



EASTGATE REGIONAL BROADBAND FEASIBILITY STUDY

for Eastgate Regional Council of Governments

Prepared by Ice Miller Whiteboard and ms consultants, inc.

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ms consultants, inc.
engineers, architects, planners

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PREPARED FOR:



PREPARED BY:

IceMiller Whiteboard



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EXECUTIVE SUMMARY

The Eastgate Regional Council of Governments issued a Request for Proposals in September 2020, seeking the services of a consultant or firm to perform a Regional Broadband Feasibility Study focused on providing enhanced and reliable internet service to rural areas lacking appropriate coverage, as well as urban centers that require increased speed and access, for the three-county region encompassing Ashtabula, Mahoning, and Trumbull Counties, Ohio. Ice Miller Whiteboard and ms consultants were awarded the RFP and began work on the Study in November 2020.

“Broadband” is objectively defined by the Federal Communications Commission as speeds of 25 megabits per second for downloads (what a user pulls from the internet) and 3 Mbps for uploads (what a user pushes to the internet), but subjective experiences of reliability at this speed vary and demands for additional speeds continue to augment, especially with the onset of the pandemic. Affordability, both of available service and the devices that connect to the service, has long been a predominant reason why households that have broadband available do not subscribe. Stories of individuals traveling to and from public library facilities in order to apply for jobs and of students completing their homework at fast food restaurants or sitting outside major retailers in order to have access to high-speed connectivity became even more problematic with the onset of the pandemic when such institutions were temporarily or permanently forced to close their doors. We learned through this Study that certain schools in the Region were unable to ever transition to remote learning during COVID due to lack of at-home service and devices among their students.

Additional feedback received during the Needs Assessment/ community engagement portion of the Study consistently identified four overarching needs facing the region:

- 1. **Regional leadership and cooperation to support broadband deployment;**
- 2. **Affordable, reliable broadband service for Regional residents and businesses;**
- 3. **More choices of broadband providers; and**
- 4. **Creative, new models to address local broadband needs.**

To address these needs, we recommend the following projects, in the order of implementation:

TIMELINE	RECOMMENDATION
SHORT-TERM	1. Identify the Eastgate Regional Council of Governments as the regional broadband convener & coordinator and incorporate additional staff support to implement the projects.
	2. Assist in marketing low-cost offerings currently available through broadband providers, and assist with sign-ups for the FCC’s Emergency Broadband Benefit (EBB) Program.
	3. Maintain a comprehensive regional asset inventory, including digital inclusion programs.
	4. Review and potentially revise or enact municipal Right-of-Way ordinances in order to ensure they are conducive to state-of-the-art ROW management and aligned with state and federal law for the deployment of small cell facilities and wireless support structures.
	5. Adopt a regional Dig-Once Policy in order to encourage conduit be installed when public rights-of-way are excavated or otherwise opened.
	6. Establish partnerships among public entities including affordable housing, education, healthcare, transit, libraries, and Information Technology Centers, to address specific broadband access and digital equity/ inclusion needs.
	7. Encourage build-out by existing providers through applications to Ohio’s Residential Broadband Expansion Grant Program and NTIA’s Broadband Infrastructure Program.
MID-TERM	8. Establish New Broadband Authority to assist in funding additional regional buildout.
	9. Consider launching Innovation Districts in areas with a Historic Building or Historic District, designated at the local, state, or federal level, for connectivity and business incubation.
LONG-TERM	10. Issue a Request for Information and/ or Request for Proposals to support public-private partnership(s) for fiber and wireless expansion, including soliciting ideas for the following:
	10.1 Regional backbone fiber expansion along Route 7 and Route 11, supplemented with East to West Connectivity along the Ohio Turnpike, 88, and 305 to ensure additional service to Townships and building off of the regional backbone(s): <ul style="list-style-type: none">» Conneaut to Pierpont Township to Kinsman Township to Brookfield to Hubbard to Liberty Township/ Girard to Niles to Warren to Newton Falls to the Turnpike» Conneaut to Pierpont Township to Kinsman Township to Brookfield to Hubbard interconnected at 304 into Youngstown to Boardman» Conneaut to Pierpont Township to Kinsman Township with East-West connections on 88 at Vernon and on 305 at Hartford in order to address Bristol, Mecca, and Johnston Townships on 88 and Champion and Bazetta Townships along 305)» Ashtabula to 224 eastward into Poland Township and westward into Canfield, then connect into conduit along 224 in Canfield
	10.2 Broadband access expansion to agricultural regions in Southern Ashtabula County, South of 90; and Northwest Trumbull County
	10.3 Lateral connections in downtown Warren, Ohio in Trumbull County
	10.4 Network expansion for Smart City implementations and affordability for residents in Youngstown

In developing the recommendations, we considered the following, among others:

- How accessible is broadband by speed and technology type currently? Is current broadband access meeting local needs of residents, businesses, and community groups?
- How many broadband options/ provider are available to end-users in the Region?
- What assets already exist that could support additional fixed and wireless broadband expansion and provider choice in the Region?
- Of those with access, what are the subscription rates in the Region and how do these change among different demographic groups and income levels?
- What programming is available and needed to support digital inclusion within the Region?

The findings throughout this Study in many ways aligned with what we would expect: those areas with lower population density experience lower broadband availability, and lack of choice/ competition among broadband providers further impacts broadband availability and affordability. However, this circumstance is not borne entirely by the rural regions of these Counties – four communities, at least one from each County, are included among Connect Your Community’s “Fifty Worst Connected Communities in Ohio with Populations over 5,000” – Youngstown (2nd); Warren (5th); Ashtabula (20th); and Niles (32nd).

The access and affordability issues plaguing the Region are not new and several efforts have already taken place to address them, including a 2017 Connect Ohio Connected Community Assessment for Youngstown/ Mahoning County; the Ashtabula Broadband Task Force, created to be a forum in which interested parties could provide updates and work collaboratively on the broadband issues facing Ashtabula County; and the specific call-out to broadband in the Eastgate Regional Council of Government’s Comprehensive Economic Development Strategy (CEDS).

Access to high-speed internet is of tremendous importance to the long-term economic viability of the Eastgate region. As technology continues to advance, so does the way in which data is transmitted, and the speed at which that data can reach its end-user. Thus, the need to study and explore the feasibility of installing modern broadband infrastructure is paramount when considering its commercial use to draw in new business investment, while also retaining major employers within the region.

– Eastgate CEDS

You will often hear the project team say that broadband is not Field of Dreams: it isn’t “if you build it, they will come.” However, if you don’t, they will likely leave. Implementing the recommendations in this Study will set a new vision for the Eastgate Region; one in which connectivity and supporting programming is readily available to all who need it, creating new opportunities for community and economic development, and ensuring long-term regional vitality.

01

*Technology &
Trends Review*

Policy Analysis

*Service and
Infrastructure
Analysis*

Site Analysis

*Market
Analysis*

*Needs
Assessment
and Outreach*

*Utility
Formation
Study*

*Programming
and Finance
Evaluation*

*Project
Identification*

TECHNOLOGY & TRENDS REVIEW

OVERVIEW OF BROADBAND TECHNOLOGIES

“Broadband” is not a single technology, but a term that describes a range of technologies that provide reliable high-speed internet access. The Federal Communications Commission (“FCC”) currently defines broadband as speeds of 25 megabits per second (“Mbps”) for downloads and 3 Mbps for uploads, which can be delivered via a wired, wireless, or satellite connection. The State of Ohio has not codified a definition of broadband; however, the Ohio Broadband Strategy report defined underserved as any region that typically has access to speeds less than the FCC definition of broadband internet access, and broadband programs launched under Governor DeWine’s Administration use the federal definition as a benchmark for service delivery.¹ The federal definition of broadband, and the State of Ohio’s programs to support broadband expansion, will both be further explored in later sections of this study.

Despite these definitions, a household’s true broadband speed needs will be dependent upon the number of internet users and devices connected to the internet within the residence, as well as the type of internet use.

i. Fiber Broadband

The primary modes of wired broadband service connections include fiber optic lines (“fiber”), digital subscriber line (“DSL”), and cable. Some have also considered focusing on existing infrastructure, such as power lines, to address

Table 1.1 Federal Communications Commission: Broadband Speed Guide

ACTIVITY	MINIMUM DOWNLOAD SPEED
General Usage	
General Browsing and Email	1 Mbps
Streaming Online Radio	Less than 0.5 Mbps
VoIP Calls	Less than 0.5 Mbps
Student	5–25 Mbps
Telecommuting	5–25 Mbps
File Downloading	10 Mbps
Social Media	1 Mbps
Watching Video	
Streaming Standard Definition Video	3–4 Mbps
Streaming High Definition (HD) Video	5–8 Mbps
Streaming Ultra HD 4K Video	25 Mbps
Video Conferencing	
Standard Personal Video Call (e.g., Skype)	1 Mbps
HD Personal Video Call (e.g., Skype)	1.5 Mbps
HD Video Teleconferencing	6 Mbps
Gaming	
Game Console Connecting to the Internet	3 Mbps
Online Multiplayer	4 Mbps

Source: <https://www.fcc.gov/reports-research/guides/broadband-speed-guide>

Table 1.2 Federal Communications Commission: Household Brand Guide

	LIGHT USE	MODERATE USE	HIGH USE
	Basic functions: email, browsing, basic video, VoIP, internet radio	Basic functions plus one high demand application: streaming HD video, multiparty video conferencing, online gaming, telecommuting	Basic functions plus more than one high-demand application running at the same time
1 user on 1 device	Basic*	Basic	Medium
2 users or devices at a time	Basic	Medium	Medium/Advanced
3 users or devices at a time	Medium†	Medium	Advanced
4 users or devices at a time	Medium	Advanced‡	Advanced

*Basic Service = 3 to 8 Megabits per second (Mbps); †Medium Service = 12 to 25 to Mbps; ‡Advanced Service = more than 25 Mbps

Source: <https://www.fcc.gov/research-reports/guides/household-broadband-guide>

Table 1.3 Ohio County-Level Broadband Availability Estimates by Technology Type

SPEED	COUNTY	PERCENT OF HOUSEHOLDS SERVED			
		CABLE	DSL	FIBER	FIXED WIRELESS
10 X 1 Mbps	Ashtabula	86.63%	45.84%	9.32%	0.00%
	Mahoning	97.38%	21.43%	0.00%	8.27%
	Trumbull	96.10%	51.89%	0.38%	0.00%
25 x 3 Mbps	Ashtabula	86.63%	15.89%	8.93%	0.00%
	Mahoning	97.33%	5.40%	0.00%	0.00%
	Trumbull	95.10%	11.88%	0.38%	0.00%
50 x 5 Mbps	Ashtabula	86.63%	11.70%	8.91%	0.00%
	Mahoning	97.33%	4.28%	0.00%	0.00%
	Trumbull	95.10%	6.60%	0.38%	0.00%
100 x 10 Mbps	Ashtabula	80.45%	0.04%	3.25%	0.00%
	Mahoning	97.33%	0.00%	0.00%	0.00%
	Trumbull	94.39%	0.09%	0.30%	0.00%

Source: Connected Nation Ohio, March 2020

broadband supply issues.² Anticipating that demand will continue to increase above the federal definition, several communities are targeting local service delivery at speeds that exceed a gigabit per second (“Gbps”), which has only been shown to be possible in real world conditions through the use of fiber optic lines (“fiber”).

Fiber is often described as “future-proof” infrastructure. In practical terms, this means that once the fiber optic lines are buried or strung aerially, they do not need to be replaced in order to enhance download/ upload speeds. Instead, only the electronics that transmit or receive the data need changed in order to respond to increased demands for high-speed connections.

This differs from predecessor wired internet connections, such as DSL. As a result, although fiber is one of the more expensive solutions up front, it may be a proportionally lower cost solution in the long-run. Additionally, fiber networks are generally easier to operate and maintain and often require less troubleshooting than other connections.

There are many additional benefits to fiber-based connectivity. Fiber optic lines transmit data by pulsating light through insulated glass tubes, which enables the transmission of massive amounts of data at superfast speeds.³ Fiber is also advantageous for capturing increased

upload speeds while maintaining fast download speeds and offering “symmetrical” (i.e., same download and upload speeds) service. Other options, such as wireless broadband, addressed in the following section, must often sacrifice download speed for upload speed and are subject to increased signal interference. Fiber will also need to be available in order to serve as backhaul for small cell deployments necessary to support 5G wireless, which will be explored in further detail in the following section.

Ensuring sufficient fiber availability has become a priority for communities, businesses, and residential consumers across the globe. However, in order to have fiber-optic service, one needs to live in proximity to where the network already exists, which is mostly limited to dense urban areas with high incomes. This predicament has incentivized many communities to explore the possible construction and/or ownership of their own fiber network.

ii. Wireless Broadband

The umbrella of “wireless broadband connections” includes both fixed and mobile wireless, the latter of which being cell phone connections, such as those provided through AT&T, T-Mobile/ former Sprint (as a result of their 2020 merger), and Verizon. Mobile wireless networks are currently receiving significant

attention, predominantly due to the upcoming “5G revolution.”

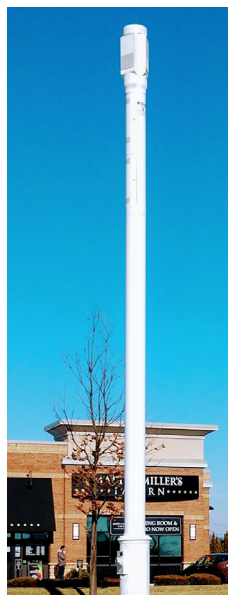
1. FIFTH GENERATION (“5G”) MOBILE WIRELESS

The “fifth generation” mobile wireless, or 5G, will be the next mobile wireless telecommunications standard. While much of the population has heard the promise of 5G through television commercials and headlines, what has not been made clear to the general public is that there are different types of 5G deployments — low-, mid-, and mmWave/ ultra-wide band high-band — and providers will be offering varying “5G” speeds through a variety of spectrum:

- **Low-band 5G** — uses a similar frequency range to 4G (between 600-850 megahertz (MHz)) and provides a “nationwide 5G” experience.⁴
- **Mid-band 5G** — the most widely deployed band, often operates between 2.5-3.7 gigahertz (GHz) at download speeds of around 100-900 Mbps. Transmissions in the mid-band spectrum can travel several miles, depending on how equipment is configured, and companies have been vying for more mid-band spectrum recently made available by the FCC, for example C-band, which will be discussed in further detail in the Policy Analysis.
- **High-band/ mmWave 5G** — is an ultra-high frequency that can achieve download speeds in gigabits per second.⁵ Marketing efforts attempt to make “5G” synonymous with mmWave deployments.

It is accurate that mmWave 5G will provide unprecedented bandwidth and speed. However, the economics of mmWave deployments require dense traffic environments and specific use cases. To that end, mmWave deployments will be focused on major metropolitan areas, as well as indoor and outdoor deployments in downtown areas, entertainment districts, hospitals, manufacturing facilities, convention centers, school campuses, sporting venues, shopping areas and targeted business locations. Additional drawbacks to mmWave 5G are its inability to travel long distances (currently only 200 to 350 yards/ a few thousand feet in optimal conditions) and its limited ability to pass through certain material, affecting its deployment in partitioned environments. However, in a suitable

Figure 1.1 Examples of Small Cell Sites



environment, mmWave 5G will provide higher speeds, extra capacity, and low latency to support innovation and provide a better overall experience.

One way to think of mmWave deployments is to envision holding a flashlight above the ground. The higher the flashlight is raised, the wider the beam, but the dimmer the light. mmWave 5G deployments need to maintain a very narrow “beam.” To do so, it will require numerous pieces of infrastructure, including smaller towers and antennas (“small cells”),⁶ which have to be placed closer together. As a result, its service territory is limited. However, low-band 5G mimics a higher raised flashlight – it can serve more people, but its signal strength is limited compared to mmWave.

There is a lot of public discussion of 5G “solving” broadband access issues. But, as highlighted above, there are varying 5G deployments and mmWave is limited to dense, predominantly urban, areas. Communities are therefore stuck in the traditional “wait and see” of whether the cellular providers are going to deploy 5G in their area and each provider has a different deployment plan, which also varies by geography. Even when 5G service is deployed, users will need a 5G-supported device. Issues with device affordability already permeate broadband adoption, addressed in more detail later in this study. As a result, if additional service options are not made available locally, 5G has the potential to perpetuate digital divides, instead of solving them.

“But the millimeter wave and the propagation properties of that, take your pick anywhere, 200, 300, 350 yards, is really not going to fulfill a coverage layer need for 5G. So 5G in terms of coverage and when you get 5G on your phone is really going to come from the more traditional side of the wireless networks.”

- Scott Mair, AT&T’s president of technology and operations”

2. FIXED WIRELESS BROADBAND:

It has been said that “[b]etween [wired] broadband and mobile broadband sits fixed-wireless broadband technology.”¹³ Fixed wireless systems broadcast high-speed internet using radio frequencies/ spectrum from a vertical asset, such as a tower, which is connected to a wired backhaul network, to receivers, such as rooftop

IN-DEPTH

Some have said that Verizon is “winning” the mmWave 5G race as AT&T has been focusing on transmitting 5G signals in its low-band spectrum.⁷ In 2019, T-Mobile made enforceable commitments to the FCC as part of its acquisition of Sprint to deploy 5G service covering 85% of the population in rural areas and 97% of all Americans within three years, with coverage rising to 90% of the population in rural areas and 99% nationwide within six years. T-Mobile committed to deploy 5G service meeting minimum download speed performance benchmarks of at least 50 Mbps available to 90% of the rural population, with two-thirds of rural Americans able to receive download speeds of at least 100 Mbps.⁸ T-Mobile’s stated end goal “is to deploy a ‘layer cake’” 5G network across the US. That layer cake will include low-band spectrum for coverage, mid-band spectrum for capacity inside cities, and high-band, mmWave spectrum for extra-fast speeds in dense urban areas.”⁹ DISH Network also recently announced its intent to bring 5G online in select cities by the end of the third quarter of 2021.¹⁰ Although DISH has historically used other telecommunication’s companies’ networks for certain services, DISH spent an estimated \$2 billion in the recent C-band auction to add to its efforts over the past two years to acquire low-, mid-, and high-band spectrum.

dishes or a fixed antenna connected to a router, installed on the user’s property.¹⁴ Generally, fixed wireless operates by communicating between two endpoints, otherwise referred to as point-to-point (“P2P”) telecommunication. A signal transmitted from one tower communicating with multiple antennas—i.e., point-to-multi-point telecommunication (“P2MP”)—is also available, but is generally more limited in range due to the widely fanned beam. Regardless of P2P or P2MP, most fixed wireless solutions require “line-of-sight” between the broadcast radio and the receiver (i.e., the radio can “see” the receiver without interference). Topography and interferences such as rain or haze can challenge this line-of-sight.

Newer iterations of fixed wireless networks are finding solutions to “line-of-sight” requirements, as detailed in the sections that follow, and a growing number of communities, particularly in rural areas where fewer fixed service provider options exist, have recognized the potential of fixed wireless to bridge the “last mile” connectivity gap. Fixed wireless’ use of airwave transmission alleviates the need for infrastructure- and maintenance-dependent phone or cable lines. Further, unlike mobile broadband systems, which are limited by the capacity of the system and frequently institute a cap on usage or charge a high premium above a defined usage level, fixed wireless broadband is not as sensitive to capacity issues and monthly plans typically allow for unlimited usage.¹⁵ As a result, it is often a more affordable broadband service option.

Experts have forecasted that service providers will continue to invest in and increasingly offer fixed wireless internet.¹⁶ Although larger carriers are showing interest in fixed wireless, see below, frequently this service is provided by a smaller wireless internet service provider (“WISP”).

“Many of these WISPs are founded by scrappy entrepreneurs who simply got so frustrated about the lack of internet in their area that they set up their own companies to provide it via [fixed wireless]. This involves finding some vertical infrastructure, such as a water tower, to set up point-to-point or point-to-multipoint antennas to serve a several-mile area.”¹⁷

-RF Engineer

Verizon and T-Mobile have announced that they will be using their existing LTE spectrum and macro towers to deliver LTE-based fixed wireless service. Verizon’s LTE Home Internet has speeds ranging from 25-50 Mbps download for \$40/month for Verizon customers and \$60/month for non-Verizon customers. For T-Mobile, this is an additional component of its commitments under its merger with Sprint. Instead of providing a connection to a mobile phone, these deployments use the same base station radio that are used to provide LTE mobile service, but they connect to customer premise equipment (“CPE”), which is usually connected to a home Wi-Fi router.¹⁸ T-Mobile has announced that it is targeting areas where AT&T stopped taking DSL sign-ups,¹⁹ and Ashtabula, Youngstown-Warren-

IN-DEPTH

Some communities have expressed health concerns regarding mmWave 5G’s higher-frequency capability. Many of these concerns find their origins in a report presented by a consultant named Bill Curry to a Florida school administration in 2000. In particular, Curry produced a graph that showed that high-frequency cell phone radiation may be absorbed in the brain at a level that could then lead to brain cancer. Medical and physics experts have since criticized Curry’s analysis as incomplete and dependent upon inaccurate assumptions. This critique from the scientific community culminated in a 2019 article published in the New York Times showing that Curry’s conclusion relied upon several significant assumptions that had since been disproven.¹² Moreover, a recent study on whether higher frequencies can have negative effects on human health, researchers found that “[t]here was no consistent relationship between power density, exposure duration, or frequency, and exposure effects.”

Boardman are included on the released listed.²⁰

Verizon also offers a mmWave-based fixed wireless 5G (“5G Home”) that operates at frequencies of about 28 GHz and 39 GHz;²¹ however, expansion has been slow and the service is currently limited to 12 cities. The company says that customers of 5G Home can expect speeds of 300 Mbps download and, depending on location, up to 1 Gbps download for \$50/month for Verizon customer and \$70/month for non-Verizon customers.²² Verizon’s 5G Home launched in Cleveland and Cincinnati, Ohio in March 2021. T-Mobile announced that its 5G home broadband service will launch in Spring 2021 and it hopes to extend the service to 7–8 million customers within five years.²³ AT&T has begun offering fixed wireless services over 5G for business customers.²⁴ AT&T’s plan options include service with up to 50 Mbps to 100 Mbps; however, customers will need to have 5G-capable devices and be in areas where 5G service is accessible. AT&T indicated as part of its March 10, 2021 announcement to offer fixed wireless over 5G, that it envisions businesses

Table 1.4 Fixed Broadband Providers by County

PROVIDER	ASHTABULA COUNTY			MAHONING COUNTY			TRUMBULL COUNTY		
	CABLE	DSL	FIBER	CABLE	DSL	FIXED WIRELESS	CABLE	DSL	FIBER
AT&T Ohio					X	X		X	
Armstrong Utilities, Inc.	X			X			X		
CableSuite 541, Inc.	X								
CenturyLink		X			X			X	X
Consolidated Communications	X	X					X	X	
Delta Telecom Inc					X				
Greatwave Communications		X	X						
RAA Services						X			
Spectrum	X			X			X		
Suddenlink Communications				X			X		
Windstream		X	X		X			X	X
Xfinity				X					
Zito Media LP	X								

Source: Connected Nation Ohio, March 2020

using this service as a primary connection, a secondary source for enhanced reliability, or to set up a temporary work site while employees work remotely. While the above fixed wireless services certainly have a role in the broadband ecosystem, none of the above offerings are currently able to rival wired in-home broadband connections and the availability of 5G home services will be dependent on carriers' existing network capacity.

iii. Wi-Fi

Wi-Fi requires infrastructure deployment connected to a large bandwidth connection, such as fiber optics, in order to facilitate wireless internet connectivity. In-building Wi-Fi is frequently available in commercial facilities and is the method in which many residents connect to their in-home network. Several communities have also explored public Wi-Fi networks provided through hotspots at local community anchor institutions, such as schools, government buildings, and libraries; or made available through transportation projects, such as Wi-Fi enabled buses.

iv. Satellite

Historically, residential satellite service was considered a last-ditch option – selected only when a fixed broadband solution, whether wired or wireless, was not available. More recently, low-orbit satellite initiatives, such as SpaceX's Starlink, have been garnering attention as another option for rural connectivity issues.²⁹

SpaceX Founder and CEO, Elon Musk has indicated that Starlink is designed to complement other broadband options rather than compete with them.³¹ This is likely due to certain shortcomings of low-orbit satellites. For example, low-orbit satellites travel at comparatively faster speeds than satellites at higher orbits. The speed limits user connectivity and places more reliance on hand-offs from one satellite to the next. It also limits the Starlink's system's capacity to provide Internet for one location. A second drawback for Starlink is the cost, which currently includes an equipment charge of \$499. Even with its limitations, Starlink largely remains in its testing phase and

Case Study: **Public Wi-Fi**

Communities across the globe have been increasingly offering public Wi-Fi networks to provide residents with a primary or alternative source of internet access. In Athens, Ohio, Ohio University began providing Wi-Fi access for the local community in August 2020.²⁵ What began as a university-only network was expanded into the Athens community to provide Wi-Fi for the public through collaboration between Ohio University and the Athens City School District. The network is currently accessible in designated drive-in parking lots throughout Ohio University's campus. Elsewhere in Ohio, Yellow Springs endeavored to make Wi-Fi available to the public in the Village's downtown area.²⁶ This has been part of Yellow Springs' long-term goal to optimize internet access with fiber optics.²⁷ Yellow Springs reportedly intends to provide free Wi-Fi access in its downtown area for a year in a pilot project to prove the community-wide broadband concept.

For many students who travel long-distance



Photo by Julia Martins de Sa

by bus to school, having Wi-Fi in the bus can provide mobile study halls. That was the idea in Lancaster, Pennsylvania where T-Mobile and the Red Rose Transit Authority (RTA) partnered to provide Wi-Fi enabled transit buses.²⁸ Built on 5G and LTE, T-Mobile's Wi-Fi is available to commuters without charge. However, it is not publicly known whether T-Mobile charged the RTA with equipment, installation, or other fees or have set an expiration date on this program.

is anticipated to improve in quality and cost as testing continues.

In competition with SpaceX is Amazon's Project Kuiper low-orbit satellite broadband network. In addition, OneWeb has started construction of its constellation of low-orbit satellites, launching seventy-four of such satellites pre-COVID, with hopes of offering global internet access.³² Making up lost ground after filing for bankruptcy in March 2020, OneWeb has since received significant funding from the U.K. government and India-based Bharti Global.³³ As of December 2020, OneWeb has resumed launching satellites and hopes to complete its 650-satellite constellation by the end of 2021.³⁴

v. Up-and-Coming Broadband Service Offerings

There are several technologies that the Eastgate region should track for potential deployment locally. Where applicable, these are also discussed in the Project Identification section. However, the region should use caution when considering

nascent technologies, particularly if additional FCC approvals are required, and be mindful that there is no silver bullet to solving all of local broadband needs.

1. CITIZENS BROADBAND RADIO SERVICE (CBRS)

To advance 5G, the FCC has been aggressively auctioning off mid-band spectrum. This includes licenses in the 3.5GHz band for Citizens Broadband Radio Service ("CBRS"),³⁵ for which 228 bidders recently won a total of 20,625 licenses nationwide³⁶ through the FCC. Unlike Wi-Fi, CBRS provides greater quality of service and security through the FCC's dedicated band. A significant benefit to CBRS is that it can bring private 5G to specific organizations with geographically confined footprints, such as convention centers, sports arenas, mines, ports, farms, and manufacturing plants.³⁷ Further, because of its security, CBRS-facilitated 5G is well-suited for mission-critical applications such as communications for mobile health care units, security teams, and roaming surveillance. CBRS has also been used for deployments to

serve rural and/ or lower-income populations. Notably, agricultural manufacturing giant John Deere purchased five CBRS licenses in the FCC's recent CBRS spectrum auction.³⁸ However, CBRS currently lacks versatility relative to competing solutions, and connecting equipment to CBRS requires unique configurations that usually are not included in off-the-shelf devices such as routers and cameras.

2. TV WHITESPACES

One trending solution to rural broadband connectivity issues is TV Whitespaces. Whitespaces, in telecommunications terminology, refer to frequencies allocated to a broadcasting service, but not used locally. In the U.S., TV Whitespace tend to operate in frequencies around 700 MHz, many of which the government abandoned. Because TV whitespaces are in lower band frequencies, signals can travel over longer distances and penetrate many obstacles,⁴⁴ which enables it to propagate internet access to rural communities. TV whitespaces frequency availability is somewhat limited, however, due

to the competition over lower band spectrum. Nevertheless, many in the government and private sector have advocated for use of so-called "whitespace devices" designed to detect and utilize currently unused airwaves to send signals to rural areas. On January 12, 2021, the FCC finalized a regulatory rule to increase unlicensed wireless device use in TV Whitespaces.⁴⁵ The rule expands the ability of unlicensed whitespace devices to operate in unused portions of the TV band (channels 2-35) to provide rural broadband services.

3. TERRAGRAPH

Terragraph is a point-to-multi-point fixed wireless network that operates in the unlicensed 60 GHz band and provides connectivity solutions for urban environments where the infrastructure does not exist or is cost-prohibitive for alternative internet connections. The Terragraph network, a Facebook initiative, is a multi-gigabit speed wireless network that uses the cloud for intensive data processing and self-organization. Equipment is mounted on City-owned street poles and buildings to extend high-speed internet connectivity for significantly less cost than traditional fiber installations. One of the primary uses for Terragraph is to provide "last-mile gigabit per second" connectivity between a provider's fiber presence and an end-user, such as a house.⁴⁶ Besides its signature "last-mile" connection, communities can deploy Terragraph in small radios on telephone poles at low cost.

4. FACEBOOK SUPERCCELL

Facebook's telecommunications arm—Facebook Connectivity—has been testing a new solution to offer internet to rural areas: SuperCell.⁴⁸ These tall towers focus power on high-gain, narrow-sectored antennas to reach remote populations in previously virtually disconnected areas. Based on trials conducted in Nigeria, the superior height and antenna technology of one SuperCell can replace up to 15-25 conventional cell towers. This added capability could reduce the installation and maintenance costs for tens of towers that could be crippling to a smaller community's budget. During a trial in New Mexico, the SuperCell supported two-way voice and video chat at a range of over 23 miles. However, zoning restrictions can complicate SuperCell deployment due to its extraordinary height.

Case Study Starlink

The State of Ohio has initiated a pilot program in Union County to test Starlink's ability to serve rural areas with broadband access.³⁰ State officials announced the program in December 2020 and have reportedly begun a 12-month test with 100 subject-customers. If the program succeeds, the State of Ohio may consider broader, statewide satellite initiatives, according to Lt. Gov. Husted.



Photo by Getty Images

Case Study: **Up-and-Coming Broadband Service Offerings**

CITIZENS BROADBAND RADIO SERVICE (CBRS):

The Purdue Research Foundation recently publicized its plan to bring CBRS spectrum connectivity to mostly rural areas in Jasper County, Indiana.³⁹ After Rushville-based Watch Communications submitted a bid for CBRS licensing, Watch partnered with the Purdue Research Foundation in an effort to provide wireless broadband access to underserved areas for educational purposes. The group also teamed up with SBA Communications to use a local tower to distribute the signal. The Purdue Research Foundation hopes to go live possibly as early as January 2021.

In December 2020, a coalition of education, philanthropic and business leaders in Indianapolis announced a \$1.7 million pilot program to provide Internet access to 1,500 lower income families.⁴⁰ The coalition and its supporters plan to achieve this program by providing mobile hotspots to qualifying families that will connect with the CBRS frequency.⁴¹ To distribute the CBRS signal, participating public schools will receive antennas capable of reaching families at least within two miles.⁴² The city of Indianapolis is providing \$730,000 in federal CARES Act funding to support the program while private donations reached nearly \$1 million.⁴³

TERRAGRAPH:

In 2019, Agile Network Builders, in partnership with RADWIN and Facebook, launched a pilot Terragraph deployment in a Canton, Ohio Innovation District spanning a 12-block/10-acre area of its downtown, marking the first commercial implementation of the Terragraph technology. The Terragraph deployment will utilize the Ohio Academic Resources Network ("OARnet") fiber backbone in order to connect up to 32 buildings, including commercial and residential spaces, through its high-speed fixed wireless solution.⁴⁷ Terragraph's limited dependency on infrastructure and low-cost can make it a useful option to extend urban networks to hard-to-reach parts of town.

TRENDS

The COVID-19 pandemic has highlighted more than ever the need for, and in many locations persisting lack of, broadband access and digital inclusion to support remote work, telehealth, distance learning, e-government, entertainment, and more. We anticipate that all levels of government will start, or enhance, investing in intelligent infrastructure like never before.

Smart Cities

Communities of all size increasingly find themselves in a precarious balancing act to streamline costs for their utilities, water and waste management, economic development, transportation, and telecommunications, while simultaneously trying to improve services. While there is no one, unified definition for what constitutes a "smart city," generally a smart city initiative is one in which a community seeks to improve efficiencies and enhance service delivery,

and ideally reduce costs, through integration of technology. Smart city projects can include intelligent transportation systems, traffic control, public safety, utility monitoring, and more. Thoughtful roll-out of any smart city initiative is important as there may be privacy concerns among members of the community.

ENERGY AND UTILITY MONITORING:

The private sector has begun to offer digital and automated solutions for energy and utility monitoring functions. Such technology enables utility operators to become more efficient with supervisory control and data acquisition ("SCADA") systems and real-time reporting, ultimately reducing cost to provide residential utility services (in turn saving consumers money as well).

PUBLIC SAFETY:

There are many "smart city" implementations

Case Study

The Challenges of Smart Cities

The city and port of San Diego learned the hard way how rolling out smart technologies without fully appreciating the cost or involving community input can lead to disaster.⁴⁹ In 2016, the city began implementing a smart streetlight program, in which the city installed smart streetlights with audio and visual sensors that could track cars and pedestrians. The energy saving technology of the lights was supposed to pay for the program with the money saved from prior utility expenses. The city took out a \$30 million loan to start the program, which the city used not only to monitor traffic, but also to support law enforcement. This caused significant concerns in the community when the public learned about the surveillance capabilities and usage of the streetlights. Like the City, the Port also implemented a smart streetlights program, but spent less than \$110,000 acquiring equipment and services. Even then, the Port found that the money saved from the reduced energy consumption was not as high as expected, unlike the cost to implement and maintain the streetlights. City and Port officials have since expressed that they wished they would have further investigated the costs and savings related to the streetlight program and involved the community more heavily to get their impression of and consent to the surveillance features before deployment.



Photo: The City of San Diego

available in public safety including police body and in-car cameras, cloud storage of video data, crime prevention through data mining, and contact tracing and other disease prevention.

COMMUNICATION INFRASTRUCTURE:

Including digital billboards, signage, and kiosks facilitates efficient information sharing between local governments and their constituents and enhanced service delivery.

TRANSPORTATION AND PARKING INFRASTRUCTURE:

Enables communities and residents to enjoy the convenience, enhanced safety, and reduced carbon footprint of intelligent transportation systems, including connected/autonomous vehicles (“CAVs”); smart parking meters; and more.

