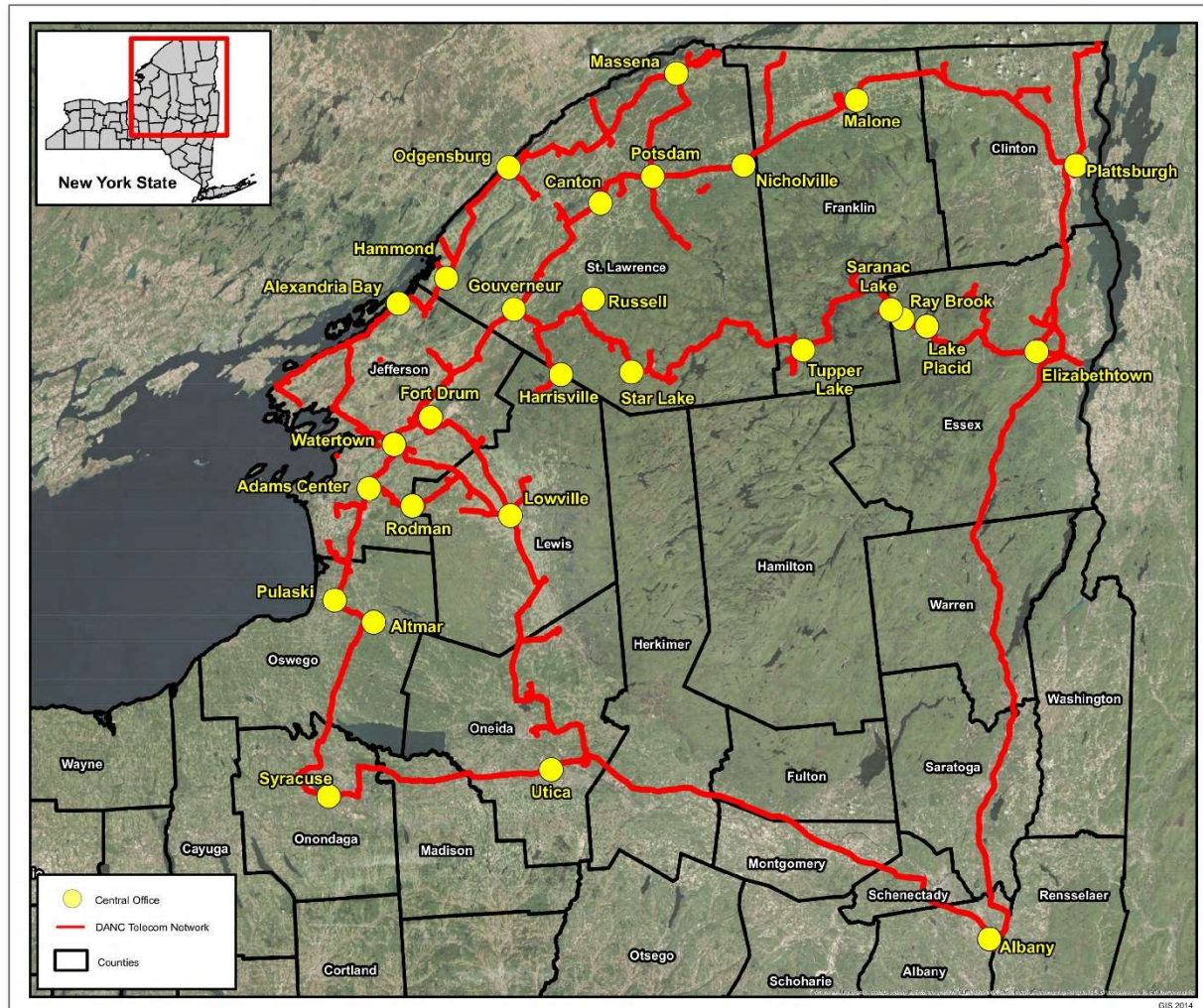


FIGURE 13 DANC NETWORK MAP²⁰

As shown in Figure 13, DANC has a high strand count Open Access backbone fiber cable that routes vertically north to south through the middle of Lewis County, with spurs and secondary routes branching out from Lowville.

DANC's regional upstate NY fiber system has a number of service providers using it, including CLECs, FTTH providers, and long-haul carriers such as Verizon Wireless, AT&T, Slic and Westelcom. DANC has a central office or colocation in Lowville and Harrisville, NY.

In September of 2020, the village of Tupper Lake received a Northern Border Regional Commission grant of \$200K to develop a municipal broadband project in its area. This system when built will be a hybrid model based on fiber to the business/home and wireless technology.

DANC has partnered with the village on this initiative by providing cash, fiber and wireless infrastructure buildout and overall project management and support. Appendix C of this report contains an article that provides details on the buildout and partnership of the network.

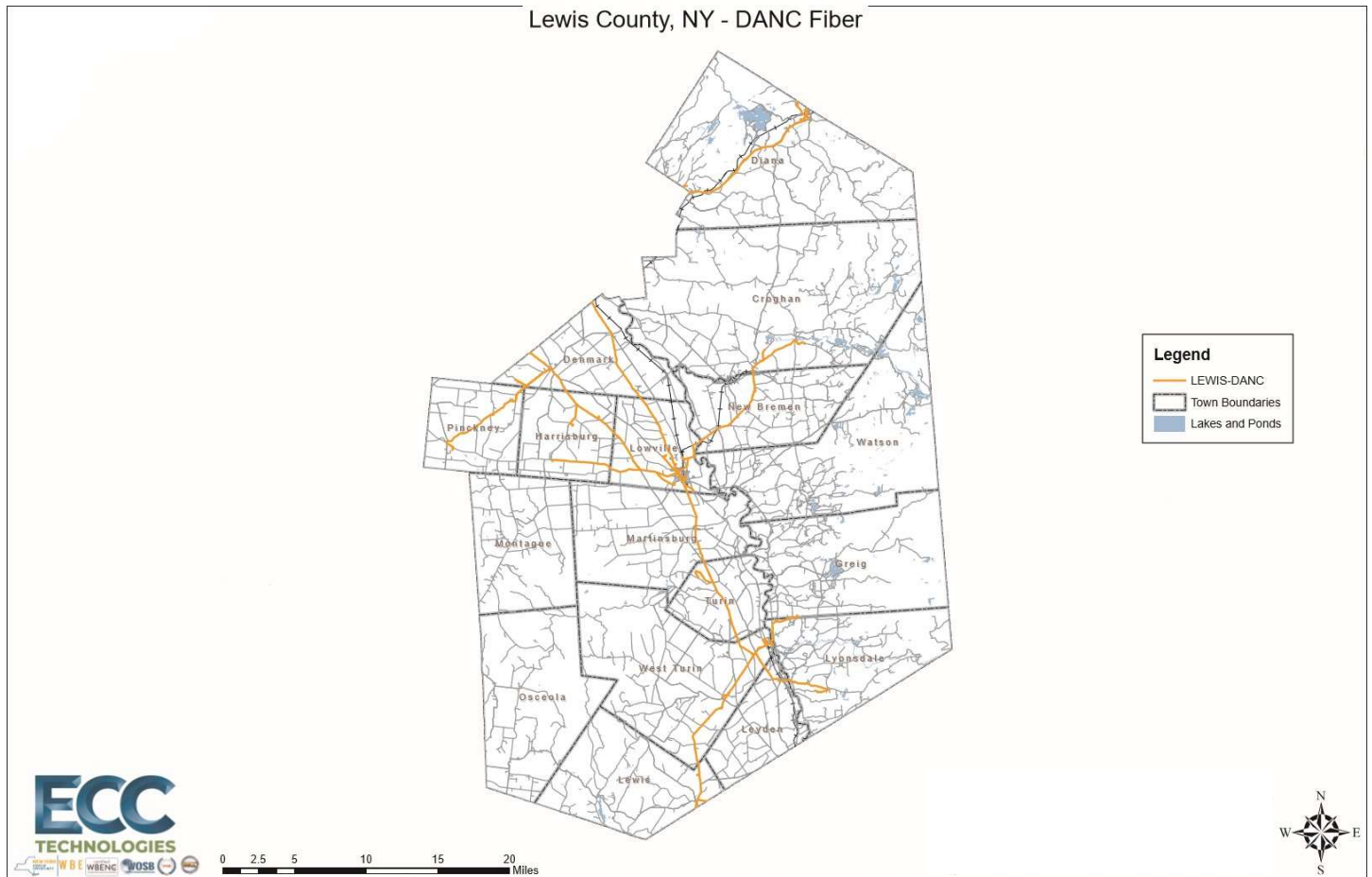


FIGURE 14 DANC FIBER IN LEWIS COUNTY NY

4.8 Broadband Availability & Service Gaps

Broadband providers must submit data to the FCC twice per year on broadband deployments. Form 477 is the FCC nomenclature which establishes the format of the data submitted. This FCC data is only granular to the census block level; meaning that **if one household within a block is served by that provider, the whole block is reported as being served.**

Throughput on Form 477 is reported within speed tiers/ranges and reflects the maximum advertised download and upload speeds within that block, by that provider. Said differently, the information by its very nature is **overstated** by the providers.

This data provides an accurate though dated foundation of general broadband availability in a region and can be utilized as a planning tool by capturing which providers are active in which areas or census blocks. However, the Form 477 data does not capture the exact service available to each home within a block.

The map in Figure 15 shows Verizon and Frontier availability for fixed landline broadband services at the maximum available speeds within the County boundaries. Figure 16 displays a map showing the same criteria from Spectrum.

These maps were created by ECC using the publicly available FCC Form 477 datasets. The different colors represent various speeds of service, ranging from no service up to 1 Gigabit. The different colors designate the different speeds offered according to their website. This information will be used to make comparisons to the field inventory study.

The Form 477 information is at least 18 months old and as new network expansions in the County are “turned up,” many of the areas below shown at less than 10 Mb/s speeds will get changed accordingly. The FCC data is often inconsistent with data from private reporting sources and sometimes the provider websites.

