



Mifflin County Rural Broadband Initiative



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Contributors

This report was completed based on the financial contributions from the following:

Mifflin County	Mifflin County School District
Geisinger Lewistown Hospital	Derry Township
Wayne Township	Private Contribution/Wayne Supervisor
Granville Township	Armagh Township
Brown Township	Menno Township
Oliver Township	Union Township
Municipal Authority of the Borough of Lewistown	Lewistown Borough
Mifflin County Industrial Development Corporation	

Executive Summary

Mifflin County is investigating multiple pathways to encourage the expansion of broadband service coverage offered to residents and businesses within the county's identified underserved areas. These discussions may take place with adjacent counties, Pennsylvania state broadband representatives, existing service providers, and Cooperatives (Co-Ops). Understanding that these efforts will inevitably center on cost assumptions, Noovis surveyed multiple locations within the county to determine a base cost for deploying fiber optics in the existing Outside Plant (OSP) communications infrastructure. The OSP infrastructure surveyed in all locations consisted of aerial cabling placed along pole lines. Having these cost assumptions in hand will allow the county to drive pragmatic discussions as it pursues smart broadband expansion.

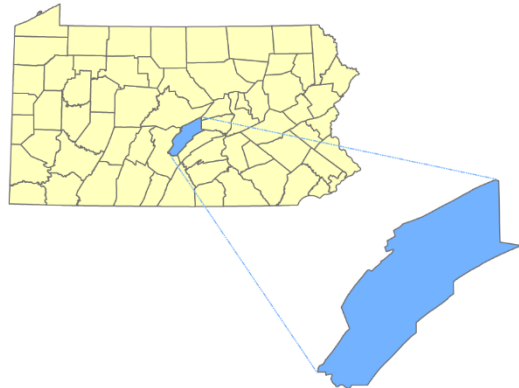


Figure 1: Mifflin County

Four areas were selected in rural Mifflin County to establish estimated costs for the placing of new infrastructure. The costs derived assumed no active electronics or make-ready work as these costs could vary greatly. In these areas, population densities varied from 7 homes per mile in the least dense areas to over twice that in the more dense areas, while the average cost per mile to build the infrastructure varied little, remaining in the \$20,000 range.

Area	Homes	Distance (Miles)	Poles	Placing Fiber Cost	Homes Per Mile	AVG Cost Per Home	Average Cost Per Mile
Mail Pouch/Ertley	39	5.5	142	\$104,000 - 121,000	7	\$2,900	\$20,455
River RD	28	4.2	105	\$78,000 - \$90,000	7	\$3,000	\$20,000
Atkinson Mills	104	8.17	204	\$151,000 - \$173,000	13	\$1,557	\$19,828
522 and Summit	134	8.51	219	\$160,000 - \$184,000	16	\$1,290	\$20,212

Figure 2: OSP Cost Summary, 2019.

While funding options do exist for municipalities seeking monetary assistance, Mifflin County does not plan to own/operate any communications infrastructure. The county can still take an active role in championing broadband availability by implementing favorable public policies to reduce barriers to deployment such as making fees to access rights-of-way and permitting cost-based and competitively neutral.

The digital divide will not be closed in Mifflin County or elsewhere by implementing conventional networks that were established to provide broadband service in the most populated areas – Collaboration will be key. Co-Ops such as the Rural Broadband Co-Op in Huntingdon County are driving wireless solutions and doing so entirely on volunteer support from citizens. Joint county focused efforts such as SEDA COG is pursuing could lead to the development of a Co-Op. At this time, they are seeking to address the issue through a wireless solution leveraging assets across

three counties (Mifflin, Juniata, Perry) despite many participants not having access to equivalent resources.

History

Centrally located in Pennsylvania, Mifflin County is home to over 46,000 residents in 16 municipalities spread across 415 square miles. Typical of rural areas, the county is struggling with its fair share of the nationwide digital divide as many residents living outside of the more densely populated areas suffer poor broadband coverage.