HEALTH OUTCOMES:

Access to healthcare can vary due to a variety of factors, such as distance to medical facilities and time and travel constraints. Broadband access and the ability to utilize live video conferencing, remote patient monitoring, and mobile health, has transformed the way healthcare services are provided to patients. New avenues created by telehealth and telemedicine services, especially with the onset of the COVID-19 pandemic, have resulted in faster treatment and better service.

“Telehealth services depend on reliable, high-speed internet options and are only as good as the internet connection behind them.”

-The Ohio Broadband Strategy⁵⁴

Business use

Each of the following, and its impact on the region, will be further explored in the Market Analysis section of the study.

ENTREPRENEURSHIP:

High-speed connectivity enables entrepreneurial opportunities; increased access to home-learning; and bandwidth to utilize multiple devices.

MANUFACTURING:

High-speed connectivity enables 3D printing; design simulation; agile scheduling; real-time inventory management; optimal material handling; training (e-learning); sales management; social media product-marketing.

Case Study: **Utility Monitoring**

120WaterTM offers digital solutions, including software, water sampling kits, and related professional services, to government and public water management organizations for water quality and wastewater monitoring.⁵⁰ Because public water systems can facilitate the spread of bacteria or infectious disease in communities, 120WaterTM also recently rolled out its COVID-19 Wastewater Monitoring services.⁵¹ 120WaterTM COVID-19 Wastewater Monitoring solution tests wastewater sewage for SARS-Cov-2-RNA to provide a seven-day leading indicator of outbreaks, compared to other compiled testing data. The solution reportedly aggregates all wastewater plant data, which will then trigger the shipment of sample kits to the water management facility before routing it to a lab for analysis. Once evaluated, 120WaterTM displays the results on a digital dashboard accessible to the water management facility operators and management.

Case Study: **Smart Mobility Corridor**

US-33 Smart Mobility Corridor is a 35-mile stretch of U.S. 33 in between Dublin, Ohio and Marysville, Ohio serving as a real-world proving ground for connected/ autonomous vehicles.⁵² Public and private sector partners involved in the project include the Cities of Dublin and Marysville, Ohio; Union County, Ohio; Logan County Economic Development; the Ohio Department of Transportation ("ODOT"); Honda; Battelle; and Michael Baker International. The project funds include over \$3.4 million in public and private match dollars, which are used to install a fiber network and Roadside Units ("RSUs")/ sensors; the installation of communication devices/ Wi-Fi in fleets; utilization of warning systems and smart traffic signals; and related data generation. Public sector partners benefit from new economic development

opportunities along the corridor, and private sector partners benefit from expedited approvals for permitting, rights-of-way usage, and more to enable CAV testing.

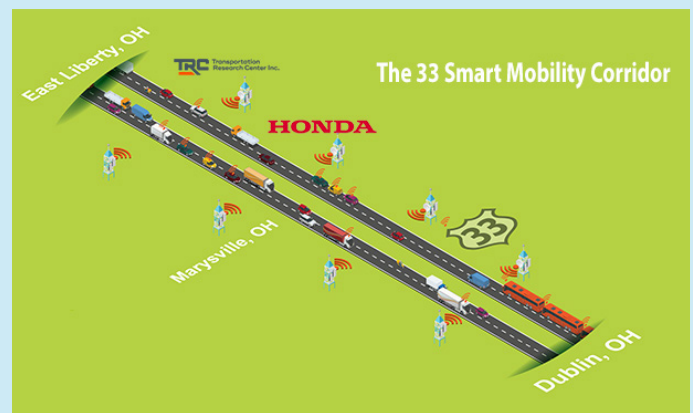


Photo: City of Dublin Ohio

TRANSPORTATION & LOGISTICS:

High-speed connectivity enables for just-in-time supply chain management; autonomous vehicles & transit; monitoring of traffic patterns and traffic data collection; product sensor-tags.

ENERGY AND NATURAL GAS:

High-speed connectivity enables for faster communication between operations centers and production sites; remote generation monitoring; energy savings sensors; grid and supply service management.

Case Study

Smart Cities & Public Health Outcomes

TELEMEDICINE:

Rural areas have long dealt with limited access to healthcare on weekends or holidays when the one or two centers within reasonable driving distances close. Because internet connection tends to be limited, telemedicine solutions to weekend medical emergencies are historically unavailable. In Milam County, Texas, however, a Texas A&M project has introduced new telemedicine kiosks or health care stations for members of the largely rural community in need of urgent care beyond normal office hours.⁵³ This standalone booth virtually connects patients to medical practitioners from miles away to offer near-real time treatment. At a standard rate of \$65 per session, Milam County's residents can virtually access health care previously unavailable.

SMART INHALERS:

Air Louisville in Louisville, Kentucky uses smart connected inhalers to help improve one of the nation's highest concentrations of asthma-inflicted citizens.⁵⁵ By partnering with Propeller Health, Air Louisville can track asthma attack information through Propeller Health's inhaler sensors.⁵⁶ This program provides residents with sensors for their asthma inhalers that tracks inhaler use. Air Louisville touts this program as not only assisting residents with managing their symptoms, but also enabling community leaders to make informed decisions about policy matters that might aggravate asthma attacks, such as air quality. Air Louisville has reportedly already enrolled 1,147 Louisville residents.

Case Study

Whitespace Network

Wilmington, North Carolina launched the first large-scale whitespace spectrum network for public use.⁵⁷ In 2010, Wilmington began testing TV whitespace and applications to take advantage of unused bands of wireless spectrum that were left over when television broadcasters switched from analog to digital. Because Wilmington was one of the first major markets in the U.S. to switch to exclusively digital broadcasting of TV programming in 2008,⁵⁸ Wilmington had an ideal network for accessing TV whitespace.⁵⁹ Wilmington teamed up with wireless network developer, Spectrum Bridge, Inc., to establish the first large-scale "Smart City" whitespace network.⁶⁰ After the FCC approved its use of whitespace devices and database, Wilmington officially released its TV whitespace network in 2012.⁶¹ Wilmington has used its whitespace spectrum for a variety of infrastructure tasks such as law enforcement video surveillance, monitoring real-time water quality to maximize energy efficiency, and tracking traffic conditions on roads that previously lacked access to a broadband connection to manage congestion.⁶² For public consumption, Wilmington has offered free Wi-Fi in city parks that leverages Wilmington's TV whitespace network.⁶³ Wilmington city officials have recognized the technical benefits that TV whitespace provides, including its superior non-line-of-sight performance which allows the signal to penetrate obstacles at greater distances than unlicensed spectrum.⁶⁴ Since then, the FCC has used Wilmington's network as a testbed for new whitespace-compatible devices developed to provide or facilitate broadband services.⁶⁵

SMART AGRICULTURE:

High-speed connectivity enables GPS soil mapping; seed and fertilizer counts; irrigation and grain-bin monitoring; precision farming/ agriculture. A study released by the FCC at the end of 2020 showed positive impacts of rural broadband on farm productivity.⁶⁶ The analysis found that a 1% increase in the number of 25 Mbps or better broadband connections per 1,000 households is associated with a 3.6% increase in corn yields, as measured in bushels per acre.

FOOD & RETAIL:

High-speed connectivity enables access to food and grocers; access to retail and increased retail & e-retail activity.

Case Study: Smart Agriculture

Microsoft recently teamed up with large farming cooperative, Land O'Lakes, to explore technology-based improvements for farm production and sustainability.⁶⁷ The project intends to use software to survey fields to mitigate plant stress and limit fertilizer use to areas most in need. For areas with poor broadband connection, the project plans to use Digital Dairy solution, which uses edge computing located at the farm that will be powerful enough to process data without having to send the data to the cloud. Separately from Microsoft, Land O'Lakes commenced its American Connection Project in 2020 to prioritize rural broadband expansion.⁶⁸ Land O'Lakes leveraged its farm cooperative network and strategic partnerships to provide more than 2,800 free, public Wi-Fi locations across 49 states, including Ohio.⁶⁹ Even then, Land O'Lakes calls this a "temporary patch for a much larger systemic issue" concerning the digital divide.

Deere & Co. has introduced broadband to farming to advance precision agriculture.⁷⁰ Among other technological applications, Deere has brought artificial intelligence (AI) facial recognition technology so that farmers could automate crop monitoring. Like Microsoft and Land O'Lakes, Deere realizes the limitations that rural connectivity issues cause. Deere hopes that communities bring 5G broadband to farmers in the near future to create parity between urban and rural connection levels and improve food production.



SECTION ENDNOTES

1. *The Ohio Broadband Strategy*. (2020). Retrieved from Innovate Ohio: <https://innovateohio.gov/wps/portal/gov/innovate/priorities/resources/broadband/strategy>.
2. Public and private entities have tested BPL deployment and found that the method has limited reach and bandwidth, making it less preferable to Wi-Fi or even 3G. Courtney, M. (2013). *Whatever happened to broadband over power line?* Retrieved from the EIT: <https://eandt.theiet.org/content/articles/2013/10/whatever-happened-to-broadband-over-power-line/>. See also *Cincinnati BPL Internet Service Provider Pulls the Plug on its System*. (2014). Retrieved from AARL: <http://www.arrl.org/news/cincinnati-bpl-internet-service-provider-pulls-the-plug-on-its-system>.
3. Rembert, M., Feng, B., & Partridge, M. (2017). *Connecting the Dots of Ohio's Broadband Policy*. Retrieved from https://aede.osu.edu/sites/aede/files/publication_files/Connecting%20the%20Dots%20of%20Ohio%20Broadband_0.pdf.
4. Dano, M. (2020). *5G mmWave silence from AT&T, T-Mobile becomes deafening*. Retrieved from Light Reading: <https://www.lightreading.com/5g/5g-mmwave-silence-from-atandt-t-mobile-becomes-deafening/a/d-id/762154>.
5. Davies, Darrell (May 20, 2019). "Small Cells – Big in 5G". Nokia. Retrieved August 29, 2020.
6. Such network densification is a challenge that communities need to be mindful of with mmWave 5G deployments, particularly those communities designated as a municipal corporation in Ohio. Assembling the various components necessary for such network densification, including permits, power and backhaul, is frequently cited as a challenge by incumbent providers, who have influenced the FCC and state governments to enact rules or legislation, respectively, limiting local governments' abilities to influence the placement of such infrastructure in rights-of-way.
7. Dano, M. (2020). *AT&T falls behind Verizon in mmWave race*. Retrieved from Light Reading: <https://www.lightreading.com/opticalip/atandt-falls-behind-verizon-in-mmwave-race/a/d-id/766020>.
8. *FCC Approves T-Mobile/Sprint Transaction with Conditions*. (2019). Retrieved from Federal Communications Commission (FCC): <https://www.fcc.gov/document/fcc-approves-t-mobilesprint-transaction-conditions>.
9. Dano, M. (2020). *T-Mobile lays out \$60B, five-year buildout plan for 5G*. Retrieved from Light Reading: <https://www.lightreading.com/5g/t-mobile-lays-out-60b-five-year-buildout-plan-for-5g/d/d-id/759586>.
10. Johnson, A. (2021). *Dish is confident in its plan to offer 5G in its first major cities by end of Q3 2021*. Retrieved from The Verge: <https://www.theverge.com/2021/2/22/22295777/dish-network-5g-q3-2021>.
11. *Edited Transcript T.N - AT&T Inc at Barclays Global Technology, Media and Telecommunications Conference (Virtual)*. (2020). Retrieved from Refinitiv. <https://investors.att.com/~media/Files/A/ATT-IR/financial-reports/quarterly-earnings/2020/2020-12-09-mair-at-barclays-conference-transcript.pdf>.
12. William J. Broad, *The 5G Health Hazard That Isn't*, NY Times, July 16, 2019, available at <https://www.nytimes.com/2019/07/16/science/5g-cellphones-wireless-cancer.html>.
13. Rembert, M., Feng, B., & Partridge, M. (2017). *Connecting the Dots of Ohio's Broadband Policy*. Retrieved from https://aede.osu.edu/sites/aede/files/publication_files/Connecting%20the%20Dots%20of%20Ohio%20Broadband_0.pdf.
14. Schell, A. (2019). *Fixed Wireless Internet vs DSL: What are the Pros and Cons of both Types of Internet*. Retrieved from Upward Broadband: <https://www.upwardbroadband.com/fixed-wireless-internet-vs-dsl-the-pros-and-cons/>.
15. Rembert, M., Feng, B., & Partridge, M. (2017). *Connecting the Dots of Ohio's Broadband Policy*. Retrieved from https://aede.osu.edu/sites/aede/files/publication_files/Connecting%20the%20Dots%20of%20Ohio%20Broadband_0.pdf.

16. *How can wireless help close the U.S. digital divide?* (n.d.). Retrieved from RF Engineer: <https://rfengineer.net/rf-antenna/how-can-wireless-help-close-the-u-s-digital-divide/>.
17. Hardesty, L. (2021). *How can wireless help close the U.S. digital divide?* Retrieved from https://www.fiercewireless.com/wireless/how-can-wireless-help-close-u-s-digital-divide?utm_source=sendgrid&utm_medium=email&utm_campaign=Newsletters.
18. Fletcher, B. (2020). *T-Mobile puts target on AT&T with LTE fixed wireless pilot expansion*. Retrieved from Fierce Wireless: <https://www.fiercewireless.com/operators/t-mobile-puts-target-at-t-major-lte-fixed-wireless-pilot-expansion>.
19. *T-Mobile Expands Home Internet to More Than 450 Cities & Towns Left High-and-Dry by AT&T*. (2020). Retrieved from <https://www.t-mobile.com/news/network/t-mobile-expands-home-internet-to-more-than-450-cities-towns-left-high-and-dry-by-att>.
20. *Id.*
21. *What frequency is 5G?* (2020). Retrieved from Verizon: <https://www.verizon.com/about/our-company/5g/what-frequency-5g>
22. Hardesty, L. (2020). *Timing is everything for Verizon's LTE fixed wireless access*. Retrieved from Fierce Wireless: <https://www.fiercewireless.com/operators/timing-everything-for-verizon-s-lte-fixed-wireless-access>
23. Johnson, A. (2021). *T-Mobile's long-promised 5G home broadband will launch later this month*. Retrieved from The Verge: https://www.theverge.com/2021/3/11/22325833/t-mobile-5g-home-broadband-internet-launch?mkt_tok=ODUwLVR-BQS01MTEAAAF7xZkWjxK5e_2b1wuHOZ95GCWcBA4UhXp5wrEvXxrWStkGi899KoicU87dVxOCcCmP-oARgsveE-4jU5wqiwdKH9zEqjBljKxEkxqi7Nn0PFYD
24. Fletcher, B. (2021). *AT&T starts offering 5G fixed wireless for business customers*. Retrieved from Fierce Wireless: <https://www.fiercewireless.com/operators/at-t-starts-offering-5g-fixed-wireless-for-business-customers>
25. Bolyard, J. (2020). *Ohio University provides Wi-Fi access for local community with drive-in spots*. Retrieved from Ohio University: <https://www.ohio.edu/news/2020/08/ohio-university-provides-wi-fi-access-local-community-drive-spots>
26. Bachman, M. (2020). *Village of YS—Free Wi-Fi downtown coming*. Retrieved from The Yellow Springs News: <https://ys-news.com/news/2020/11/village-of-ys-free-wi-fi-downtown-coming>
27. Yellow Springs Municipal Broadband, <http://www.yellow-springs.net/> (last visited May 20, 2021).
28. Weinschenk, C. (2020). *T-Mobile Brings Wi-Fi to Transit Buses*. Retrieved from Telecompetitor: <https://www.telecompetitor.com/t-mobile-brings-wi-fi-to-transit-buses/>
29. Elon Musk, Mike Suffradini (7 July 2015). ISSRDC 2015 – A Conversation with Elon Musk (2015.7.7) (video).
30. Tobias, A. (2020). *Ohio Pilot Project Tests SpaceX Satellite Broadband*. Retrieved from Government Technology: <https://www.govtech.com/network/Ohio-Pilot-Project-Tests-SpaceX-Satellite-Broadband.html>
31. Pressgrove, Jed (2021). *Experts: Closing the Digital Divide Will Take More than Satellites*. Retrieved from Government Technology: <https://www.govtech.com/network/Experts-Closing-the-Digital-Divide-Will-Take-More-than-Satellites.html>
32. Wattles, Jackie (2020). *SpaceX internet competitor OneWeb is back in action after bankruptcy*. Retrieved from CNN: <https://www.cnn.com/2020/12/18/tech/oneweb-launch-satellites-internet-scn/index.html>
33. *Id.*

34. *Id.*
35. Bastian, Chris (2020). *The CBRS Auction and Its Impact on the Cable Industry*. Retrieved from Cablefax: <https://www.cablefax.com/technology/the-cbrs-auction-and-its-impact-on-the-cable-industry>
36. FED. COMM. COMM'N, *FCC Announces Winning Bidders of 3.5 GHz Band Auction*, [online] <https://docs.fcc.gov/public/attachments/DOC-366624A1.pdf> (Sept. 2, 2020).
37. Doyle, Lee (2020). *CBRS wireless can bring private 5G directly to enterprises*. Retrieved from Networkworld: <https://www.networkworld.com/article/3529291/cbrs-wireless-can-bring-private-5g-directly-to-enterprises.html>
38. Johnston, Jeff (2020). *What the CBRS Spectrum Auction Results Mean for Rural Telecom*. Retrieved from CoBank: <https://www.cobank.com/knowledge-exchange/communications/what-the-cbrs-spectrum-auction-results-mean-for-rural-telecom>
39. Mills, Wes (2020). *Purdue Using Emerging Technology to Bridge Digital Divide*. Retrieved from Inside Indiana Business: <https://www.insideindianabusiness.com/story/42996002/purdue-using-emerging-technology-to-bridge-digital-divide>
40. Mills, Wes (2020). *Indy E-Learning Fund to Pilot Private Internet Network*. Retrieved from Inside Indiana Business: <https://www.insideindianabusiness.com/story/43061056/indy-elearning-fund-to-pilot-private-internet-network>
41. *Id.*
42. *Id.*
43. *Id.*
44. Paul Garnett & Sid Roberts, *Overview of Internet service provider technology considerations for rural broadband deployments*, <https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RE4mKct> (Nov. 2019).
45. Uniform Administrative Requirements, Cost Principles, and Audit Requirements for HHS Awards, 86 Fed. Reg. 7, 2278 (Jan. 12, 2021) (to be codified at 2 C.F.R. pt. 200) (<https://www.govinfo.gov/content/pkg/FR-2021-01-12/pdf/2020-26706.pdf>).
46. Editorial Team (2019). *What is Terragraph?* Retrieved from <https://www.everythingrf.com/community/what-is-terragraph>
47. Allevan, M. (2019). *Agile networks prepares to LAUNCH Terragraph technology in Ohio*. Retrieved from <https://www.fiercewireless.com/wireless/agile-networks-prepares-to-launch-terragraph-technology-ohio#:~:text=Agile%20Networks%20prepares%20to%20launch%20Terragraph%20technology%20in,10%2C000%20to%2050%2C000%20people%29%20starting%20with%20Canton%2C%20Ohio>.
48. Allevan, M. (2020, December 03). *Facebook connectivity aims high with Supercell for rural coverage*. Retrieved from <https://www.fiercewireless.com/operators/facebook-connectivity-aims-high-supercell-for-rural-coverage>
49. Marx, J. (2020). *The Port of San Diego Had Its Own Smart Streetlight Program*. Retrieved from <https://www.voiceofsandiego.org/topics/government/the-port-of-san-diego-had-its-own-smart-streetlight-program/>
50. About 120Water. (2021). Retrieved from <https://120water.com/about/>
51. 120Water. (2020). *120Water Launches Solution For Early Detection of COVID-19 Using Wastewater Testing* [Press release]. Retrieved from <https://120water.com/120water-launches-solution-for-early-detection-of-covid-19-using-wastewater-testing/>
52. Drive Ohio. (2020). *33 Smart Mobility Corridor*. Retrieved from <https://drive.ohio.gov/wps/portal/gov/driveohio/know-our-projects/projects/03-33-smart-mobility-corridor>

53. *On-demand care for rural communities*. (n.d.). Retrieved from <https://www.hcsc.com/newsroom/category/community-health/rural-telemedicine-innovation>
54. *The Ohio Broadband Strategy* (n.d.) Retrieved from https://innovateohio.gov/wps/wcm/connect/gov/bde9a8ce-5f93-4a04-b937-102788469bdb/OhioBroadbandStrategy_121919.pdf?MOD=AJPERES&CONVERT_TO=url&CACHEID=ROOT-WORKSPACE.Z18_M1HGGIK0N0JO00QO9DDDDM3000-bde9a8ce-5f93-4a04-b937-102788469bdb-mYuKib6
55. Air Louisville, <https://www.govinfo.gov/content/pkg/FR-2021-01-12/pdf/2020-26706.pdf> (last visited May 20, 2021).
56. *About*, AIR LOUISVILLE, <https://www.airlouisville.com/about.html> (last visited May 20, 2021).
57. D’Orazio, D. (2012). *First white space network launched today in Wilmington, North Carolina*. Retrieved from <https://www.theverge.com/2012/1/26/2743697/first-white-space-spectrum-network-wilmington-north-carolina>
58. Davidson, Paul (n.d.). *Wilmington, N.C., to test mandatory switch to digital TV*. Retrieved from https://usatoday30.usatoday.com/money/media/2008-05-07-digitaltv_N.htm
59. Patel, N. (2010). *White space ‘Smart City’ network goes up in Wilmington, North Carolina*. Retrieved from <https://www.engadget.com/2010-02-26-white-space-smart-city-network-goes-up-in-wilmington-north-ca.html>
60. *Id.*
61. Toor, A. (2012). *North Carolina launches FCC-approved TV White Space network in Wilmington*. Retrieved from <https://www.engadget.com/2012-1-30-north-carolina-launches-fcc-approved-tv-white-space-network-in-w.html>
62. *Id.*
63. Patel, N. (2010). *White space ‘Smart City’ network goes up in Wilmington, North Carolina*. Retrieved from <https://www.engadget.com/2010-02-26-white-space-smart-city-network-goes-up-in-wilmington-north-ca.html>
64. Toor, A. (2012). *North Carolina launches FCC-approved TV White Space network in Wilmington*. Retrieved from <https://www.engadget.com/2012-01-30-north-carolina-launches-fcc-approved-tv-white-space-network-in-w.html>
65. Editorial Staff (2013). *Whatever Happened To ... White Space Network Products, L.A.’s Gmail Contract, Fingerprint ID Program?* Retrieved from <https://www.govtech.com/health/Whatever-Happened-To--White-Space-Network-Products-LAs-Gmail-Contract-Fingerprint-ID-Program.html>
66. OFFICE OF ECON. AND ANALYTICS, *Impact of Broadband Penetration on U.S. Farm Productivity*, (last updated Feb. 19, 2021), <https://docs.fcc.gov/public/attachments/DOC-368773A1.pdf>.
67. Dawson, Doug (2020). *Microsoft Looking at Broadband and Agriculture*. Retrieved from <https://potsandpansbyccg.com/2020/12/09/microsoft-looking-at-broadband-and-agriculture/>
68. *American Connection Project: Why (and how) LandO’Lakes is connecting America*. Retrieved from <https://www.landolakesinc.com/Press/News/American-Connection-Project>
69. American Connection Project, <https://docs.fcc.gov/public/attachments/DOC-368773A1.pdf> (last visited May 20, 2021).
70. Rosenbaum, Eric (2020). *Deere’s farm version of facial recognition is coming to fields in 2021*. Retrieved from <https://www.cnbc.com/2020/12/10/deeres-farm-version-of-facial-recognition-is-coming-to-fields-in-2021.html>

02

*Technology &
Trends Review*

Policy Analysis

*Service and
Infrastructure
Analysis*

Site Analysis

*Market
Analysis*

*Needs
Assessment
and Outreach*

*Utility
Formation
Study*

*Programming
and Finance
Evaluation*

*Project
Identification*

POLICY ANALYSIS

BACKGROUND

Policies aimed at expanding broadband access in the United States have roots in the Communications Act of 1934. This legislation established the FCC, and put in place policies to support universal telephone access. The Telecommunications Act of 1996 expanded the traditional universal service policies to include emerging telecommunications technologies, such as mobile phones and high-speed internet.

“Developing policies that support universal broadband access presents some unique challenges. Telephone service was largely based on a single technology, copper wires. This made it easier to develop policies that supported the provision of this single technology. As broadband emerged, it quickly became a multi-modal technology, delivered to customers by copper telephone wire, coaxial cable used in cable television, wireless receivers, and satellite. Multiple technology options can offer advantages by increasing competition and by offering several solutions for delivering service to customers in a variety of circumstances. Yet, the complexity that this variety introduces can pose challenges to crafting and evaluating broadband expansion policies.” - Combini and Jang, 2009¹

THE FEDERAL COMMUNICATIONS COMMISSION

The FCC plays a central role in federal broadband policy. Specifically, Section 706 of the Telecommunications Act of 1996 states that the FCC must “encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans.”²

As referenced in the previous section of this Study, the FCC currently defines “broadband” as high-speed internet at speeds of 25 Mbps download/ 3 Mbps upload or higher. However, policymakers have periodically revised the definition of “broadband” to reflect improvements in technology and changes in customer demand.³ Historically, these revisions have taken place under democratic FCC Chairs,⁴ and we will likely see another increase in the definition of “broadband” under the Biden Administration.⁵ In Ohio, the DeWine Administration also “recognizes the definition of broadband internet will continue to change as technology evolves, requiring

even faster speeds.”⁶ The federal definition of broadband has significant policy implications as it is often used to determine eligibility for federal and state broadband funding sources,⁷ which will be analyzed further in the Programming and Finance Evaluation section of this Study.

In addition to potential changes to the federal broadband definition, with control of the FCC having passed to the Democrats in 2021, we have already started to see changes to Universal Service Fund (“USF”) programs and pushes to increase subsidies available under such programs, as well as significant action on spectrum allocations; all of which are explored in more detail below. However, it is important to note that Nathan Simington’s confirmation as a new Republican Commissioner at the end of the Trump Administration, coupled with the departure of Republican Chairman Ajit Pai, leaves the five-member FCC with two Democrats and two Republicans, which curtails its current ability to carry out a full telecom agenda, including revisiting Net Neutrality.

Universal Service Fund

There are four Universal Service Fund programs: (1) the Schools and Libraries Program or “E-Rate”; (2) the Connect America Fund (“CAF”) program, currently transitioning to the Rural Digital Opportunities Fund (“RDOF”) program; (3) Rural Health Care; and (4) Lifeline.

E-RATE:

The E-Rate program provides financial support to schools and libraries to make critical telecommunications investments, including broadband. The program prioritizes libraries and schools in rural or high poverty areas by tying the subsidy/ discount level, ranging from 20% to 90% of the cost of E-rate eligible services, to the percentage of students who are eligible for the National School Lunch Program (“NSLP”) and the urban/ rural status at the school district level.⁸

Historically, E-Rate program funding was limited to use for on-campus connectivity at the school or library facility. On March 23, 2020, in response to the COVID-19 pandemic, the FCC released a public notice reminding schools and libraries that they are permitted to allow the general public to use E-rate-supported Wi-Fi networks while on the school’s campus or library property, even if the school or library is closed.⁹ Nearly one year later,

the American Rescue Plan Act of 2021 (“ARPA”), detailed further below, was signed into law by President Joe Biden on March 11, 2021, which allocated roughly \$7.2 billion in order to expand the E-rate program to better address students’ off-campus or at-home internet access needs.

To help demonstrate the magnitude of the program, since its founding in 1996, Ohio schools and libraries have received more than \$1 billion in funding through the E-rate program.¹⁰ There are nearly 500 entities, including schools, libraries, school districts, and consortiums, participating in the E-rate program in the three-county region addressed by this Study.¹¹

CAF/ RDOF:

Formerly the FCC’s High-Cost Support Program, the Connect America Fund is the USF program targeted to rural areas. The FCC has taken numerous steps in recent years to reform this program to focus on ensuring access to fixed and mobile broadband for unserved Americans.

Under the Connect America Fund program, support was provided to certain qualifying companies to build out broadband coverage to rural areas that were considered “high-cost” to serve. On April 29, 2015, the FCC announced details of CAF Phase II and offered \$1.7 billion in subsidies to larger, price cap carriers (the incumbent local exchange carriers or “ILECs”) to build-out at least 10 Mbps download/1 Mbps upload broadband service in select areas on a state-by-state basis (which, as stated previously, is a lesser speed than the FCC’s definition of broadband service).

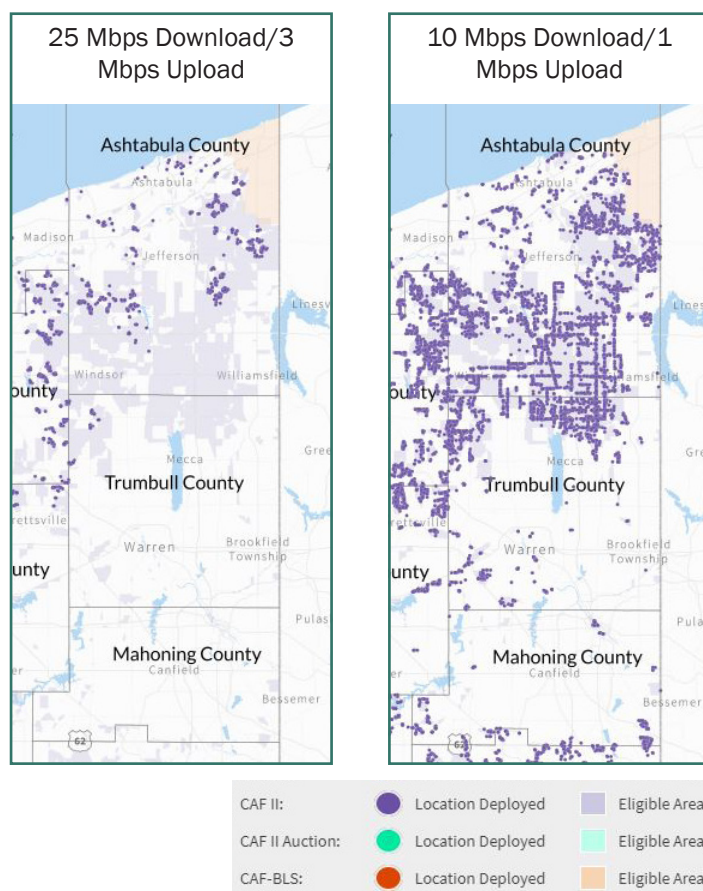
The FCC’s objective under its later CAF Phase II auction was to “distribute the funds it ha[d] available for price cap areas where the incumbent ETC decline[d] to make a state-level commitment in such a way as to bring advanced services to as many consumers as possible in areas where there is no economic business case for the private sector to do so.”¹² There are no CAF Phase II auction implications in the three-county region encompassed in this study.

However, building off the CAF Phase II Auction, the FCC adopted a framework for the Rural Digital Opportunities Fund in April 2020.¹³ The Rural Digital Opportunities Fund will be explored in more detail in the Programming and Finance Evaluation section of this Study.

RURAL HEALTH CARE:

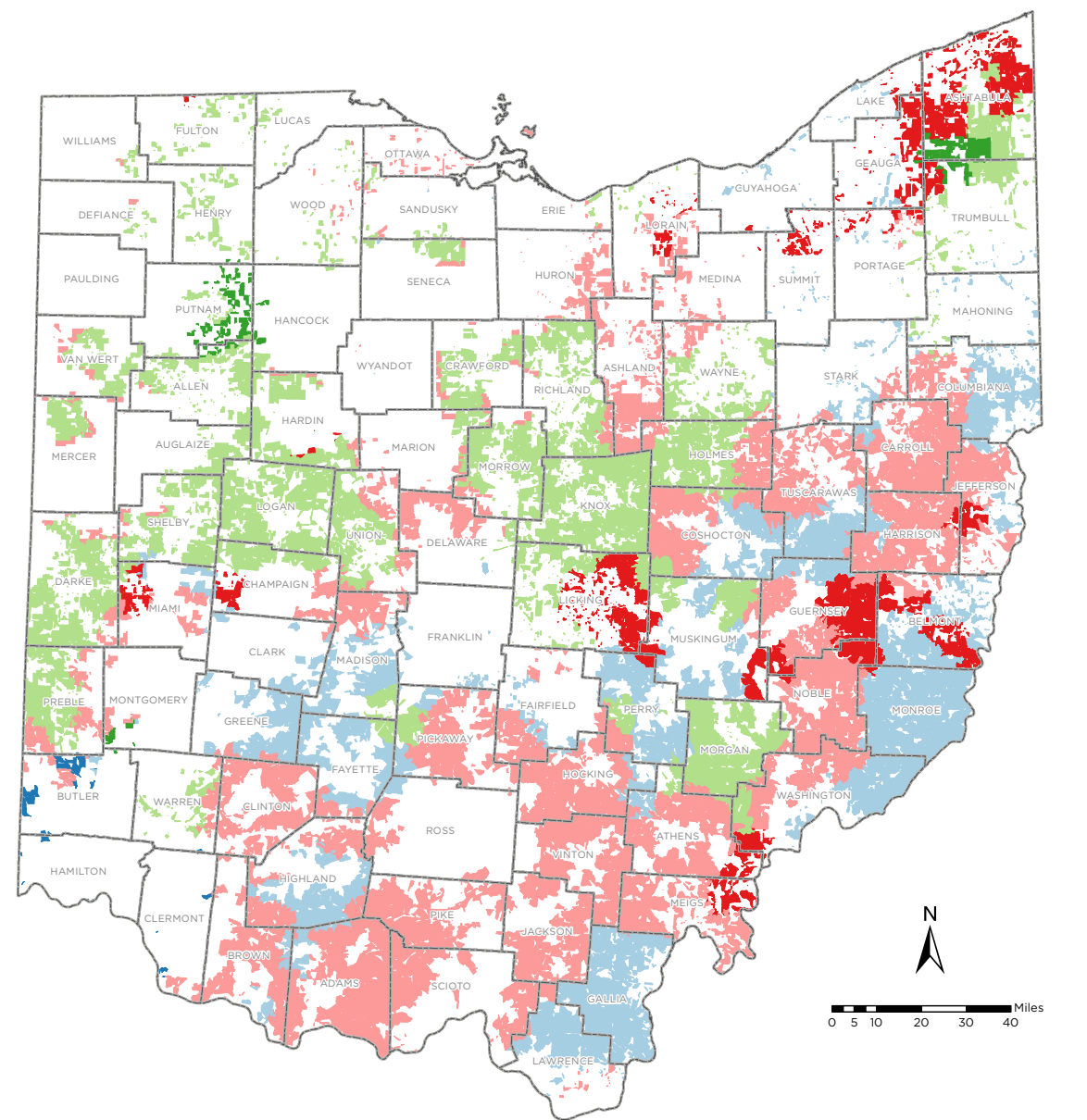
The Rural Health Care Program provides funding to eligible health care providers (“HCPs”) for telecommunications and internet services necessary for the provision of health care. The program offers a sixty-five percent (65%) discount on eligible broadband connectivity expenses for eligible rural health care providers.¹⁴ Generally, the program is limited to rural, non-profit or public HCPs.¹⁵ In particular, eligible HCPs include: (1) post-secondary educational institutions offering health care instruction, teaching hospitals, and medical schools; (2) community health centers or health centers providing health care to migrants; (3) local health departments or agencies; (4) community mental health centers; (5) not-for-profit hospitals; (6) rural health clinics; (7) skilled nursing facilities (as defined in section 395i-3(a) of title 42 and (8) consortium of health care providers consisting of one or more entities falling into the first seven categories. Non-rural HCPs,

Figure 2.1 CAF Program Build-Out as of 2019



Source: Universal Service Administrative Company

Figure 2.2 Connect American Fund Phase II Build-Out Commitments (August 2015)



Carrier	Housing and Business Locations in Targeted Areas	Annual CAF Investment
AT&T	37,603	\$14,802,500
Cincinnati Bell	745	\$194,944
CenturyLink	47,707	\$15,982,805
FairPoint	1,247	\$420,997
Frontier	66,592	\$22,927,850
Windstream	13,073	\$4,154,270

Legend

- County Boundary
- AT&T Areas Targeted for CAF Investment
- Cincinnati Bell Areas Targeted for CAF Investment
- CenturyLink Areas Targeted for CAF Investment
- FairPoint Areas Targeted for CAF Investment
- Frontier Areas Targeted for CAF Investment
- Windstream Areas Targeted for CAF Investment



however, may participate and receive support as part of consortia that include a majority rural HCPs sites.¹⁶

In addition to the Rural Health Care Program, the following initiatives were established under the 2020 CARES Act to help health care providers offer telehealth services to patients at home or mobile locations. Both programs were limited to nonprofit and public health care providers that fall within the categories of health care providers in section 254(h)(7)(B) of the 1996 Telecommunications Act: (1) post-secondary educational institutions offering health care instruction, teaching hospitals, and medical schools; (2) community health centers or health centers providing health care to migrants; (3) local health departments or agencies; (4) community mental health centers; (5) not-for-profit hospitals; (6) rural health clinics; (7) skilled nursing facilities; or (8) consortia of health care providers consisting of one or more entities falling into the first seven categories. An eligibility determination from the Universal Service Administrative Company (“USAC”) was also required. Eligible health care provider applicants were permitted to apply for both programs, but could not apply for funds for the same service:

- COVID-19 Telehealth Program: The FCC’s COVID-19 Telehealth Program was established under a *Report and Order* released by the Commission on April 2, 2020. The COVID-19 Telehealth Program provided \$200 million (approximately \$1 million per applicant) in immediate funding support directly to nonprofit and eligible public health care providers responding to the COVID-19 pandemic by fully funding (i.e., reimbursing) their telecommunications services, information services, and devices necessary to provide critical connected care services (i.e., telehealth) and prevent, prepare for, and respond to COVID-19 (not necessarily to *treat* COVID).
 - » Telecommunications Services and Broadband Connectivity Services: Voice services and Internet connectivity for health care provider or their patients.
 - » Information Services: Remote patient monitoring platforms and services; patient-reported outcome platforms; store and forward services, such as asynchronous

transfer of patient images and data for interpretation by a physician; platforms and services to provide synchronous video consult.