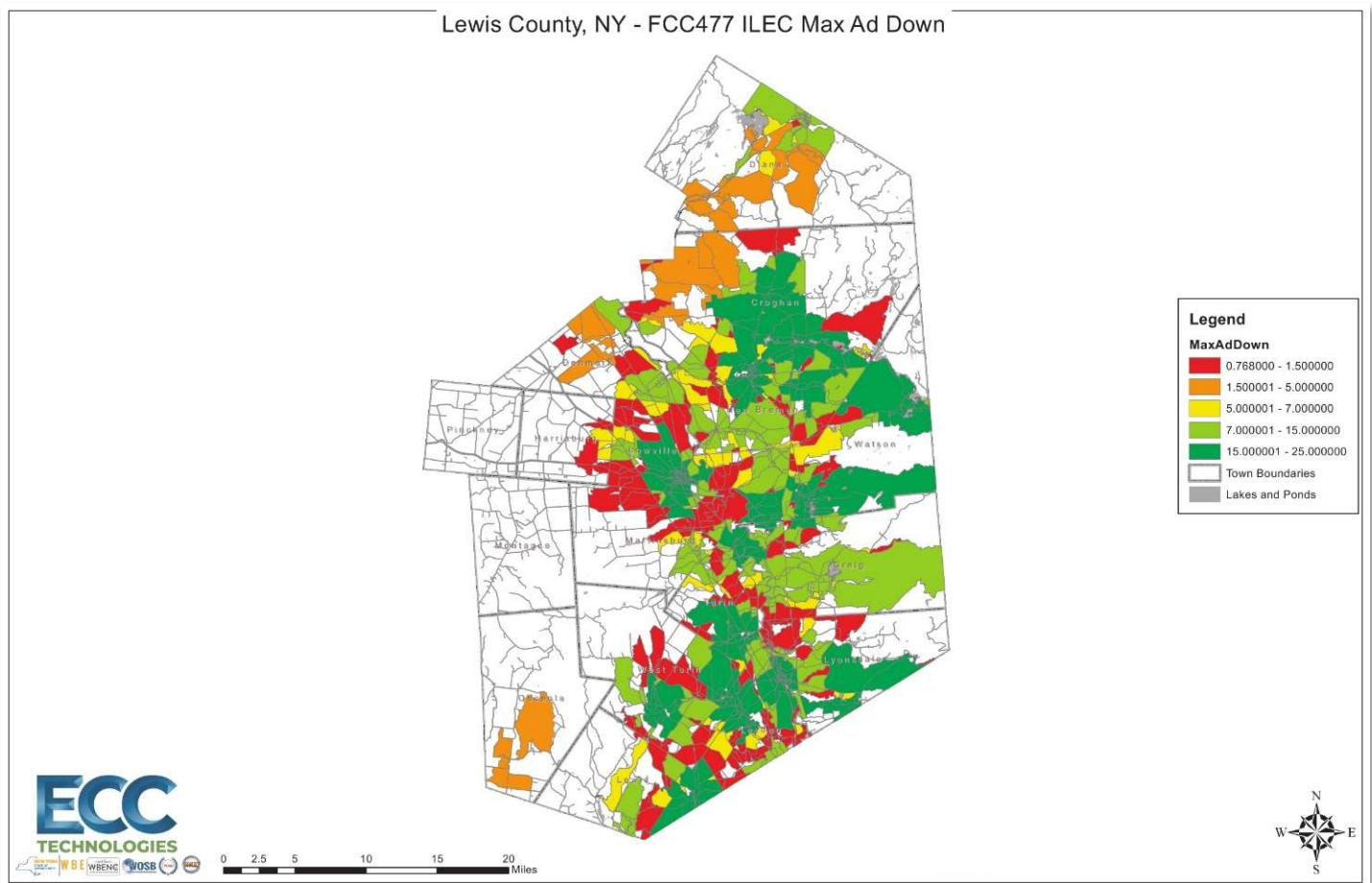


FIGURE 15 FCC 477 DATA – ILEC MAXIMUM DOWNLOAD SPEEDS

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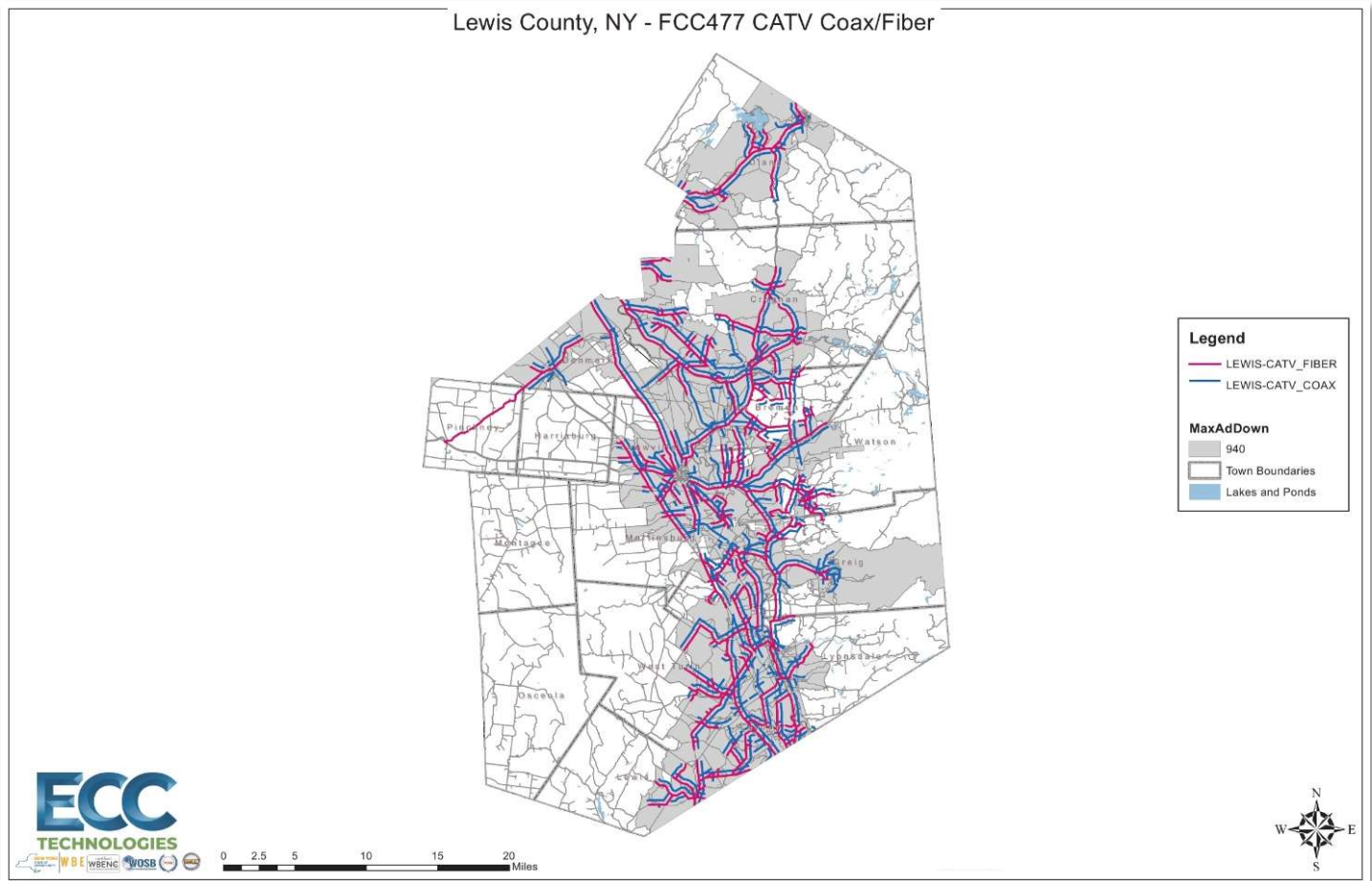


FIGURE 16 FCC 477 DATA – CABLE TELEVISION MAXIMUM ADVERTISED DOWNLOAD SPEEDS

In Figure 16, ECC overlaid the CATV fiber and coaxial data layer onto the FCC served census blocks data. Upon closer inspection, it becomes apparent as to where the coaxial cable ends while the entire census block is counted as being served. That said, there are partial census block areas that remain unserved but not eligible for grant funding under the current grant program rules.

Figure 17 following shows the fiber optic cable and coax cable discovered and documented in the County field survey with the housing and then the population numbers added.

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Lewis County, NY - 2010 Population with Infrastructure

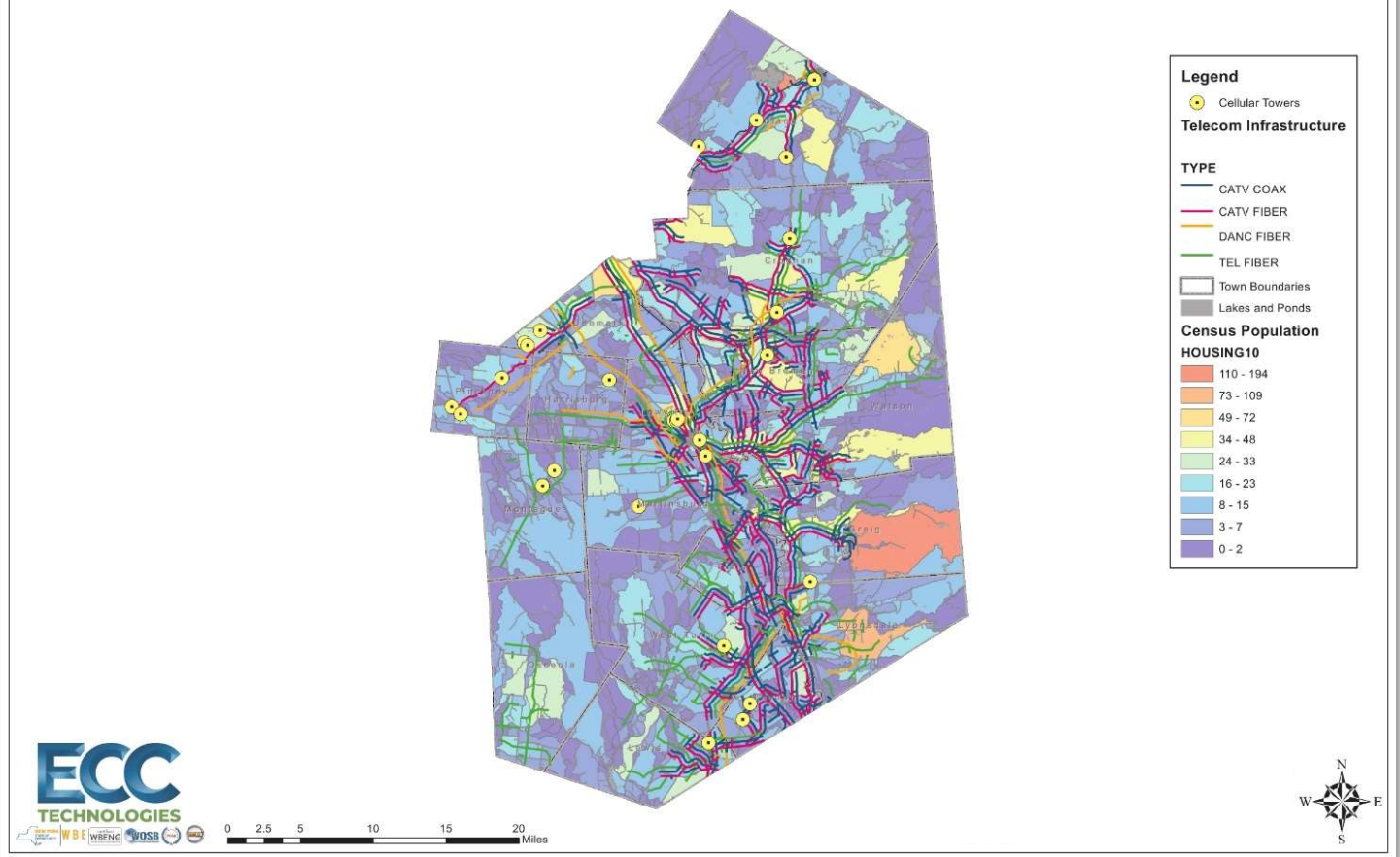


FIGURE 17 LEWIS COUNTY POPULATION AND INFRASTRUCTURE²²

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Lewis County, NY - 2010 Population with Infrastructure