Seeking to understand its current state of broadband availability, Mifflin County conducted a comprehensive Internet Survey of its residents in 2017. Specifically, this comprehensive survey allowed the county to better understand where the current Internet Service Providers (ISPs) were operating and how the residents perceived the quality of their service. With over half of all residential respondents indicating that they needed service or improved service and only 34% accepting their current service as satisfactory, even though there were at least six different ISP's currently providing service in different locations throughout the county, Mifflin County looked to gather more data to address the broadband gap.

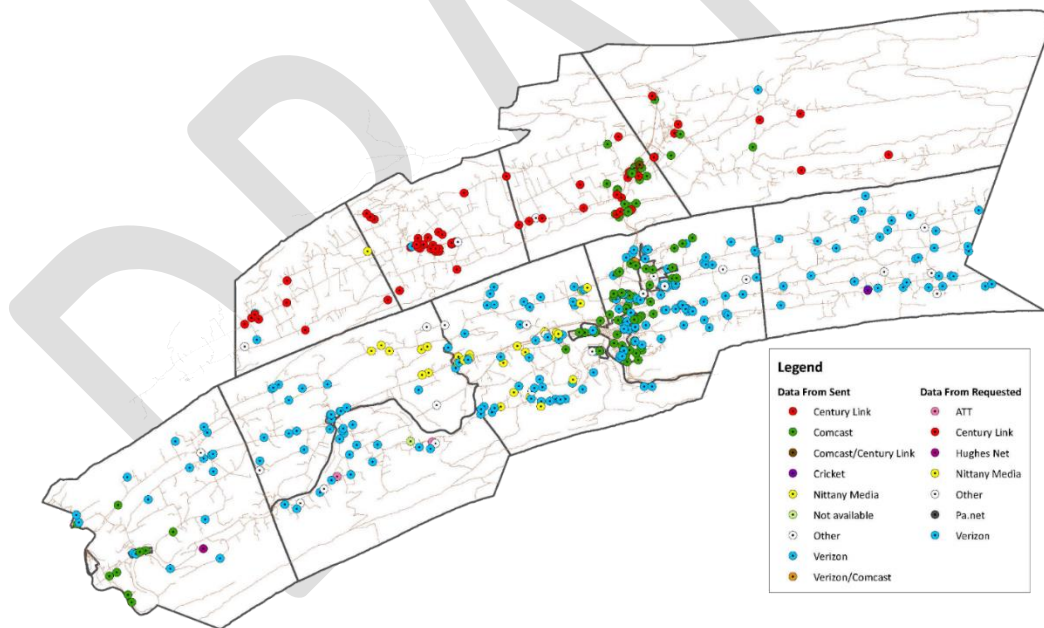


Figure 3: Existing Broadband Providers from 2017 County Survey.

In an effort to quantify the costs associated with expanding broadband service, the county contracted Noovis to provide the county with a results-oriented report that will provide the county

with cost estimations to expand service in selected areas and potential funding options to potentially offset the costs of doing so.

Cost Estimation Methodology

A review of four separate locations within Mifflin County was completed to determine an average cost to place new fiber optic cabling on existing infrastructure. Placing costs include the capital outlay required to support the time and material costs associated with deploying a crew of technicians to hang new cable on existing pole runs. Active electronics were excluded as each ISP will have different costs associated with this portion of any deployment. Working in conjunction with local ISPs, further assumptions included a pole attachment fee of \$11.00 per pole per year and a \$300.00 - \$500.00 engineering fee assessed by the pole owner to determine if any make-ready work would be necessary before placing new cabling. Placing costs for new communications infrastructure assume 25 poles per mile and an expected cost range of \$3.50 - \$4.00 per foot, equating to about \$20,000 per mile. This assumption is confirmed by similar estimates from existing ISPs budgeting for work in the Armagh Township.