- » Internet-Connected Devices/Equipment: tablets, smart phones, or connected devices to receive connected care services at home (e.g., broadband-enabled blood pressure monitors; pulse-ox) for patient or health care provider use; telemedicine kiosks/carts for provider sites.
- » Applications for the COVID-19 Telehealth Program were accepted on a rolling basis until the allocated funds were exhausted, which occurred prior to several applications being awarded.
- Connected Care Pilot Program:¹⁷ The Connected Care Pilot Program under the CARES Act was geared toward eligible healthcare providers, particularly those that serve low-income and/ or veteran populations. The program was allocated \$100 million to provide three years of funding to eligible hospitals and other health centers, rural and non-rural, to cover 85% of the eligible costs of pilot projects to provide connected care through the use of broadband services and network equipment. Eligible services and network equipment included: (1) patient broadband internet access services, (2) health care provider broadband data connections, (3) other connected care information services, and (4) certain network equipment (e.g., equipment necessary to make a supported broadband service function such as routers).

LIFELINE:

In 1985, the FCC created a program to provide subsidies to help low-income Americans gain access to affordable communications services known as the “Lifeline” program. As technology shifted from landline telephone service to mobile telephone service, the Lifeline program evolved to subsidize plans that include mobile broadband.¹⁸ Currently, the Lifeline program offers qualifying low-income consumers a discount of up to \$9.25 per month on voice, broadband internet access service, or bundled services that meet the program’s minimum service standards. Recently, the FCC finalized a new rule that removes broadband-only internet service from the list

IN-DEPTH

The Public Utilities Commission of Ohio (“PUCO”) urges qualifying low-income residents to apply for Lifeline Telephone Assistance. Lifeline assistance makes basic local telephone service more affordable for income-eligible families across Ohio. Those who qualify could receive discounts for monthly telephone bills and/or installation costs of telephone service. Wireless and broadband providers also offer Lifeline.

of services supported by the Lifeline program.¹⁹ However, the rule preserved the Commission’s authority to fund broadband internet access service through the Lifeline program when, for example, supported services are packaged with or supported by broadband internet service such as voice services. A further discussion on the above USF programs is included in later sections of this Study.

Beyond the USF Programs, the FCC’s Mobility Fund is also transitioning to a new program: **the 5G Fund for Rural America (“Rural 5G Fund”)**. On October 27, 2020, the FCC rolled out the 5G Fund for Rural America, which aims to distribute up to \$9 billion over the next decade to bring 5G wireless broadband connectivity to rural America.²⁰ The 5G Fund will use multi-round reverse auctions in two phases to target support from the FCC’s funds to eligible areas based on the improved mobile broadband coverage data gathered in the FCC’s Digital Opportunity Data Collection initiative, discussed in the Service and Infrastructure section of this Study.

Phase I of the 5G Fund will target up to \$8 billion of support nationwide to areas lacking unsubsidized 4G LTE or 5G mobile broadband. To determine eligible areas, the auction will use granular, precise mobile broadband coverage data developed in the Digital Opportunity Data Collection initiative, allowing the FCC to more efficiently target funding to areas of the country where support is most needed. Phase II will provide at least an additional \$1 billion, along with any unawarded funds from Phase I, to specifically target the deployment of technologically innovative 5G networks that facilitate precision agriculture.

On February 24, 2021, the FCC issued a new rule setting forth 5G Fund adjustment factor values to help direct more 5G Fund support to harder to serve areas. For example, the FCC adopted adjustment factor values based on the interrelation between demand factors (e.g., low, medium, high demand) and area terrain elevation variation (e.g., flat, hilly, mountainous areas). This, the FCC believes, appropriately reflects the relative cost of serving areas with differing terrain characteristics, as well as the potential business case for each area, with less profitable areas receiving greater weight and therefore more support. The FCC hopes that using these values will help distribute 5G Fund support to, and disaggregate legacy support in, a range of areas across the country that are geographically and economically diverse, serving the public interest.

Spectrum Allocation

Generally speaking, “spectrum” is the radio frequency in which all wireless communications signals travel. Spectrum for non-federal use is administered by the FCC; spectrum for federal use is administered by the National Telecommunications and Information Administration [NTIA]. Several mid-band spectrum bands receiving attention in the “race to 5G” are discussed below.

2.5 GHZ (2496-2690 MHZ):

The 2.5 GHz band is considered to be prime mid-band spectrum for next generation mobile operations, including 5G. Unlike mmWave 5G, explored in the previous section, signals in a 2.5 GHz network travel much further and require a much smaller number of transmitters.²¹ In July 2019, the FCC modernized the 2.5 GHz band for 5G services.²² In the 2.5 GHz Report and Order, the FCC transformed the regulatory framework governing the band. The FCC ordered the removal of restrictions on the types of entities that can hold licenses and the Order provided opportunities, through competitive bidding, to access the previously unused spectrum.

3.7 – 3.98 GHZ (C-BAND):

According to analysts, mid-band C-band spectrum provides wider channels that support faster connections and lower latency than other ranges available to carriers.²³ Because C-Band provides exclusive spectrum access to 5G, telecommunications enterprises—big and small—

have been competing for their piece of the C-band pie. On December 8, 2020, the FCC kicked off the C-band auction (Auction 107) offering 280 MHz licenses.²⁴ Of the 57 bidders, industry experts followed Verizon and AT&T's involvement closely. Unlike T-Mobile, which inherited a trove of 250 MHz access from Sprint, Verizon and AT&T hoped to increase their 5G capabilities during the auction and the C-band auction ended as the largest spectrum auction to-date.

“The importance of the [C-band] auction to the development of 5G is difficult to overemphasize. Lower frequencies are the more traditional carrier spectrum, since they have excellent propagation characteristics and allow carriers to cover wide areas with a single base station, but that spectrum is heavily crowded, with few wide channels available. Higher, millimeter-wave frequencies offer enormous channels and potentially blazing-fast connection speeds, but they also propagate terribly. Those signals generally won’t penetrate doors and windows, and the coverage for a single access point is mostly limited to devices in the same room. C-band is the happy medium . . .” - Jon Gold, Network World (2020)

3.45 – 3.55 GHz

The Consolidated Appropriations Act, enacted by Congress in 2020, required the FCC to commence a system of competitive bidding for licenses in the 3.45 GHz mid-band spectrum by the end of calendar year 2021. In March 2021, the FCC adopted new rules for the 3.45 GHz band and released a Public Notice seeking comment on an upcoming auction (Auction 110) of mid-band spectrum in the 3.45-3.55 GHz band for 5G deployment. Bidding for up to 4,060 new flexible-use licenses for spectrum in the 3.45-3.55 GHz band in Auction 110 is projected to commence in October 2021.²⁵

In April 2021, the FCC issued a new agency rule to make 100 megahertz of mid-band spectrum in the 3.45-3.55 GHz band available for flexible use. This is consistent with the FCC’s Auction 110 efforts. This new rule also allocates mid-band spectrum to add non-federal use through licensing and competitive bidding. To make way, the FCC plans to relocate most of the current federal operations to other bands and prohibit amateur operators from using the band without approval. This rule will take effect in June 2021.

Small Cells

In spring 2018, the Ohio General Assembly enacted House Bill 478 (“H.B. 478”) to amend Ohio Revised Code chapter 4939 (“O.R.C. 4939” or “Chapter 4939”), “Use of Municipal Rights-of-Way,” which is addressed further in the sections that follow. Amended Chapter 4939, which became effective August 1, 2018, governs the installation of small cell facilities and wireless support structures by private providers in local rights-of-way in Ohio.

Shortly thereafter, the FCC adopted an Order, *Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Inv.* (the “Small Cell Order”), regarding 5G/ small cell deployment in the public right-of-way.²⁶ The Small Cell Order preempted state law with regard to application and annual fees; local aesthetic review and requirements (including undergrounding, historical, and environmental requirements); the time periods in which a municipal corporation must provide approval for new constructions and collocations (the “shot clocks”); and more.

Cities across the country challenged the fees, aesthetics, and shot clocks established by the Small Cell Order and on August 12, 2020, the United States Court of Appeals for the Ninth Circuit issued its ruling, vacating and remanding the Small Cell Order’s aesthetics requirements.

Several cities have petitioned the Supreme Court to review the Ninth Circuit’s decision, though the Court has not yet acted on this petition. In addition, a consortium of municipalities in California and Oregon have challenged the June 2020 Declaratory Ruling, alleging that the FCC violated the Administrative Procedure Act, the Constitution, and the Communications Act. These proceedings have been stayed until July 2021.²⁷

We anticipate that the Small Cell Order will continue to work its way through the appeals process in Biden Administration.

Additional federal agencies involved in broadband will be detailed in the Programming and Financing Evaluation section as their involvement is primarily through grant/ loan funding.

FEDERAL LEGISLATION:

Starting with the CARES Act, since the start of the COVID-19 pandemic, broadband-related legislation at the federal and state levels has been, and continues to be introduced and considered at an unprecedented rate. Extending affordable and reliable internet access to all Americans has become a priority of many federal legislators. Several of the legislation below, and the programs created, will be revisited in the Programming and Financing section of this Study.

CARES Act:

On March 27, 2020, Congress passed the CARES Act to provide various forms of relief from the ongoing coronavirus pandemic. Title V of the CARES Act appropriated \$150 billion “for making payments to States, Tribal governments, and units of local government.”²⁸ These payments cover “necessary expenditures incurred due to the public health emergency.”²⁹ The Act further instructed that the funds were intended to cover only those costs of the State, Tribal government, or unit of local government that: (1) are necessary expenditures incurred due to the public health emergency with respect to COVID-19; (2) were not accounted for in the budget most recently approved as of enactment of this section for the State or government; and (3) were incurred during the period that begins on March 1, 2020, and ends on December 30, 2020.³⁰

At the state-level, Ohio, like other states, sought to address the challenge of providing internet access to underserved communities by dedicating CARES Act dollars to help families with K-12 students at home purchase internet-

IN-DEPTH

Congressional Delegation for Ashtabula, Trumbull, & Mahoning Counties

- Representative Bill Johnson, District 6
- Representative Tim Ryan, District 13
- Representative David Joyce, District 14
- Senator Sherrod Brown
- Senator Rob Portman

enabled devices, wireless hotspots, or both.³³ As of September 18, 2020, Ohio made over \$657 million in CARES Act funding available to various state programs.³⁴ For example, Ohio dedicated \$50 million of its CARES Act funding for its BroadbandOhio Connectivity Grant, which provided hotspots and internet-enabled devices to students from lower-income households. ^[3] Ohio allowed schools districts, community schools, educational service centers, country boards of developmental disabilities, and other local organizations to apply for up to \$250,000 for economically disadvantaged students, vulnerable children and youth, and students with chronic conditions to gain access to the internet. In addition to the BroadbandOhio Connectivity Grant, Ohio directed CARES Act funding to the Elementary and Secondary School Emergency Relief (ESSER) and Governor’s Emergency Education Relief (GEER) programs.

COVID Relief Act:

On December 27, 2020, Congress enacted as part of the Consolidated Appropriations Act of 2021, the Coronavirus Response and Relief Supplemental Appropriations Act (“COVID Relief Act”).³⁵ In addition to the extending of one year (until December 31, 2021) use of funds provided to states and localities in the CARES Act, the COVID Relief Act included \$7 billion for broadband initiatives and established or re-appropriated numerous significant broadband-related support programs, summarized below.³⁶

- **\$300 million** for a new NTIA grant program to establish partnerships between state/ local governments and fixed broadband providers to fund broadband in rural areas.

Case Study School Partnership

In Columbus, Ohio, Columbus City Schools (CCS) announced the use of \$7 million of CARES Act funding to purchase 20,000 Chromebooks for CCS students,³¹ and Columbus City Council has passed legislation to reimburse the Columbus Partnership with \$500,000 in federal CARES Act money to pay for broadband equipment and services for Columbus students.³²

Under the program, priority for the funding is for projects proposing 100 Mbps download/20 Mbps upload service level. Eligible service areas under the program include any census block where broadband service is not available to 1/+ households or businesses.

- **\$3.2 billion** in emergency funds for low-income families impacted by the coronavirus to access broadband through an FCC fund separate from the Lifeline program (the “Emergency Broadband Benefit (EBB) Program). The EBB Program covers up to \$50 per month for broadband service (\$75 on eligible tribal lands) for households that

are Lifeline eligible; are eligible for existing discount broadband programs, explored later in this Study; have children eligible for free and reduced school lunches; have a household member who is a Pell Grant recipient; or have a household member who is unemployed.

A participating provider may seek reimbursement of up to \$100 for a connected device that it provides to an eligible household, if it charges the household between \$10 to \$50 for the connected device, such as a laptop or desktop computer.³⁷ The provider must also certify that eligible

Table 2.1 Participating EBB Providers in Ohio

BROADBAND PROVIDER NAME	SERVICE TYPE
Access Wireless	Mobile
AirVoice Wireless	Mobile
American Broadband and Telecommunications Company	Mobile
Amplex Internet	Fixed
AT&T	Fixed/Mobile
Ayersville Telephone Company	Fixed
Bascom Communications	Fixed
Benton Ridge Telephone Company	Fixed
Boost Mobile	Mobile
Buckeye Broadband	Fixed
Charter (Spectrum)	Fixed
The Chillicothe Telephone Company	Fixed
Cincinnati Bell Telephone Company	Fixed
Comcast (Xfinity)	Fixed
Consolidated Fiber	Fixed
Cox	Fixed
EmpowerCLE	Fixed
enTouch Wireless	Mobile
Frontier Communications	Fixed
Gen Mobile	Mobile
good2go mobile	Mobile
human-I-T	Mobile
Life Wireless	Mobile
Massillon Cable TV (MCTV)	Fixed

BROADBAND PROVIDER NAME	SERVICE TYPE
Mediacom	Fixed
Metro by T-Mobile	Fixed/Mobile
MetroNet	Fixed
MetaLINK Technologies	Fixed
Middle Point Home Telephone Company	Fixed
Nextlink Internet	Fixed
PCs for People	Mobile
Point Broadband	Fixed
Q Link Wireless	Mobile
Sano Health	Mobile
Selectel Wireless	Mobile
StandUp Wireless	Mobile
Suddenlink	Fixed
TDS Telecommunications Corporation	Fixed
Telephone Service Company	Fixed
T-Mobile USA	Fixed/Mobile
TM Telecomm Corp	Fixed/Mobile
TracFone Wireless	Mobile
TruConnect	Mobile
Verizon	Fixed/Mobile
Windspeed Broadband	Fixed
Windstream	Fixed
Wabash	Fixed
WATCH Communications	Fixed
WOW! Internet Cable and Phone	Fixed

Denotes provider offering connected devices (Laptop, Desktop, or Tablet)

households are not required to pay an early termination fee (if the household agrees to enter into a service contract), and will not be subject to a mandatory waiting period.

Participating in the Emergency Broadband Benefit is voluntary for Internet Service Providers. There are two categories of broadband providers who are eligible to participate in the EBB Program: (1) eligible telecommunications carriers (“ETCs”), which do not need to seek approval from the FCC in order to participate in the EBB; and (2) non-ETCs, (i.e., all other broadband providers), which must receive FCC approval in order to participate.³⁸

On March 4, 2021, the FCC released a Public Notice (“PN”) announcing the initial milestones for broadband provider participation in the EBB Program.³⁹ According to the PN, the non-ETC provider application portal for those seeking approval from the FCC prior to the commencement of household enrollments in the EBB Program opened with the FCC’s Wireline Competition Bureau (the “Bureau”) on March 8, 2021, and closed on March 22, 2021. The full list of EBB-participating providers in Ohio is in Table 2.1

It is important to note, however, that the EBB is a short-term program and early estimates project the allocated funds to cover approximately four months of service for eligible consumers.

“While the President recognizes that individual subsidies to cover internet costs may be needed in the short term, he believes continually providing subsidies to cover the cost of overpriced internet service is not the right long-term solution for consumers or taxpayers.” - The White House Fact Sheet on the American Jobs Plans

- **\$250 million** in renewed funding for the FCC’s COVID-19 Telehealth program, discussed previously.
- **\$65 million** appropriated to the FCC to complete the broadband maps in order for the government to effectively disperse funding to the areas that need it most.

- **\$1.9 billion** to small telecommunication providers to rip out Huawei/ZTE equipment to replace it with secure equipment, as directed by recent FCC regulation.
- **\$1 billion** Tribal broadband fund, which requires a minimum of 25 Mbps download/ 3 Mbps upload service. Under the fund, tribes can also contract with non-Tribal entities.
- **\$285 million** for NTIA Office of Minority Broadband Initiatives for a pilot project to connect Historically Black Colleges and Universities (“HBCUs”) and surrounding communities to broadband service.

Separately, Congress approved a \$1.4 trillion omnibus appropriations legislation, which included several telecommunications-related provisions, including appropriating \$33 million for broadband mapping. The importance of broadband mapping, which is intended to provide better data on how internet access service is available across the country and to help the FCC target funds to improve access to broadband for underserved areas, is discussed in the Service and Infrastructure analysis section. The funding bill also increases the USDA’s broadband infrastructure program by \$80M. This program is discussed in more detail in the Programming and Financing Evaluation section.

The America Rescue Plan Act of 2021 (“ARP”)⁴⁰

The \$1.9 trillion American Rescue Plan Act, H.R. 1319 (“ARP” or the “Rescue Act”), signed into law in March 2021, made available substantial funding that will or could be put toward broadband programs, including broadband mapping, deployment, adoption, and affordability.⁴¹ Six initiatives, in particular, highlight ARP’s prioritization of broadband funding.

First, and most notably, ARP set aside \$7.17 billion for the Emergency Connectivity Fund to facilitate remote learning while in-person education was limited due to the pandemic.

Second, ARP guarantees funds, although does not guarantee funding level, to U.S. city and county governments through the **State Fiscal Recovery Fund**. For cities under 50,000 in population, funds will be distributed according to population size. Counties and cities have until December 31, 2024 to expend the funds, which

can be used for a variety of purposes, including to make investments in broadband infrastructure. State and local governments may transfer funds to private nonprofit groups, public benefit corporations involved in passenger or cargo transportation, and special-purpose units of state or local governments. Coronavirus State Fiscal Recovery Funds — Through December 2024, \$219.8 billion will be made available for states, territories, and tribal governments to mitigate the fiscal effects caused by COVID-19. \$193.5 billion is provided to all 50 states and DC. Of this amount, \$25.5 billion is reserved for equal allocation and the remainder is to be allocated based on unemployment rates. Outside of this \$193.5 billion, \$20 billion is allocated to tribal governments and \$4.5 billion is set aside for U.S. territories.

Coronavirus Local Fiscal Recovery Funds

Localities will be given \$130.2 billion for metropolitan cities, local governments, and counties. \$45.5 billion will be specifically allocated to metropolitan cities while counties receive \$65.1 billion and non-entitlement units of local governments receive \$19.5 billion.

Funding will be distributed in two tranches — 50% within 60 days of the enactment of the legislation (i.e. May 31, 2021) and 50% no earlier than one year later. States must distribute funding within 30 days of receipt to local governments.

Third, ARP appropriated \$10 billion for states, territories and Tribal governments “to carry out critical capital projects directly enabling work, education, and health monitoring, including remote options, in response to the public health emergency.” Sec. 604. This likely includes broadband projects.

Fourth, Section 6001 provides \$3 billion to the Economic Development Administration, for which broadband projects in economically distressed communities are eligible for funding.

Fifth, ARP set aside almost \$10 billion for the “Homeowners Assistance Fund.” With this Fund, states may provide residences with payment assistance for household “qualified expenses” for, among other things, “internet service, including broadband internet access service.” This will remain through September 30, 2025.

President Biden’s American Jobs Plan

Beyond the ARP, the American Jobs Plan (“AJP”) will have various broadband-related components as well. According to the fact sheet put out by the White House, the AJP will seek to bring “affordable, reliable, high-speed broadband to every American, including the more than 35 percent of rural Americans who lack access to broadband at minimally acceptable speeds.” In fact, a whole section is dedicated to revitalizing America’s digital infrastructure as seen in the “In-Depth” Fact Sheet excerpt on the following page.

Broadband-specific Federal Legislation:

In its Request for Proposals (“RFP”), the Eastgate Regional Council of Governments specifically requested an overview of statutes that govern how public broadband is regulated. While a comprehensive chart of broadband-specific federal legislation under review in the current Congress is available in **Table 2.2**, there are two specific bills that include reference to regulating local networks:

THE ACCESSIBLE, AFFORDABLE INTERNET FOR ALL ACT⁴²

The Accessible, Affordable Internet for All Act is comprehensive legislation, introduced by members of the House Rural Broadband Task Force and House Democrats in June 2020 and re-introduced in March 2021.⁴³ With a proposal of \$94 billion, this legislation’s stated goal is to expand the nation’s high-speed broadband infrastructure in unserved and underserved communities and ensure that the resulting internet service is affordable. The Act specifically includes the following notable highlights:⁴⁴

- \$80 billion to implement high-speed broadband infrastructure nationwide, particularly rural broadband infrastructure; the bill instructs the FCC and states to use competitive bidding systems for ISPs to bid on broadband deployment projects in areas with service below 25 Mbps symmetrical service and areas with low-tier service (service between 25 Mbps symmetrical service and 100 Mbps symmetrical service);⁴⁵
- \$5 billion for low-interest financing of broadband deployment through a new secured loan program called the Broadband Infrastructure Financing Innovation (BIFIA) program; BIFIA would be administered by NTIA and would provide state and local

FACT SHEET: The American Jobs Plan**Revitalize America's digital infrastructure:**

"Generations ago, the federal government recognized that without affordable access to electricity, Americans couldn't fully participate in modern society and the modern economy. With the 1936 Rural Electrification Act, the federal government made a historic investment in bringing electricity to nearly every home and farm in America, and millions of families and our economy reaped the benefits. Broadband internet is the new electricity. It is necessary for Americans to do their jobs, to participate equally in school learning, health care, and to stay connected. Yet, by one definition, more than 30 million Americans live in areas where there is no broadband infrastructure that provides minimally acceptable speeds. Americans in rural areas and on tribal lands particularly lack adequate access. And, in part because the United States has some of the highest broadband prices among OECD countries, millions of Americans can't use broadband internet even if the infrastructure exists where they live. In urban areas as well, there is a stark digital divide: a much higher percentage of White families use home broadband internet than Black or Latino families. The last year made painfully clear the cost of these disparities, particularly for students who struggled to connect while learning remotely, compounding learning loss and social isolation for those students."

The President believes we can bring affordable, reliable, high-speed broadband to every American through a historic investment of \$100 billion. That investment will:

- Build high-speed broadband infrastructure to reach 100 percent coverage. The President's plan prioritizes building "future proof" broadband infrastructure in unserved and underserved areas so that we finally reach 100 percent high-speed broadband coverage. It also prioritizes support for broadband networks owned, operated by, or affiliated with local governments, non-profits, and co-operatives—providers with less pressure to turn profits and with a commitment to serving entire communities. Moreover, it ensures funds are set aside for infrastructure on tribal lands and that tribal nations are consulted in program administration. Along the way, it will create good-paying jobs with labor protections and the right to organize and bargain collectively.
- Promote transparency and competition. President Biden's plan will promote price transparency and competition among internet providers, including by lifting barriers that prevent municipally-owned or affiliated providers and rural electric co-ops from competing on an even playing field with private providers, and requiring internet providers to clearly disclose the prices they charge.
- Reduce the cost of broadband internet service and promote more widespread adoption. President Biden believes that building out broadband infrastructure isn't enough. We also must ensure that every American who wants to can afford high-quality and reliable broadband internet. While the President recognizes that individual subsidies to cover internet costs may be needed in the short term, he believes continually providing subsidies to cover the cost of overpriced internet service is not the right long-term solution for consumers or taxpayers. Americans pay too much for the internet – much more than people in many other countries – and the President is committed to working with Congress to find a solution to reduce internet prices for all Americans, increase adoption in both rural and urban areas, hold providers accountable, and save taxpayer money."

governments, public authorities, and public-private partnerships financial assistance in the form of secured loans, lines of credit, and loan guarantees;

- \$60 million for grants to states to develop their digital equity plans and an additional \$625 million for a State Digital Equity Capacity Grant program to implement digital equity plans;⁴⁶ and
- \$6 billion for the extension of The Emergency Broadband Benefit Program.⁴⁷

The bill also seeks to remove several challenges to broadband expansion, such as prohibiting state governments from enforcing laws or regulations that prevent local governments, public-private partnerships, and cooperatives from delivering broadband service.⁴⁸

CONNECT ACT

The “Communities Overregulating Networks Need Economic Competition Today” Act, or the “CONNECT Act,” seeks to limit government-run broadband networks (i.e., prohibit states and municipalities from building their own networks) under the guise of “promoting competition” and “encouraging private investment.”⁴⁹ While the Act includes an exception for existing government networks, such networks may only continue if “there is no more than one other commercial provider of broadband Internet access that provides competition for that service in a particular area.”⁵⁰ The bill also limits such networks from being constructed or extended beyond the geographic area of the state or political subdivision in which it currently operates.

STATE OF OHIO:

Multiple State agencies have played a role, some larger than others, in broadband in Ohio. However, historically, the broadband landscape within State government has been decentralized, with no individual State agency or office having full oversight over broadband expansion in Ohio.

The Ohio Broadband Strategy included a goal of creating an “Office of Broadband” - a new office to optimize expansion efforts and leverage federal programs to expand internet access.

BroadbandOhio, housed within the Ohio Development Services Agency (“DSA”) and led by Peter Voderburg, is now to serve as the convener among state agency efforts. This office serves

as a single contact point for state agencies and program managers, as well as private businesses, internet providers, nonprofits, communities, and others as they work to expand high-speed internet in Ohio. We anticipate supplemental budget and staffing made available to BroadbandOhio in the next State Budget, which would become effective on July 1, 2021, for Fiscal Year 2022 (“FY 22”).

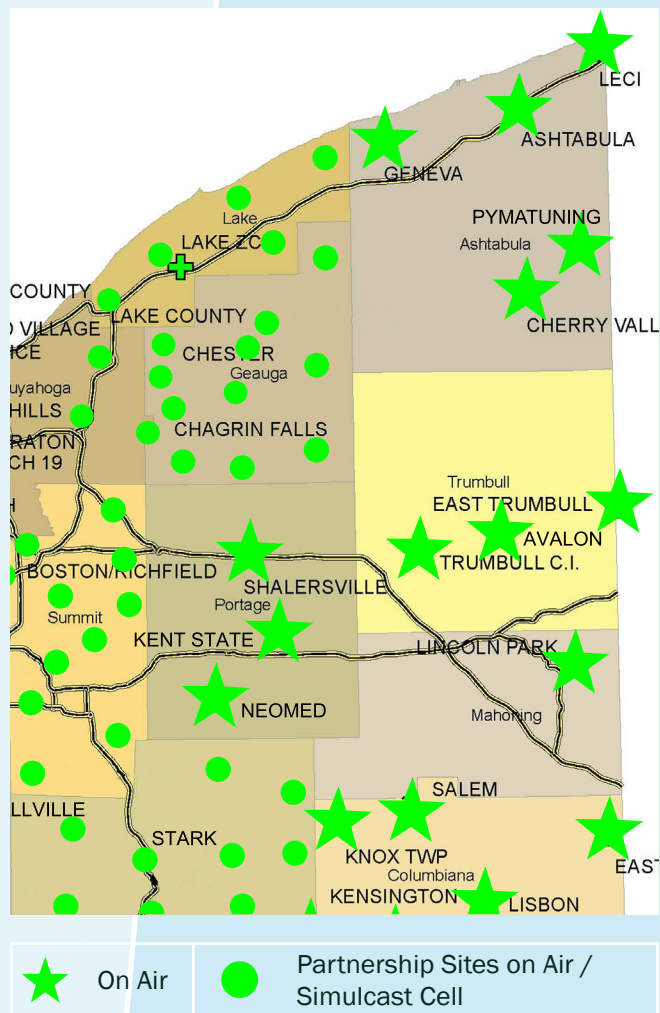
In addition to BroadbandOhio, the following State entities are involved in broadband in Ohio:

- **InnovateOhio:** InnovateOhio was established in January 2019 by Governor DeWine. Led by Lieutenant Governor Jon Husted, InnovateOhio’s “mission is to make Ohio the most innovative, creative, and entrepreneurial state in the Midwest.”⁵¹ Innovate Ohio seeks to use technology in government to improve services, reduce cost, and spur a culture of innovation in Ohio, and to improve the way citizens interact with state government.
- In 2019, InnovateOhio released the Ohio Broadband Strategy, which “explore[d] ways to provide service to all communities by leveraging our state assets and resources, encouraging public-private partnerships, and coordinating broadband expansion with economic development initiatives.”⁵²
- InnovateOhio also houses the state broadband map on its website, discussed further in the Service and Infrastructure section.
- **Department of Administrative Services (“DAS”):** The Ohio Department of Administrative Services (DAS) operates the Multi-Agency Radio Communications System (MARCS) designed to provide Ohio’s first responders and public safety providers with state-of-the-art wireless digital communications.⁵³ MARCS is a 700/800 MHz radio and data statewide network that uses advanced technology to provide statewide interoperability throughout Ohio.
- **Governor’s Office of Appalachia:** The Governor’s Office of Appalachia, led by Director John Carey, serves as the advocate for Ohio’s Appalachian region, working to coordinate economic and community development and partnership endeavors to improve the lives of those living in the region,

Case Study MARCS Towers

In January 2021, Lt. Gov. Husted announced a pilot program aimed at expanding broadband in Scioto and Jackson Counties, Ohio through the MARCS towers.⁵⁴ The State is offering Internet Service Providers (ISPs) an opportunity to apply for a grant to attach to six towers. Lt. Gov. Husted hopes that this initiative provides access to or increased speed for Internet in Southeastern Ohio. The grant application period was scheduled to close on February 26, 2021.

Figure 2.3 MARCS Tower Map, Northeast Ohio



Source: Ohio Department of Administrative Services (2019)

which includes the three counties included in this Study. The Office works to execute the federal Appalachian Regional Commission's ("ARC") five goals, which includes investing in infrastructure such as broadband.

- Ohio Board of Regents:** The Ohio Board of Regents leads the Ohio Academic Resources Network (OARnet). Established in the 1990s as an effort to link Ohio's colleges and libraries to the internet, OARnet is now one of the most advanced broadband backbone systems in the country, with more than 2,000 miles statewide of dedicated high-speed fiber serving Ohio's state and local governments, research institutions, medical centers, community anchor institutions, education institutions, and the Ohio Supercomputer Center. The State has made significant investments in the OARnet system, previously replacing copper wire with an advanced fiber optic network, which enables OARnet to offers speeds up to 100Gbps.⁵⁵
- Public Utilities Commission of Ohio (PUCO):** The PUCO is a state agency that has authority over and regulates certain aspects of services provided by telecommunications providers in the state of Ohio, namely those that also provide local exchange telephone service. In addition, the PUCO oversees electrical grid modernization in Ohio, which may have implications for fiber expansion across the state.
- Ohio Department of Transportation (ODOT):** The Ohio Department of Transportation is managing the permitting process to use State right-of-way for broadband expansion projects.⁵⁶ In addition, ODOT partnered with InnovateOhio in June 2019 to release a Request for Information ("RFI") regarding Ohio's digital infrastructure assets and strategy. The purpose of the RFI was to gather best practices and identify how the State can utilize current resources to expand internet access to the unserved and underserved areas of the state.⁵⁷ Specifically, the RFI was "intended to identify the entities that are interested in accessing the rights-of-way controlled by the Ohio Department of Transportation for fiber-optic and telecommunications purposes and to

identify which rights-of-way that each entity would like to access.”⁵⁸ ODOT also supports DriveOhio, the State’s central entity for smart mobility initiatives and advancements, many of which will require connectivity.