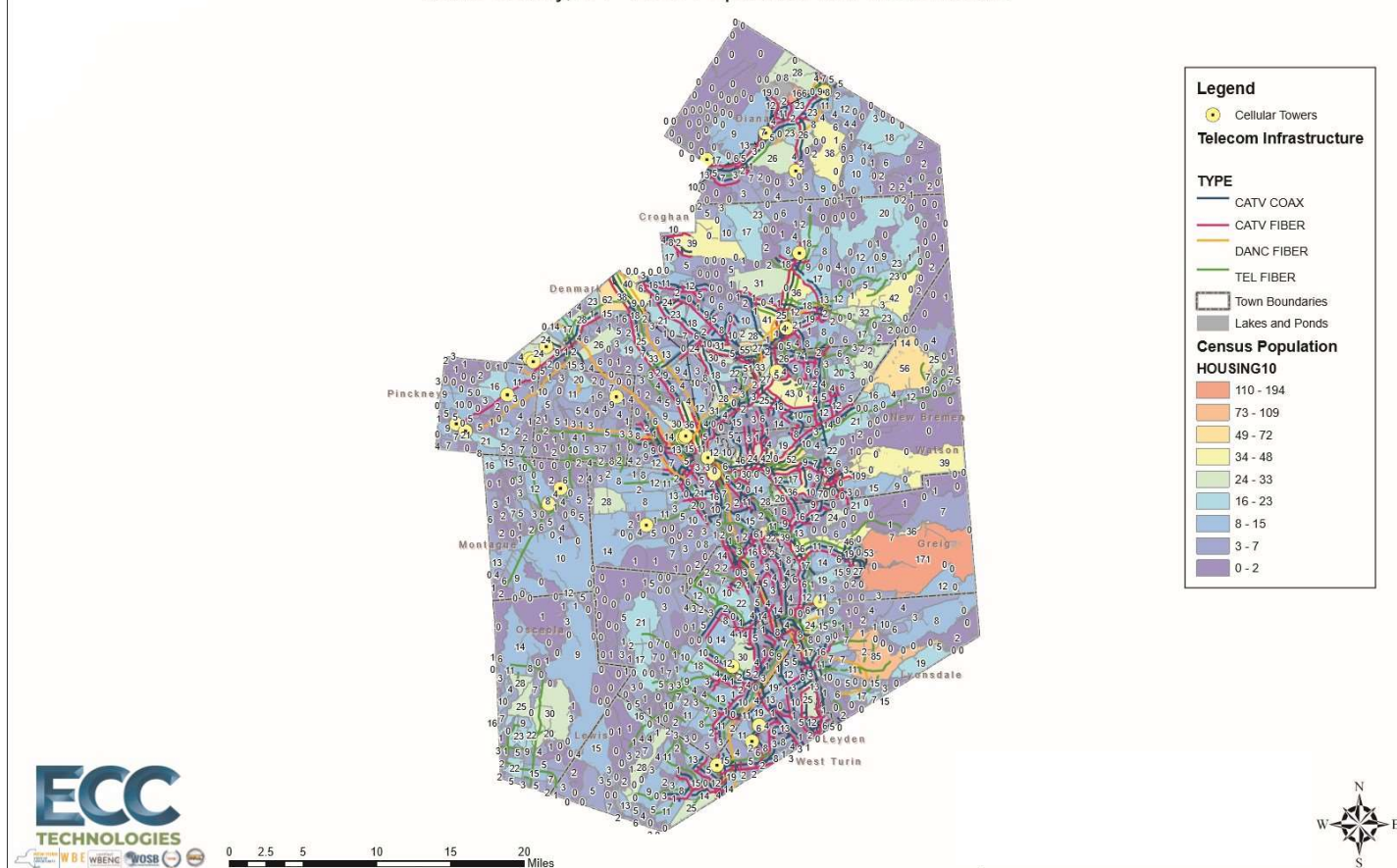


FIGURE 18 LEWIS COUNTY COMPREHENSIVE MAP WITH POPULATION

Initial Target Areas for Expansion

The RDOF program allowed for applications in areas previously awarded to HughesNet through the NYS New NY Broadband program. There are census blocks in the County that were awarded through the New NY program to HughesNet and through the RDOF program to Frontier and SpaceX.

Furthermore, the first two rounds of the ReConnect grant program likewise allowed for applications in census blocks previously awarded to HughesNet by the NYS grant program.

If the third round of ReConnect is consistent with the first two rounds, applications for grant/loans in census blocks that were previously awarded to HughesNet by NYS may be available. The third round of the USDA ReConnect program is anticipated to be available by the end of the year.

Below is a map that shows the areas of the County that were awarded to HughesNet by the New NY Broadband Grant program, and not awarded through the RDOF program. These areas represent 2,995 households in the County. These could become new grant target areas and should be considered for future broadband initiatives.

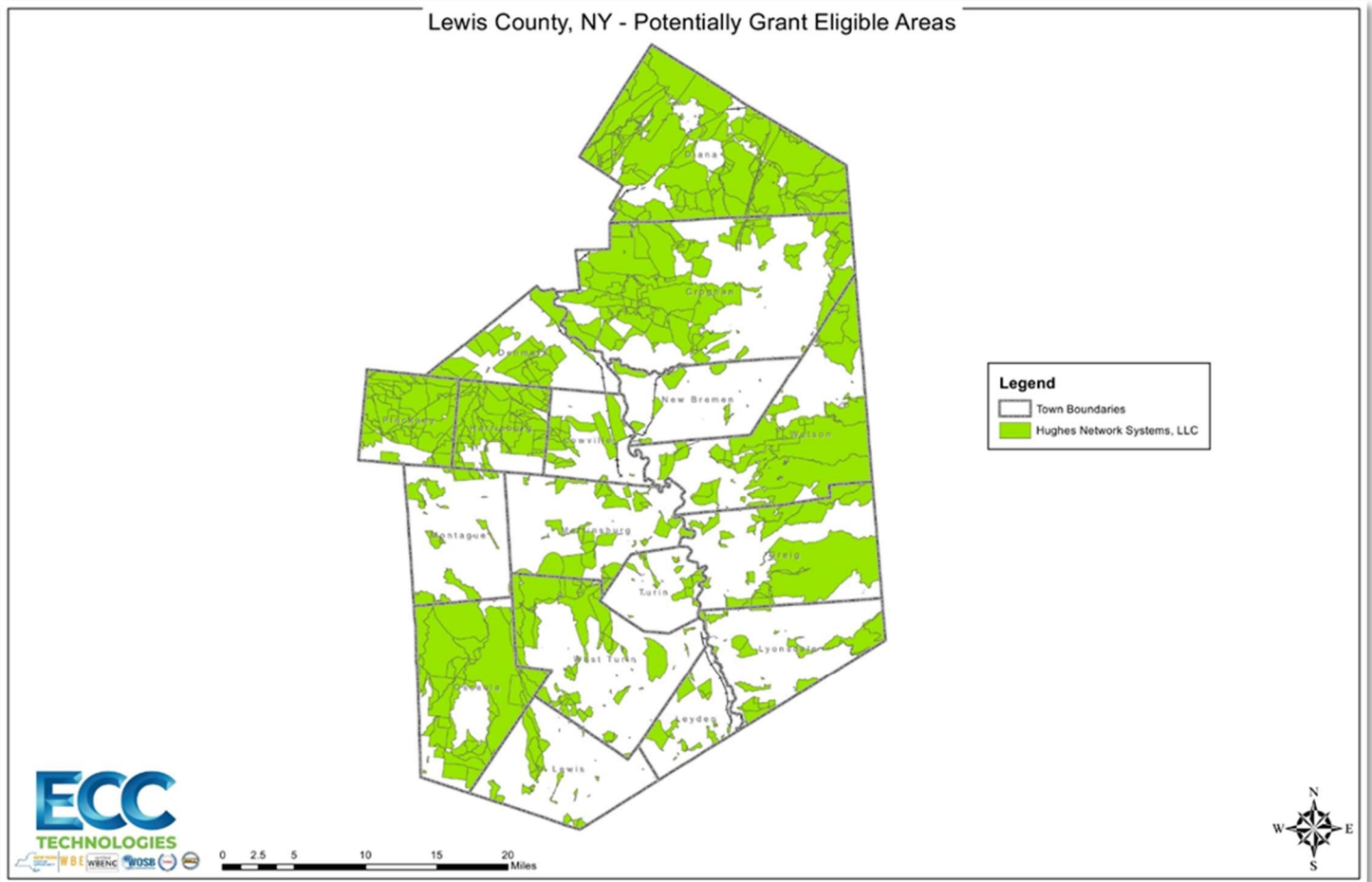


FIGURE 19 NEW NY BROADBAND GRANT BLOCKS AWARDED TO HUGHESNET AND NOT AWARDED THROUGH RDOF

4.9 Broadband Providers and Speeds by Town and Zip Code.

The following pages list internet providers, type of service offered, coverage area and the maximum speed advertised for Lewis County by municipality. This information was gathered by keying in zip codes from an online database at BroadbandNow.com that utilizes the FCC 477 information.