Prior to the start of this study, a member of the Mifflin County Internet Advisory Committee worked with one of the ISP's to see about extending service along Havice Valley Road in Armagh township. Through this effort, they were able to find 14 potential customers, but after a further review, the costs for this extension would be around \$160,000. This early effort further amplifies and supports what this report has discovered in its analysis as it also included the necessary make-ready work.

It is important to note that while these costs capture the capital outlay for new networks, it has been stated by existing providers in the county that bandwidth requirements double every 18 months which further strains typical maintenance and upgrade operational expenses.

Working with the county, Noovis chose four separate locations for which to provide cost estimates.

1. Summit Rd /522N in Decatur Township
2. Mail Pouch/Ertley Roads in Decatur Township
3. River Road in Bratton Township
4. Atkinson Mills in Wayne Township



Figure 4: Mifflin County Selected Areas

Field visits determined that the existing communications infrastructure in rural Mifflin County is like others battling the digital divide. Most aerial cabling is placed roadside with only partial sections traversing a right of way. Common to these areas is the fact that there were few homes per mile and many homes are located an extended distance from the road.

At each location the following attributes were established.

Total Homes: Derived from physical site surveys and Google Earth

Placing Costs: \$3.50 - \$4.00 per foot (no active electronics included)

Average Cost per Home: Average Placing cost divided by the number of homes

Pole Attachment Fee: Based on \$11.00 per pole per year

Additional Engineering Fees: Based on an average of \$400 per pole for the pole owner to determine if make-ready work is necessary

Summit Rd and 522N in Decatur Township

This site was chosen due to the fact that in the original 2017 Internet Survey, there were a number of residents in this area expressing interest in improved service. This site included a total of twelve roads encompassing 8.5 miles and 134 total homes. Averaging 16 homes per mile, this was the most dense area surveyed.



Figure 5: Summit Rd Route

Street	Homes	Distance (Miles)	Poles	Placing Fiber Cost
Summit Rd	40	3	76	\$56,000 - \$65,000
522 North	36	2.34	59	\$44,000 - \$50,000
Bear Run Road	6	0.35	9	\$7,000 - \$7,500
Rager Lane	4	0.27	7	\$5,000 - \$6,000
Romig Lane	4	0.23	6	\$4,500 - \$5,000
Country View and Crestwood Lane	18	0.35	9	\$6,500 - \$7,500
Howell Lane	3	0.23	6	\$4,500 - \$5,000
Stagmire Lane	2	0.39	10	\$7,500 - \$8,500
N Ruths Rd and Alsatian Way	8	0.29	8	\$5,500 - \$6,500
Bedrock Lane and S Ruth Rd	8	0.33	9	\$6,000 - \$7,000
Private Rd?	2	0.44	12	\$8,000 - \$9,500
McCormick Lane	3	0.29	8	\$5,500 - \$6,500
Total	134	8.51	219	\$160,000 - \$184,000

Figure 6: Summit Rd Cost Summary, 2019.

Total Homes = 134 (AVG 16 per Mile)

Placing Cost = \$160,000 - \$184,000

Average Cost Per Home = \$1,290

Pole Attachment Fee: \$3,025 per year (219 Poles)

Additional Engineering Fee: \$88,000

Mail Pouch and Ertley Roads in Decatur Township

Extending North off 522N where the previous Summit Rd survey was conducted, the population density was cut in half even though the areas were essentially neighbors. This area averaged only 7 homes/mile leaving it one of the least dense areas that was reviewed.