- **Ohio Turnpike Commission:** According to Drive Ohio, the Ohio Turnpike is outfitted with fiber-optic cable, and it already served as a testing site for self-driving trucks.⁵⁹
- **JobsOhio:** JobsOhio, the state’s private nonprofit economic development corporation, has become increasingly involved in broadband initiatives.⁶⁰ Led by President and CEO J.P. Nauseef, JobsOhio’s mission includes spurring job creation and new capital investment in Ohio through business attraction, retention and expansion.

STATE LEGISLATION:

Similar to federal legislators, extending affordable and reliable internet access across Ohio has become a priority of many state legislators. Currently, 19 states have laws designed to shield the biggest corporate internet service providers from competition. Although such legislation has not been enacted in Ohio, and is continually challenged in other states, there remains an

ongoing risk that language restricting municipal networks will be enacted in Ohio. It will be imperative that the Eastgate Regional Council of Government, and its member counties, continue to monitor state legislation, whether through the Ohio Association of Regional Councils (“OARC”) or otherwise.

A summary of broadband-related legislation currently under consideration or previously enacted in Ohio is below.

Ohio House Bill 2

The Ohio Broadband Strategy included a goal of “work[ing] with the Ohio General Assembly to implement a statewide grant program to assist in bringing high-speed internet access to unserved and underserved areas in Ohio,”⁶² the focused on the following principles:

- Provide broadband service in areas that are unserved or underserved by broadband at speeds of 25 Mbps download/ 3 Mbps upload;
- Incentivize private sector investment in needed broadband infrastructure deployment;
- Establish sound metrics and eligibility requirements to ensure that grant funds are limited to expanding coverage in eligible

Case Study JobsOhio & Starlink

Recently, JobsOhio partnered with the DeWine Administration, BroadbandOhio, and the City of Marysville to roll out a pilot broadband program through SpaceX called Starlink.⁶¹ Understood to be the largest such program in the Midwest, the initiative will test the delivery of Starlink’s space-based high-speed internet to 90 households and 10 small businesses, all of which are underserved with broadband, in the Allen Township area of Union County, outside of Marysville. While JobsOhio and its partners have not yet selected the participating homes and businesses, the pilot program is expected to begin during the first quarter of 2021 and, if successful, pilot may be extended to other areas of Ohio.

IN-DEPTH

State Legislative Delegation for Ashtabula, Trumbull, & Mahoning Counties

- State Senator Sandra O’Brien, District 32
- State Senator Michael Rulli, District 33
- State Representative Sarah Fowler Arthur, District 99
- State Representative Michael O’Brien, District 64
- State Representative Mike Loychik, District 63
- State Representative Michele Lepore-Hagan, District 58
- State Representative Al Cutrona, District 59

areas; and

- Focus on expanding broadband coverage in the most appropriate manner for the community, as opposed to favoring one type of technology or method over another.

Ohio House Bill 2 (“H.B. 2”), which was introduced on February 3, 2021 and passed the House on February 18, 2021, and Ohio Senate Bill 8 (“S.B. 8”), which was introduced on January 21, 2021 and passed the Senate on February 10, 2021, are companion legislation regarding broadband expansion. H.B. 2 passed the Senate on April 28, 2021 and we anticipate its full enactment near the end of this Study. H.B. 2’s language is summarized below.

BROADBAND PROVIDERS QUALIFYING FOR SUPPORT UNDER H.B. 2

If enacted in its current form, the language of H.B. 2 enables “broadband providers” to apply for state grant funds to assist in providing last-mile service at speeds of at least 25 Mbps download/ 3 Mbps upload. More specifically, broadband providers can apply for funds to help cover the “broadband funding gap,” defined as the difference between the total amount of money a broadband provider calculates is necessary to construct the last mile of a specific broadband network and the total amount of money that the provider has determined is the maximum amount of money that is cost effective for the provider to invest in last mile construction for that network.⁶³

H.B. 2 defines a “broadband provider” as follows:

“Broadband provider” means one of the following:

- (a) A video service provider as defined in section 1332.21 of the [Ohio] Revised Code;
- (b) A provider that is capable of providing tier one or tier two broadband service and is one of the following:
 - (i) A telecommunications service provider;
 - (ii) A satellite broadcasting service provider;
 - (iii) A wireless service provider as defined in section 4927.01 of the [Ohio] Revised Code.

Governmental and quasi-governmental entities are explicitly excluded from the definition of “broadband providers” under H.B. 2.

According to O.R.C. § 1332.21, a “video service provider” is a person granted a video service

authorization under sections 1332.21 to 1332.34 of the [Ohio] Revised Code.⁶⁴

“Telecommunications service provider” and “satellite broadcasting service provider” are not defined in H.B. 2. However, there are other codified definitions available for such terms.

According to O.R.C. § 4927.01, which is the section also used to define a wireless service provider in H.B. 2, as hereinafter discussed, “telecommunications service” means the offering of telecommunications for a fee directly to the public, or to such classes of users as to be effectively available directly to the public, regardless of the facilities used.⁶⁵ As a result, in order to qualify as a “telecommunications service provider” under H.B. 2, a provider must: (1) offer telecommunications; (2) for a fee; and (3) directly to the public, or to such classes of users as to be effectively available directly to the public, regardless of the facilities used.

“Telecommunications” is defined in O.R.C. § 4927.01 as “the transmission, between or among points specified by the user, of information of the user’s choosing, without change in the form or content of the information as sent and received.”⁶⁶ This, and the above definition of “telecommunications service” align with the federal definitions of such terms in 47 U.S.C. § 153.

“Satellite broadcasting service” is defined in O.R.C. § 5739.01 as “the distribution or broadcasting of programming or services by satellite directly to the subscriber’s receiving equipment without the use of ground receiving or distribution equipment, except the subscriber’s receiving equipment or equipment used in the uplink process to the satellite, and includes all service and rental charges, premium channels or other special services, installation and repair service charges, and any other charges having any connection with the provision of the satellite broadcasting service.”⁶⁷

Lastly, a “wireless service provider” is defined in O.R.C. § 4927.01 as “a facilities-based provider of wireless service to one or more end users in this state.”⁶⁸ “Wireless service” is defined in the same O.R.C. section as follows:

- Wireless service means federally licensed commercial mobile service as defined in the “Telecommunications Act of 1996,” 110 Stat. 61, 151, 153, 47 U.S.C. 332(d) and further

defined as commercial mobile radio service in 47 C.F.R. 20.3. Under division (A)(19) of this section, commercial mobile radio service is specifically limited to mobile telephone, mobile cellular telephone, paging, personal communications services, and specialized mobile radio service provided by a common carrier in this state and excludes fixed wireless service.⁶⁹

H.B. 2 will require the applicant broadband provider to disclose whether it plans to use wired, wireless, or satellite technology to complete the project.

ELIGIBLE PROJECT AREAS UNDER H.B. 2

Under H.B. 2, broadband providers may receive funds to help cover the costs of providing broadband service to “eligible project” areas. An “eligible project” is a project to provide 25 Mbps download/ 3 Mbps upload (“tier two broadband service”) or higher service to residences in an unserved or tier one area, as such terms are hereinafter defined, of an eligible municipal corporation or township.

Four designations are key to understanding the areas eligible for support under H.B. 2:

- 1. Tier one broadband service: a retail wireline or wireless broadband service capable of delivering internet access at speeds of at least 10 Mbps download/ 1 Mbps upload, but no greater than 25 Mbps download/ 3 Mbps upload.
- 2. Tier two broadband service: a retail wireline or wireless broadband service capable of delivering internet access at speeds of at least 25 Mbps download/ 3 Mbps upload.
- 3. Tier one area: an area that has broadband access of speeds between 10 Mbps download/ 1 Mbps upload and 25 Mbps download/ 3 Mbps upload (tier one broadband service), but not at speeds above 25 Mbps download/ 3 Mbps upload (tier two broadband service). This includes an area where network construction to provide tier one broadband service is in progress and scheduled to be complete within a two-year period; however, excludes an area where network construction to provide *tier two* broadband service is in progress and scheduled to be complete within a two-year period.

- 4. Unserved area: an area without access to 10 Mbps download/ 1 Mbps upload or 25 Mbps download/ 3 Mbps upload broadband service, excluding an area where network construction to provide broadband service of at least 10 Mbps download/ 1 Mbps upload is in progress and scheduled to be complete within a two-year period.

Despite the lengthy definitions encompassed in an eligible project area, H.B. 2 is silent as to what data source is to be used to determine coverage at the delineated speed tiers.

OHIO DEVELOPMENT SERVICES AGENCY’S ROLE UNDER H.B. 2

If enacted, the Grant Program will be overseen by the Ohio Development Services Agency (“DSA”), and likely the office of BroadbandOhio. Specifically, H.B. 2 tasks DSA with the following:

- Administering and providing staff assistance for the program;
- Receiving and reviewing program grant applications;
- Distributing completed applications to the Broadband Expansion Program Authority (the “Authority”), as further defined in the next section, for final review and award;
- Paying all reimbursements and stipends to the Authority, as further analyzed in the following section;
- In coordination with the Authority, develop a weighted scoring system; and
- Adopt rules for the Grant Program establishing an application form and procedures.

THE BROADBAND EXPANSION PROGRAM AUTHORITY

As aforementioned, H.B. 2 creates within DSA the Broadband Expansion Program Authority.⁷⁰

The Compilation and Meetings of the Authority:

The Authority will consist of: (1) the Director of DSA, or her designee, as issued in writing, who shall serve as the Chair of the Authority (the “Chair”); (2) the Director of InnovateOhio, or his designee, as issued in writing; (3) one member appointed by the Senate President; (4) one member appointed by the Speaker of the House; and (5) one member appointed by the Governor

(collectively the “Authority Members”). A vice-chair of the Authority (the “Vice-Chair”) will be elected by the Authority Members, three (3) of which will constitute a quorum. All votes will be taken in a roll call manner. In the absence of the Chair, the Vice-Chair will preside over meetings.

The members appointed by the Senate President, the Speaker of the House, and the Governor (collectively the “Appointed Members”) must have expertise in broadband infrastructure and technology, and may not be affiliated with or employed by the broadband industry, nor in a position to benefit from a grant issued under the program. Appointed Members will serve four-year terms, unless appointed to fill a vacancy prior to the expiration of the term for which the member’s predecessor was appointed, in which case the appointed member will hold the position for the remainder of that term. All Appointed Members are eligible for re-appointment. Further, unless such Appointed Member is currently serving as an administrative department head, Appointed Members will receive a monthly stipend, calculated under O.R.C. 145.016, and in an amount that will qualify each member for one (1) year of retirement service credit under the Ohio Public Employees Retirement System (“OPERS”) for each year of the Appointed Member’s term. All Authority Members will be reimbursed for necessary and actual expenses incurred in performing the business of the Broadband Expansion Program Authority.

The Authority meetings will take place in-person; however, Authority Members may attend electronically so long as: (1) at least three of the Authority Members are present in person at the location where the meeting is being conducted; and (2) there is the ability for simultaneous communication among the members attending in-person, electronically, and all the members of the public attending in person.

The Authority’s Responsibilities:

The Authority is tasked with considering each application for a broadband grant that DSA has reviewed and provided. The Authority will score all applications according to the scoring criteria established under H.B. 2 and award grants accordingly. In addition, the Authority must:

- Continually examine and propose updates to any broadband plan provided by law enacted by the General Assembly or Executive Order

of the Governor;

- Monitor the Residential Broadband Expansion Grant program and conduct hearings, as needed, in order to track the program applications and awards, including:
 - » The number of applications to the program;
 - » The geographic locations of eligible projects included in the program applications;
 - » The broadband providers submitting applications;
 - » The tier two infrastructure and technology proposed in the applications;
 - » Any public rights-of-way or public facilities that will be used for the projects;
 - » The speeds of tier two broadband services that will be provided by the projects;
 - » The amount of grant funds requested by each project, and the proportion of project funding to be provided by the broadband provider and other participating entities;
 - » The number of residential and nonresidential locations that will have access to tier two broadband service under each project;
 - » Listing the amount of any unencumbered program grant funds that remain available for award under the Grant Program; and
 - » Any additional factors deemed necessary by the Authority to monitor the program;
- Review all progress reports and operational reports required under H.B. 2;⁷¹
- Review all pending county requests made pursuant to H.B. 2;
- Identify best practices for and impediments to the continued expansion of tier two broadband;
- Coordinate and promote the availability of publicly accessible digital literacy programs;
- Identify, examine, and report on any federal or state government grant or loan program that would promote the deployment of tier two broadband in Ohio;
- Track the availability, location, rates and speeds, and adoption of programs that offer

tier one and tier two broadband service in an affordable manner to low-income Ohioans; and

- Submit a written public report of its findings and recommendations to the Governor and the General Assembly by December 1 of each calendar year.

THE APPLICATION AND EVALUATION PROCESS UNDER H.B. 2

DSA will provide an application form, which providers will need to accurately complete in order to apply for funding under the Grant Program, which will include, but is not limited to:⁷²

- The location and description of the project, including the residential addresses in the unserved or tier one areas where tier two broadband service will be available;
- A notarized letter of intent that the provider will provide tier two broadband service to all of the residential addresses listed in the application and that none of the funds will be used to extend service to areas that are not unserved or in a tier one area;
- The broadband funding gap and the amount of grant funds requested;
- The amount of any monetary or in-kind contributions, such as funds that the broadband provider is willing to contribute; funds received or approved under a federal or state grant or loan; general revenue or other discretionary funds, or property tax assessments, of a municipal corporation, township, or county in which the eligible project is located;⁷³ alternate payment terms between the broadband provider and the legislative authority in which the project is located;⁷⁴ and contributions or grants from individuals, companies, or organizations;⁷⁵
- A description of the provider's managerial and technical expertise in broadband;
- Whether the provider plans to use wired, wireless, or satellite service in the project;
- A description of the project's scalability;
- The download and upload speeds planned for the project;
- A description of the provider's customer service capabilities, including any locally based call centers or customer service offices,

and a copy of the providers general customer service policy, including customer credits for service outages, etc.;

- The length of time that the broadband provider has been operating in Ohio;
- Proof that the broadband provider has the financial stability to complete the project, including publicly available financial statements;
- A projected construction timeline;
- A description of the anticipated government authorizations, permits, and other approvals required for the project and an estimated timetable for such approvals;
- Notification of any information in the application the provider considers trade secret; and
- A brief description of any arrangement, including sublease or joint ownership, that the provider has entered into or plans to enter into with another broadband provider, electric cooperative, or electric distribution utility, to enable the tier two services.

Applications will be accepted during a "Submission Period" designated by the Authority, which will be at least 60, but no longer than 90 days, and may occur no more than twice in a fiscal year. Applications deemed "incomplete" can be refiled in a complete form during the Submission Period, or granted an extension. If not filed in a complete form, the application will be denied.

Application evaluation priorities, from highest to lowest, include:

- Eligible projects for unserved areas;
- Eligible projects located within distressed areas in accordance with O.R.C. § 122.19;
- Eligible project receiving or approved to receive financial or in-kind contributions;
- Eligible projects for which the proposed construction will utilize State of Ohio rights-of-way or otherwise require attachment to, or use of, public facilities;
- Eligible projects based on proposed upstream and downstream speeds and scalability of such service to speeds higher than 25 Mbps downstream/ 3 Mbps upstream;

- Eligible projects based on each of the following, in equal measure:
 - » Demonstrated support for community and economic development efforts in, or adjacent to, the projects, including service to commercial and nonresidential entities as a result of, but not directly funded by, the program;
 - » The provider's experience, technical ability, and financial capability;
 - » The length of time the provider has been providing tier two service in Ohio;
 - » The extent to which funding is necessary;
 - » The ability of the broadband provider to leverage nearby or adjacent tier one or tier two broadband service infrastructure to facilitate the proposed deployment;
 - » The extent to which the project utilizes or upgrades existing infrastructure; and
 - » The eligible project's location within Ohio Opportunity Zones.

Applications will be funded in accordance with the scoring system developed by DSA and the Authority until funds for that fiscal year are no longer available. An application pending at the end of the fiscal year will be deemed "denied," but can be refiled in subsequent fiscal years. The Authority will publish project awards on its website.

CHALLENGE PROCESS UNDER H.B. 2

Within five (5) days after the close of the Submission Period, DSA will publish the list of residential addresses included in completed applications received, and within thirty-five (35) days after the close of the Submission Period, DSA will publish on its website and distribute via email all information from completed applications that it determines is not confidential.

Once published on DSA's website, a broadband provider or a municipal electric utility that provides tier two service within or directly adjacent to an eligible project may challenge in writing all or part of an application within sixty-five (65) days after the close of the Submission Period or an extension (each a "Challenging Provider"), with sufficient evidence, as provided in H.B. 2, of the Challenging Provider's existing or

planned tier two broadband service to the eligible project (a "Challenge").

Within thirty (30) days of receipt of a Challenge, the Authority may allow the applicant to revise its application in order to limit the eligible project; or reject the Challenge and proceed with the application process. Further Challenges to the revised application are prohibited. The provider's failure to respond or properly revise its application will be considered a withdrawal.

If the Challenging Provider fails to provide tier two broadband service, the Challenging Provider may be required to pay DSA the amount of the original broadband funding gap, which amount shall be contributed to the General Revenue Fund, and/or comply with the requirements of any other penalties prescribed by agency rule and imposed after consultation with the Authority, in addition to being subject to additional remedies under law.

FUNDING AVAILABLE UNDER H.B. 2

DSA will disburse up to thirty percent (30%) of program grants before project construction begins; up to sixty percent (60%) through periodic payments over the course of construction; and the remaining portion not later than sixty (60) days after being notified of project completion.

Ohio Revised Code chapter 4939 (Use of Municipal Public Way)

As referenced previously, under Ohio Revised Code chapter 4939, amended in 2018, municipal corporations maintain certain authority, but in many ways are limited, regarding the placement of small cell facilities and wireless support structures in the public way/ rights-of-way.

LOCAL POLICY

The Eastgate Region, including its Counties, Cities, and Townships, can create policy locally to positively impact broadband development in the area through the use of existing state and federal law grants of jurisdictional authority. Cost-effective ways for communities to encourage and facilitate enhanced broadband expansion in an area include effectively managing local rights-of-way and seeking opportunities to reduce build-out costs and permitting delays. There are several opportunities to curb such costs and delays via

local policies.

“It often takes five to ten days for tower work crews to add the necessary equipment to a tower, but it frequently takes months to obtain the proper permits from local regulators” -Mike Dano, Light Reading (2020)

As discussed further in the Needs Assessment section of the Study, permitting delays and inconsistent requirements from municipality to municipality were cited by the private providers as the number one impediment to local expansion.

Rights-of-Way Ordinance

Referenced earlier in the Policy Section in the discussion of Small Cells, Ohio Revised Code Chapter 4939 provides the necessary authority to municipal corporations in Ohio to regulate and administer the use and occupancy of municipally owned public ways by utilities and telecommunications providers (including the use of design guidelines applicable to small cell providers). Chapter 4939 grants municipalities the authority to promote coordination and standardization of municipal management of the occupancy or use of public ways (i.e., rights-of-way) in order to enable efficient placement and operation of structures, appurtenances, and facilities necessary for the delivery of utility and communications services. The regulation of rights-of-way use by such service providers includes both wired and wireless broadband providers.

By drafting and implementing thoughtful and comprehensive right-of-way management and administration ordinances, municipal corporations within the three-county area can properly protect existing rights-of-ways and public safety, encourage coordination among service providers and promote advanced service deployments, ultimately facilitating robust and responsible economic development. Appropriate rights-of-way management control and use policies, clear and concise rules and regulations, and forward-thinking small cell design guidelines provide and outline important “rules of the road” (literally) for broadband providers and, if drafted with care, can aid in incentivizing providers to further deploy broadband services locally.

Zoning Ordinance

Ohio law also provides municipal corporations with the ability to manage and administer zoning regulations within their jurisdictional boundaries. While small cell providers and fiber builds will seek to use local rights-of-way for expansion, providers may seek to locate other infrastructure, particularly macro wireless towers, outside of the rights-of-way, but still within the public property of a community. In such instance, a local zoning ordinance comes into play.

Ohio municipalities often use antiquated zoning regulations in their efforts to address wireless facility placement. Wireless technology has changed greatly in recent years. Equipment size has diminished, and location and placement of infrastructure based on radio frequency engineering has changed dramatically. Thoughtful updates and careful modifications to existing jurisdictional zoning regulations and requirements can provide important practical and legal incentives to encourage broadband deployment and development within a jurisdiction.

Dig-once Policy

Case Study Dig-once Policy

In West Virginia, the House of Delegates recently passed broadband House Bill 2002 that includes a dig once policy that the lead sponsor called the “single most important thing” the state legislature could approve in 2021.⁷⁷ To speed up the process of installing new broadband, the bill expedites the permit process and have broadband companies share in the cost of a project with utility companies and other entities that do work that requires digging in right-of-way areas maintained by the West Virginia Division of Highways. It improves “dig-once” regulations that allow multiple internet service providers to install fiber broadband at the same time without digging multiple trenches. It also allows internet service providers to install broadband for any utility dig. The bill now moves to the state Senate for passage.

A major cost barrier to broadband expansion, particularly wired broadband, is the cost of excavating existing roadways or otherwise digging, boring, or trenching into the ground. Dig-once policies typically require that broadband providers be notified when public rights-of-ways are excavated/ opened so that they can be given the opportunity to install broadband infrastructure, including conduit and/or fiber optics. Such policies often require that dedicated internet conduit be laid in the right-of-way during new construction to prepare for future broadband needs.”⁷⁶ A dig-once policy is a common sense method of reducing the cost of communications infrastructure deployment. However, communities should think broadly when implementing dig-once policies, knowing that broadband infrastructure does not simply

have to be buried alongside a roadway project or in coordination with a telecommunications-specific project.

“... local governments should treat broadband like other types of critical infrastructure such as roads, water, and sewer, and integrate broadband into the comprehensive planning process.” - Bo Feng, Mark Partridge, & Mark Rembert (2017)

Partnerships and collaboration are particularly important to encourage effective policy development and enactment. For example, partnerships with local education and workforce providers, and/or public libraries. More on such policies and partnership opportunities, such as utilizing existing public infrastructure for broadband deployment and launching a regional

IN-DEPTH

What the American Rescue Plan Act Means for Libraries

“When President Biden signed into law the \$1.9 trillion American Rescue Plan Act (ARPA) of 2021 on March 11, the Institute of Museum and Library Services (IMLS) received \$200 million, the largest single increase in the agency’s 25-year history. The funding package also provides billions of dollars for academic, public, and school library-eligible programs, including the Emergency Education Connectivity Fund through the federal E-Rate program.

Of the \$200 million for IMLS, \$178 million is allocated for the Library Services and Technology Act and will go to state library administrative agencies on a population-based formula. IMLS announced state allotments for ARPA funding in a March 11 press release. Because there is a \$2 million state minimum, every state will receive a significant infusion of funding. As with last year’s CARES Act funding, state library agencies have discretion to determine how the funds will be spent.

In addition to IMLS funding, ARPA also includes nearly \$7.2 billion for an Emergency Education Connectivity Fund through the Federal Communications Commission’s (FCC) E-Rate program. Participating libraries will receive 100% reimbursement for the cost of hotspots and other Wi-Fi-capable devices such as modems, routers, laptops, and tablets. ALA will provide input during the rulemaking process for the new program, which must be developed by the FCC within 60 days of the bill’s passage.

Of the additional billions of dollars in library-eligible funding that the rescue legislation provides, \$135 million each is earmarked for the National Endowments for the Arts and Humanities and more than \$360 billion will go to state, local, and tribal governments.

To receive a portion of the billions of dollars in library-eligible funding outside of IMLS, libraries—academic, public, school, and others—must advocate at the state and local level. Partnering with local governments, school administrators, and other community service organizations will be key to securing ARPA funding. ALA will explore opportunities for libraries of all kinds to leverage these resources and provide guidance for members on how to tap into those funds through updates on ALA’s American Rescue Plan Act web page.”

-Kathi Kromer, American Libraries Magazine (March 12, 2021)

Table 2.2 Broadband-Specific Federal Legislation

BILL / ACT	SPONSORS / CO-SPONSORS	SUMMARY	STATUS
H.R. 205 Accelerating Broadband Connectivity Act of 2021	Rep. Trent Kelly (R-MS)	This bill establishes the Accelerating Broadband Connectivity Fund from which the Federal Communications Commission (FCC) shall offer additional funding to certain terrestrial telecommunications carriers for specified broadband projects. Specifically, the FCC shall make one-time funding offers from the Accelerating Broadband Connectivity Fund to certain terrestrial telecommunications carriers that receive support from the Rural Digital Opportunity Fund. The Rural Digital Opportunity Fund is a mechanism through which the FCC finances high-speed broadband networks in unserved rural areas. Recipients of amounts from the Accelerating Broadband Connectivity Fund shall use such funds to (1) begin construction of a broadband network, (2) make broadband available from the network deployed using Rural Digital Opportunity Fund support, and (3) meet all build-out obligations pursuant to receiving amounts from the Rural Digital Opportunity Fund.	Introduced in House ⁷⁸
S. 436 American Broadband Buildout Act of 2021	Sen. Susan Collins (R-ME) (Co-Sponsor Jacky Rosen (D-NV))	A bill to provide Federal matching funding for State-level broadband programs.	Introduced in Senate ⁷⁹
H.R. 870 National Broadband Plan for the Future Act of 2021	Sen. Anna Eshoo (D-CA) (Co-Sponsors Eleanor Norton (D-D-C), Ed Case (D-HI), Bennie Thompson (D-MS), Mike Thompson (D-CA), Jared Huffman (D-CA), Steven Horsford (D-NV), Michael San Nicholas (D-GU), Gregory Meeks (D-NY))	To require the FCC to update the national broadband plan, and for other purposes.	Introduced in House ⁸⁰
H.R. 1046 Federal Broadband Deployment in Unserved Areas Act	Rep. John Curtis (R-UT) (Co-Sponsor Virginia Foxx (R-NC))	To require the FCC to provide broadband availability data to the Department of the Interior.	Introduced in House ⁸¹
S. 279 National Broadband Plan for the Future Act of 2021	Sen. Edward Markey (D-MA)	A bill to require the Federal Communications Commission to update the national broadband plan, and for other purposes.	Introduced in Senate ⁸²
H.R. 1218 Data Mapping to Save Moms' Lives Act	G.K. Butterfield (D-NC) (Co-Sponsors Gus Bilirakis (R-FL), Lisa Blunt Rochester)	To require the FCC to incorporate data on maternal health outcomes into its broadband health maps.	Introduced in House ⁸³

BILL / ACT	SPONSORS / CO-SPONSORS	SUMMARY	STATUS
H.R. 1047 Rural Broadband Permitting Efficiency Act of 2021	Rep. John Curtis (R-UT) (Co-Sponsor Virginia Foxx (R-NC))	To allow certain State and Tribal permitting authority to encourage expansion of broadband service to rural and Tribal communities, and for other purposes.	Introduced in House ⁸⁴
H.R. 1149 CONNECT Act	Rep. Billy Long (R-MO)	To prohibit a State or political subdivision thereof from providing or offering for sale to the public retail or wholesale broadband internet access service, and for other purposes. The bill provides that “a State or political subdivision thereof may not provide or offer for sale to the public, a telecommunications provider, or to a commercial provider of broadband Internet access service, retail or wholesale broadband Internet access service.” ⁸⁵	Introduced in House ⁸⁶
S. 326 Measuring the Economic Impact of Broadband Act of 2021	Sen. Amy Klobuchar (D-MN) (Co-Sponsors Shelley Moore Capito (R-WV), Catherine Cortez Masto (D-NV), Angus King Jr. (I-ME), John Boozman (R-AR), Dan Sullivan (R-AK))	A bill to require the Secretary of Commerce to conduct an assessment and analysis of the effects of broadband deployment and adoption on the economy of the United States, and for other purposes.	Introduced in Senate ⁸⁷
H.R. 1362 BOOST Act	Rep. John Moolenaar (R-MI) (Co-Sponsors Sanford Bishop Jr. (D-GA), Jimmy Panetta (D-CA), Lisa McClain (R-MI), Bill Huizenga (R-MI), Jack Bergman (R-MI))	To amend the Internal Revenue Code of 1986 to allow a refundable credit against tax for the purchase of communications signal boosters in areas with inadequate broadband internet access service, and for other purposes.	Introduced in House ⁸⁸
S.922 Eliminate the Digital Divide Act	John Cornyn (R-Texas)	The Eliminate Digital Divide Act aims to address the rural digital divide by creating a \$10 billion State Broadband Program where governors receive funds based on the number of unserved individuals in their state. ⁸⁹ The Act also seeks to build out broadband infrastructure in unserved areas, create a process to deliver funds directly to states based on their proportion of unserved areas and include a \$1 billion set-aside for high-cost areas. The bill will also require the FCC to update their coverage maps to reflect the Broadband Data Act and allow local and state governments to challenge the FCC maps.	Reintroduced to House on March 23, 2021

SECTION ENDNOTES

1. Rembert, M., Feng, B., & Partridge, M. (2017). *Connecting The Dots Of Ohio's Broadband Policy*. Retrieved from The Ohio State University Department of Agricultural, Environmental, and Development Economics: https://aede.osu.edu/sites/aede/files/publication_files/Connecting%20the%20Dots%20of%20Ohio%20Broadband_0.pdf.
2. *47 U.S. Code § 1302 - Advanced telecommunications incentives*. (n.d.). Retrieved from Cornell Law School Legal Information Institute: <https://www.law.cornell.edu/uscode/text/47/1302>.
3. *How Much Broadband Speed Do Americans Need?* (n.d.). Retrieved from the PEW Charitable Trusts: https://www.pewtrusts.org/en/research-and-analysis/articles/2020/11/30/how-much-broadband-speed-do-americans-need?utm_medium=email&utm_campaign=Newsletters&utm_source=sendgrid&mc_cid=76976c979e&mc_eid=ed1e20ad7f.
4. Zimmer, J. (2021). *What is broadband? FCC Broadband Definition Has Changed Before and Will Change Again*. Retrieved from BroadbandNow: <https://broadbandnow.com/report/fcc-broadband-definition/>.
5. In March 2021, several U.S. Senators, including Ohio Senator Rob Portman, sent a letter to the FCC, the U.S. Department of Agriculture (“USDA”), the U.S. Department of Commerce, and the National Economic Council, encouraging establishment of a single, consistent baseline definition of high-speed broadband of symmetrical speeds of 100 Mbps. Bennet, M. F., King, Jr., A. S., Portman, R., & Manchin III, J. (2021). Washington, D.C.; United States Senate (Letter). Retrieved from Senate.gov: https://www.bennet.senate.gov/public/_cache/files/c/7/c76028fb-488d-498e-8506-7d8a2dce3172/05DDC-9148CC7F12A9F09235F77BB7A0D.bipartisan-broadband-speed-letter.pdf?utm_campaign=Newsletters&utm_source=sendgrid&utm_medium=email&mc_cid=23075c1ab9&mc_eid=ed1e20ad7f.
6. *The Ohio Broadband Strategy*. (2020). Retrieved from Innovate Ohio: <https://innovateohio.gov/wps/portal/gov/innovate/priorities/resources/broadband/strategy>.
7. Rembert, M., Feng, B., & Partridge, M. (2017). *Connecting The Dots Of Ohio's Broadband Policy*. Retrieved from The Ohio State University Department of Agricultural, Environmental, and Development Economics: https://aede.osu.edu/sites/aede/files/publication_files/Connecting%20the%20Dots%20of%20Ohio%20Broadband_0.pdf.
8. *E-Rate for Ohio K12: Managing the Cost of Connectivity*. (n.d.). Retrieved from Ohio K12 Help: <https://ohio-k12.help/erate/>.
9. *WIRELINER COMPETITION BUREAU CONFIRMS THAT COMMUNITY USE OF ERATE-SUPPORTED WI-FI NETWORKS IS PERMITTED DURING SCHOOL AND LIBRARY CLOSURES DUE TO COVID-19 PANDEMIC*. (2020). Retrieved from Federal Communications Commission: <https://docs.fcc.gov/public/attachments/DA-20-324A1.pdf>.
10. Telephone expansion policies have long been supported by the Universal Service Fund that is funded by a fee assessed on the end-user revenues generated by telecommunication companies. Rembert, M., Feng, B., & Partridge, M. (2017). *Connecting The Dots Of Ohio's Broadband Policy*. Retrieved from The Ohio State University Department of Agricultural, Environmental, and Development Economics: https://aede.osu.edu/sites/aede/files/publication_files/Connecting%20the%20Dots%20of%20Ohio%20Broadband_0.pdf.
11. *Entity Download Tool*. (n.d.). Retrieved from Universal Service Administrative Company: <https://data.usac.org/publicreports/EntityDownload/Entity/Download>.
12. *In the Matter of Connect Am. Fund*, 64 Communications Reg. (P&F) 1565 (F.C.C. May 26, 2016).
13. *Rural Digital Opportunity Fund, Connect America Fund*. (2020). Retrieved from Federal Register: <https://www.federalregister.gov/documents/2020/09/14/2020-17728/rural-digital-opportunity-fund-connect-america-fund>.
14. *Healthcare Connect Fund Program*. (2019). Retried from Universal Service Administrative Company: <https://www.usac.org/rural-health-care/healthcare-connect-fund-program/>.
15. See 47 USC § 254(h)(7).