There are a number of towns and villages listed that are outside the County but have zip code-based areas in the County. The zip code map is shown below for illustrative purposes and can be used as a key to assist with identifying provider service.

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Summary of Internet Providers by Location

Lewis County Locations			Zip Code
Summary of Internet Providers in Beaver Falls			13305
Provider	Type	Coverage	Speed
Charter Spectrum	Cable	100%	940 Mbps
Frontier Communications	DSL	100%	115 Mbps
King Street Wireless	Fixed Wireless	100%	1.0 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps

Summary of Internet Providers in Brantingham			13312
Provider	Type	Coverage	Speed
King Street Wireless	Fixed Wireless	100%	1.0 Mbps
Frontier Communications	DSL	97.6%+	115 Mbps
Charter Spectrum	Cable	91.8%+	940 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps

Summary of Internet Providers in Port Leyden			13433
Provider	Type	Coverage	Speed
Frontier Communications	DSL	86.2%+	115 Mbps
Charter Spectrum	Cable	86.0%+	940 Mbps
King Street Wireless	Fixed Wireless	18.4%+	1.0 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps

Summary of Internet Providers in Castorland			13620
Provider	Type	Coverage	Speed
King Street Wireless	Fixed Wireless	100%	1.0 Mbps
Charter Spectrum	Cable	91.2%+	940 Mbps
Frontier Communications	DSL	82.0%+	115 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps

Summary of Internet Providers in Croghan			13327
Provider	Type	Coverage	Speed
King Street Wireless	Fixed Wireless	99.8%+	1.0 Mbps
Frontier Communications	DSL	89.2%+	115 Mbps
Charter Spectrum	Cable	45.8%+	940 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps

Summary of Internet Providers in Glenfield			13343
Provider	Type	Coverage	Speed
King Street Wireless	Fixed Wireless	99.8%+	1.0 Mbps
Frontier Communications	DSL	92.8%+	115 Mbps
Charter Spectrum	Cable	80.3%+	940 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps

Summary of Internet Providers in Greig			13345
Provider	Type	Coverage	Speed
Charter Spectrum	Cable	100%	940 Mbps
King Street Wireless	Fixed Wireless	100%	1.0 Mbps
Frontier Communications	DSL	97.2%+	115 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps

Summary of Internet Providers in Turin			13473
Provider	Type	Coverage	Speed
Frontier Communications	DSL	87.5%+	115 Mbps
Charter Spectrum	Cable	79.0%+	940 Mbps
King Street Wireless	Fixed Wireless	27.2%+	1.0 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps

Summary of Internet Providers in West Leyden			13489
Provider	Type	Coverage	Speed
Frontier Communications	DSL	79.2%+	115 Mbps
Charter Spectrum	Cable	55.8%+	940 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps

Summary of Internet Providers in Lyons Falls			13368
Provider	Type	Coverage	Speed
Frontier Communications	DSL	87.7%+	115 Mbps
Charter Spectrum	Cable	71.5%+	940 Mbps
King Street Wireless	Fixed Wireless	33.6%+	1.0 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps

Summary of Internet Providers in Martinsburg			13404
Provider	Type	Coverage	Speed
Charter Spectrum	Cable	100%	940 Mbps
King Street Wireless	Fixed Wireless	100%	1.0 Mbps
Frontier Communications	DSL	94.9%+	115 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps

Summary of Internet Providers in Lowville			13367
Provider	Type	Coverage	Speed
King Street Wireless	Fixed Wireless	99.6%+	1.0 Mbps
Frontier Communications	DSL	85.5%+	115 Mbps
Charter Spectrum	Cable	82.3%+	940 Mbps
Mohawk Networks	Fiber & Fixed Wireless	23.1%+	100 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps
Frontier Business	DSL	100%	24 Mbps
Spectrum Business	Cable and Fiber	65.8%+	940 Mbps
Crown Castle Fiber	Fiber	3.0%+	1,000 Mbps
Mohawk Networks	Fiber	0.9%+	100 Mbps

Summary of Internet Providers in Constableville			13325
Provider	Type	Coverage	Speed
Frontier Communications	DSL	76.8%+	115 Mbps
Charter Spectrum	Cable	67.3%+	940 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps

Summary of Internet Providers in Copenhagen			13626
Provider	Type	Coverage	Speed
Verizon	DSL	8.3%+	15 Mbps
King Street Wireless	Fixed Wireless	99.6%+	1.0 Mbps
Charter Spectrum	Cable	55.0%+	940 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps

Summary of Internet Providers in Harrisville			13648
Provider	Type	Coverage	Speed
Verizon	DSL	81.4%+	15 Mbps
King Street Wireless	Fixed Wireless	76.8%+	1.0 Mbps
Charter Spectrum	Cable	66.0%+	940 Mbps
Mohawk Networks	Fixed Wireless	27.5%+	50 Mbps
Slic Network Solutions	Fiber	3.8%+	100 Mbps
TDS Telecom	Fiber and DSL	1.3%+	1,000 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps

Summary of Internet Providers in Boonville			13309
Provider	Type	Coverage	Speed
Frontier Communications	DSL	84.5%+	115 Mbps
Charter Spectrum	Cable	79.1%+	940 Mbps
Viasat Internet (formerly Exede)	Satellite	100%	100 Mbps
HughesNet	Satellite	100%	25 Mbps
Northland Communications	Fiber	14.4%+	1,000 Mbps

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5 County Telecommunications Summary

5.1 Summary of Findings:

In summary, based on the information gathered in this study, Lewis County has fair amount of incumbent telecommunications infrastructure within populated areas for a rural county.

For the most part the business areas of the County have broadband access through incumbent local exchange carriers, cable company and DANC. The investments in fiber infrastructure made by DANC and others also provide access to diverse fiber infrastructure.

The more rural areas of the County, to the west and east of the Rt 12 corridor have limited access. In this regard Lewis County is not unlike many other rural counties across the State and U.S.

Local Providers.

In terms of providers there are two Incumbent Local Exchange Carriers (ILEC), one cable TV provider, and two Competitive Local Exchange Carriers (CLEC) that were identified. Additionally, one alternative fiber provider, a fixed wireless provider, and four (4) cellular phone service providers were identified.

Infrastructure.

From an infrastructure standpoint there are eleven Central Offices (including 5 outside the County) and numerous remote terminals providing service to residents and businesses. There are 24 FCC registered towers, with the majority of these located near developed areas along transportation corridors including Routes 12 and 194 to the west, and Routes 812 and 12 to the east and north.

In addition to the central offices and wireless towers, there are miles of fiber infrastructure installed along the major transportation corridors linking towns, communities, and many remote areas.

Through recent state and federal grant funding since 2015, many unserved areas in Lewis County are being addressed. More than \$13M has been committed to expand broadband in Lewis County. The state's New NY Broadband Grant program has provided funding for Frontier and Verizon to implement fiber to the home projects. These areas now have very high bandwidth service.

The remaining census blocks awarded to HughesNet include 2,995 homes. These blocks received grant funding for Hughes Network satellite service which is stated to have a bandwidth of at least 25/3 Mbps. The federal RDOF areas will receive Gigabit service from Frontier and at least 25/3 Mbps service from SpaceX. However, with this program the providers have up to 6 years to complete their buildouts.

The study found that infrastructure supporting DSL based broadband access in the County is available in the populated areas and some of the rural areas. DSL based broadband is available to businesses and residents located close enough - within three miles - to the local incumbent telephone company Central

Offices or remote terminals, which can extend DSL service. The field study identified a number of fiber-fed remote terminals placed in a 15-mile-wide corridor running north and south along Rt 12.

Spectrum.

Broadband services provided by Spectrum, identified by reviewing their fiber and coaxial routes, are available in and around population centers and other areas covering a 15 mile wide area running north and south along Rt.12.

However Spectrum service is not available in many of the more rural areas running north and south parallel to Route. 12. On the eastern side of the County a path seven miles wide is void of Spectrum service through Lyonsdale, Greig, Watson, Croghan and Diana. To the west, a sixteen mile wide path is also void of Spectrum service through Lewis, Osceola, West Turin, Montague, Harrisburg and Pinckney.

As part of the Charter/Time Warner Cable merger, Spectrum is required by the State to expand its service to 145,000 unserved homes. We can deduce where these areas are by looking at where the State awarded grant funding as part of the New NY Broadband Grants. These grants were awarded in areas where Spectrum will not be expanding service.

Alternative Providers.

Most of the households and grant areas in Lewis County were awarded to satellite provider HughesNet. It appears as though at least half of Lewis County will have the minimum broadband service level of 25Mbps download and 3Mbps upload. In many of these areas of the County, satellite and DSL will be the only choice.

ECC found that the central portion of the County along Rt 12 and the roadways leading out of and into Lowville have fiber cable availability. However, there are larger pockets in the eastern and western third of the County, primarily areas in which HughesNet has won the state New NY grant awards, that do not have fiber infrastructure. In areas where fiber is not available, land line-based providers are relying on more traditional infrastructure (generally copper based) to meet customer demands.

Crown Castle and Mohawk Networks are two CLEC type companies with limited networks in the County. According to their FCC 477 reports both companies have a small number of business customers in Lowville. If they choose to connect to customers elsewhere, they will need to rely on the incumbent's infrastructure or build their own. This limits the competitive impact these companies have in other areas of the County.

DANC has open access fiber throughout the central and western areas of Lewis County. This fiber allows CLECs and others that want to compete in the County low-cost marketplace entry. Since the DANC fiber is already in place, the competitive provider need only to build a lateral off the backbone to access customer locations to provide service.

Cellular Providers.

The cellular providers in the County are AT&T Wireless, Verizon Wireless, T-Mobile and Spectrum. All of these cellular companies have equipment on towers strategically placed in the County to provide mobile wireless service to the maximum number of customers. Not surprisingly most investment in 5G cellular-based infrastructure is located in central populated third of the County.

County Infrastructure

The County owns eight Public Safety towers and co-locates on two other towers for its communications radio system. Based on the FCC information, the County has registered three towers in Lowville, one in Redfield and one in Harrisville.

6. Next Steps:

6.1 Summary of Actions

The study has shown that there are clearly areas within the County that do not have access to acceptable broadband services. Like other communities, the County has the option to request that providers implement their own programs via RDOF or other means however, we do not believe this will cover all of the unserved and it will be a six-year wait or longer.