Figure 7: Mail Pouch and Ertley Rd Route

Street	Homes	Distance (Miles)	Poles	Placing Fiber Cost
Mail Pouch RD	21	2.3	58	\$42,000 - \$50,000
Ertley RD	6	1	26	\$19,000 - \$22,000
Kricks RD	4	1	26	\$19,000 - \$22,000
Samuels Church RD	8	1.25	32	\$24,000 - \$27,000
Total	39	5.55	142	\$104,000 - 121,000

Figure 8: Mail Pouch and Ertley Rd Cost Summary, 2019

Total Homes = 39 (AVG 7 per mile)

Placing Cost = \$104,000 - \$121,000

Average Cost Per Home = \$2,900

Pole Attachment Fee: \$1,997 per year (142 Poles)

Engineering Fee: \$56,800

River Rd in Bratton Township

Located on the opposite side of Lewistown, the River RD area had a density of 7 homes per mile similar to the previous survey, north of 522S.



Figure 9: River Rd Route

Street	Homes	Distance (Miles)	Poles	Placing Fiber Cost
River Rd	28	4.2	105	\$78,000 - \$90,000

Figure 10: River Rd Cost Summary, 2019

Total Homes = 28 (AVG 7 per mile)

Placing Cost = \$78,000 - \$90,000

Average Cost Per Home = \$3,000

Pole Attachment Fee: \$1,155 per year (105 Poles)

Engineering Fee: \$42,000

Atkinson Mills in Wayne Township

Atkinson Mills included a total of four roads encompassing 8.5 miles and 104 total homes. Averaging 13 homes per mile, this was the second most dense area surveyed.