SECTION ENDNOTES

16. *Connected Care Pilot Program - Frequently Asked Questions: II. Healthcare Provider Eligibility*. (2019). Retrieved from Federal Communications Commission: <https://www.fcc.gov/general/healthcare-connect-fund-frequently-asked-questions#II>.
17. *Connected Care Pilot Program*. (2021). Retrieved from Federal Communications Commission: <https://www.fcc.gov/wire-line-competition/telecommunications-access-policy-division/connected-care-pilot-program>.
18. Rembert, M., Feng, B., & Partridge, M. (2017). *Connecting The Dots Of Ohio's Broadband Policy*. Retrieved from The Ohio State University Department of Agricultural, Environmental, and Development Economics: https://aede.osu.edu/sites/aede/files/publication_files/Connecting%20the%20Dots%20of%20Ohio%20Broadband_0.pdf.
19. 86 FR 994-1021 (Jan. 7, 2021).
20. *FCC Establishes a 5G Fund for Rural America*. (2020). Retrieved from Federal Communications Commission: <https://www.fcc.gov/document/fcc-establishes-5g-fund-rural-america-0>.
21. Dano, M. (2020). *T-Mobile lays out \$60B, five-year buildout plan for 5G*. Retrieved from Light Reading: [https://www.lightreading.com/5g/t-mobile-lays-out-\\$60b-five-year-buildout-plan-for-5g/d/d-id/759586](https://www.lightreading.com/5g/t-mobile-lays-out-$60b-five-year-buildout-plan-for-5g/d/d-id/759586).
22. *FCC Transforms 2.5 GHz Band for 5G Services*. (2019). Retrieved from Federal Communications Commission: <https://www.fcc.gov/document/fcc-transforms-25-ghz-band-5g-services-0>.
23. Gold, J. (2020). *FCC's 5G-frequency auction prompts \$2 billion in bids on the first day*. Retrieved from Network World: <https://www.networkworld.com/article/3600828/5g-frequency-auction-prompts-2-billion-in-bids-on-the-first-day.html>.
24. *FCC BEGINS MAJOR 5G SPECTRUM AUCTION*. (2020). Retrieved from Federal Communications Commission: <https://docs.fcc.gov/public/attachments/DOC-368618A1.pdf>.
25. *FCC Seeks Comment on Mid-Band Spectrum Auction*. (2021). Retrieved from Benton Institute for Broadband & Society: https://www.benton.org/headlines/fcc-seeks-comment-mid-band-spectrum-auction?utm_source=sendgrid&utm_medium=email&utm_campaign=Newsletters.
26. *FCC 18-133 | Declaratory Ruling and Third Report and Order: Accelerating Wireless and Wireline Broadband Deployment by Removing Barriers to Infrastructure Investment*. (2018). Retrieved from Federal Communications Commission: <https://docs.fcc.gov/public/attachments/FCC-18-133A1.pdf>.
27. *Stepping In: The FCC's Authority to Preempt State Laws Under the Communications Act*. (2021). Retrieved from Congressional Research Service: <https://crsreports.congress.gov/product/pdf/R/R46736>.
28. 42 U.S.C. § 801(a)(1).
29. *Id.* § 801(d)(1).
30. *Id.* § 801(d).
31. *Students / Homepage*. (n.d.). Retrieved from Columbus City Schools: <https://www.ccsok.us/Students.aspx>.
32. *Internet access has become too costly for many*. (2020). Retrieved from The Columbus Dispatch eEdition: <http://digital.olivesoftware.com/Olive/ODN/ColumbusDispatch/shared/ShowArticle.aspx?doc=TCD%2F2020%2F11%2F18&entity=Ar00105&sk=D4442FEB&mode=text>.
33. *States Tap Federal CARES Act to Expand Broadband*. (2020). Retrieved from The Pew Charitable Trusts: <https://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2020/11/states-tap-federal-cares-act-to-expand-broadband>.
34. *CARES Act Funding*. (2021) Retrieved from Ohio Department of Education: <http://education.ohio.gov/Topics/Reset-and-Restart/CARES-Act-Funding>.

35. <https://ohio-k12.help/broadbandohio-connectivity-grant/>. *BroadbandOhio Connectivity Grant* (n.d.). Retrieved from Ohio K12 Help: <https://ohio-k12.help/broadbandohio-connectivity-grant/>.
36. Consolidated Appropriations Act, 2021, Pub. L. No. 116-260, div. N, tit. IX, § 904, 134 Stat. 1182, 2130 (2020), available at <https://www.congress.gov/bill/116th-congress/house-bill/133/text> (*Consolidated Appropriations Act*).
37. *The Coronavirus Response and Relief Act - What You Need to Know About the Second Largest Stimulus Bill in History*. (2021). Retrieved from JD Supra, LLC: <https://www.jdsupra.com/legalnews/the-coronavirus-response-and-relief-act-8910990/>.
38. Dunn, G. J., Miller, L. M., & Miller, C. L. (2021). *The FCC's Emergency Broadband Benefit ("EBB") Program*. Retrieved from Ice Miller LLP: [https://www.icemiller.com/ice-on-fire-insights/publications/the-fcc-s-emergency-broadband-benefit-\(ebb\)-prog/](https://www.icemiller.com/ice-on-fire-insights/publications/the-fcc-s-emergency-broadband-benefit-(ebb)-prog/).
39. See, WC Docket No. 20-445, Report and Order, FCC 21-29 (2021) (*EBB Program Order*).
40. *H.R.1319 - 116th Congress (2019-2020): American Rescue Plan Act, 2021*. (2021). Retrieved from Library of Congress: <https://www.congress.gov/bill/117th-congress/house-bill/1319/text>.
41. Lide, C. (2021). *Broadband Support Opportunities for State and Local Governments Under the American Rescue Plan Act of 2021*. Retrieved from The National Law Review: <https://www.natlawreview.com/article/broadband-support-opportunities-state-and-local-governments-under-american-rescue>.
42. *The Accessible, Affordable Internet for All Act, introduced in the House of Representatives yesterday, would make over \$100 billion available for broadband initiatives. The majority of the funding — \$80 billion — would go toward building broadband infrastructure, primarily rural infrastructure.* (n.d.). Retrieved from Telecompetitor – Pivot: <https://www.telecompetitor.com/accessible-affordable-internet-for-all-act-proposes-100-billion-for-broadband/>.
43. H.R. 7302, 117th Cong. (2021) available at <https://www.majoritywhip.gov/wp-content/uploads/2021/03/Accessible-Affordable-Internet-for-All-Act-Clyburn.pdf>.
44. Gonsalves, S. (2020). *Major Change on the Horizon? Explaining the Affordable, Accessible Internet for All Act - Part 1*. Retrieved from Community Broadband Networks: <https://muninetworks.org/content/major-change-horizon-explaining-affordable-accessible-internet-all-act-part-1>.
45. Gonsalves, S. (2020). *Big Bucks for Broadband in the Balance: Explaining the Affordable, Accessible Internet for All Act - Part 4*. Retrieved from Community Broadband Networks: <https://muninetworks.org/content/big-bucks-broadband-balance-explaining-affordable-accessible-internet-all-act-part-4>.
46. Davis, S. (2021). *Congress Introduces Accessible, Affordable Internet For All Act*. Retrieved from National Digital Inclusion Alliance: <https://www.digitalinclusion.org/blog/2021/03/11/congress-introduces-accessible-affordable-internet-for-all-act/>.
47. *Id.*
48. Gonsalves, S. (2021). *Removing Roadblocks on Bridge Over Digital Divide: Explaining the Affordable, Accessible Internet for All Act - Part 5*. Retrieved from Community Broadband Networks: <https://muninetworks.org/content/removing-roadblocks-bridge-over-digital-divide-explaining-affordable-accessible-internet-all>.
49. Brodtkin, J. (2021). *House Republicans propose nationwide ban on municipal broadband networks*. Retrieved from Ars Technica: <https://arstechnica.com/tech-policy/2021/02/gop-plan-for-broadband-competition-would-ban-city-run-networks-across-us/>.
50. *Id.*
51. *The Ohio Broadband Strategy*. (2020). Retrieved from Innovate Ohio: <https://innovateohio.gov/wps/portal/gov/innovate/priorities/resources/broadband/strategy>.

52. *Ohio Broadband Strategy: Letter from Governor Mike DeWine*. (2019). Retrieved from Innovate Ohio: <https://innovateohio.gov/wps/portal/gov/innovate/priorities/resources/broadband/strategy>.
53. *Multi-Agency Radio Communication System*. (n.d.). Retrieved from Ohio Department of Administrative Services: <https://das.ohio.gov/Divisions/Information-Technology/MARCS-Services>.
54. Hedrick, C. (2021). *Ohio broadband expansion pilot project launching in Scioto and Jackson Counties*. Retrieved from WSAZ NewsChannel 3: <https://www.wsaz.com/2021/01/22/ohio-broadband-expansion-pilot-project-launching-in-scioto-and-jackson-counties/>.
55. Rembert, M., Feng, B., & Partridge, M. (2017). *Connecting The Dots Of Ohio's Broadband Policy*. Retrieved from The Ohio State University Department of Agricultural, Environmental, and Development Economics: https://aede.osu.edu/sites/aede/files/publication_files/Connecting%20the%20Dots%20of%20Ohio%20Broadband_0.pdf.
56. *Right-of-Way and Utility Permits* (n.d.). Retrieved from Ohio Department of Transportation: <https://www.transportation.ohio.gov/wps/portal/gov/odot/working/permits/row-utility/row-utility>.
57. *The Ohio Broadband Strategy*. (2020). Retrieved from Innovate Ohio: <https://innovateohio.gov/wps/portal/gov/innovate/priorities/resources/broadband/strategy>.
58. *REQUEST FOR INFORMATION (RFI) – DIGITAL INFRASTRUCTURE ASSETS AND STRATEGY*. (n.d.). Retrieved from State of Ohio, Department of Transportation: <https://innovateohio.gov/wps/wcm/connect/gov/f8f7a5bf-2880-4113-aab9-42687d7da705/Broadband+RFI.pdf?MOD=AJPERES&CVID=mYuZkT0>.
59. *Ohio Turnpike*. (2019). Retrieved from Drive Ohio: <https://drive.ohio.gov/wps/portal/gov/driveohio/know-our-projects/projects/11-ohio-turnpike>.
60. *Expanding Broadband Access for All Ohioans*. (n.d.). Retrieved from Jobs Ohio: <https://www.jobsohio.com/broadband-solutions/>.
61. *New Satellite High Speed Internet Service Will Connect Underserved Households and Businesses in Central Ohio*. (2020). Retrieved from Jobs Ohio: <https://www.jobsohio.com/media-relations/posts/satellite-high-speed-internet-service-central-ohio/>.
62. *The Ohio Broadband Strategy*. (2020). Retrieved from Innovate Ohio: <https://innovateohio.gov/wps/portal/gov/innovate/priorities/resources/broadband/strategy>.
63. Any broadband infrastructure constructed by a broadband provider under H.B. 2 remains the property of the provider. However, nothing in H.B. 2 prevents an assignment, sale, change in ownership, or other similar transaction associated with the broadband infrastructure. Regardless, no assignment, sale, change in ownership, or other similar transaction relieves the successor of any obligation under H.B. 2.
64. *O.R.C. § 1332.21 | Video service definitions*. (2007). Retrieved from Ohio Legislative Service Commission: <https://codes.ohio.gov/ohio-revised-code/section-1332.21>.
65. *O.R.C. § 4927.01 | Definitions*. (2015). Retrieved from Ohio Legislative Service Commission: <https://codes.ohio.gov/ohio-revised-code/section-1332.21>.
66. *Id.*
67. *O.R.C. § 5739.01 | Sales tax definitions*. (2020). Retrieved from Ohio Legislative Service Commission: <https://codes.ohio.gov/ohio-revised-code/section-1332.21>.
68. O.R.C. § 4927.01(B) also states that the definitions provided in O.R.C. § 4927.01 shall be “applied consistent with the definitions in the “Telecommunications Act of 1996,” 110 Stat. 56, 47 U.S.C. 151 et seq., as amended, and with federal decisions interpreting those definitions.” *O.R.C. § 4927.01 | Definitions*. (2015). Retrieved from Ohio Legislative Service Commission: <https://codes.ohio.gov/ohio-revised-code/section-1332.21>.

69. *O.R.C. § 4927.01 | Definitions.* (2015). Retrieved from Ohio Legislative Service Commission: <https://codes.ohio.gov/ohio-revised-code/section-1332.21> (*emphasis added*).
70. The Authority does not constitute an agency for the purposes of O.R.C. sections 101.82–101.87.
71. Each broadband provider that receives a program grant shall submit to DSA an annual progress report on the status of the deployment of the broadband network for which the program grant award was made and an operational report with the agency not later than sixty (60) days after the completion of the project and annually thereafter for a period of four (4) years. In each report, the broadband provider shall include an account of how program grant funds have been used and the project’s progress toward fulfilling the program objectives. To ensure compliance with program requirements, DSA may, through an independent third party, conduct a speed test verification of an eligible project. DSA may withhold payments for failure to meet minimum speeds until such speeds are achieved. Further, failure to comply with program requirements or to meet the required tier two broadband service proposed in the application may require the provider to refund the program grant award.
72. Upon adoption of a resolution, a board of county commissioners may request that DSA solicit applications from broadband providers for eligible projects in the municipal corporations and townships in the county. Upon receipt of a request from a board of county commissioners, DSA shall solicit, on behalf of the county, applications for program grants for eligible projects under the Grant Program. Not later than seven (7) days after receipt of the request, DSA shall make the request, and any accompanying information submitted with the request, available for review the agency’s web site. The request shall remain available on the website for up to two (2) years. An application for a program grant made in response to such request shall fully comply with all of the Grant Program requirements.
73. If a program grant is awarded for an eligible project, the board of township trustees or the county commissioners in which the project is situated, by resolution, may levy a special assessment upon residential property within the township or county for the purpose of providing a contribution to the broadband funding gap for the eligible project. The special assessment shall be levied at a rate that will produce a total assessment that is not more than the township’s or county’s contribution towards the funding gap for the eligible project.
74. Under alternate payment term arrangements, unless otherwise negotiated, the participating legislative authorities in which the eligible project is located shall assume all financial responsibility for all of the eligible project costs incurred by the broadband provider prior to completion of the project or the award of a program grant.
75. A broadband provider may enter into an arrangement to designate video service provider fees remitted by the broadband provider for contribution towards an eligible project’s broadband funding gap when the broadband provider is a video service provider (“VSP”) that, pursuant to O.R.C. § 1332.32, collects and remits VSP fees to one or more legislative authorities in which an eligible project is located; or the arrangement is entered into by mutual consent with one or more of the legislative authorities in which the eligible project is located.
76. Rembert, M., Feng, B., & Partridge, M. (2017). *Connecting The Dots Of Ohio’s Broadband Policy*. Retrieved from The Ohio State University Department of Agricultural, Environmental, and Development Economics: https://aede.osu.edu/sites/aede/files/publication_files/Connecting%20the%20Dots%20of%20Ohio%20Broadband_0.pdf.
77. Pierson, L. (2021). *West Virginia Passes Broadband Bill to Protect Consumers*. Retrieved from Government Technology: <https://www.govtech.com/policy/west-virginia-passes-broadband-bill-to-protect-consumers.html>.
78. *H.R.205 - 117th Congress (2021-2022): Accelerating Broadband Connectivity Act, 2021.* (2021). Retrieved from Library of Congress: <https://www.congress.gov/bill/117th-congress/house-bill/205?q=%7B%22search%22%3A%5B%22broadband%22%5D%7D&s=2&r=1>.
79. *S.436 - 117th Congress (2021-2022): American Broadband Buildout Act, 2021.* (2021). Retrieved from Library of Congress: <https://www.congress.gov/bill/117th-congress/senate-bill/436?q=%7B%22search%22%3A%5B%22broadband%22%5D%7D&s=2&r=2>.
80. *H.R.870 - 117th Congress (2021-2022): National Broadband Plan for the Future Act, 2021.* (2021). Retrieved from Library of Congress: <https://www.congress.gov/bill/117th-congress/house-bill/870?q=%7B%22search%22%3A%5B%22broadband%22%5D%7D&s=2&r=3>.

81. *H.R.1046 - 117th Congress (2021-2022): Federal Broadband Deployment in Unserved Areas Act.* (2021). Retrieved from Library of Congress: <https://www.congress.gov/bill/117th-congress/house-bill/1046?q=%7B%22search%22%3A%5B%22broadband%22%5D%7D&s=2&r=4>.
82. *S.279 - 117th Congress (2021-2022): National Broadband Plan for the Future Act, 2021.* (2021). Retrieved from Library of Congress: <https://www.congress.gov/bill/117th-congress/senate-bill/279?q=%7B%22search%22%3A%5B%22broadband%22%5D%7D&s=2&r=5>.
83. *H.R.1218 - 117th Congress (2021-2022): Data Mapping to Save Moms' Lives Act.* (2021). Retrieved from Library of Congress: <https://www.congress.gov/bill/117th-congress/house-bill/1218?q=%7B%22search%22%3A%5B%22broadband%22%5D%7D&s=2&r=6>.
84. *H.R.1047 - 117th Congress (2021-2022): Rural Broadband Permitting Efficiency Act, 2021.* (2021). Retrieved from Library of Congress: <https://www.congress.gov/bill/117th-congress/house-bill/1047?q=%7B%22search%22%3A%5B%22broadband%22%5D%7D&s=2&r=7>.
85. Brodtkin, J. (2021). *House Republicans propose nationwide ban on municipal broadband networks.* Retrieved from Ars Technica: <https://arstechnica.com/tech-policy/2021/02/gop-plan-for-broadband-competition-would-ban-city-run-networks-across-us/>.
86. *H.R.1149 - 117th Congress (2021-2022): CONNECT Act.* (2021). Retrieved from Library of Congress: <https://www.congress.gov/bill/117th-congress/house-bill/1149?q=%7B%22search%22%3A%5B%22broadband%22%5D%7D&s=2&r=8>.
87. *S.326 - 117th Congress (2021-2022): Measuring the Economic Impact of Broadband Act of 2021.* (2021). Retrieved from Library of Congress: <https://www.congress.gov/bill/117th-congress/senate-bill/326?q=%7B%22search%22%3A%5B%22broadband%22%5D%7D&s=2&r=9>.
88. *H.R.1362 - 117th Congress (2021-2022): BOOST Act.* (2021). Retrieved from Library of Congress: <https://www.congress.gov/bill/117th-congress/house-bill/1362?q=%7B%22search%22%3A%5B%22broadband%22%5D%7D&s=2&r=10>.

*Technology &
Trends Review*

Policy Analysis

*Service and
Infrastructure
Analysis*

Site Analysis

*Market
Analysis*

*Needs
Assessment
and Outreach*

*Utility
Formation
Study*

*Programming
and Finance
Evaluation*

*Project
Identification*

SERVICE AND INFRASTRUCTURE ANALYSIS

As detailed in the Technology and Trends section, internet access includes fixed service, such as fiber, cable, DSL, and fixed wireless; and cellular/ mobile wireless connectivity. An analysis of residential, business, and government fixed and mobile broadband service, and the wired and wireless infrastructure available to support such services within the three-county region, is encompassed in the following section, and further addressed in the Site Analysis portion of the Study.

FEDERAL AND STATE BROADBAND DATA AND MAPPING

Broadband providers are required to file their fixed broadband coverage data with the FCC twice each year using the FCC's Form 477.¹ Form 477 data as of December 31, 2020 was due to the Commission by March 1, 2021, and will not be released in time for inclusion in this Study. All references to FCC Form 477 data in this Study refer to 2019 data released from the Commission.

Form 477 data has historically been used to populate the national broadband map, available at: <https://broadbandmap.fcc.gov/>. However, for reasons further explored below, federal broadband data to-date has been notoriously flawed, leading to inaccurate, overstated coverage. Although a variety of organizations have released broadband maps/ analyses, the source of these maps is also predominantly the providers' Form 477 data.

Federal broadband coverage depictions are inflated as a result of Form 477 filing requirements: in their submissions, so long as the reporting provider "does or could . . . without an extraordinary commitment of resources"² serve at least one location within a census block, the provider can depict the entire census block as served by broadband at the reported speed.³

Census blocks are the smallest unit of geography defined by the United States Census Bureau ("Census Bureau"). In urban areas, a census block may be smaller than a tenth of a square mile; however, in rural (e.g., the Appalachian region), a census block can encompass many square miles (the largest census block is 8,500 square miles and is located in Alaska). With simply one location being the determinate as to whether an area is "served" by broadband, overstated coverage—

Table 3.1 Ohio's Worst-Connected Midsize and Large Cities in Terms of At-Home Access

CITY BY RANK	HOUSEHOLDS WITH NO BROADBAND SUCH AS CABLE, FIBER OPTIC OR DSL	
	# of Households	% of Total Households
1. East Cleveland	5,409	65.7%
2. Youngstown	3,238	47.5%
3. Cleveland	80,188	47.0%
4. Dayton	25,184	43.8%
5. Warren	7,398	43.7%
6. Lorain	11,137	43.5%
7. Trotwood	4,419	42.3%
8. Sandusky	4,504	41.2%
9. Zanesville	4,297	40.4%
10. Euclid	9,010	40.3%
11. Canton	12,319	39.9%
12. Warrensville Heights	2,417	39.9%
13. Steubenville	2,881	39.9%
14. Alliance	3,518	39.7%
15. Whitehall	2,842	39.2%
16. Portsmouth	3,354	39.1%
17. Greenville	2,259	38.9%
18. Barberton	4,285	38.8%
19. Marion	5,026	38.50%
20. Ashtabula	2,893	38.5%
21. Mansfield	6,944	38.4%
22. Bedford Heights	2,133	38.2%
23. Marietta	2,242	38.2%
24. Fremont	2,550	38.0%
25. Springfield	9,039	37.90%
26. Middletown	7,485	37.9%
27. Mount Vernon	2,566	37.8%
28. New Philadelphia	2,741	37.2%
29. Lima	5,417	37.2%
30. Washington Court House	2,241	37.0%
31. Toledo	43,653	36.9%
32. Niles	3,072	36.9%
33. Fostoria	2,036	36.7%
34. Akron	31,124	36.6%
35. Elyria	8,275	36.3%

Source: Connect Your Community Institute (2021)

particularly in the larger census blocks— is inevitable.⁴

Not only does this service reporting inflate coverage, but it creates uncertainty as to local broadband competition. According to Connected Nation Ohio, as of 2019, nearly 2.4 million Ohio households did not have high-speed internet service or only had one choice of internet provider.⁵ As flawed data continues to inform federal broadband policy decisions and Commission actions, including reporting broadband service availability to Congress and the public, informing transaction reviews, and supporting the FCC’s universal service policies,⁶ it also perpetuates broadband access and affordability issues, which exacerbates digital divides.

“Accurate connectivity data is the foundation for investments in our nation’s broadband infrastructure as Congress and federal agencies use data collected by the Federal Communications Commission [] to determine gaps in connectivity and the level of funding needed to address these disparities. Unfortunately, connectivity data provided to the FCC is often inaccurate and inflated — leaving many communities overlooked and disconnected.”

-National Association of Counties

However, significant efforts are underway to improve federal broadband data. First, the National Telecommunications and Information Administration (“NTIA”) National Broadband Availability Map (“NBAM”) seeks to “better inform broadband projects and funding decisions” and create “a national platform that can help inform policymakers and expand internet coverage across the United States.”⁷ The NBAM includes data not only from the FCC, but also from the Census Bureau, USAC, the U.S. Department of Agriculture (“USDA”), the Bureau of Indian Affairs (“BIA”), the Economic Development Administration (“EDA”), and the Appalachian Regional Commission (“ARC”); as well as two speed test organizations: Ookla and Measurement Lab (“M-Lab”). Recently, the NTIA also began incorporating data from 30 states. Ohio’s state-level mapping efforts are explored in more detail below; however, to-date, this state-level information has not been incorporated into the NBAM.

Figure 3.1 Digital Divide Index by Census Tract, 2019¹⁶

ASHTABULA COUNTY:

Median Download: **60.0 Mbps**

Median Upload: **8.0 Mbps**

Pop. no access 100/20: **19.9%**

TRUMBULL COUNTY:

Median Download: **40.0 Mbps**

Median Upload: **2.0 Mbps**

Pop. no access 100/20: **4.8%**

MAHONING COUNTY:

Median Download: **12.0 Mbps**

Median Upload: **0.8 Mbps**

Pop. no access 100/20: **1.3%**

**It is interesting to note that, despite the presence of Youngstown, the most urban area in the Study, Mahoning County still has the lowest median broadband download speed among the counties according to the Purdue Center for Regional Development’s 2020 Digital Divide Index. This is also counter to the provider-reported coverage information.*

In addition, the FCC’s Digital Opportunity Data Collection (“DODC”) was adopted in August 2019.⁸ Congress largely codified the DODC in the Broadband Deployment Accuracy and Technological Availability Act (“DATA Act”), signed into law on March 23, 2020 and discussed previously in the Policy Analysis section of this Study.

“... it has become increasingly clear that the fixed and mobile broadband deployment data collected on the Form 477 are not sufficient to understanding where universal service support should be targeted and supporting the imperative of our broadband-deployment policy goals.” - FCC FACT SHEET: Digital Opportunity Data Collection

In accordance with the DATA Act, in July 2020, the FCC took further steps to improve broadband availability data by adopting requirements for providers of fixed and mobile broadband service to report broadband coverage and availability. In particular, the FCC Order requires providers to submit: (1) where the providers have actually built out broadband infrastructure such that they are able to provide service; and (2) where the providers could perform a standard broadband installation.⁹ Among other requirements, all fixed and satellite service providers must report either polygon shapefiles or lists of addresses or locations that constitute their service areas.

On January 19, 2021, the FCC adopted additional rules for the DODC to help ensure that the FCC collects precise and accurate broadband deployment data.¹⁰ The January Order specifies which fixed and mobile broadband internet access service providers are required to report availability and/or coverage data and adopts requirements for reporting speed and latency for fixed technologies. The January Order also requires fixed broadband internet access providers to report whether broadband services are offered to residential and/or business customers and creates a process whereby providers submit and respond to challenges to fixed and mobile coverage map data. The January Order also requires mobile service providers to submit, on a case-by-case basis, either infrastructure information or on-the-ground test data to verify the provider's coverage data. Additionally, mobile providers will be required to submit, for each 4G LTE or 5G new radio ("NR") propagation map they submit, a set of heat maps showing the signal levels from each active cell site. However, the updated maps will not include community anchor institution coverage. On March 22, 2021, the FCC announced outreach to also collect consumer broadband availability experiences, similar to the outreach conducted as part of this Study and detailed in the Needs Assessment section of this report. According to the Public Notice, a new webpage on the FCC's site (www.fcc.gov/BroadbandData), now includes a "share your broadband experience" form for consumers.¹¹ The submitted experiences will inform the FCC's Broadband Data Task Force, established in February 2021 by FCC Acting Chairwoman Jessica Rosenworcel to "implement

Table 3.2 Broadband Availability by Technology Type (25 Mbps download/ 3 Mbps upload)

COUNTY	PERCENT OF HOUSEHOLDS SERVED		
	CABLE	DSL	FIBER
Ashtabula	86.63%	15.89%	8.93%
Mahoning	97.33%	5.40%	0.00%
Trumbull	95.10%	11.88%	0.38%

Source: Connected Nation Ohio, March 2020

long-overdue improvements to the agency's broadband data and mapping tools."¹²

On April 7, 2021, the FCC issued its third report and order on the DODC and collecting broadband data.¹³ Building on its earlier efforts, the April Order specifies that facilities-based fixed service providers are required to report broadband internet access service coverage in the DODC and require them to identify where such services are offered to residential locations and business locations. Also, the April Order establishes specific reporting requirements relating to speed and latency for fixed service providers and require terrestrial fixed wireless services providers to report on the coordinates of their base stations.

Further, the FCC has released a speed test app ("FCC Speed Test App") to measure speeds through Android and iOS devices in order to further aid in its broadband data collection and deployment efforts.¹⁴

With the adoption of these additional measures, the FCC believes it is well positioned to move forward with the development of the elements of the DODC. Turning to state-level efforts, as stated previously, the State of Ohio has also taken steps to ensure additional granularity of Ohio's broadband coverage data.

Connected Nation Ohio has historically served as the state's broadband data and mapping repository. Utilizing the FCC Form 477 data as a baseline, supplemented with more granular information derived from direct provider outreach and data collection from across the state, Connected Nation Ohio released updated Ohio broadband inventory maps in March

2020 for public use.¹⁵ These maps depict fixed broadband coverage, although mobile and/or satellite service may also be available in an areas. County broadband maps are available at: <https://connectednation.org/ohio/mapping-analysis/>; the State's interactive map is available at: <https://innovateohio.gov/wps/portal/gov/innovate/priorities/resources/broadband/>.

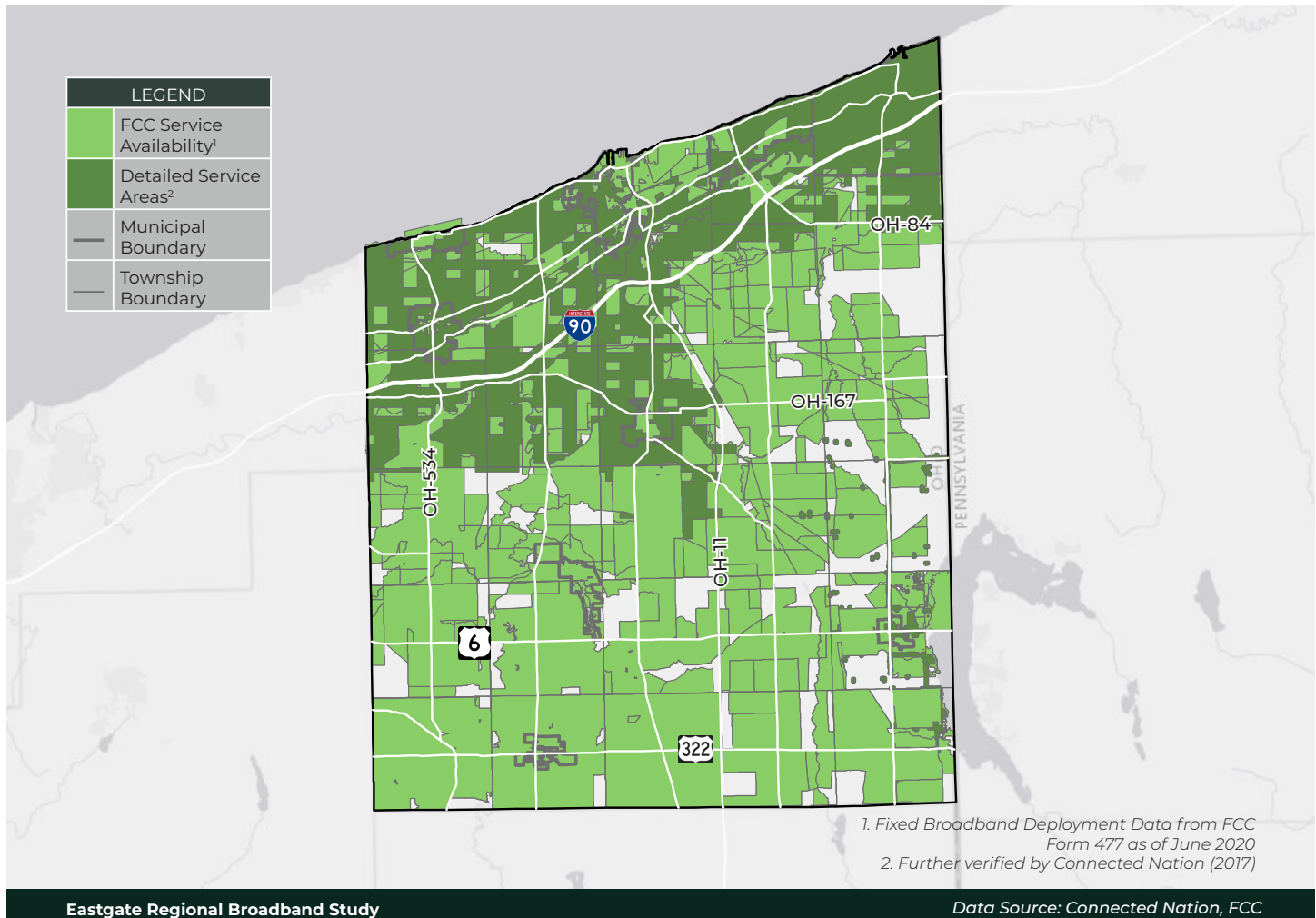
Connected Nation Ohio's data is serving as the baseline of our residential service analysis. Where possible, this information was supplemented by updated FCC Form 477 data and outreach to area providers.

BROADBAND ACCESS IN THE EASTGATE REGION:

Residential Fixed Broadband Access

"In the Eastgate region, significant rural portions of Ashtabula and Trumbull County lack access to even minimal download and upload speeds, barely reaching 10Mbps download and 1Mbps upload. For stakeholders in the region, this is unacceptable, and the unavailability of broadband internet access is surely a detriment to further economic development and investment into the region." – Eastgate CEDS

Figure 3.2 Ashtabula County Broadband Coverage at 25 Mbps Download / 3 Mbps Upload



As stated previously, in releasing its 2020 state broadband maps, Connected Nation Ohio utilized the FCC Form 477 data as a baseline, and supplemented the data with more granular information derived from direct provider outreach and data collection efforts from across the state. However, not all broadband providers were willing or able to supply more granular data. As a result, the maps that were produced depict coverage in two shades – the darker shaded areas are service areas in which more granular information was made available to confirm service (“Detailed Service Areas”), while the lighter shaded areas depict provider information available through the FCC Form 477 (“FCC Service Availability”). While nothing depicted on the maps should be considered a guarantee of broadband service, the project team also solicited consumer feedback as to actual coverage experience through our

community engagement, encompassed in the Needs Assessment portion of the study.

In accordance with **Table 3.2 Broadband Availability by Technology Type**, the majority of service in the Eastgate region is provided via cable broadband connectivity. The majority of Windstream’s fiber deployments are fiber-to-the-premises (“FTTP”) and are aerial; however, they have fiber-to-the-node (“FTTN”) and fixed wireless solutions as well.

As discussed previously, the FCC’s current definition of “broadband” is 25 Mbps download/ 3 Mbps upload. Individual county maps at this speed tier are provided in Figures 3.2, 3.3, and 3.4.

As would be expected, depicted coverage decreases as speed tier increase (see **Exhibit A** for regional and county-level maps at different speed tiers).