The County has the option to play a lead role in developing solutions to meet the needs and requirements of the County as a whole.

Assumptions ECC is making with respect to these solutions are that the County does not want to be a service provider, providing broadband service to the home, and that the Development Authority of the North Country (DANC) also does not want to be a to-the-home broadband provider.

Both the County and DANC would play a supporting role as needed and the optimum solution would be to create programs that incentivize providers to expand services to the unserved areas of the County.

In taking a leadership role the County has several options in which to accomplish its goals of 100% broadband availability. We believe and recommend that any options would involve a partnership of the County and service providers working together. DANC as a major infrastructure owner in the County could also be brought to the table to provide access to critical fiber infrastructure which will be needed.

Option 1.

The County can self-fund the build-out of infrastructure, fiber or wireless, needed to provide the unserved residents with broadband. Once built, the County would partner with a reliable established broadband partner that would operate it.

Generally speaking, this option would have a significant level of expense and could represent a direct burden to the taxpayers. It does, however, allow for a shared revenue relationship which would allow the County to recover some costs.

Aside from the cost burden of this type of program it is likely that many of the currently served residents may also want this service delivered to them. This would initially create an uncertain financial model, be difficult to manage and require the buildout to areas already served.

Several communities across the U.S., mostly cities and villages, are implementing this model. It is widely known as Municipal Broadband and generally is a last resort in rural communities. ECC does not recommend this approach, but in the absence of any other options, this could be considered.

Option 2.

The County can consider creating a partnership with broadband service providers to solicit grant programs to pay for infrastructure needed to expand broadband to unserved areas.

This program, which ECC recommends, would enable the County to play a leadership role and share the costs with public, private and grant funding sources. The information developed as part of this Broadband study will serve as justification for the County and its partners to solicit the needed grant funds.

Grant funds historically have been available via the FCC. The County could pursue broadband grant opportunities for rural area broadband access, such as those periodically provided by the USDA, NTIA, New York State, Public Safety, the Northern Border Regional Commission, private foundations, and others.

Locally in New York, this type of program has been implemented by several counties including Yates, which secured grant funds via the USDA ReConnect program and Madison County, which has submitted a request to the USDA ReConnect program as well. Both Yates and Madison Counties used ECC's inventory and BAAT programs as the foundations to support their grant requests. A summary of the Madison County program is as follows,

Madison County , NY.

The County identified areas that needed broadband expansion and investment by conducting a broadband inventory and BAAT campaign similar to that done in Lewis County. The County leveraged their study information to create a partnership with and team with Empire Access to apply for a USDA ReConnect grant to offer a fiber-to-the-premise solution.

Their program will offer high speed data, TV, and phone services to the unserved and underserved areas. The solution would make fiber based broadband available to 970 homes that currently do not have access to adequate broadband in the County.

The total project is estimated to require over \$16M. The County will contribute \$3.4M, the USDA Grant would contribute \$10.2M and Empire Access will contribute \$2.5M.

The County will own the infrastructure. Empire will use the infrastructure to offer services, invoice and service clients and maintain the network. The application is still under review by the USDA for approval.

6.2 Analysis

After evaluating the infrastructure within the County and understanding the grant awards that have been made with the plans to expand broadband within the County, we can clearly begin to see areas of the County that need additional help in the expansion of broadband availability.

Lewis County, NY - Potentially Grant Eligible Areas

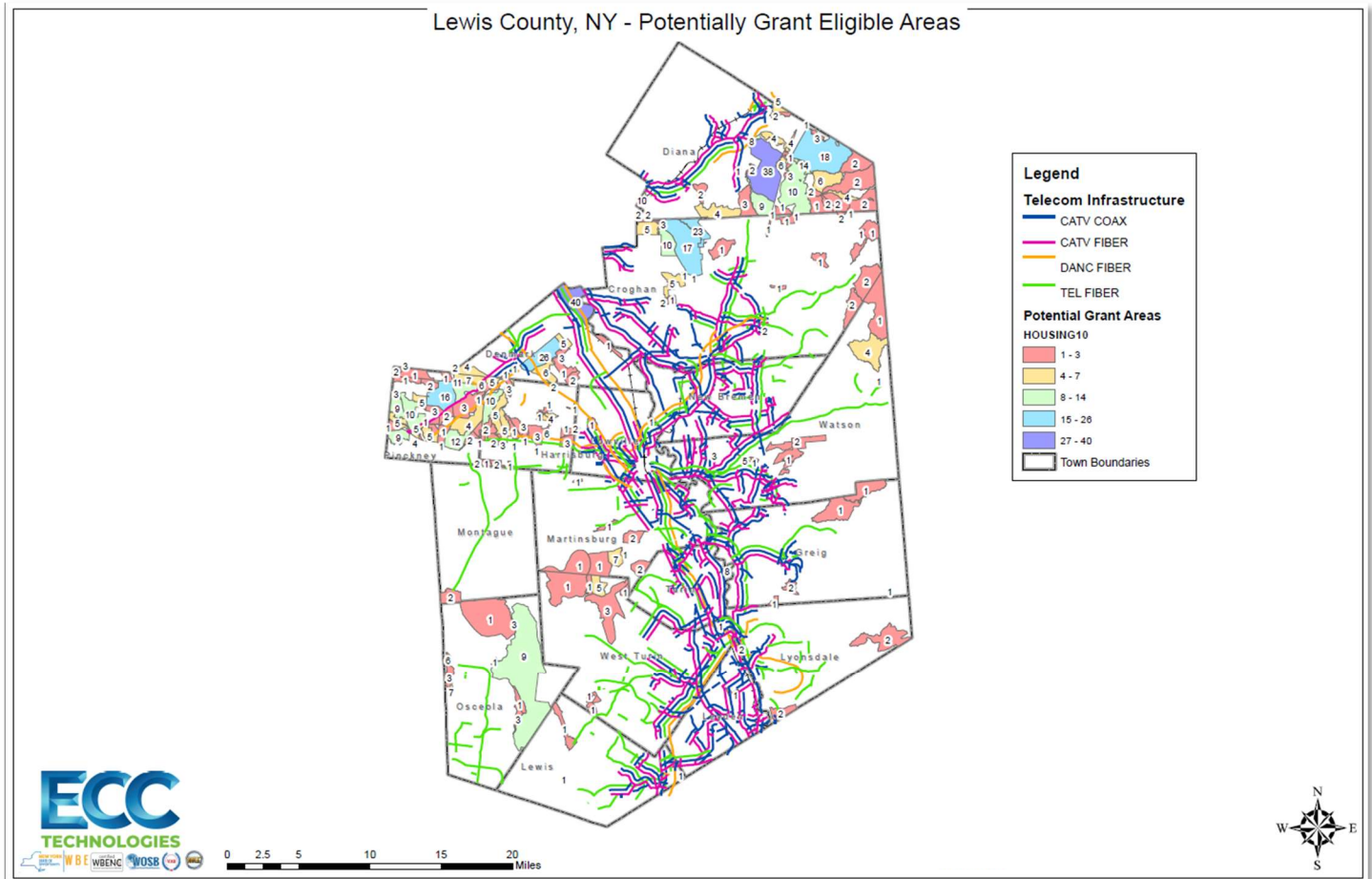


FIGURE 21 CENSUS BLOCKS SERVED ONLY BY HUGHESNET NOT SERVED BY LANDLINE INFRASTRUCTURE

After selecting the census blocks served only by HughesNet and not by any other provider, a limited set of census blocks is revealed which can be prioritized and targeted for funding. Public/private partnerships between the County, DANC and other carriers can focus on technical solutions and funding for these areas. There are many grant and investment options which could be brought to bear to fund these solutions.

After removing the infrastructure from Figure 21, we are left with the image found in Figure 22 which includes only the census blocks and respective households with which to prioritize potential broadband expansion.

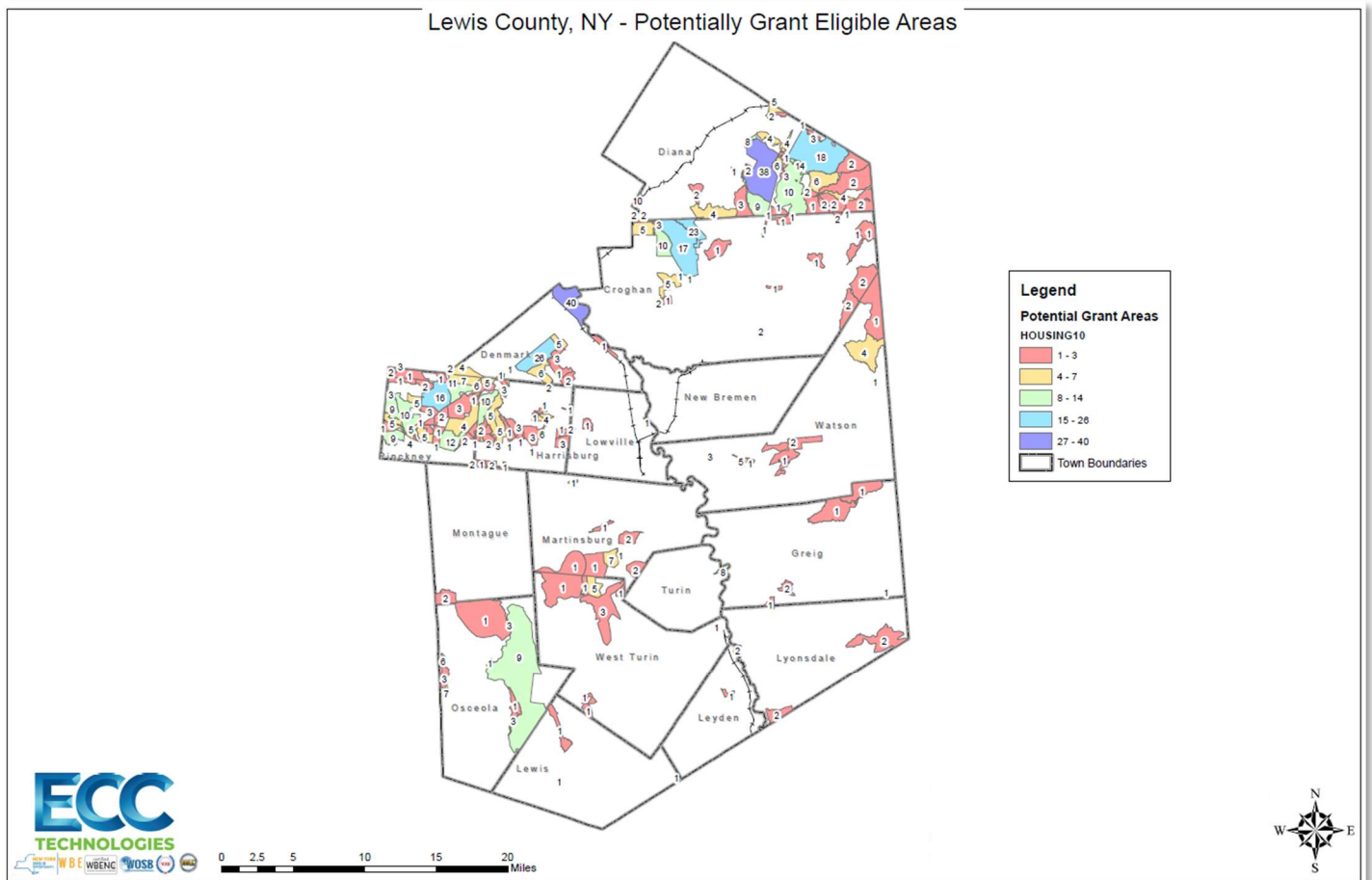


FIGURE 22 AREAS OF POTENTIAL EXPANSION

The next two figures are from the BAAT Survey Campaign conducted from December 2020 through February 2021. Figure 23 represents the type of internet access the respondents have if any. Figure 24 helps us to understand if the respondents can purchase the bandwidth they need and where in the County they are located.