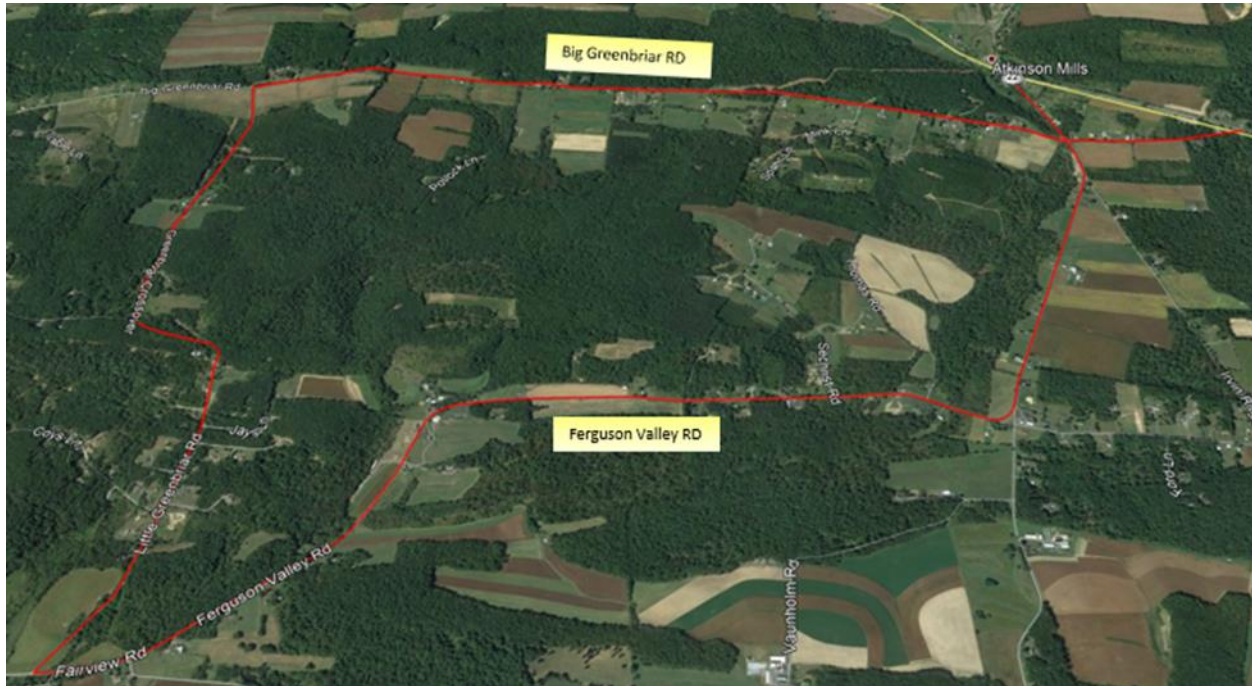


Figure 11: Atkinson Mills Route

Street	Homes	Distance (Miles)	Poles	Placing Fiber Cost
Ferguson Valley RD	47	3.53	88	\$65,000 - \$75,000
Big Greenbriar RD	35	2.71	68	\$50,000 - \$58,000
Greenbriar Crossover	7	0.83	21	\$15,000 - \$18,000
Little Greenbriar RD	15	1.1	28	\$20,000 - \$23,000
Total	104	8.17	205	\$151,000 - \$173,000

Figure 12: Atkinson Mills Cost Summary, 2019

Total Homes = 104 (AVG 13 per mile)

Placing Cost = \$151,000 - \$174,000

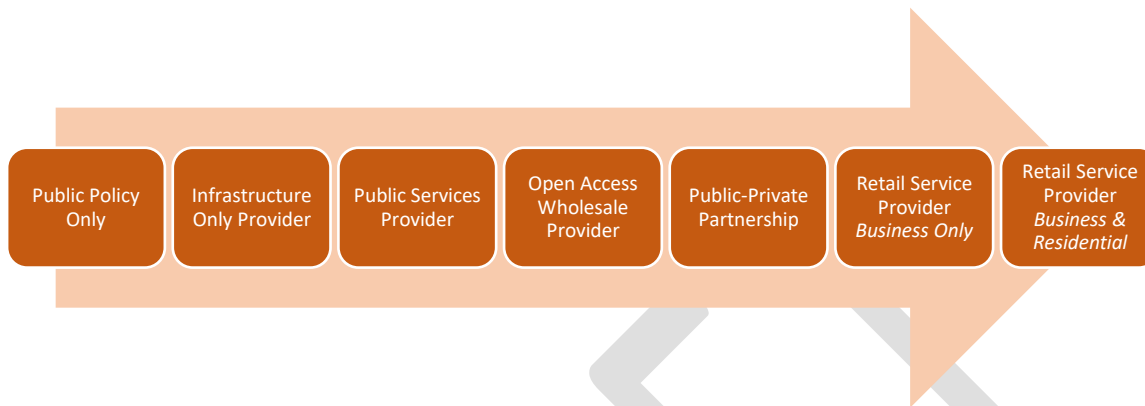
Average Cost Per Home = \$1,557

Pole Attachment Fee: \$2,250 per year (205 Poles)

Engineering Fee: \$82,000

Business Models

While it has been established that Mifflin County does not plan to own/operate any communications infrastructure, it is still worth noting the business model options that can be available in the future.



Source: Derived from BroadbandUSA Seven Models for Community Broadband

Public Policy Only

Under this option, the county would utilize its public policy tools to influence how broadband services are likely to develop. This includes permitting, right-of-way access, construction, fees, and franchises that regulate the cost of constructing and maintaining broadband infrastructure within its jurisdiction. This option is not considered a true business model but does significantly affect the local broadband environment and is therefore included as one option. Municipalities that do not wish to take a more active role in broadband development often utilize policy participation to positively influence the local broadband environment.

This option is provided as the minimum recommended participation and engagement for Mifflin County. There is essentially no Capital Expense (CAPEX) involved, unless the county decided to incentivize certain programs, and minimal Operations Expense (OPEX) in the form of personnel costs involved with focused resources on Broadband Policy. At a high-level, the county would invest in a level of expertise and dedicated responsibility/time focused on broadband needs that could be met by encouraging commercial companies to build infrastructure for the county, businesses, and residents. The effort uses all of the county's policies and management controls to find creative ways to remove impediments and improve the commercial Return on Investment (ROI) process.

Understanding that local municipalities control much of the utility planning and development, areas where the county could help facilitate county-wide collaboration between municipalities and the potential service providers include.