Figure 3.3 Trumbull County Broadband Coverage at 25 Mbps Download / 3 Mbps Upload

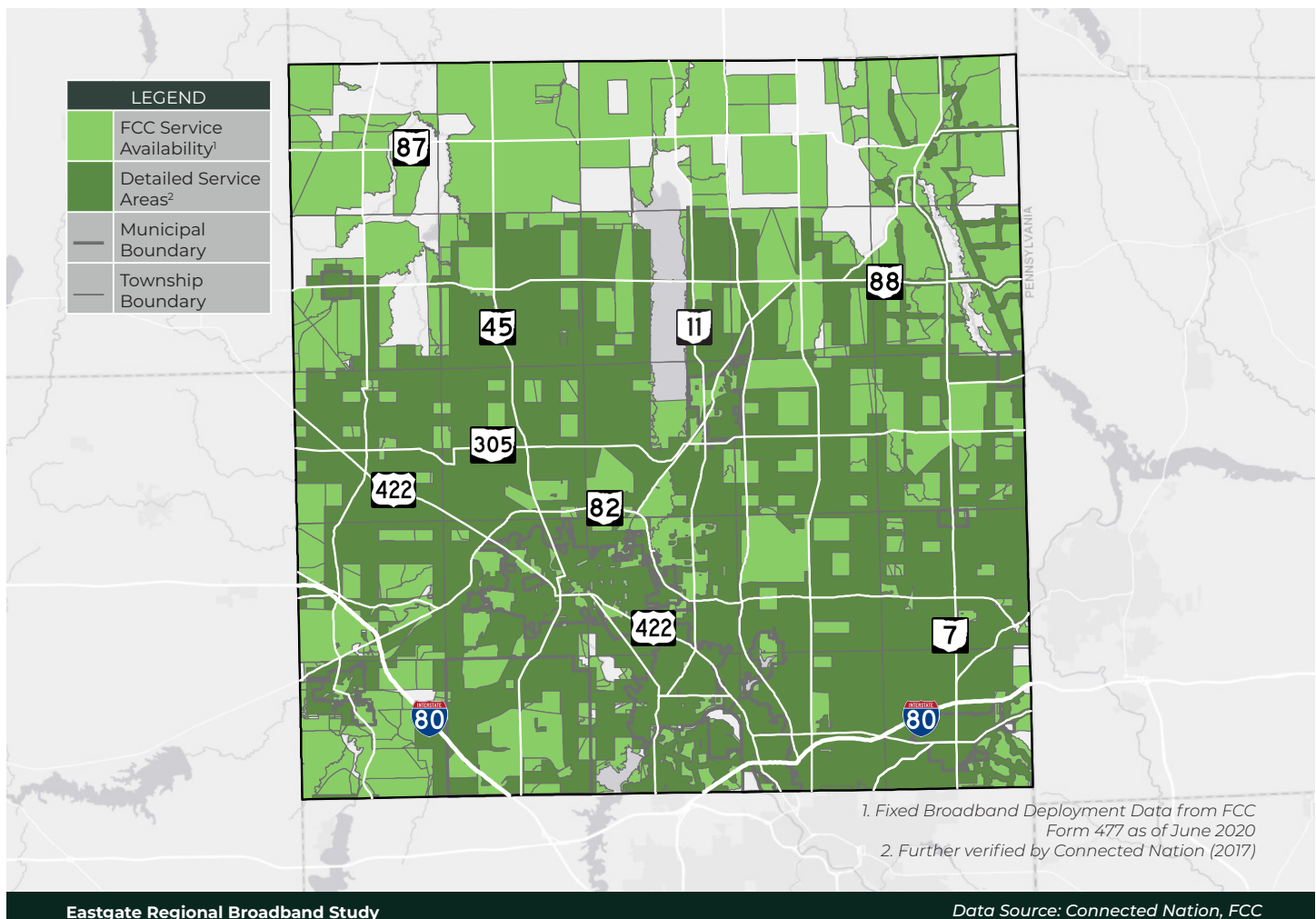


Table 3.3 Ohio County-Level Broadband Availability Estimates by Speed Tier

COUNTY	NUMBER OF HOUSEHOLDS	PERCENT OF HOUSEHOLDS SERVED			
		10 X 1 MBPS	25 X 3 MBPS	50 X 5 MBPS	100 X 10 MBPS
ASHTABULA	39,363	95.01%	90.37%	89.43%	80.50%
MAHONING	98,712	98.65%	97.60%	97.45%	97.33%
TRUMBULL	86,011	98.60%	96.24%	95.99%	94.50%

Note: Percentages are among fixed technologies (i.e. cable, DSL, fiber, fixed wireless)

Source: Connected Nation Ohio, March 2020

Figure 3.4 Mahoning County Broadband Coverage at 25 Mbps Download / 3 Mbps Upload

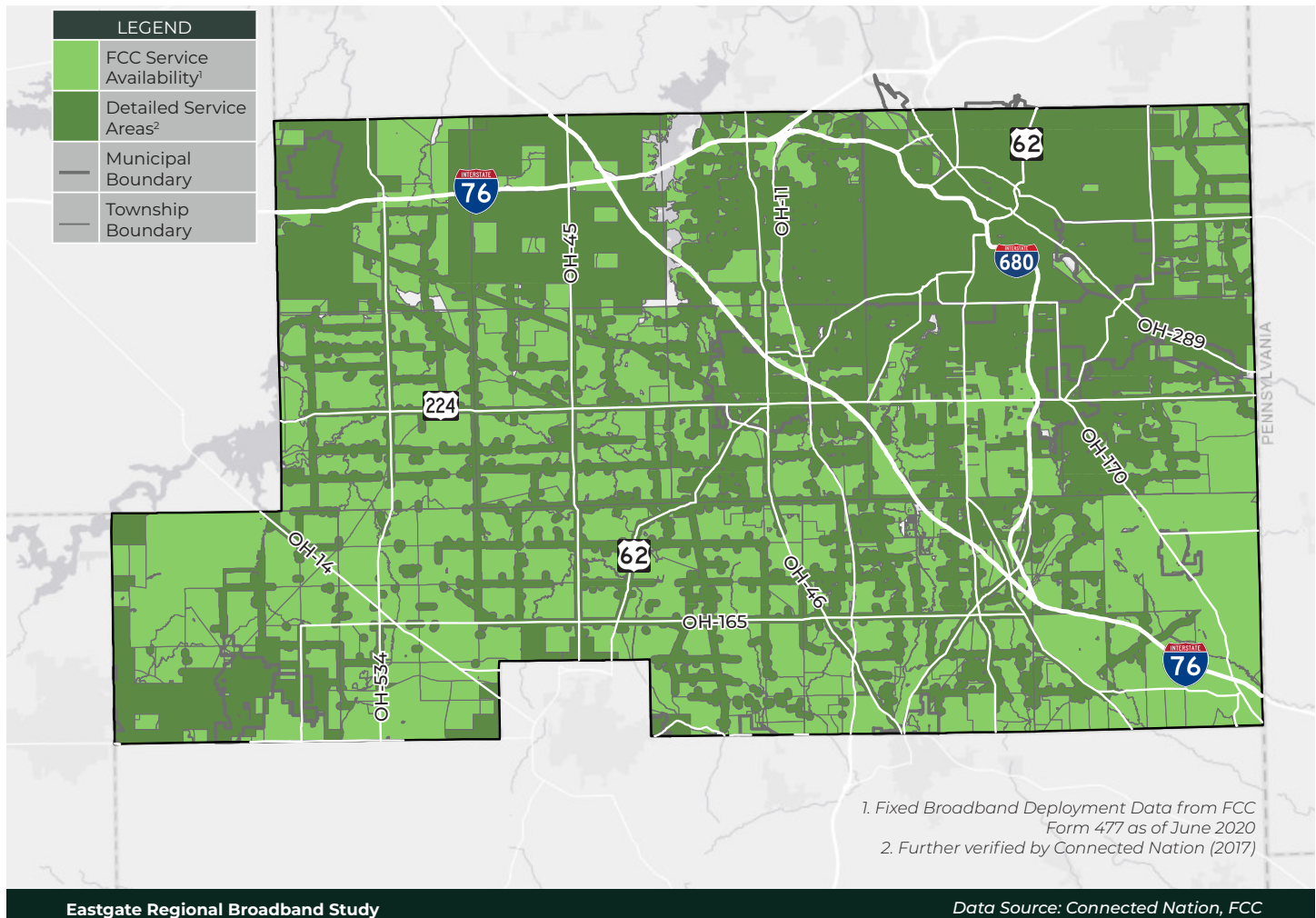


Figure 3.5 Maximum Advertised Available Download Speed for Fixed Residential Access

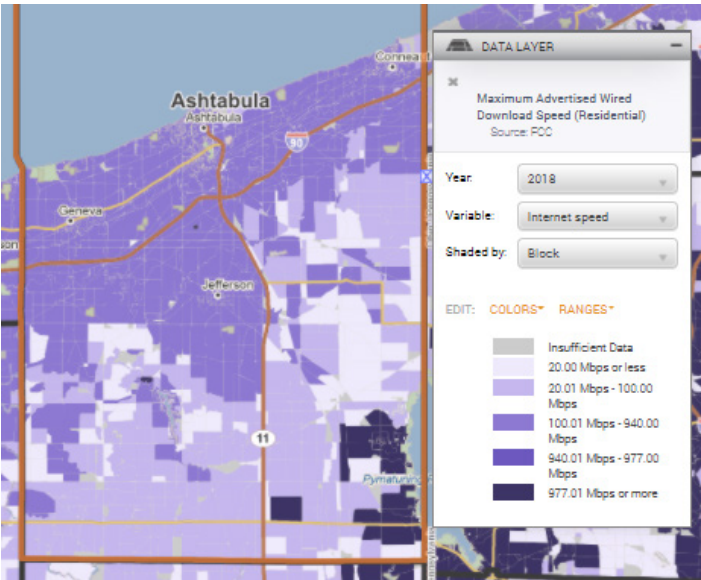
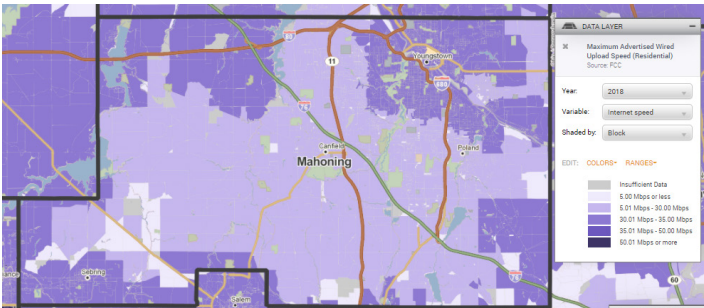
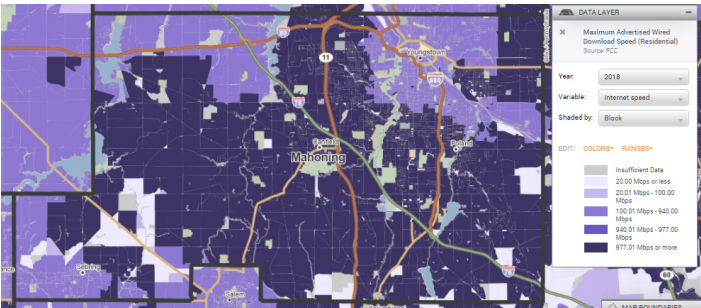
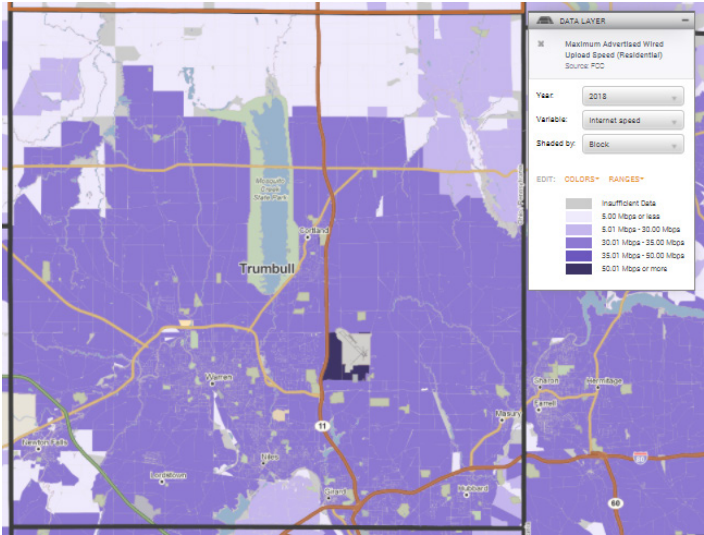
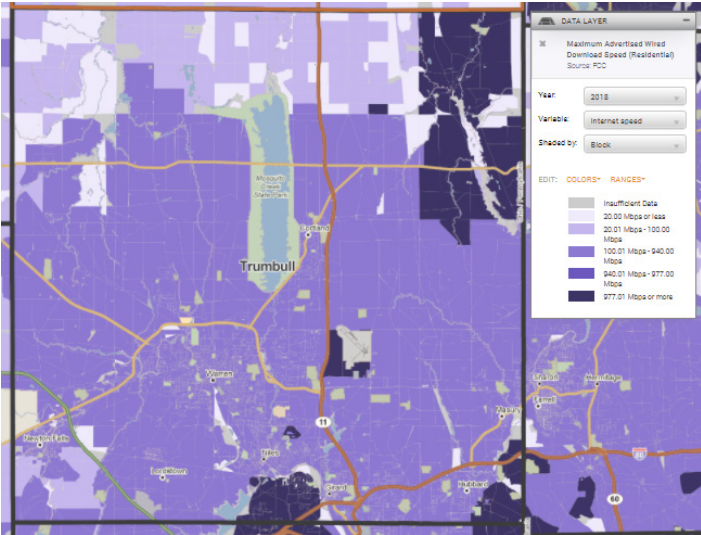
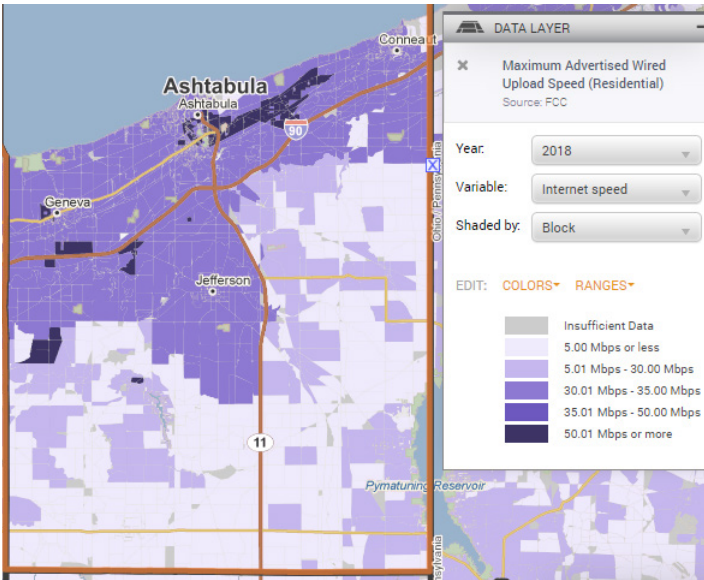


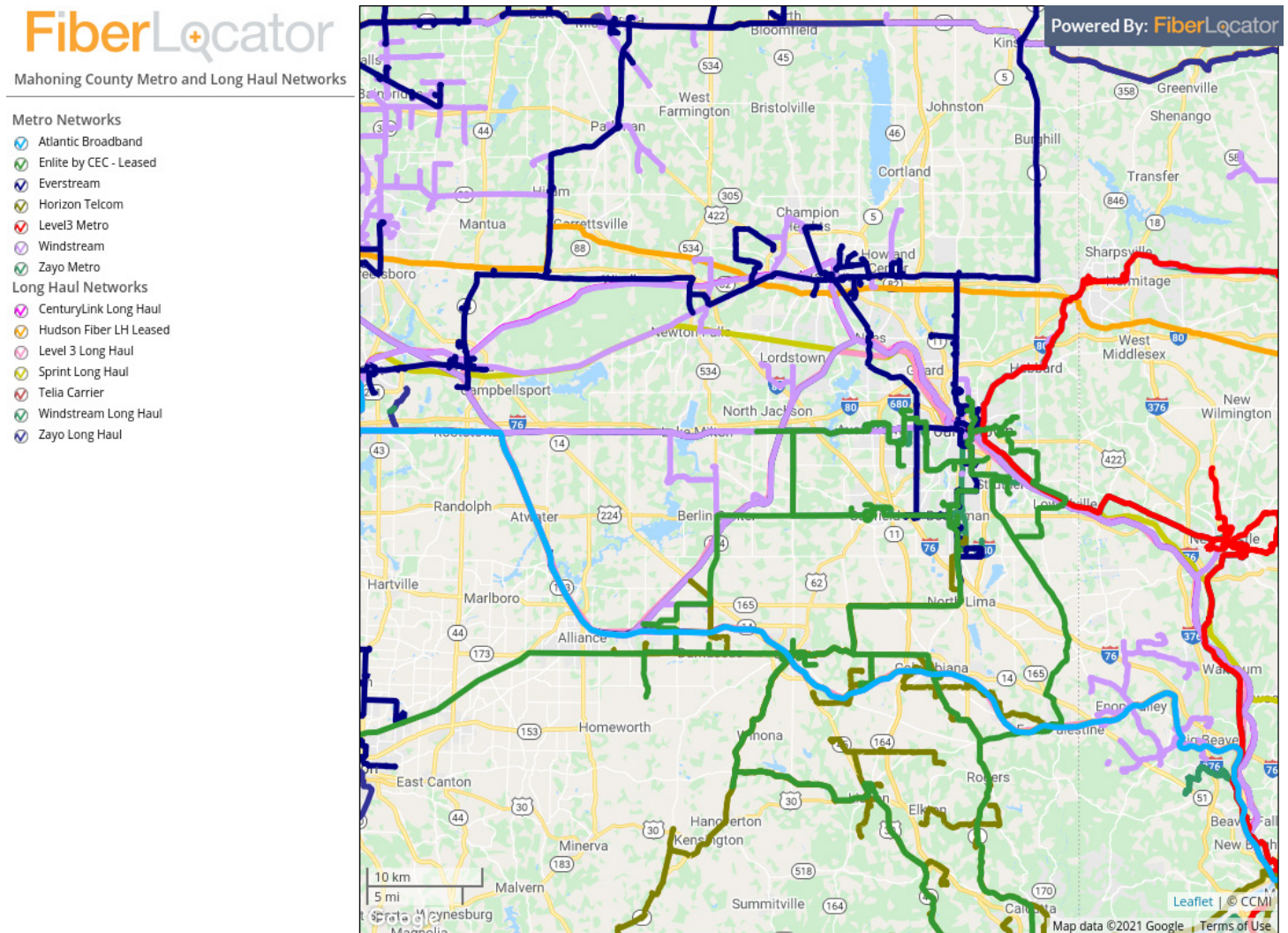
Figure 3.6 Maximum Advertised Available Upload Speed for Fixed Residential Access



Source: PolicyMap

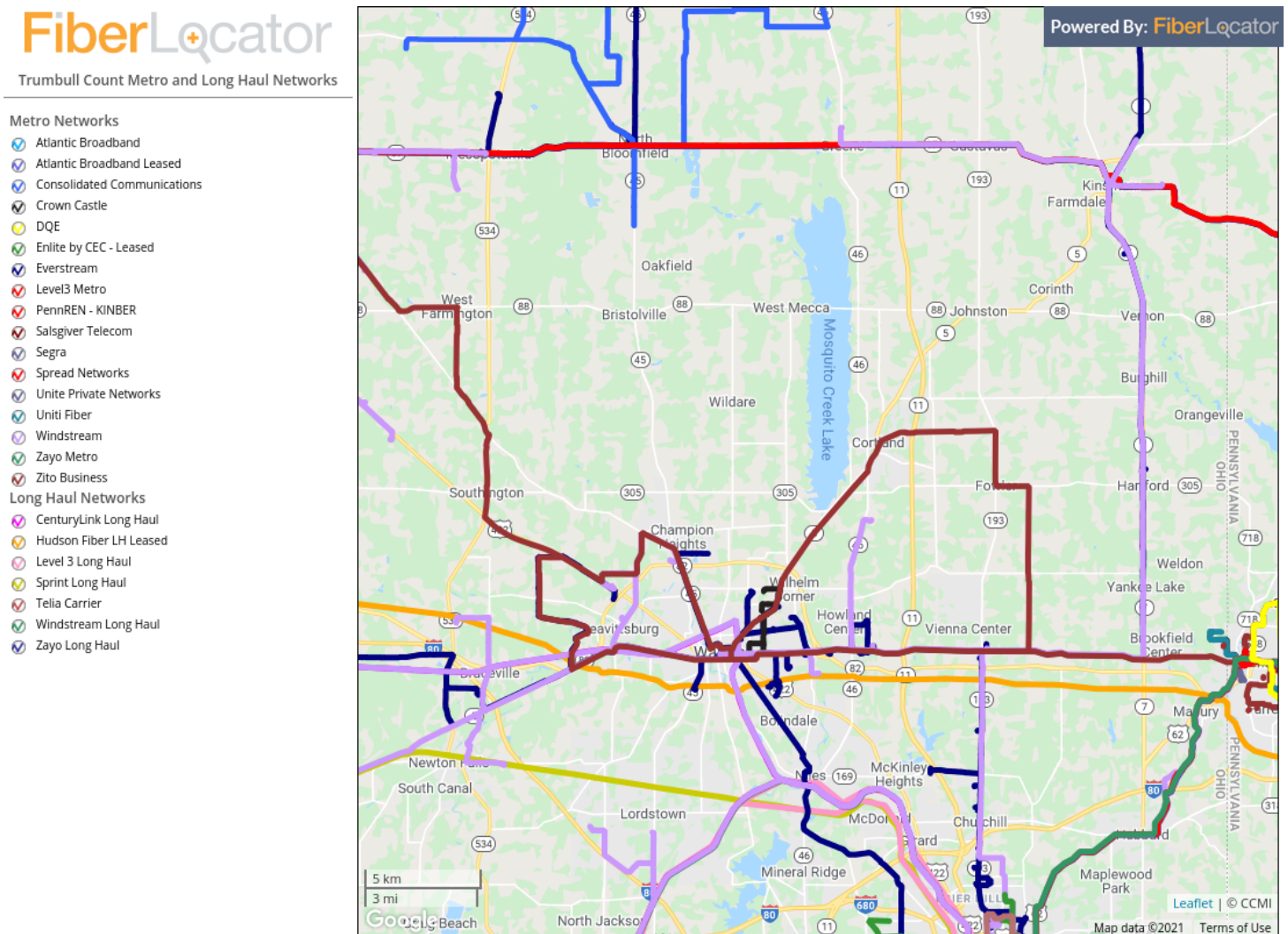
Source: PolicyMap

Figure 3.7 Mahoning County Metro & Long Haul Networks (Fiber Locator)



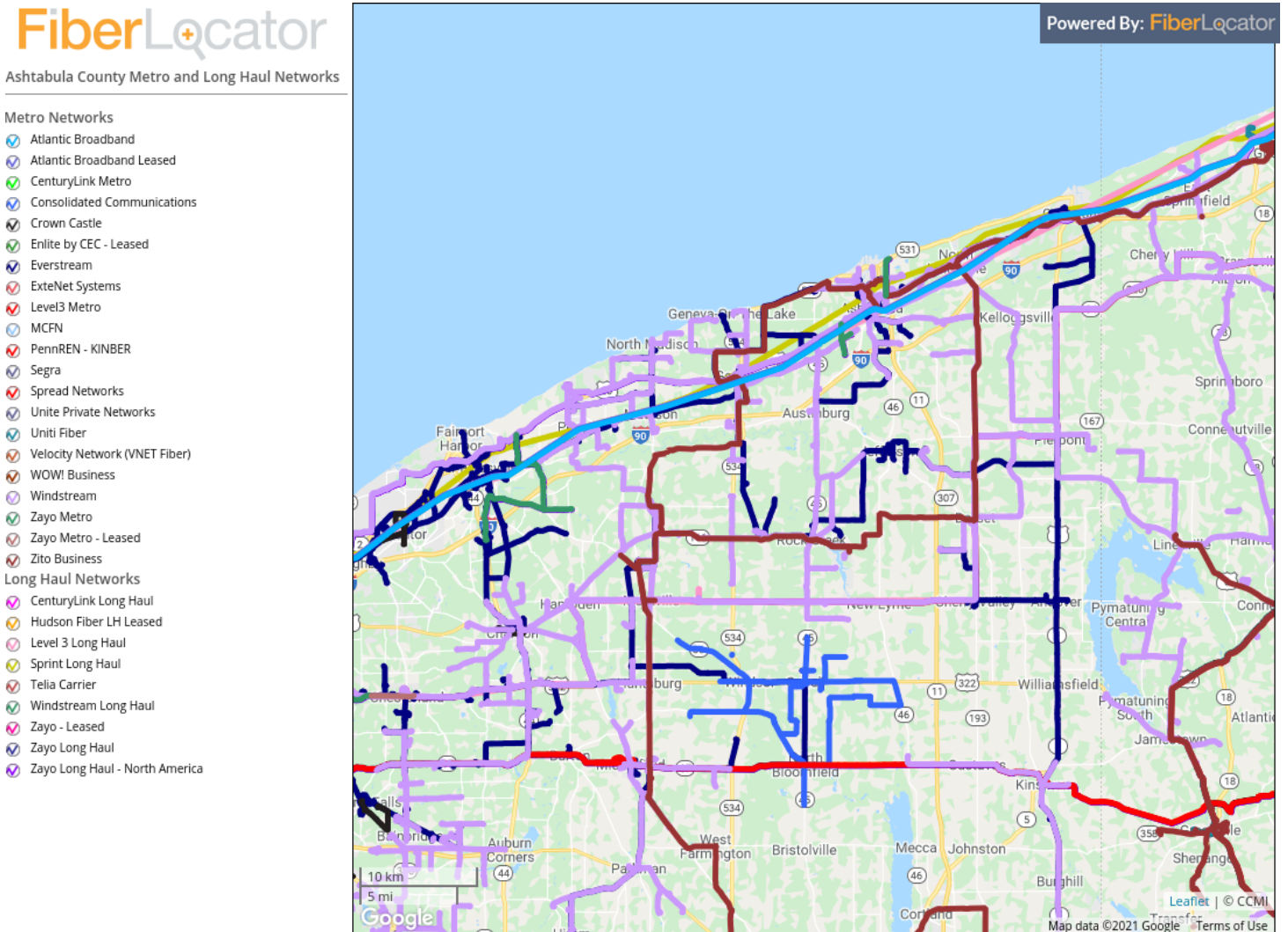
**Note: not all providers include their fiber coverage in the Fiber Locator tool*

Figure 3.8 Trumbull County Metro & Long Haul Networks (Fiber Locator)



**Note: not all providers include their fiber coverage in the Fiber Locator tool*

Figure 3.9 Ashtabula County Metro & Long Haul Networks (Fiber Locator)

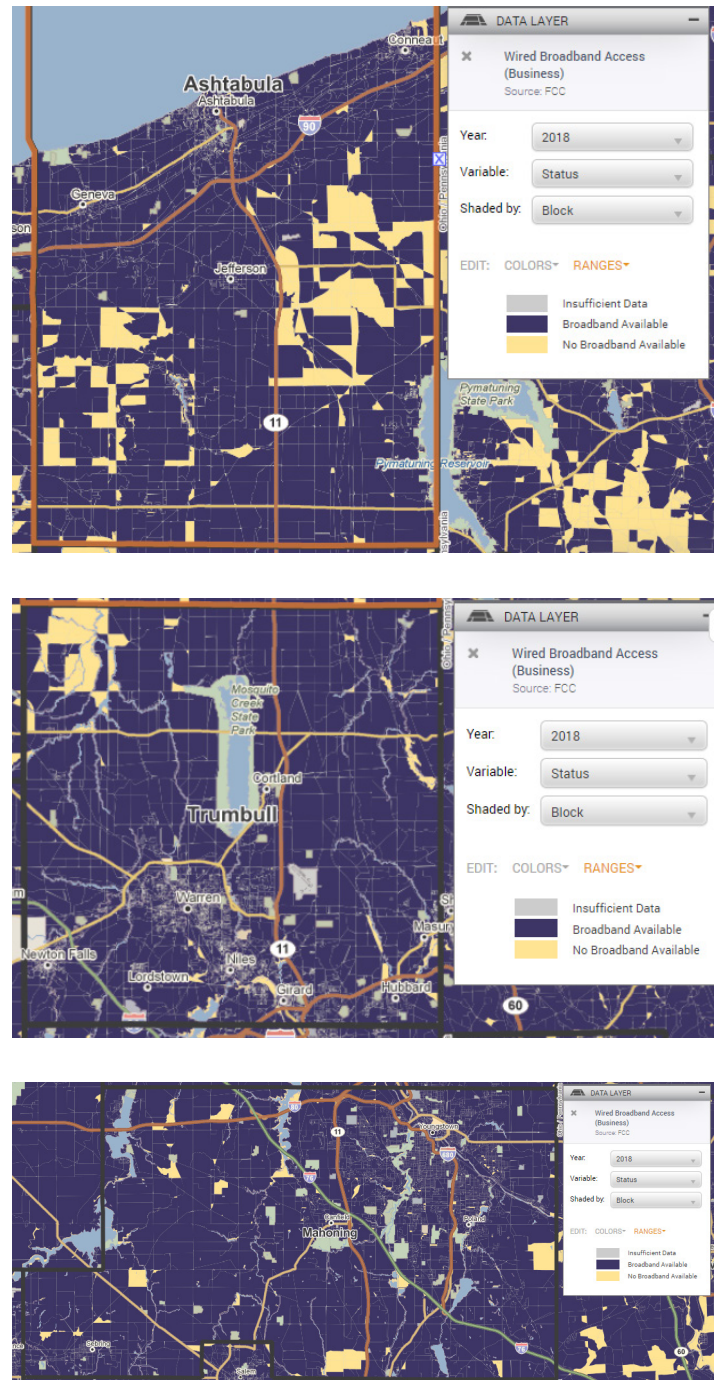


**Note: not all providers include their fiber coverage in the Fiber Locator tool*

Business and Government Fixed Broadband Access

Connected Nation Ohio's mapping is limited to residential service. However, various sources have analyzed the 2018 FCC Form 477 data regarding business and government fixed broadband access. Business and government broadband access information gathered through the community engagement under the Needs Assessment portion of this Study will be further addressed in that section.

Figure 3.10 Availability of Wired Business and Government Broadband Availability



Source: PolicyMap

Figure 3.11 Availability of Fiber Access to Business and Government User

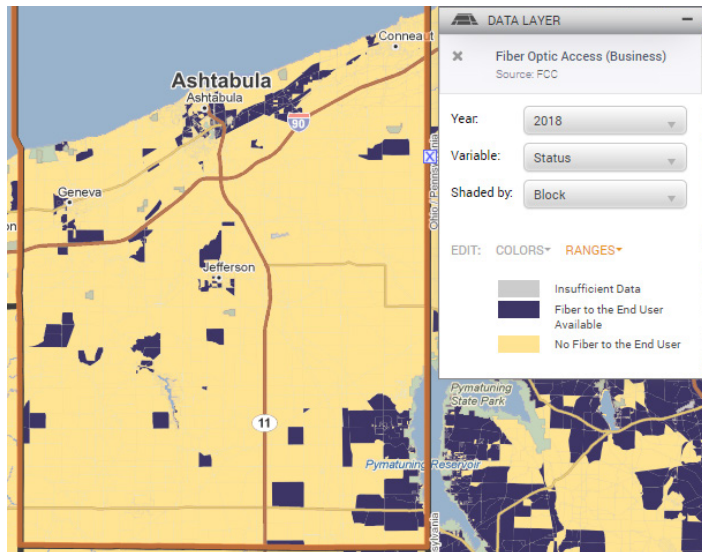
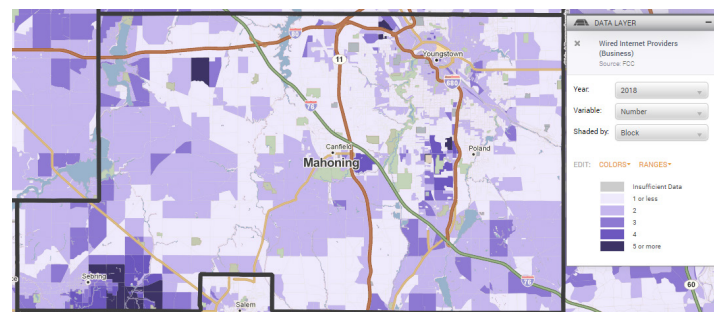
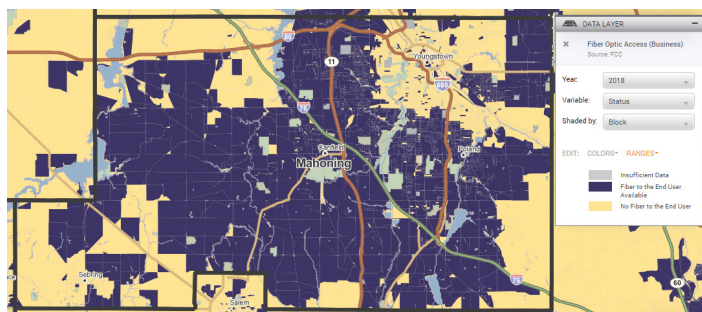
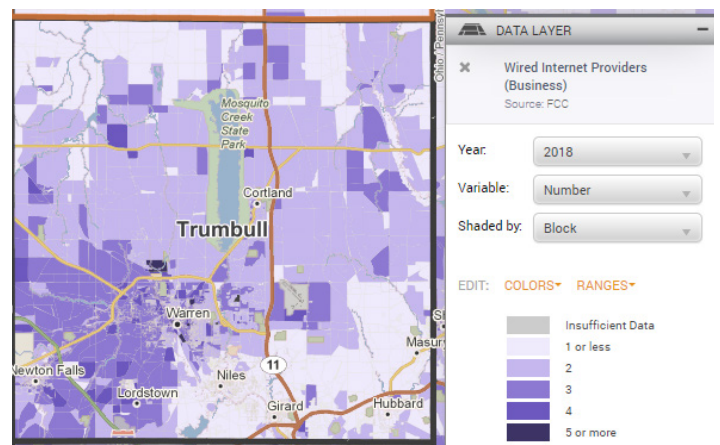
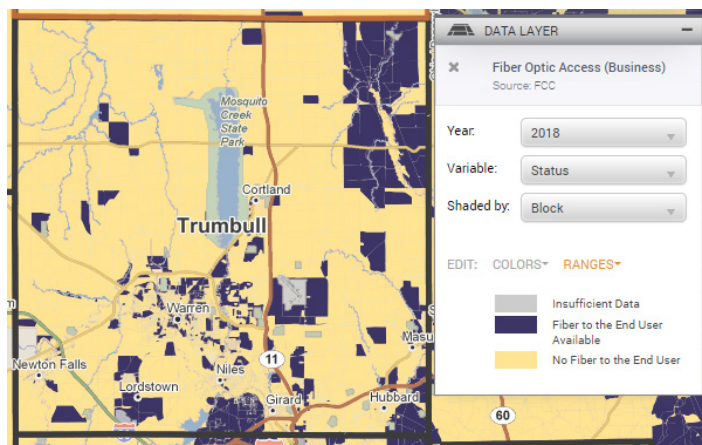
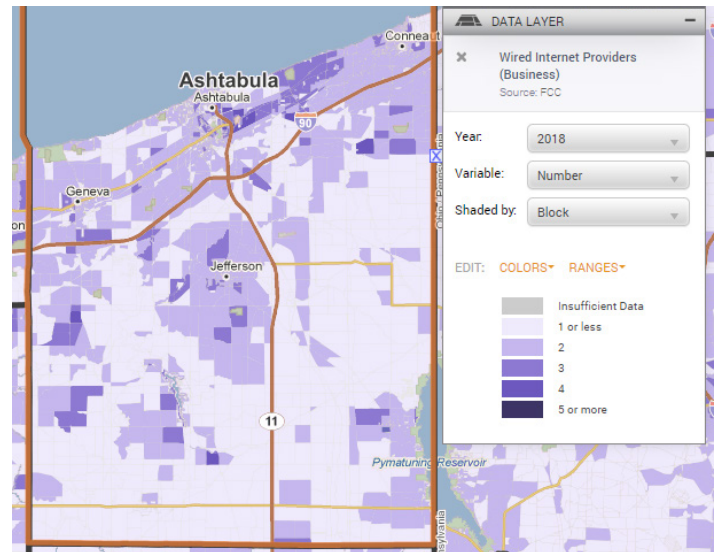