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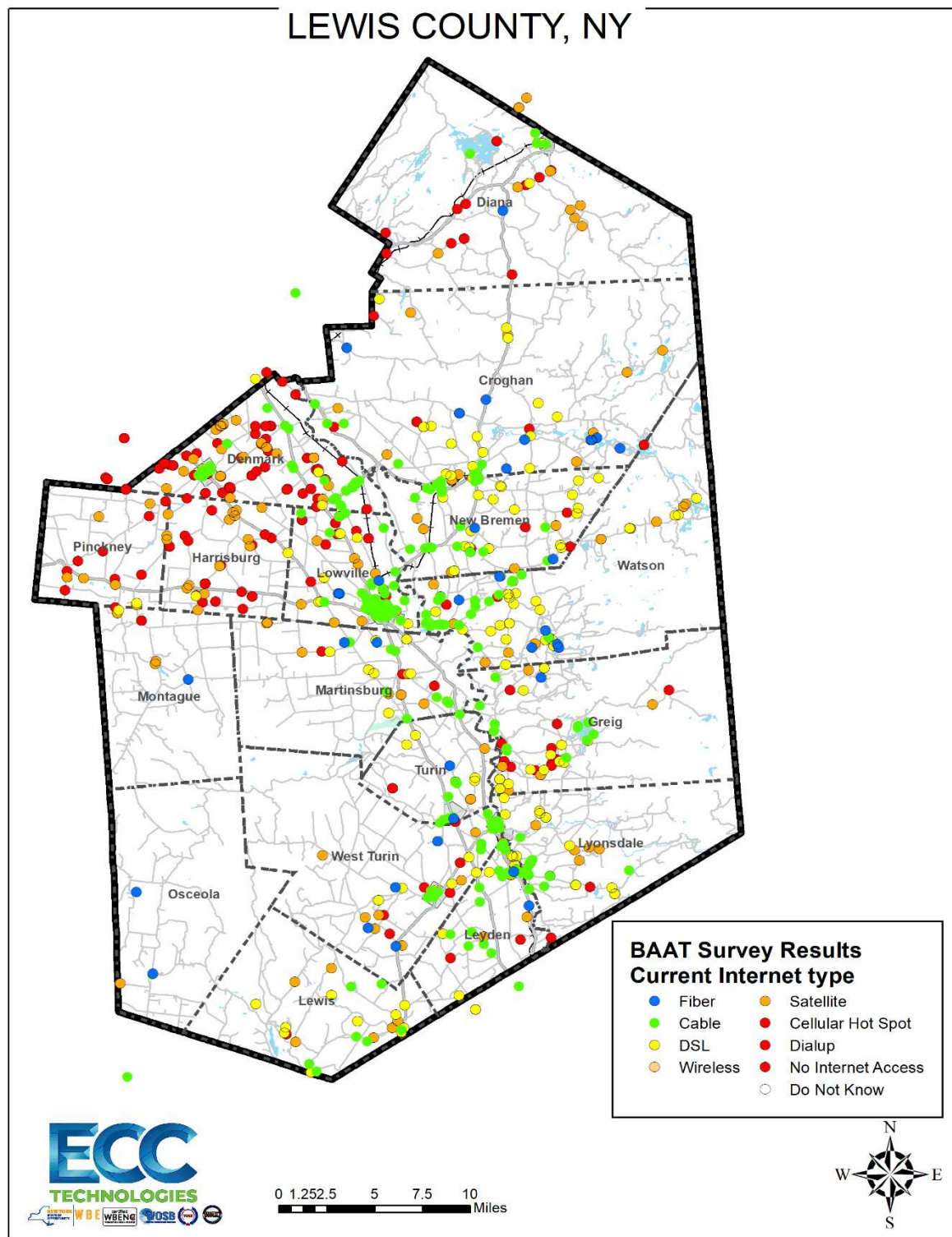


FIGURE 23 TYPE OF INTERNET SUBSCRIBED

LEWIS COUNTY, NY

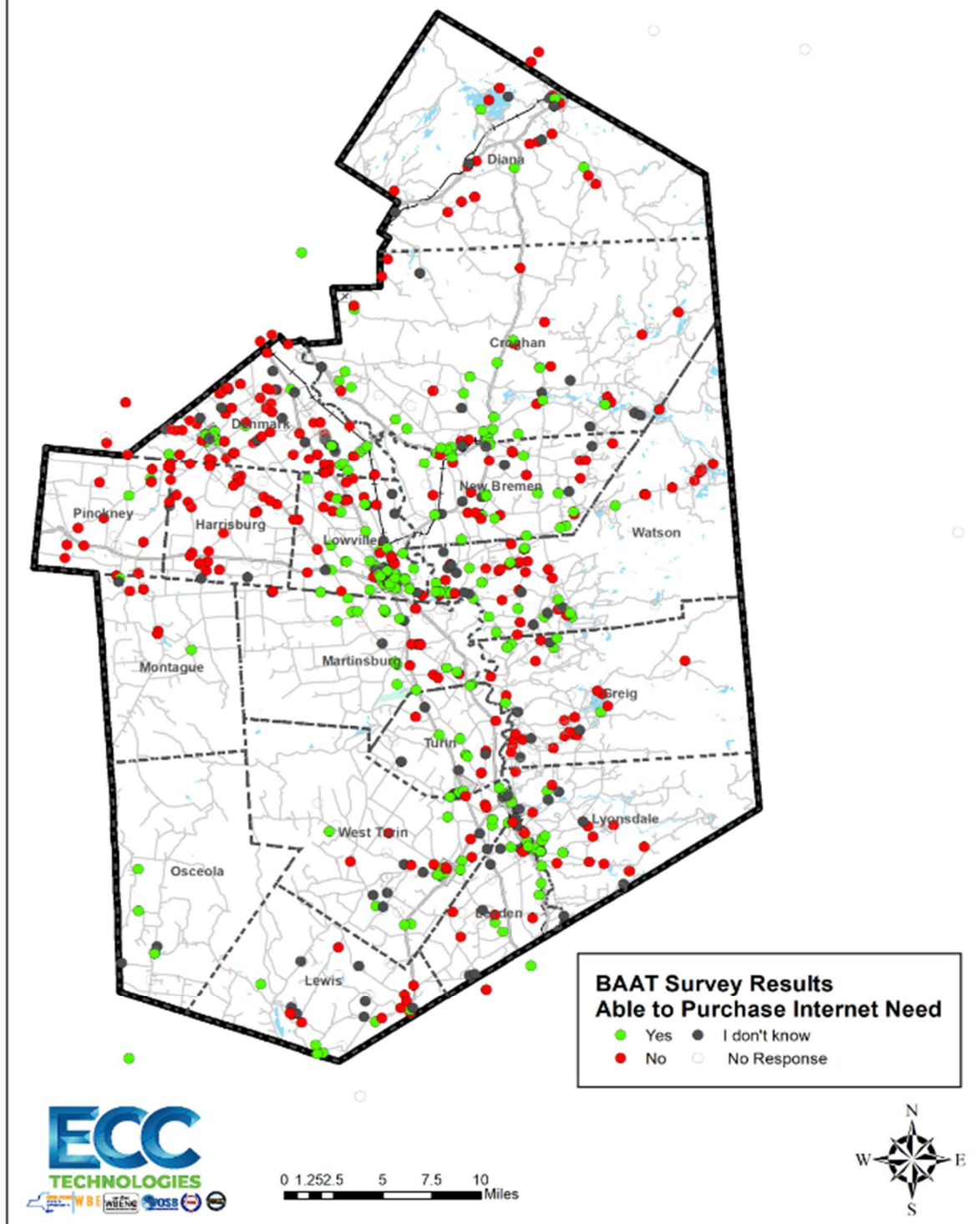


FIGURE 24 SUBSCRIBER CAN PURCHASE DESIRED INTERNET

6.3 Target Areas

Based upon Figure 21, 22, 23 and 24 we have defined six potential areas to target for broadband expansion and possible grant funding. The areas have been defined into the following geographic areas:

1. **Pinckey & Harrisburg** – This area consists of 199 households served by basic telephone and DSL service and HughesNet. This area has fiber infrastructure running through it along route 194. However, it appears as though this fiber infrastructure, owned by Spectrum and DANC, is limited to providing backhaul bandwidth to two cellular towers near Barnes Corners.

This could be an ideal area for DANC or Spectrum to leverage their fiber infrastructure to provide either Coaxial or Fiber based broadband services. Another option could be to deploy a fiber fed fixed wireless solution for the area. This area could also prove to be ideal for a Northern Border Regional Commission Grant as the backbone infrastructure already exists.

2. **Denmark** – has 86 households as a potential market in a relatively small area. It has a high number of respondents unable to obtain the speed they require and is near DANC and Spectrum backbone making it easier and more cost effective to expand infrastructure.
3. **Diana** – Includes 168 households with some respondents indicating they cannot obtain the speed they need. DANC, Spectrum and telephone company fiber is in the general area, but a lengthy fiber build may be required to reach the homes.
4. **Croghan** – with 83 potential households to serve, CATV fiber, DANC fiber and Telco Fiber are all a roughly 3 miles distant from the center of the service area. There were few responses in that specific part of Croghan. However, most had DSL, satellite, or no internet.
5. **Osceola** – has 39 households. However, the respondents indicate they can get the broadband speed they need.
6. **Martinsburg** – with 26 potential households to serve, had no responses in the areas which could be eligible for grant funding.