- Broadband-friendly right-of-way policies;
- Updated utility pole policies;
- Development code requirements;
- Cost reductions and incentives; and
- Planning involvement.

Infrastructure Only Provider

In this option, the county would lease and/or sell physical infrastructure such as conduit, dark fiber, poles, tower space, and property to broadband service providers that need access within the communities. These providers are often challenged with the capital costs required to construct this infrastructure, particularly in high cost environments. The municipal infrastructure provides a cost-effective alternative to providers constructing the infrastructure themselves. In these cases, municipalities generally use a utility model or enterprise fund model to develop programs to manage these infrastructure systems and offer them to broadband service providers using standardized rate structures.

Public Services Provider

If the county becomes a public service provider, it will utilize its fiber optic network to interconnect multiple public organizations (community anchor institutions) with fiber optic or wireless connectivity. These organizations are generally limited to the community anchors that fall within their jurisdiction including local governments, school districts, higher education organizations, public safety organizations, utilities, and occasionally healthcare or other social service providers. The majority of these anchors require higher capacity connectivity and, often, the municipal network provides higher capacity at lower costs than these organizations are able to obtain commercially. Local government networks across the country have been built to interconnect cities, counties, school districts, and utilities to one another at lower costs and with long-term growth capabilities that support these organizations' future needs and protect them from rising costs. In these cases, entities extending networking to community anchor institutions may be towns, cities, counties, ports, or consortia that build and maintain the network. The entities utilize inter-local agreements between public agencies to establish connectivity, rates, and the terms and conditions of service.

Open Access Wholesale Provider

Municipalities that adopt open access generally own and operate a substantial fiber optic network in their communities. Open access allows these municipalities to “light” the fiber and equip the network with the electronics necessary to establish a “transport service” or “circuit” for service providers interconnecting to incorporate additional capacity and connectivity into their local network. Service providers are connected from a common interconnection point with the open-access network and have access to all customers connected to that network. Open access refers to a network that is available for any qualified service provider to utilize in order to connect their customers. It allows municipalities to provide an aggregation of local customers on a single network that service providers are able to compete for efficiently and cost effectively to provide services. The concept of open access is designed to enable competition among service providers across an open network that is owned by the municipality. The municipality remains neutral and ensures non-discriminatory practices and access for all providers who operate on the network. The municipality establishes a standard rate structure and terms of service for use by all participating service providers.

Public-Private Partnership

A Public-Private Partnership (PPP) is a negotiated agreement between public and private entities to expand broadband services in a given geographical area. PPPs have gained popularity over recent years as more cities put in public broadband networks in conjunction with private broadband providers. PPPs leverage public broadband assets such as fiber, conduit, poles, facilities with private broadband provider assets, and expertise to increase the availability and access to broadband services. Under this option, a municipality would make investments in broadband infrastructure and make it available to broadband providers with the goal of enticing providers to service their communities. The municipality would be considered an Infrastructure Provider who maintains permanent ownership interest in the broadband infrastructure.

Broadband PPPs are growing in popularity because they align public organizations and private providers, leveraging each other’s core strengths. A PPP would alleviate the municipality from requirements of providing retail or wholesale broadband services and allow them to employ their broadband infrastructure and policies with providers who take on these responsibilities. This business model could prove key to the forming of a Cooperative.

Retail Service Provider – Business Only

Municipalities that provide end user services to business customers are considered retail service providers. Most commonly, municipalities provide Internet and voice services to local businesses. In many cases, a municipality may have built a fiber network for the purposes of connecting the city's primary sites that has been expanded to connect local businesses, in an effort to support local economic development needs for business recruitment and retention within the city. Municipalities that provide these services are responsible for managing customers at a retail level. They manage all operational functions necessary to connect customers to the network and provide Internet and voice services. Municipalities compete directly with service providers in the local business market, which requires the municipality to manage an effective sales and marketing function in order to gain sufficient market share to operate at break-even or better. This may or may not require certification and authority from the state's public utilities commission.