Figure 3.12 Number of Wired Business and Government Internet Providers from 2018



Source: PolicyMap

Source: PolicyMap

Figure 3.13 Maximum Available Contractual Download Speed for Business and Government Users

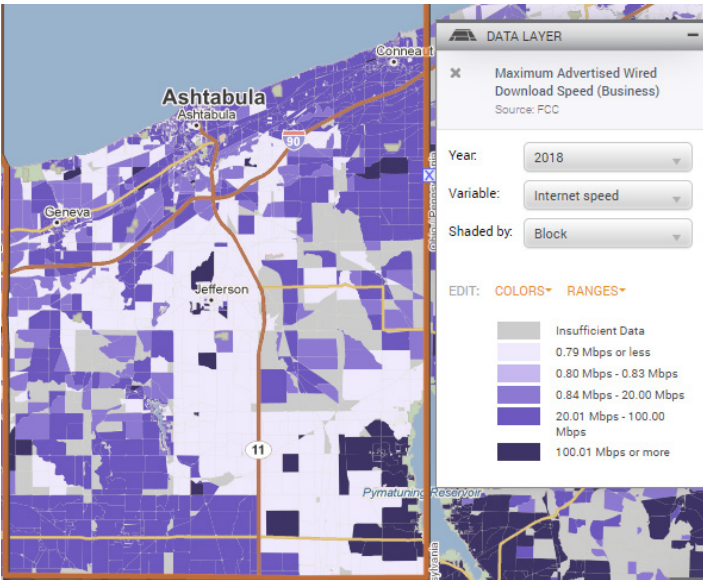
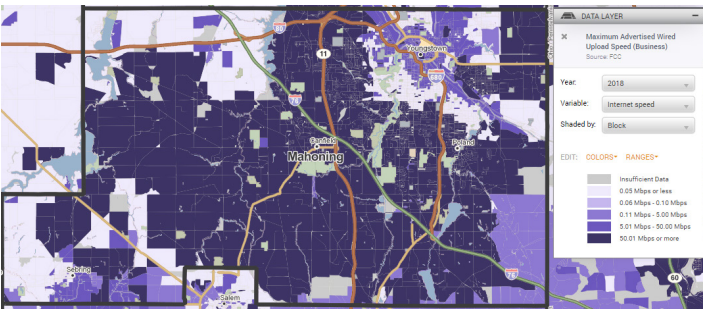
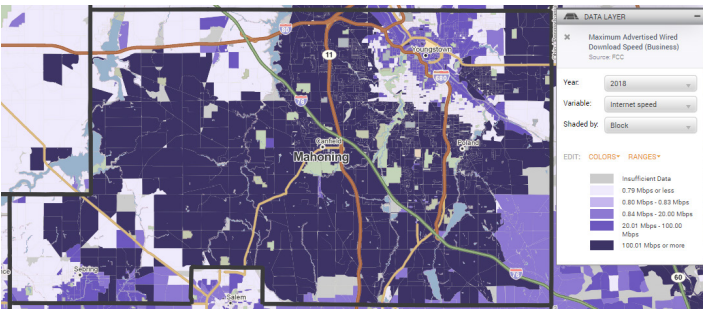
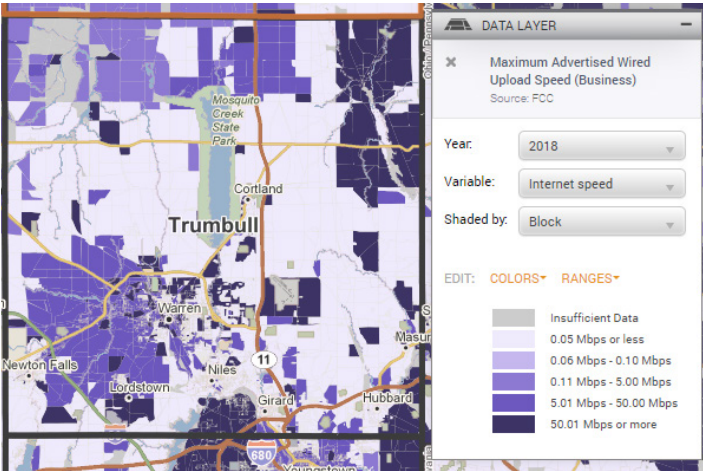
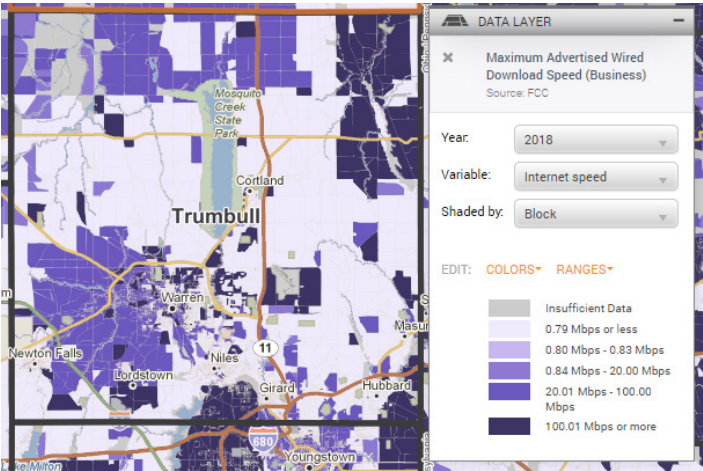
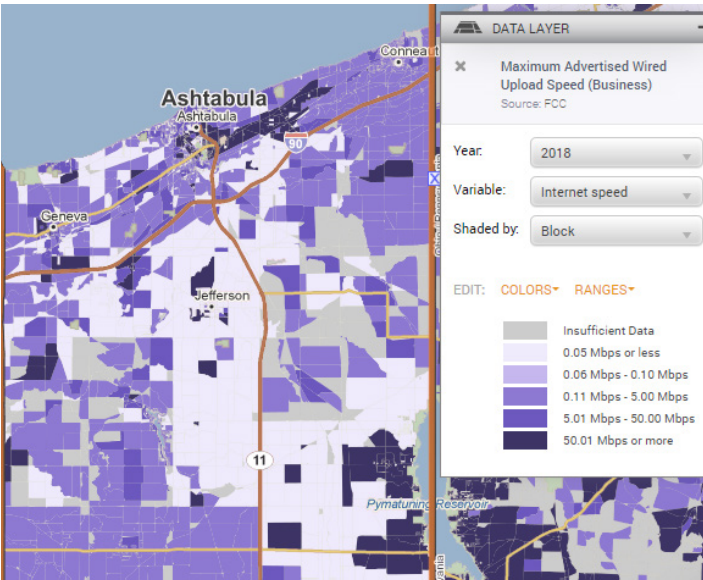


Figure 3.14 Maximum Available Contractual Upload Speed for Business and Government Users



Source: PolicyMap

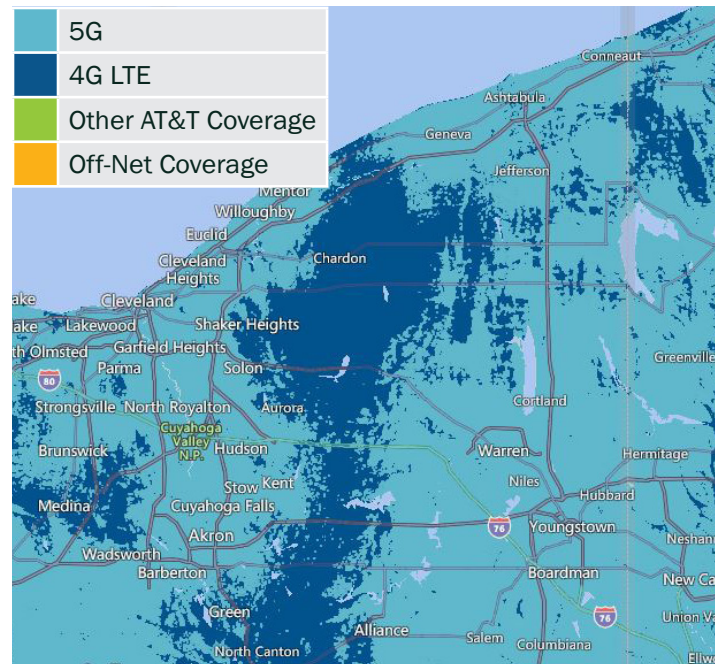
Source: PolicyMap

Mobile Broadband Access

Mobile broadband service providers report their total subscribers for each state in which they provide service to customers utilizing the FCC Form 477.¹⁷ Although mobile carrier coverage maps depict near ubiquitous 4G and even 5G (see earlier discussion on the types of 5G service) for the Eastgate region, mobile connection digital divides unquestionably still exist.

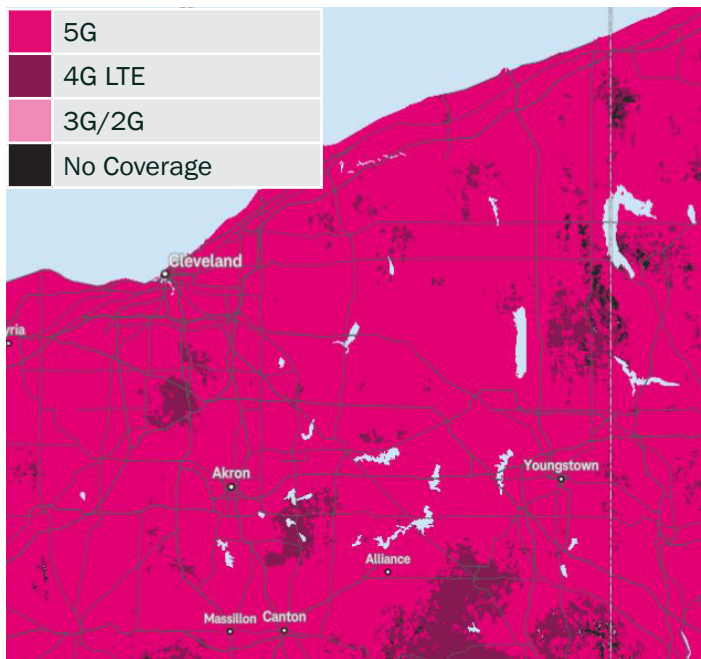
On December 30, 2020, the FCC's Office of Economics and Analytics issued a working paper discussing the digital divide in U.S. mobile broadband.¹⁸ The paper found that a mobile digital divide indeed exists in the U.S. as rural areas are more dependent on non-Wi-Fi mobile technology and experience slower speeds on mobile connections. Demographically, the paper concluded that counties with greater minority populations are more likely to use older mobile technologies. Counties with older populations tend to use mobile technologies, but are more likely to have slower speeds. Meanwhile, counties with larger households are more likely to use Wi-Fi and have faster Wi-Fi.

Figure 3.15 AT&T Claimed Mobile Wireless Coverage



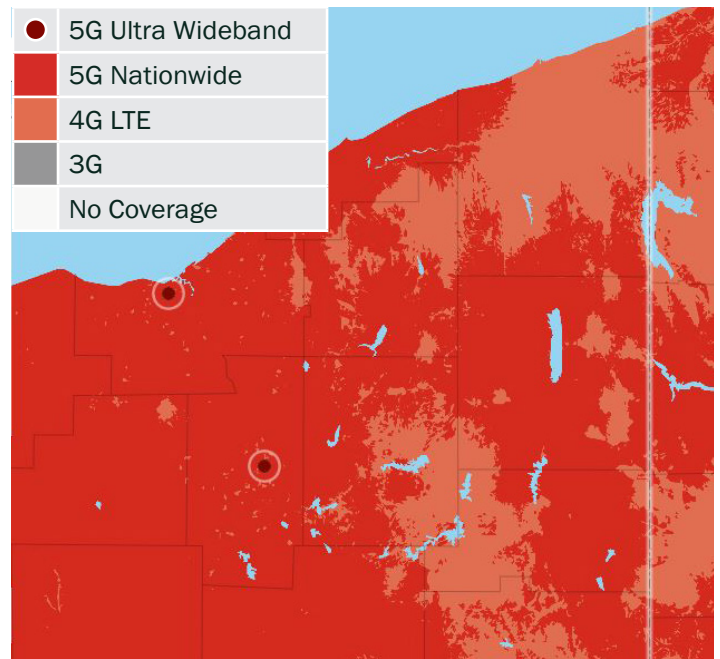
Source: AT&T

Figure 3.16 T-Mobile Claimed Mobile Coverage



Source: T-Mobile

Figure 3.17 Verizon Claimed Mobile Coverage

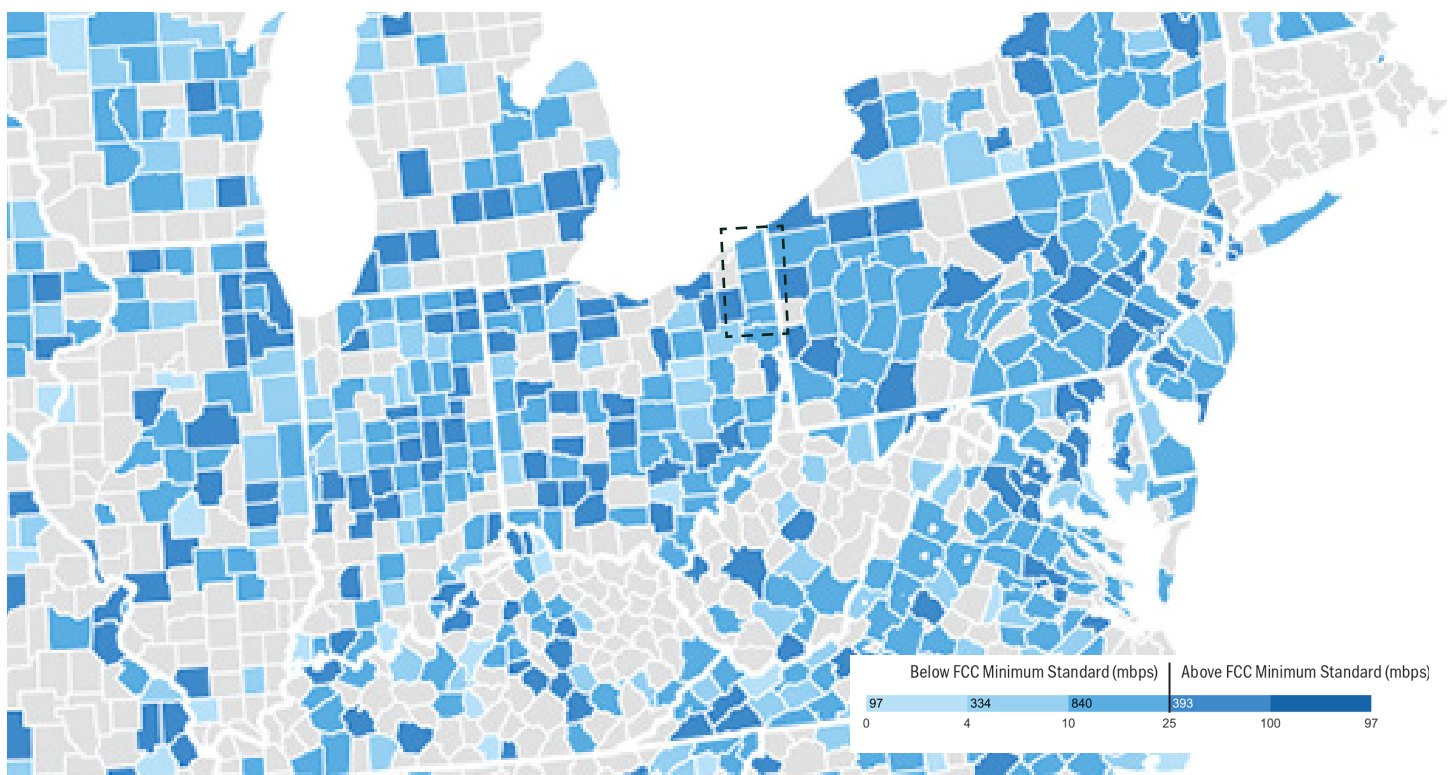


Source: Verizon

In March 2020, the National Association of Counties (“NACo”) released connectivity data that it collected in partnership with the Rural Local Initiatives Support Corporation (“LISC”), Rural Community Assistance Partnership (“RCAP”), National Association of Development Organizations (“NADO”), Farm Credit and Land O’Lakes. Working with M-Lab, the partners developed the TestIT mobile app “to empower individuals to provide data on how they experience cellular and broadband internet every day.”¹⁹ According to NACO’s analysis, the county average cellular download speeds in the three-county region participating in this Study are all below the FCC minimum.

However, access is only one component of the broadband challenge facing the three-county region encompassed in this Study: the other is broadband adoption, inclusive of digital equity and digital inclusion, which will be examined in the Market Analysis.

Figure 3.18 County Average Cellular Download Speeds vs. FCC Minimum Standard



Source: National Association of Counties (NACO)

Note: The sample size for the above map is limited to individuals who downloaded the TestIT app and measured the speed of their service

SECTION ENDNOTES

1. *Fixed Broadband Deployment Data from FCC Form 477*. (2020). Retrieved from Federal Communications Commission: <https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477>.
2. *FCC 1908-02 | REPORT AND ORDER AND SECOND FURTHER NOTICE OF PROPOSED RULEMAKING: Establishing the Digital Opportunity Data Collection; Modernizing the FCC Form 477 Data Program*. (2019). Retrieved from Federal Communications Commission: <https://docs.fcc.gov/public/attachments/DOC-358433A1.pdf> (*emphasis added*).
3. *Fixed Broadband Deployment Data from FCC Form 477*. (2020). Retrieved from Federal Communications Commission: <https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477>.
4. *More About Census Blocks FCC Form 477*. (2020). Retrieved from Federal Communications Commission: https://transition.fcc.gov/form477/Geo/more_about_census_blocks.pdf.
5. *Connected Nation Ohio Rebooted: The Next Phase in Connecting Ohioans to Broadband*. (2019). Retrieved from Globe Newswire: <https://www.globenewswire.com/news-release/2019/07/29/1893051/22853/en/Connected-Nation-Ohio-Rebooted-The-Next-Phase-in-Connecting-Ohioans-to-Broadband.html#:~:text=Approximately%202.4%20million%20Ohio%20households,download%20and%203%20mbps%20upload>.
6. *FCC 1908-02 | REPORT AND ORDER AND SECOND FURTHER NOTICE OF PROPOSED RULEMAKING: Establishing the Digital Opportunity Data Collection; Modernizing the FCC Form 477 Data Program*. (2019). Retrieved from Federal Communications Commission: <https://docs.fcc.gov/public/attachments/DOC-358433A1.pdf>.
7. *National Broadband Availability Map*. (n.d.). Retrieved from National Telecommunications and Information Administration: <https://www.ntia.doc.gov/category/national-broadband-availability-map>.
8. *Broadband Data Collection*. (2021). Retrieved from Federal Communications Commission: <https://www.fcc.gov/Broadband-Data>.
9. Second Report and Order, 35 FCC Rcd. 7460 (2020).
10. *FCC Takes Next Step to Collect More Precise Broadband Mapping Data*. (2021). Retrieved from Federal Communications Commission: https://www.fcc.gov/document/fcc-takes-next-step-collect-more-precise-broadband-mapping-data?utm_source=sendgrid&utm_medium=email&utm_campaign=Newsletters.
11. *FCC Reaches Out to Collect Consumer Broadband Availability Experiences*. (2021). Retrieved from Federal Communications Commission: <https://www.fcc.gov/document/fcc-reaches-out-collect-consumer-broadband-availability-experiences>.
12. ACTING CHAIRWOMAN ROSENWORCEL ESTABLISHES BROADBAND DATA TASK FORCE: Task Force Will Lead Cross-Agency Effort. (2021). Retrieved from Federal Communications Commission: <https://docs.fcc.gov/public/attachments/DOC-370049A1.pdf>.
13. 86 FR 18124-18163 (Apr. 7, 2021).
14. Kelly, M. (2021). *The FCC wants you to test your internet speeds with its new app*. Retrieved from The Verge: <https://www.theverge.com/2021/4/12/22379848/fcc-speed-test-app-google-apple-download-broadband-maps-coverage>.
15. *BROADBAND MAPPING & ANALYSIS*. (2020). Retrieved from Connected Nation Ohio: <https://connectednation.org/ohio/mapping-analysis/>.
16. Gallardo, R. (2020). *Digital Divide Index. Purdue Center for Regional Development*. Retrieved from Digital Divide Index (DDI): <http://pcrd.purdue.edu/ddi>.

17. *FCC 1908-02 | REPORT AND ORDER AND SECOND FURTHER NOTICE OF PROPOSED RULEMAKING: Establishing the Digital Opportunity Data Collection; Modernizing the FCC Form 477 Data Program.* (2019). Retrieved from Federal Communications Commission: <https://docs.fcc.gov/public/attachments/DOC-358433A1.pdf>.
18. Dempsey, J. & Sun, P. (2020). *The Digital Divide in U.S. Mobile Technology and Speeds*. Retrieved from Federal Communications Commission: <https://docs.fcc.gov/public/attachments/DOC-369010A1.pdf>.
19. Scott, A. (2020). *UNDERSTANDING THE TRUE STATE OF CONNECTIVITY IN AMERICA*. Retrieved from National Association of Counties: <https://www.naco.org/resources/featured/understanding-true-state-connectivity-america>.

04

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SITE ANALYSIS

As referenced in the discussion on local policies in the Policy Analysis section, a cost-effective tactic for communities to encourage and facilitate enhanced broadband expansion includes reducing build-out costs.

One approach to doing so is to utilize existing infrastructure. With a clearer picture provided as to broadband access, or in certain locations, lack thereof, in the three-county region, it is next important to determine whether existing public assets could be used to better facilitate local broadband expansion.

Each of the counties expressed concern of an overall lack of assets for broadband expansion; however, there are a number of creative solutions to expanding coverage in the three-county region, which will be further explored in the Project Identification section. An additional recommendation contained in the Project Identification section is for the Eastgate region to

launch and maintain a vertical asset inventory in order to identify which assets are readily available for broadband build-out on an ongoing basis.

Working with the counties, the project team compiled county asset lists including municipal/ community-owned land, buildings, water towers, and more, which were then compiled into a variety of maps, featured in the following section and in the **Exhibit B**. Interactive versions of these maps are also available on Eastgate's website at: <https://www.eastgatecog.org/broadband>.

The following map (Figure 4.1) depicts municipally owned parcels within the three-county project area as compared to broadband service availability at 25 Mbps download/ 3 Mbps upload.

Diving further, the maps in this section depict county-owned assets and municipal parcels as compared to broadband service availability at 25 Mbps download/ 3 Mbps upload.

Figure 4.1 Eastgate Region at 25 Mbps download / 3 Mbps upload with Government Parcels

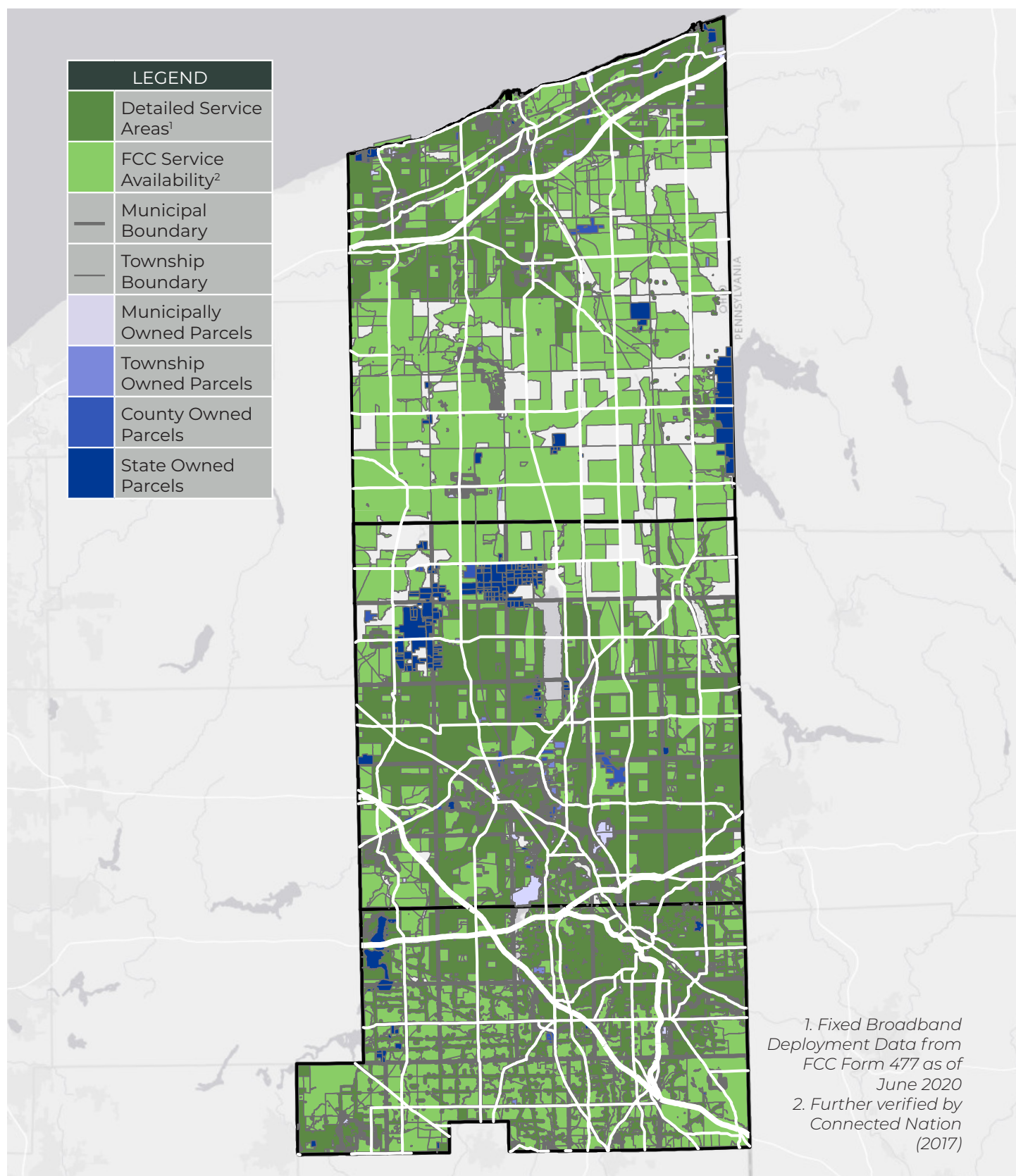


Figure 4.2 Ashtabula County at 25 Mbps download/ 3 Mbps upload with County Assets

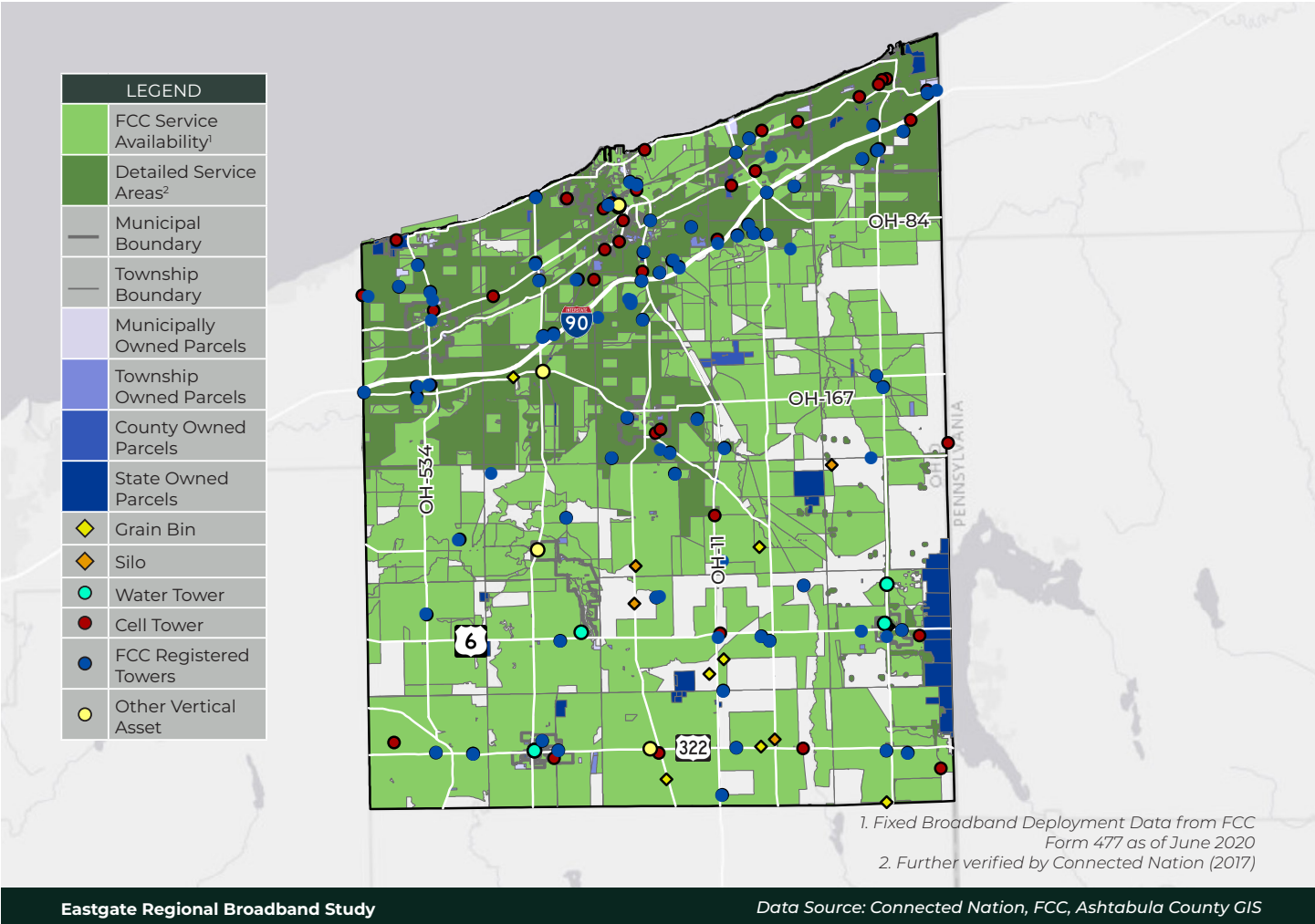


Figure 4.3 Examples of Ashtabula County Assets



Pictured from left to right: Water tower (Andover), Wind tower (Colebrook), and Grain elevator (Orangeville)

Figure 4.4 Mahoning County at 25 Mbps download/ 3 Mbps upload with County Assets

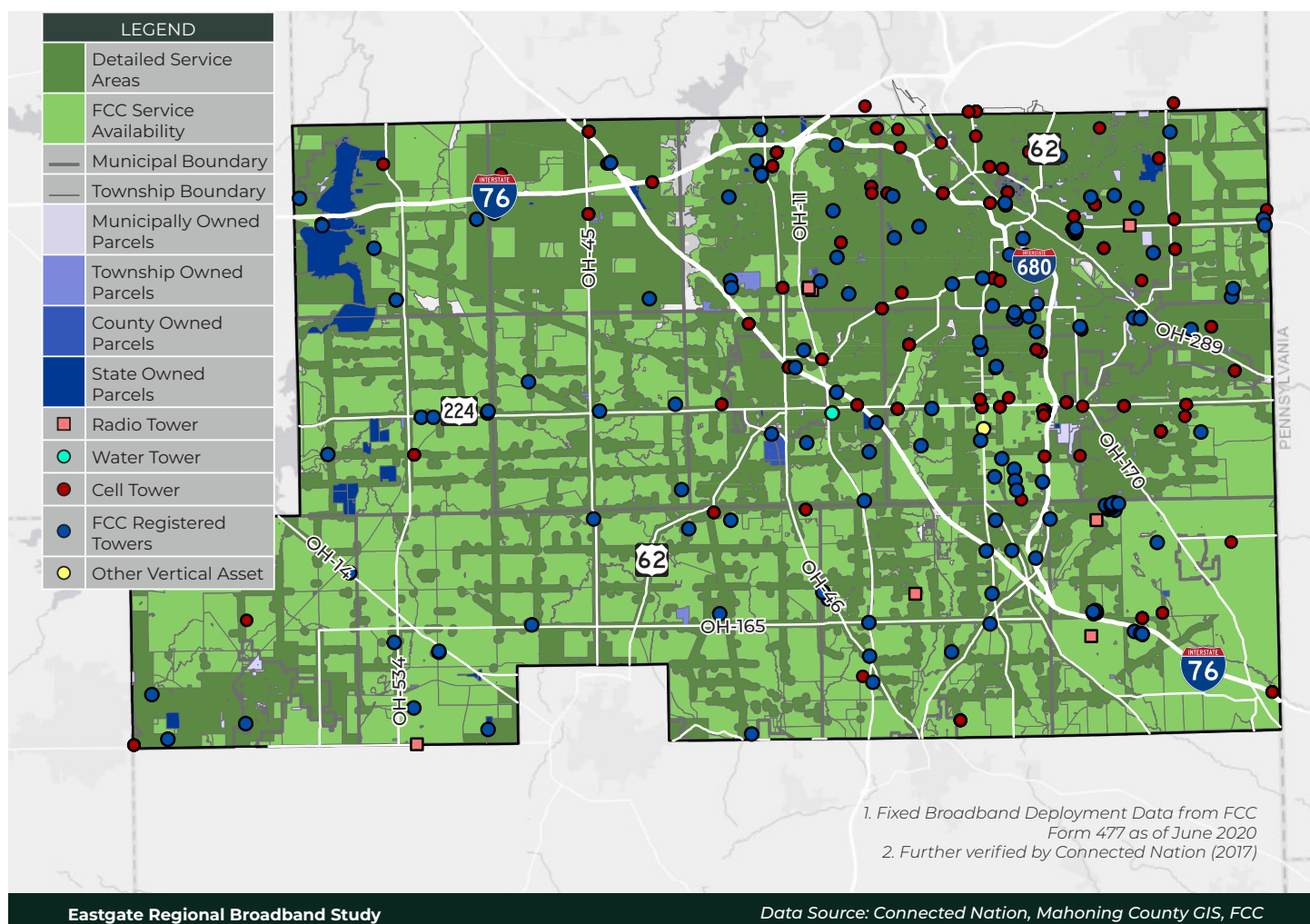


Figure 4.5 Examples of Mahoning County Assets



Radio towers, water towers, and cell towers are just a few examples of existing vertical assets in the region that can be utilized for broadband expansion.