Appendix

Appendix A. Provider Service, Speeds and Costs

Spectrum Residential

Internet

Get high-speed Internet with no data caps

\$49 99/mo
for 12 mos.

[Pricing Info](#)

Speeds up to 100 Mbps

CHOOSE

▼ [Read more](#)

Internet Ultra

Go faster and turbo charge all your devices with Internet Ultra

\$69 99/mo
for 12 mos.

[Pricing Info](#)

Speeds up to 400 Mbps

CHOOSE

▼ [Read more](#)

Internet Gig

For the ultimate experience choose Internet Gig - our fastest speed available

\$109 99/mo
for 12 mos.

[Pricing Info](#)

Speeds up to 940 Mbps

CHOOSE

Spectrum Business



Advertisement for Spectrum Business Internet. The background is dark blue. On the left, a silver laptop is open, displaying 'Faster Speeds' and '200 Mbps' on its screen. To the right of the laptop is a white badge with 'BEST PRICE' in blue. Further right, the text 'Spectrum Business Internet' is above a large price tag '\$49.99' with a note '/mo for 12 mos when bundled*'. Below the price tag, it says '4X FASTER than 50Mbps DSL[†]'. At the bottom, three bullet points are listed: 'No contracts', '• No hidden fees', and '• No added taxes'.

Faster Speeds
200 Mbps

BEST PRICE

Spectrum Business Internet
\$49.99 /mo for 12 mos when bundled*
4X FASTER than 50Mbps DSL[†]

- No** contracts
- **No** hidden fees
- **No** added taxes

Frontier Residential

7738 N State Rd Lowville, NY 13367



Speed details ^

Max speeds as fast as 18M

- Everyday low price with no hidden monthly fees^[2]
- No annual commitment
- Stream your favorite movies and TV shows, or play games online

\$44⁹⁹ /mo^[1]

per month for 12 mos. One-time charges apply. Service subject to availability and all applicable terms and conditions. Speeds may not be available in all areas. Max speeds are wired speeds. Wi-Fi speeds may vary. Performance details at frontier.com/stateinternetdisclosures.

Frontier

Business

7709 Park Ave Lowville NY 13367

\$49⁹⁹/mo*

Wi-Fi router & unlimited monthly data included*

1.833.795.1355

*For 24 months on new internet service, plus taxes, governmental surcharges and one-time charge. Actual speeds may vary. Subject to availability.

DSL PRICING

\$49.99 UP TO 11MBPS

\$54.99 UP TO 12-35MBPS

\$59.99 UP TO 45+MBPS

Mohawk Networks



No Contracts



Fiber-To-Wireless



No Data Caps

25/10 Mbps

69⁹⁸
monthly

Enhanced Router Included

Up to 25 Mbps download and 10 Mbps upload

Verizon

Services Zip codes 13626, 13648 per *Broadband Now* website

4. Verizon High Speed Internet - 8.3% Available in 13626



DSL Internet

Speeds up to:
15mbps

Pricing starts at:
\$69.99 per month

Plans:
5

SET UP NEW SERVICE:

(855) 342-7165

[Order Online »](#)

4. Verizon High Speed Internet - 81.4% Available in 13648



DSL Internet

Speeds up to:
15mbps

Pricing starts at:
\$69.99 per month

Plans:
5

SET UP NEW SERVICE:

(855) 342-7165

[Order Online »](#)

Appendix B USDA Reconnect

Appendix B USDA ReConnect

The scope of the ReConnect grant is extensive, in depth and complex. ECC will be happy to work closely with and support DANC and the County on the development of any grant application.

Below, however, is an example of the information required from the Round 2 ReConnect Grant application.

USDA Round 2 ReConnect Application Tasks:

SECTION A - GENERAL INFO ON THE APPLICANT AND THE PROJECT

- General Info on the Applicant
- A description of the project (which will be made public)
- The estimated dollar amount of the Funding Request

SECTION B - AN EXECUTIVE SUMMARY OF THE PROPOSED PROJECT

- Description of Existing Operation
- Key Management
- Description of Workforce
- Interaction between Parent and Affiliate or Subsidiary
- Detailed description of the proposed Project

SECTION C - DESCRIPTION OF THE PROPOSED FUNDED SERVICE AREA

- Description of the Proposed Funded Service Area including Homes Passed

SECTION D - SUBSCRIBER PROJECTIONS

- No. of Subscribers for BB, Video and Voice -- and other services
- Description of the Proposed Service and the Pricing Plan
- Explanation of Service Affordability

SECTION E - MAP OF THE PROPOSED FUNDED SERVICE AREA (PFSA)

- Create Map from RUS Mapping Tool -- reconnect.usda.gov
- Identify and Prove Areas without BB and non-funded service areas of the applicant*
 - Assessment of Current BB in Project Area
 - Description of data source or methodology to capture data
 - Unserved Areas - Identify Eligible Areas
 - Map of Unserved area
 - BAAT data
 - Census Block Overlay

*Donut Holes are allowed in PFSA and MM Fiber can route through noneligible area

SECTION F - DESCRIPTION OF ADVERTISED PRICES BY COMPETITORS IN THE SAME AREA

- Description of Advertised Prices by Competitors in the Same Area
- Description of Existing Services and Speeds

SECTION G - NETWORK DESIGN

- Description of Proposed Technology Used
 - Narrative explaining design of deployment

- Explanation of current networks and equipment to be leveraged
- Explanation of tying the number of users - for new service
- Fixed Wireless providers explain frequency to be used and other info
- Explanation of Scalability
- Demonstrate that all premises can be served
- A Network Diagram
- Buildout Timeline and Milestone
- Network Information Certified by Professional Engineer
- Certify 100Mbps both ways? Y or N
- List all Required Licenses and Regulatory approvals needed for project
- List how much Applicant will rely on contractors and vendors to deploy network

SECTION H - RESUMES, READINESS AND ORG CHART

- Resumes of Key Management
- Description of org's readiness to manage BB network
- Org Chart showing all Parent orgs and subsidiaries and affiliates

SECTION I - LEGAL OPINION (Client legal team provides)

- Ability to enter Award Documents
- Describe all pending litigation matters
- Pledge Security
- Ability to Provide BB under State Law

SECTION J - INFRASTRUCTURE COSTS

- Summarize and itemize Budget of infrastructure costs
 - Narrative
 - Budget Detail
- Describe Ratio of Loans to Grant, and any other outside funding

SECTION K - WORKING CAPITAL

- Description of Working Capital requirements and Source of Funds

SECTION L - HISTORICAL FINANCIAL STATEMENTS

- Last 4 years or since startup --including income statement, balance sheet, cash flow

SECTION M - AUDITED FINANCIAL STATEMENT

- 2 Previous Years of Operation from Each of the Partners

SECTION N - PROJECT PRO FORMA -- PER US GAAP ACCOUNTING PER GOV'T WEBSITE

- As per <http://www.rd.usda.gov/files/accounting/guidance10.PDF>
- Subscriber estimates, annual financial projections with balance sheets, income statements, and cash flow, depreciation schedule
 - Narrative
 - Budget Detail
 - Financial Model
 - Definition
 - Creation

- Review
- Committed Resources of Capital Funding and Include Bridge Year

SECTION O - RUS APPLICATION SYSTEM ATTACHMENTS

- Download forms below from USDA website and fill out the ones that apply
 - Closing Instructions
 - Legal Opinion
 - Mortgage-Co-Lender
 - Mortgage-Existing Borrower
 - Mortgage- New Borrower
 - ReConnect Agreement – Loan/Grant and Security Agreement
 - Farm or Business Pre-Subscription Form
 - Network Design Certification

SECTION P - SCORING SHEET

- Create Scoring Sheet set forth in FOA

SECTION Q - OBLIGATIONS

- List of Obligations, security agreements, service agreements etc.

SECTION R - ENVIRONMENTAL INFORMATION

- Required to certify construction meets the NEPA and Endangered Species
- Use Online system and after the fact info

SECTION S - CERTIFY AGREEMENTS TO INVESTORS

- Certification that agreements or obligations with investors do not breach government draft award

SECTION T - TRIBAL LAND

- Certification from Tribal Official that they support the project
- Include land that will be part of project, owned or held in trust, ID landowners

SECTION U - OTHER MATERIAL REQUESTED IN THE ONLINE APPLICATION SYSTEM

ECC will be happy to work closely with DANC and the County to project manage, develop, and submit grant applications. Once it is determined grant application(s) will be required, ECC develops a detailed project plan with action items for the DANC and the County. ECC staff, DANC and County representatives compile data and responses to be entered into the respective grant portal.

Appendix C. Article Reprint

Appendix C Article Reprint

*Bad Service by Building Its Own Network**

Posted by Ry Marcattilio-McCracken

Tuesday, November 24, 2020. Residents in the village of Tupper Lake, New York, will soon enjoy a municipally owned broadband option to get online. With the awarding of a grant by the Northern Border Regional Commission matched by local funds, a hybrid Fiber-to-the-Home (FTTH) and fixed wireless network will bring faster speeds and more reliable service to homes and businesses in the northern part of the Empire State by the middle of next summer.

Unreliable Service

The village of Tupper Lake (which sits within the boundaries of the town of Tupper Lake) is located in the foothills of the Adirondack Mountains not too far from Lake Placid. Its an overwhelmingly rural area, and a little more than 3,500 people call the village home.

Last year we wrote about local efforts to improve connectivity options. Back in 2018, a broadband committee was born mostly in response to a lack of Internet access options and complaints about poor service (Spectrum services the region). A study followed that work in 2019 and included a survey of the speeds and prices that homes and businesses in the downtown were paying. Frequent and prolonged outages were a particular problem in Tupper Lake.

“We were talking to one business owner who said I was out of service for a day and a half,” Development Authority of the North Country (DANC) General Manager for Telecommunications told WAMC public radio,

“[T]hat is almost impossible to do, because now I’ve got to write down credit card numbers and wait for a day to charge people and stuff like that and it just was very difficult.” The Adirondack Daily Enterprise reported that “broadband was the topic of around 30-50% of the emails and calls” to State Assemblyman Billy Jones’ office even before the pandemic.