Retail Service Provider – Business & Residential

Municipalities that provide end user services to business and residential customers are considered retail service providers. Most commonly, municipalities provide Internet, voice, and television services to their businesses and residents through a municipally owned public utility or enterprise fund. As a retail service provider that serves businesses and residents, the municipality is responsible for a significant number of operational functions, including management of its retail voice, television, and Internet offerings, network operations, billing, provisioning, network construction, installation, and general operations and maintenance. The municipality competes with service providers in the business and residential markets and must be effective in its sales and marketing program to gain sufficient market share to support the operation. Many municipalities that have implemented these services are electric utilities that serve small to midsize markets, which already operate and maintain a fiber optic network for internal uses. Many of these markets are rural or underserved in areas that have not received significant investments by broadband service providers. Retail service providers must comply with state and federal statutes for any regulated telecommunications services. These organizations must also comply with state statutes concerning municipal and public utility broadband providers; a set of rules has been developed in most states that govern the financing, provision, and deployment of these enterprises. This may or may not require certification and authority from the state's public utilities commission.

	Infrastructure Provider	Government Service Provider	Open Access Provider	Public-Private Provider	Retail Service Provider – Business Only	Retail Service Provider – Business & Residential
Services Offered	<ul style="list-style-type: none"> • Conduit • Right-of-way • Dark fiber • Tower space • Property 	<ul style="list-style-type: none"> • Connectivity services to public organizations • Conduit • Right-of-way • Dark fiber • Tower space • Property 	<ul style="list-style-type: none"> • Wholesale transport service to service providers • Connectivity services to public organizations • Conduit • Right-of-way • Dark fiber • Tower space • Property 	<ul style="list-style-type: none"> • Wholesale transport to service providers • Connectivity service to public organization • Conduit • Right-of-way • Dark fiber • Tower space • Property 	<ul style="list-style-type: none"> • Internet, voice, and other business-focused retail services • Connectivity services to public organizations • Conduit • Right-of-way • Dark fiber • Tower space • Property 	<ul style="list-style-type: none"> • Internet, voice, video, and other business and residential retail services • Connectivity services to public organizations • Conduit • Right-of-way • Dark fiber • Tower space • Property
Customers	<ul style="list-style-type: none"> • Service providers • Community anchors 	<ul style="list-style-type: none"> • Service providers • Community anchors 	<ul style="list-style-type: none"> • Service providers • Community anchors 	<ul style="list-style-type: none"> • Residential • Business 	<ul style="list-style-type: none"> • Businesses • Service providers 	<ul style="list-style-type: none"> • Residents • Businesses
Opportunity	<ul style="list-style-type: none"> • Improvements to general broadband access and availability • Accelerate broadband deployments • Reduce costs to provide new services 	<ul style="list-style-type: none"> • Enhanced capacity and capabilities to community anchors • Increased efficiencies and collaboration among public organizations • Reduced cost for public organizations 	<ul style="list-style-type: none"> • Specialized fiber services to service business and economic development • Establishing a more competitive market with more providers • Accelerated delivery to the market 	<ul style="list-style-type: none"> • Triple-play services to homes and businesses • Control over how and where services are available to maximize community impact • Accelerated delivery to market • Possible revenue share 	<ul style="list-style-type: none"> • Improved services to the business community • Establishing a more competitive market with more providers 	<ul style="list-style-type: none"> • Triple-play fiber services to homes and businesses • Control over how and where services are available to maximize community impact

Figure 13: Summary of Business Models

Funding Options

CONNECT AMERICA FUND (High Cost Program) | In Phase 2 of this program, the Federal Communications Commission authorized ten telecommunications carriers to receive \$9B in support over a six-year period to fund rural broadband deployment.