Connectivity for students was also a driving factor, with a large majority of families with students reporting to the St. Lawrence County school district that they didn't have Internet access at home because they couldn't afford it.

To remedy this and in pursuit of the grant opportunity, Tupper Lake partnered with the DANC, which sent workers to drive every road in the town and document where services were. The village committed to acting as the service provider (though it might contract for it), relying on the DANC’s technical expertise to build the new infrastructure and use its existing fiber for backhaul.

With the use of a \$200,000 grant and \$50,000 in matching funds, the village and DANC will extend the latter’s fiber network to all businesses in Tupper Lake and leverage those assets to stand up antennas to bring wireless service to 125 unconnected homes.

A Hybrid Approach

The DANC was established in 1985 as a public benefit corporation, initially to support operations at Fort Drum. Today, it runs a landfill for three counties, a wastewater division, and operates a regional water line in addition to an open access fiber network around 1,800 miles long.

Called the Open Access Telecom Network (see map below), it was begun in 2003 and today serves a host of business and institutional partners in upstate New York. This includes two large medical networks consisting of around 100 facilities (including in Tupper Lake), almost every school in the North Country, most of the municipal services, and other businesses.

Leveraging these assets is key for the Tupper Lake project, David Wolf said in an interview. In addition to the reliability and affordability problems, more than a hundred homes in the community are completely unserved (representing about 5%) and situated mostly outside of the village proper. The \$200,00 grant will be supplemented by around \$35,000 in cash from the DANC with the town chipping \$20,000 in in-kind contributions in the form of office and antenna space.

This will pay for roughly 5.5 miles of new 288-strand fiber where needed, as well as the antennas, a router, and software to manage the firewall and user base. The plan is to build a Fiber-to-the-Premises (FTTP) network for all 40 businesses in the downtown area, and then use that infrastructure to erect four towers and provide those 125 unserved homes with wireless.

Some homes along the new route will have fiber connectivity right away (and project leaders plan to expand it in the future). A small portion of the funds will be dedicated to adding capacity in existing DANC conduit.

The wireless coverage will connect around 50 homes around Wolf Pond (some of which are seasonal and the rest year-round), homes near Simon Pond, on islands in Raquette Pond, and to the south. Antennas will be placed near Wolf Pond, on a water tower immediately north of town, to the extreme south near the mountain where DANC fiber already runs, and at an additional location to be decided. The resulting wireless network, then, will be extremely targeted.

DANC will build out the fiber and serve the businesses and extend those lines all the way out to the tower placement points. They will own that infrastructure and service it as needed. The city will take it from there, managing the services side of the operation (including customer service, marketing, technicians, etc.) using in part the DANC's network management system.

The city will own the assets from the antenna to subscriber's homes, and either act as the provider itself or contract with a third party to do so. This part of the project remains evolving.

As it stands, the Tupper Lake network (see map of proposed fiber build, below right) will use a good deal of existing fiber owned and operated by the DANC. Initial speeds will be at minimum 25/3 Mbps (Megabits per second) for residential users, though project leaders are optimistic that they can get 100 Mbps symmetrical service in many areas.

Trees and topography remain, as for many wireless projects, the primary obstacles. Residential service will cost \$40/month. Business users will be able to subscribe to gigabit symmetrical service for \$80/month.

The town will also use the new infrastructure internally as well, for monitoring the municipal electric utility as well as to connect city and town offices.

Project Underway

The Northern Border Regional Commission grant was awarded in September. Engineering design is underway, and construction is slated to begin next March and be done in May or June. The village recently put out (with the DANC's help) an RFI for wireless providers as it considers its options. The plan is to expand both assets in the future, bringing additional wireless areas online while also expanding the Fiber-to-the-Home (FTTH) network to additional homes.

Dave Wolf pointed to the advantages that have made this possible: the DANC's mission to serve the public and the breadth and depth of its existing fiber infrastructure (which will cover around 80% of the fiber needed for the project), the village's willingness to step up on the service provider side of things, and the positive working relationship with the village's municipal electric utility in completing the make-ready work to string new lines and increase existing capacity.

This is DANC's first real foray into a project like this but plans to do more in the future.

Both North Country Chamber of Commerce President Garry Douglas and state Assemblyman Dan Stec pointed out the opportunities afforded by the project, and its importance to the region moving forward:

*<https://muninetworks.org/content/west-lake-placid-tupper-lake-tackling-monstrously-bad-service-building-its-own-network>

Appendix D Notes

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20. <https://www.danc.org/telecommunications>.

- 21. Data obtained from FCC 477
- 22. Field data collected by ECC engineers during Aug and Sept 2020

Appendix E. Glossary

APPENDIX E. GLOSSARY

BACKBONE. Backbone, in the context of networking, refers to the highest speed and widest bandwidth point of a communications circuit or path. In most cases, all information central to the users is connected to the backbone (e.g., shared databases or servers).

BANDWIDTH. Bandwidth is the amount of data that can be carried by a circuit between two points of a network. Bandwidth is typically measured in Hertz (cycles per second), bits per second or kilobits per second (shortened to Bps or Kbps). The top speed of today's modems is 56,000Bps or 56Kbps.

The wire connecting a private home to the telephone company carries up to 128,000Bps while one strand of fiber optics can carry 20,000,000,000 (20 Gigabits). A 20Gbps fiber optic strand can interconnect 357,000 telephone calls.

8 bits equal one byte of data – a byte is generally the same as one character – for example the letter “a.”

BROADBAND. Broadband is a descriptive term for evolving digital technologies that provide consumers a signal switched facility offering integrated access to voice, high-speed data service, video-demand services, and interactive delivery services.

CATV (Cable Television System). A broadband communications system capable of delivering multiple channels of programming from a set of centralized satellite and off-air antennae, generally by coaxial cable, to a community. Many cable-television designs integrate fiber-optic and microwave links.

A service through which subscribers pay to have local television stations and additional programs brought into their homes from an antenna via a coaxial cable.

CENTRAL OFFICE (CO). A CO is a major equipment center designed to serve the communications traffic of a specific geographic area. CO coordinates are used in mileage calculations for local and interexchange service rates. A Central Office usually has less than 100,000 telephone lines within its wire boundary. COs are usually owned and operated by LECs.

CLEC (Competitive Local Exchange Carrier). A CLEC is a telephone company that competes with the incumbent telephone company. The formation of these organizations is a direct result of the Telecommunications Act of 1996.

COAXIAL CABLE. A type of cable used for broadband data and cable systems. Also known as “coax.” Coaxial cable is composed of an insulated central conducting wire wrapped in another cylindrical conducting wire. It is usually wrapped in another layer and an outer protective layer and has the capacity to carry great quantities of information.

DARK FIBER. Dark Fiber is fiber optic cable, typically between end user locations, that the end user owns, lights, and operates.

DSL (Digital Subscriber Line). DSL is technology that allows for the simultaneous transmission of voice and Internet data over a single telephone line. Central Offices that have DSL technology can support DSL services to customers within approximately 18,000 feet of the Central Office.

DSL is delivered either asymmetrically (ADSL) or symmetrically (SDSL). ADSL lines have download transmission rates higher than upload rates and are typical for residential or business users that receive much more Internet content than they send. SDSL are for businesses that generate and receive large amounts of Internet data.

DOWNLOAD SPEED. The rate at which data is transferred from the Internet to the user's computer is termed download speed. This speed is typically stated in Megabits (1,000,000 bits) per second or Gigabits (1,000 Megabits) per second.

FIBER OPTICS. The technology of guiding and projecting light for use as a communications medium. Hair-thin glass fibers that allow light beams to be bent and reflected with low levels of loss and interference are known as "glass optical wave guides" or simply "optical fibers."

This cable comes in two types, single mode and multimode, each with its own unique place in communications. Single mode FO cable is typically used where long distances and very high speeds are required, while multimode is used for intra-building communications and places where lower bandwidths are required.

FIBER-OPTIC CABLE. A cable containing one or more optical fibers.

INCUMBENT LOCAL EXCHANGE CARRIER (ILEC). An ILEC is the local telephone company that provides service to business, organizations, and residences within the LATA. The ILEC is responsible for the development, maintenance, and support of cabling infrastructure necessary to provide telecommunications services within the LATA.

INTERNET. A widely used public computer network, initially developed by the U.S. military that links smaller computer networks and allows users on different electronic-mail systems to communicate with one another on a global scale.

INTERNET PROTOCOL (IP). In TCP/IP, a connection Internet layer protocol that provides a best-efforts datagram delivery service. Note the functional layer (TCP/IP) corresponds to the OSI model network layer. The Internet layer provides routing and relaying functions that are used when data must be passed from a host to some other network in the Internet. It operates in the source and destination hosts and in all the routers along the path between the hosts.

ISP (Internet Service Provider). A company that provides access to the Internet to individuals or companies. Some ISPs lease connections from Internet backbone providers.

LANDLINE. Traditional wired phone service.

LAST-MILE. Last Mile is used to describe the final connection to a building, as differentiated from the high capacity circuits extending across a city or County. The connection from the cable television trunk cable to your house is considered a "last-mile" connection.

NETWORK. Any connection of two or more computers that enables them to communicate. Networks may include transmission devices, servers, cables, routers, and satellites. The phone network is the total infrastructure for transmitting phone messages.

RF (Radio Frequency). RF refers to the electromagnetic waves operating between 10KHz and 3MHz propagated without guide (wire or cable) in free space.

RIGHT-OF-WAY. Right of Way (ROW) refers to a designated space alongside a street or other access (such as a railroad line). An entity wishing to install fiber optic cable between various sites/locations must first obtain the rights to a path along those routes. As the cable may be installed underground or on poles, right-of-way access may be granted by a city, a private landowner, or the owner of poles such a cable company, a telephone company or power company. Cities typically require written permits— usually for a fee.

SERVICE PROVIDER. A telecommunications provider that owns circuit switching equipment.

UPLOAD SPEED. The rate at which data is transferred from the user's computer to the Internet is termed upload speed. This speed is typically stated in Megabits (1,000,000 bits) per second or Gigabits (1,000 Megabits) per second.

WAN (Wide Area Network. WAN is used to extend LAN connectivity beyond a city or County, usually through common carrier facilities.

WIRELESS. Wireless describes a means of sending signals (voice, video or data) "over the air" rather than using cables. To date, wireless bandwidth rates (capacities) are significantly lower than wire rates. There are significant new developments in wireless, many of which will come to market in 2014 and beyond.