RURAL BROADBAND ACCESS LOAN & LOAN GUARANTEE PROGRAM | This loan program allows for the deployment of infrastructure to provide broadband service in rural communities meeting eligibility requirements.

COMMUNITY CONNECT GRANT | This grant encourages the deployment of broadband into rural communities. Funds may be used for construction, acquisition, leasing of facilities, spectrum, and land or buildings used to deploy broadband service.

DISTANCE LEARNING & TELEMEDICINE LOANS AND GRANTS PROGRAM | This program awards grants, loans, or a combination of the two to rural community facilities to fund advanced telecommunications systems that can provide healthcare and educational benefits to rural areas.

FARM BILL BROADBAND LOAN PROGRAM | This program provides loans to fund the construction, improvement, and acquisition of facilities and equipment to provide broadband service to eligible rural communities.

TELECOMMUNICATIONS INFRASTRUCTURE LOAN PROGRAM | This program provides long-term direct and guaranteed loans for the purpose of financing improvement, expansion, construction, acquisition, and operation of telephone lines, facilities, or systems to furnish and improve telecommunications in rural areas.

TELEHEALTH NETWORK GRANTS | This grant program funds proposals that develop sustainable telehealth programs and networks and that demonstrate the use of telehealth networks to improve healthcare services for the medically underserved in rural and frontier areas.

Community Development Block Grant (CDBG) | This grant program fund can be used to finance broadband infrastructure development in areas where at least 51% of the residents are low- and moderate-income persons.

The following funding and grant programs update for FY2020 was sourced from the March 2019 **Broadband Loan and Grant Programs in the USDA’s Rural Utilities Service** compiled by the Congressional Research Service.

FY2020 The Administration’s FY2020 budget proposal requested the following for RUS broadband programs:

Rural Broadband Access Loans—Zero funding. According to the budget proposal, the elimination of funding will be offset by continued access by most eligible borrowers to the ReConnect Program (broadband pilot loan and grants).

ReConnect Program—\$200 million, which, according to the budget proposal, will support approximately eight loans, grants, or loan/grant combinations in FY2020.

Telecommunications Infrastructure Loans and Loan Guarantees—\$1.933 million in budget authority to subsidize a loan level of \$690 million (\$175.7 million for Treasury loans and \$514.3 million for FFB loans). The subsidy is for the Treasury loans. According to the budget proposal, this funding level will provide for approximately 20 loans in FY2020.

Community Connect Grants—\$30 million, which will support approximately 13 broadband grants in FY2020.

Distance Learning and Telemedicine Grants—\$43.6 million, which will support approximately 90 projects in FY2020.

Findings

Collaboration will be key to bridging the digital divide in Mifflin County. The costs associated with deploying communications infrastructure are running just over \$20,000 per mile, regardless of the number of homes being passed, just to place new fiber optic infrastructure with active electronics excluded. Prior to doing so, engineering fees can cost an additional \$10,000 assuming 25 poles per mile and \$400 per pole for the owner just to determine *IF* make-ready work is necessary.

Both the county and ISP's have expressed interest in finding a solution where there is mutual risk and reward. Given the appropriate relationship is established, the county can pursue avenues to try and offset some of the middle-mile costs associated with extending broadband service to its residents allowing the ISP's to then focus on the final connections to the residents. These final connections will likely lead to a hybrid approach of fiber optics in the middle-mile and fixed wireless solutions making the final connections. Such fixed wireless solutions can greatly reduce the costs associated with connecting homes to the nearby poles or towers as no additional physical cabling infrastructure is required. There are many fixed wireless solutions available and at least two proposals that could impact on Mifflin County. One involves the Rural Broadband Cooperative in Huntingdon County and the other alternative is being pursued by SEDA-COG could lead to the development of a cooperative with a wireless solution between Perry, Mifflin and Juniata Counties. The final outcome will likely involve some type of collaboration between the public and private sectors.