Figure 4.6 Trumbull County at 25 Mbps download/ 3 Mbps upload with County Assets

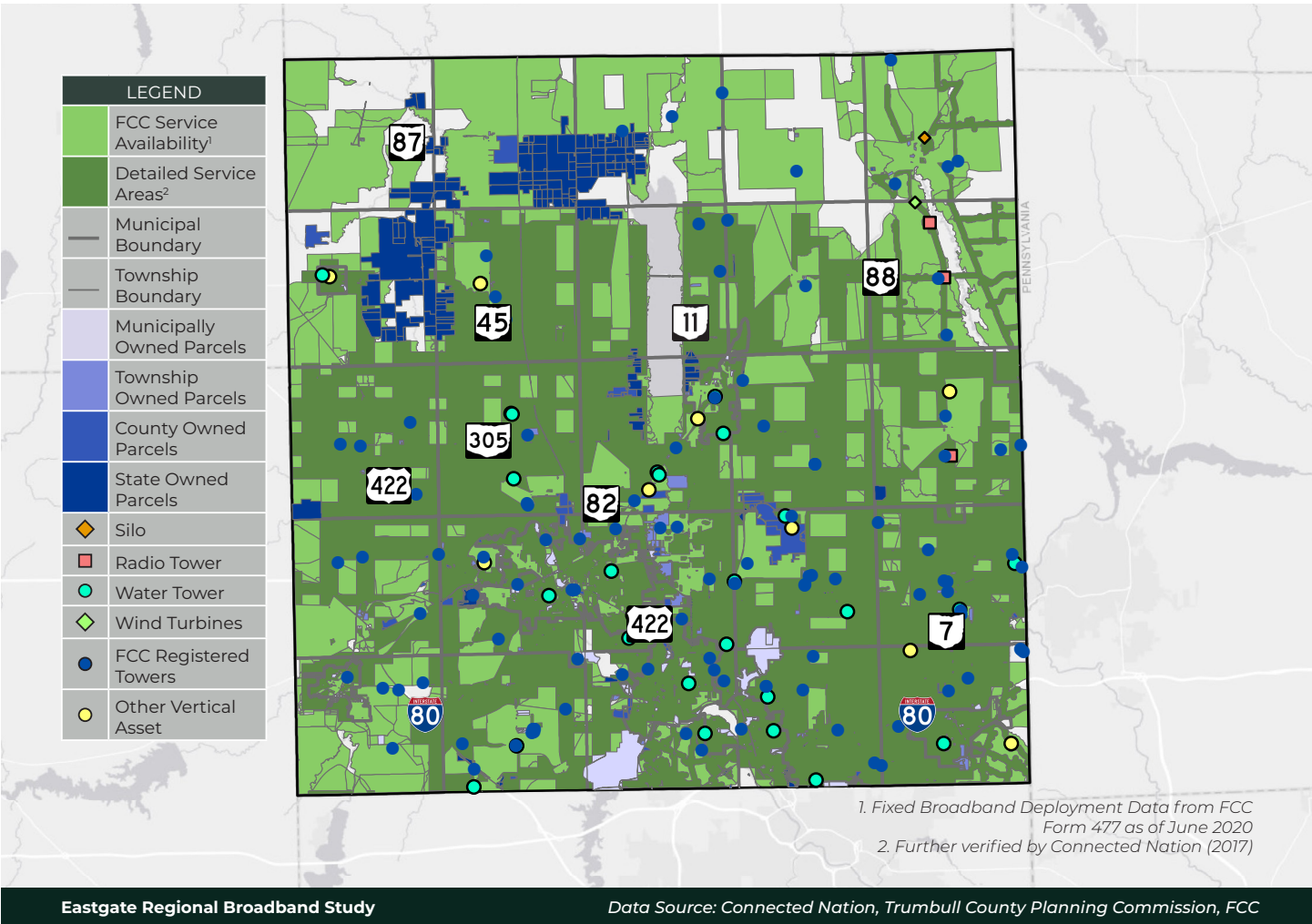


Figure 4.7 Examples of Trumbull County Assets



Government-owned buildings, such as a town hall or fire station, present opportunities to install and/or expand broadband infrastructure.

In February 2019, the U.S. Department of the Interior (“DOI”) launched a public repository of telecommunication infrastructure sites and cases, including federal structures, federal buildings, and federal land, in order to facilitate collocation and increase broadband access on federally managed property.¹

In addition to infrastructure, the Joint Overview-Established Locations (“JOEL”) map includes agency contact information.² It will be important for participating counties to work with their federal representatives, as listed in the Policy Analysis section, for assistance in facilitating access to these assets.

Figure 4.8 Eastgate region at 25 Mbps download/ 3 Mbps upload with Federal Structures, Buildings, and Land for Broadband

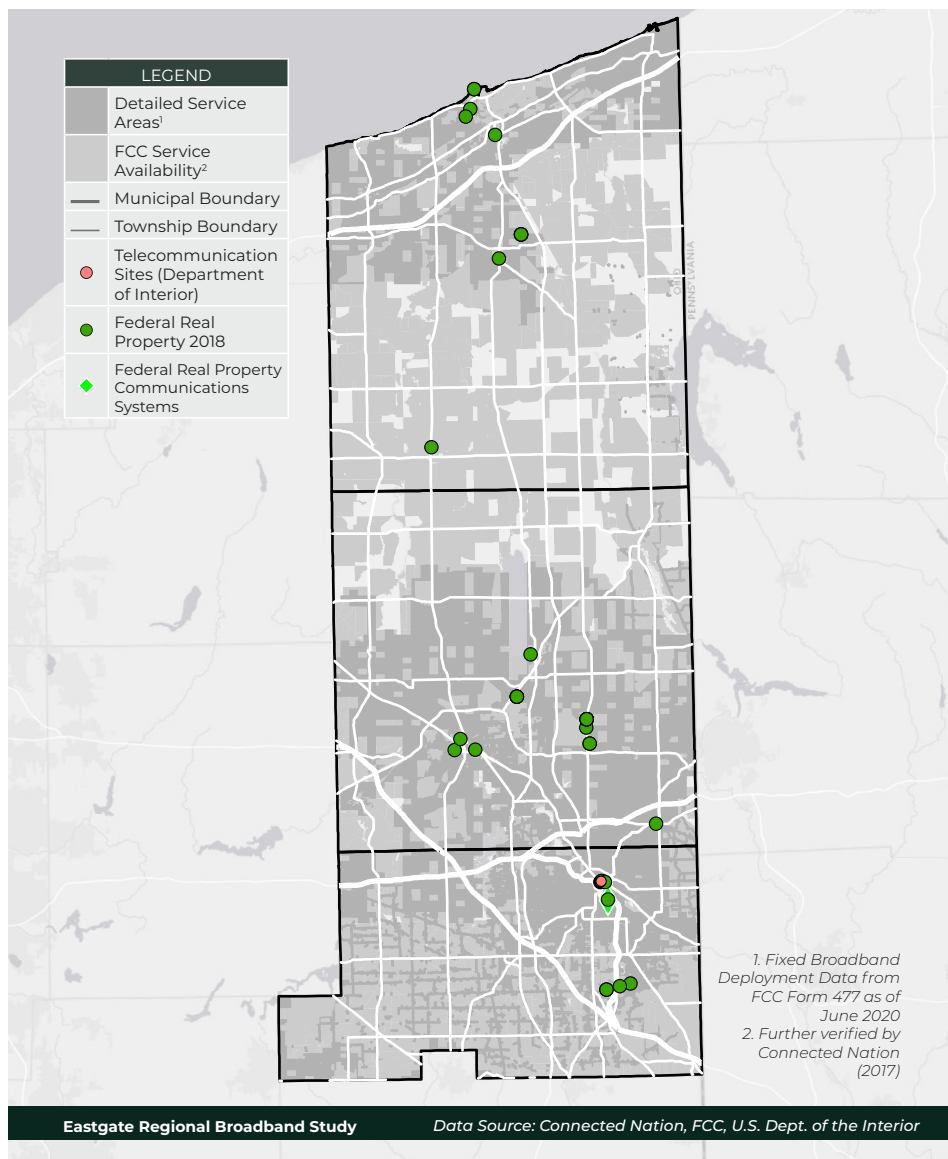


Figure 4.9 Eastgate Region at 25 Mbps download / 3 Mbps upload with FCC Registered Towers

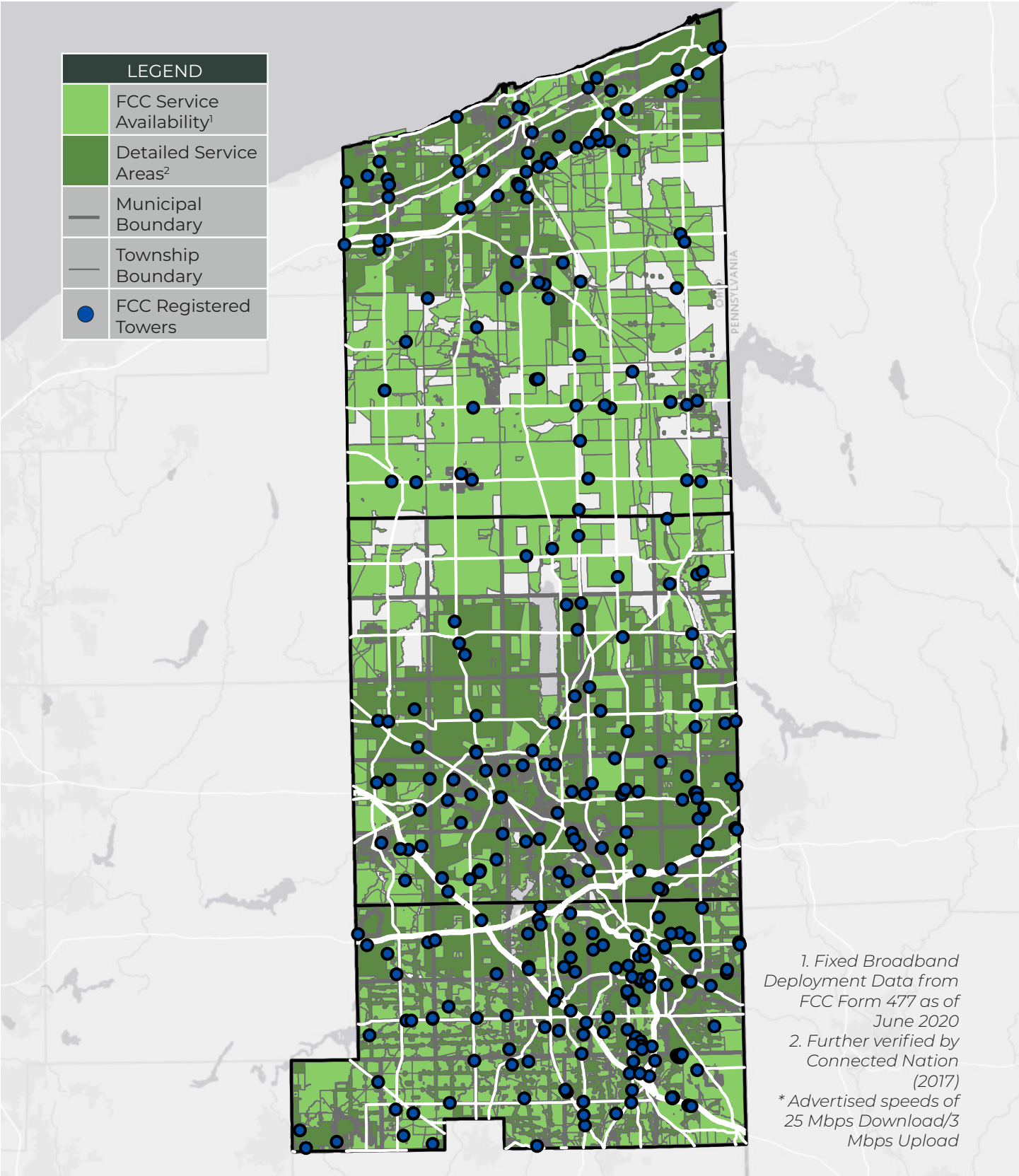


Figure 4.10 Eastgate Region at 25 Mbps download / 3 Mbps upload with 5G Tower Deployment

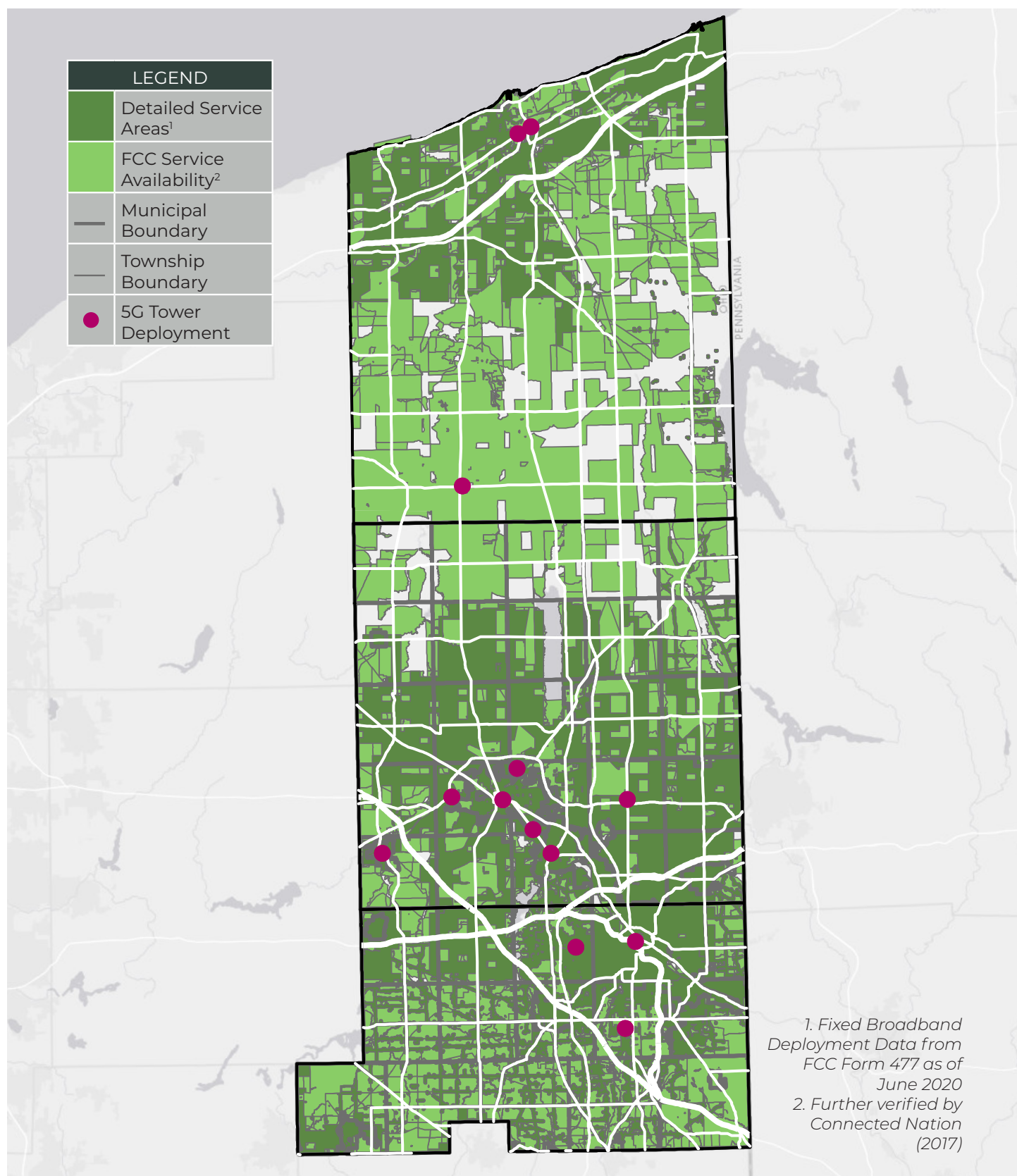
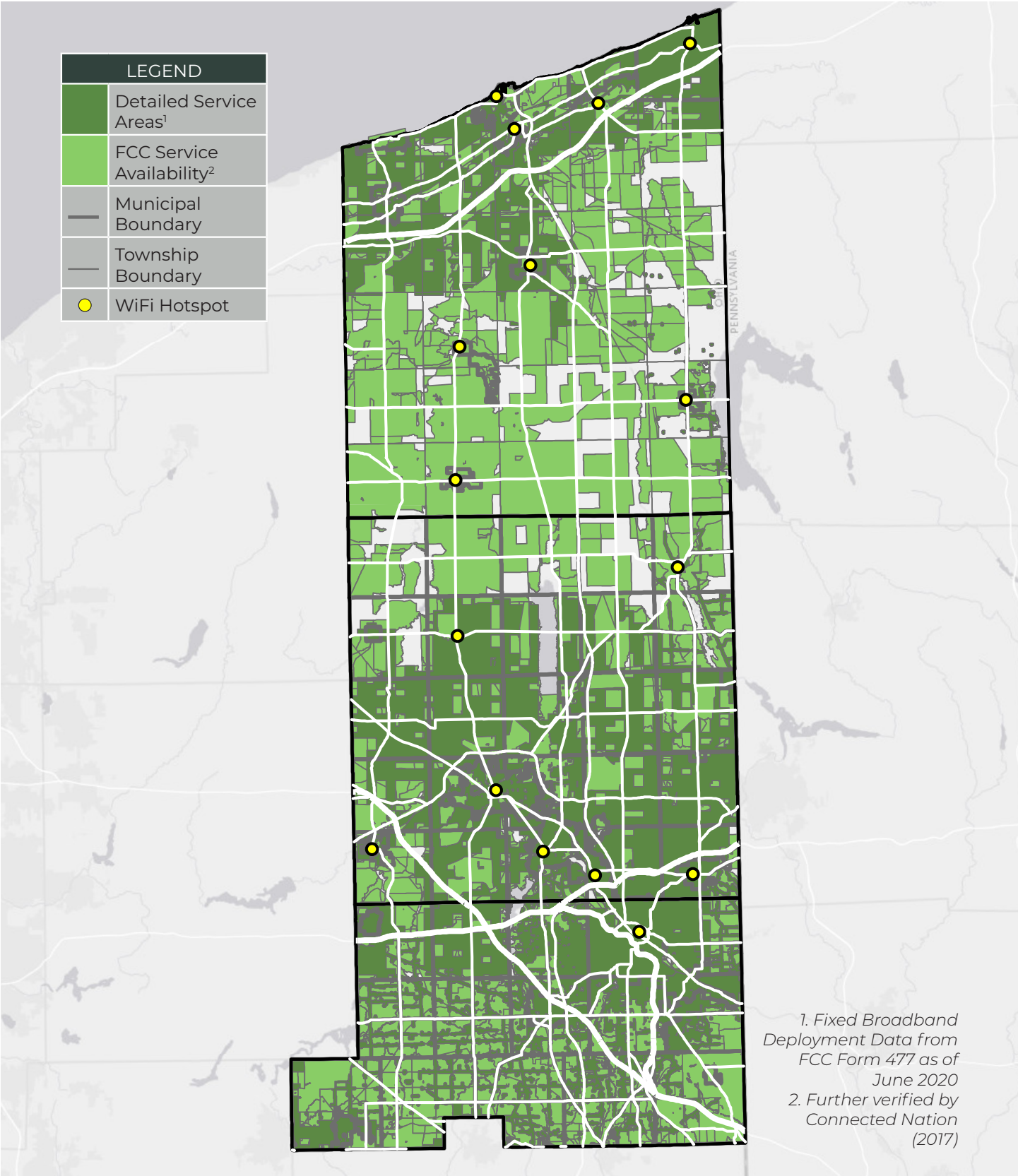


Figure 4.11 Eastgate Region at 25 Mbps download / 3 Mbps upload with WiFi Hotspots



There are many privately owned sites in the project area that could also aid in coverage expansion.

When considering fiber build(s) in the project area, one approach is a continuous fiber path or loop in a designated area. However, cost and/or construction considerations may prohibit this approach in certain areas. In those locations another option would be to utilize circuits between the existing providers; however, this will only be feasible if there is a nearby data center to which the fiber paths can be routed. There are three data centers in the project area, all of which are in Youngstown: DRS Youngstown North Datacenter; DRS Youngstown South Datacenter; and Involta.

In addition, there are two OARnet Points of Presence (“POPs”) in the project area, both of which are also in Youngstown. The benefit of these local data centers and POPs, and opportunities for expansion from them in a hub and spoke manner is further explored in the Project Identification section.

As discussed in the Policy Analysis section, OARnet serves Ohio’s state and local governments, research institutions, medical centers, community anchor institutions, education institutions, and the Ohio Supercomputer Center. In addition to OARnet itself, there may be other opportunities for partnership and expansion working with the institutions/ organizations connected to OARnet in the area, particularly with recent changes to E-rate as discussed in the Policy Analysis.

Figure 4.12 OARnet POPs



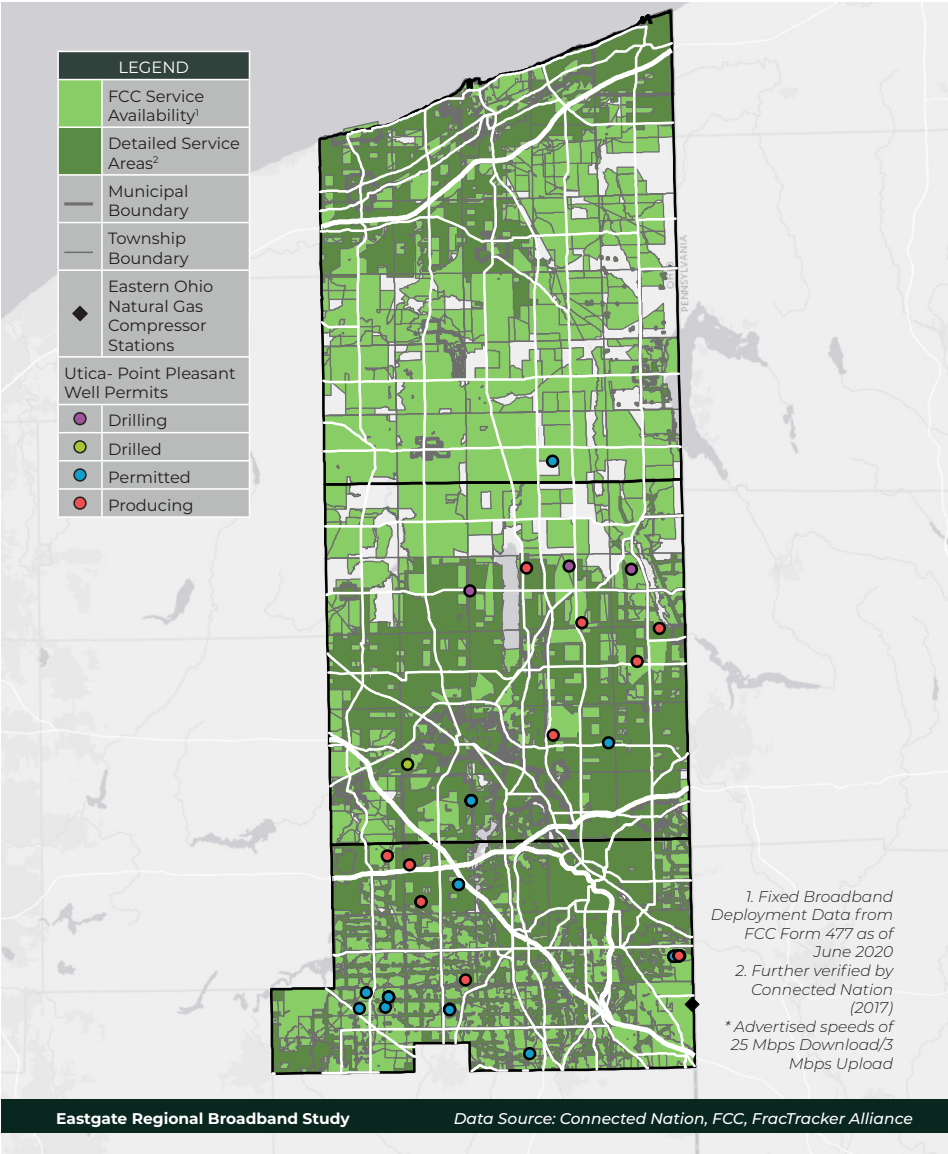
Other sites for consideration are those utilized by other utility providers, which may also be used for broadband expansion. Like individuals and communities, utilities have recognized the value of available broadband access. Several utilities in Ohio have already deployed significant fiber networks to support their day-to-day utility operations, and across the country utility providers have been setting up private LTE networks to inspect power lines, provide workers

with mobile voice and data, ensure substation redundancy, control energy flow, provide performance and outage notification, and more.

For example, Figure 4.12 depicts the shale facilities in the project area, particularly those that are currently located in an area that lacks broadband at 25 Mbps download/ 3 Mbps upload.

In addition to private utility providers, there are three municipal electric/ public power providers in the project area, all

Figure 4.13 Eastgate Region Shale Facilities



of which are located in Trumbull County: the Cities of Hubbard, Niles, and Newton Falls. Opportunities to expand upon such networks are included in the Project Identification section.

Private buildings may also be available for collocation.

Although not a physical asset, a community's current economic "spend" on telecommunications services, and how those amounts will increase in the years ahead is an "asset" that, if managed appropriately, can be contributory to expanding local service.

Case Study: **Municipal Electrics/ Public Power and Broadband**

Many Municipalities and power providers across the state of Ohio, as well as certain other states, have found success in providing internet services to their districts. The most common example of municipal broadband is free public Wi-Fi hotspots throughout a city or in designated parts. However, some cities, like Wadsworth, Ohio, have started to offer home internet as a utility service. While there can be costs, or even legal barriers, to entry, studies show that municipal broadband offers lower and more stable rates for residents than conventional internet service providers.

In Wadsworth, the city's Electric & Communications Department provide residents with municipal cable internet. In particular, Wadsworth uses its municipal company called "CityLink" to provide cable, internet, phone, and home energy.³ CityLink uses the city's fiber network to provide broadband services to homes and businesses, which CityLink offers at different speeds and prices. This includes six different tiers for residents, businesses, and nonprofit organizations that increases in internet speed and price from Tiers 1 to 5.⁴ For example, residents may purchase Tier 1 service for 20 Mbps download and 2 Mbps upload speeds at \$25 per month. According to CityLink, Tier one is "[g]ood for very light Internet surfing and email[, but] not optimized for digital phone or streaming video/audio." At the other end of the service spectrum, CityLink offers residents Tier 6 services for 500 Mbps download and 25 Mbps upload speeds at \$99 per month and advertised as "[e]xcellent for individuals or families that are streaming most of their entertainment at home."

Municipal power companies providing broadband services can offer residents lower and more stable prices. A 2018 study by the Berkman Klein Center for Internet and Society at Harvard University found that "community-owned [fiber] networks offered prices that were clear and unchanging, whereas private [internet service providers] typically charged initial low promotional or "teaser" rates that later sharply rose, usually after 12 months."⁵ Then why do municipalities decide against offering their own broadband? For 26 states, not including Ohio, their laws prohibit or restrict municipal broadband.⁶ Also, establishing and operating municipal broadband comes often comes with high initial costs. However, cities such as Wadsworth that can leverage municipal power company infrastructure have found ways to mitigate the upfront costs.

SECTION ENDNOTES

- 1 *Interior Launches New Effort to Facilitate Broadband Development in Rural America.* (2019). Retrieved from U.S. Department of the Interior: <https://www.doi.gov/pressreleases/interior-launches-new-effort-facilitate-broadband-development-rural-america>.
- 2 *Id.*
- 3 *UTILITIES.* (n.d.). Retrieved from City of Wadsworth Economic Development: <https://www.wadsworthcity.com/462/Utilities>.
- 4 *FINDING THE RIGHT PLAN.* (n.d.). Retrieved from City of Wadsworth CITYLINK: <https://www.wadsworthcity.com/555/Finding-the-Right-Plan>.
- 5 Hessekiel, K. & Talbot, D. (2018). *Community-Owned Fiber Networks: Value Leaders in America.* Retrieved from Berkman Klein Center for Internet & Society at Harvard University: <https://cyber.harvard.edu/publications/2018/01/communityfiber>.
- 6 Bode, K. (2019). *Report: 26 States Now Ban or Restrict Community Broadband.* Retrieved from Vice: <https://www.vice.com/en/article/kzmana/report-26-states-now-ban-or-restrict-community-broadband>.

05

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MARKET ANALYSIS

INTRODUCTION

The purpose of the Market Analysis portion of the Study is to assess broadband supply and demand in the Eastgate Region, which covers the Counties of Ashtabula, Mahoning, and Trumbull Counties.

For purposes of this Market Analysis, “broadband” refers to fixed wired internet subscriptions (such as a resident- or business-paid internet subscription with an internet services provider) or mobile wireless internet subscriptions (typically through a cell phone plan).

As detailed throughout this Study, broadband access can be enhanced or inhibited through a variety of mechanisms. Like any commodity, the factors considered in the purchase decision of a resident or a business includes geographic proximity and availability, price, quality of the product (which in the case of broadband refers to speed and reliability), purchasing power, convenience, need and choice. In order to simplify the research goal of these factors in determining broadband access, we focus on three questions here:

1. What are current broadband penetration and adoption rates?
2. Is current pricing sensible pricing for services provided?
3. What is the foreseeable options and market for broadband choice?

It is worth noting that in order to adequately assess the market, understanding its participants is key. The market consists of 1) suppliers, which include cable and broadcast television providers, internet service providers, cellular telephone companies, and governments; and 2) customers, which include residents and businesses within the Eastgate Region. Over the years, internet access has shifted from a luxury to a necessity, given its role in communication, business, education, socialization, and delivery of services. As such, it is assumed that every household and business needs internet to operate and sustain and all existing and new customers will be the entire business and residential footprint considered in the Eastgate Region.

Lastly, given the varying types of suppliers and customers in the marketplace, collecting data for this analysis commands a multi-faceted approach. Data for this analysis was gathered through government sources such as

Census counts and estimates, state, and local government agencies, and required reporting to the Federal Communications Commission, among others. However, some data related to pricing, demand, consumer spending, and income comes from other private sources that have more sophisticated analysis options in estimating consumer spending and commodity demand. Lastly, in order to address data integrity issues or recency issues with government data, a survey was conducted within the Eastgate Region to address some of the key research questions to undertake this analysis and fill any potential data gaps, as discussed in the Needs Assessment portion of this Study.

FINDINGS

- 39,962 households in the Eastgate Region have no internet access, representing 18% of all households.
- The difference between the lowest income bracket’s household internet access in the region and the highest income bracket’s household internet access is a difference of nearly 40%
- 49,084 households in the Eastgate Region have no internet subscription and 23,055 have cellular internet only.
- The Eastgate Region has witnessed an increase in average self-employment income per household from 2014 to 2019, by nearly 10%, with each County individually outpacing the of Ohio. Self-employment income possesses a strong correlation with home-based employees.
- Approximately \$140 million in unmet demand for wired telecommunications in the Eastgate Region.
- The number of households with no internet devices similarly follow the number of households in the area making less than \$35,000 annually as there are approximately 32,068 households making less than \$35,000 annually and 32,183 without a device.
- There are 30 providers providing fixed broadband services, with 11 providing residential services and 27 (some can provide both)
- Over the last five years, while the number of residential and business providers has

decreased, the number of blocks served has increased by 15% for residential customers and 14% for business customers over the period.

- Over the last five years, advertised speeds from residential providers has increased by 310 Mbps download 19 Mbps upload and for business providers have increased by 261 Mbps download and 14 Mbps upload.
- Over 50% of Eastgate Resident surveyed stated they are dissatisfied with their internet service.
- 25% of Eastgate Region households are cost-burdened by rent and mortgage prices, limiting purchasing power. Additionally, the average household in the Region pays over 30% of income toward transportation costs, higher when compared to peer and selected counties.
- An alternative broadband option could net an additional 37,452 households both from a need and dissatisfaction perspective.
- According to the Eastgate Survey just over 72% of those surveyed pay monthly internet subscriptions between \$40.01 to \$85.00 per month with an additional 17.8% paying over \$85 per month.
- Speeds provided by Ohio providers are increasing on average, with average download speeds increasing by 123 megabits per second (Mbps) and average upload speeds increasing by 23 Mbps. As of 2021, the average speeds are now at 250 Mbps download and 55 Mbps upload.

- Cable monthly pricing on average is \$90.94 (+28%), with a minimum of \$34.95 (+133%) and a maximum of \$199.99 (-20%).
- DSL monthly pricing on average is \$51.60 (-8%), with a minimum of \$27.99 (-33%) and a maximum of \$62.91 (-32%).
- Fixed Wireless monthly pricing on average is \$54.56 (-41%), with a minimum of \$39.95 (-57%) and a maximum of \$79.95 (-15%).
- FTTH monthly pricing on average is \$80.07 (+8%), with a minimum of \$51.77 (+4%) and a maximum of \$130.91 (+10%).
- Ohio providers are averaging 250 Mbps download speeds and 55 Mbps upload speeds at an average cost of \$68.73, with a range of \$27.99 per month minimum and \$199.99 maximum.
- Eastgate Providers are averaging 307 Mbps download speeds and 59 Mbps upload speeds at an average cost of \$83.73, with a range of \$55.18 per month minimum and \$127.93 maximum.

PENETRATION AND ADOPTION RATES

Internet Access

Data regarding internet access can include a subscription for dial-up, cellular, cable, fiber optic, DSL, satellite, or other service, or internet access without a subscription. Table 5.1 illustrates households in the Eastgate Region, by County, and the estimated percent of households with no internet access according to the U.S. Census American Community Survey.

Table 5.1 Internet Access

	TOTAL HOUSEHOLDS	WITH ACCESS	NO ACCESS	% WITHOUT
Ashtabula County	37,832	30,322	7,510	20%
Trumbull County	85,612	69,490	16,122	19%
Mahoning County	98,472	82,142	16,330	17%
Eastgate Region	221,916	181,954	39,962	18%
Ohio	4,676,358	3,987,955	688,403	15%

Source: Census & ACS 2019

The majority of residential respondents to the Needs Assessment survey pay between \$51 and \$85 per month for an internet subscription. The monthly cost of a quality, reliable internet subscription can be more challenging depending on the income level of a household. The national average cost of an internet subscription is approximately \$556 per year, or \$46.33 per month,⁴ which can represent 6% of household income for the lowest household income brackets. However, there is variability to that \$46.33 per month price point based on the availability of subscribers, physical infrastructure, and quality of internet.

There are 7,807 households in the Eastgate Region making \$10,000 or less annually and 10,616 households paying more than half of their income toward monthly rent or mortgage costs. Table 5.2 provides Eastgate households by County and income bracket, illustrating the correlation between household income and internet access - the difference between the lowest income bracket household internet access in the region and the highest income bracket household internet access is a difference of nearly 40%.

Internet Subscriptions

Data regarding internet subscriptions or “Paid Subscriptions” can include a subscription for dial-up, cellular, cable, fiber optic, DSL, satellite, or other service. This does not include households with internet access provided through other means without a subscription. For example, households with “No Paid Subscription” may

IN-DEPTH

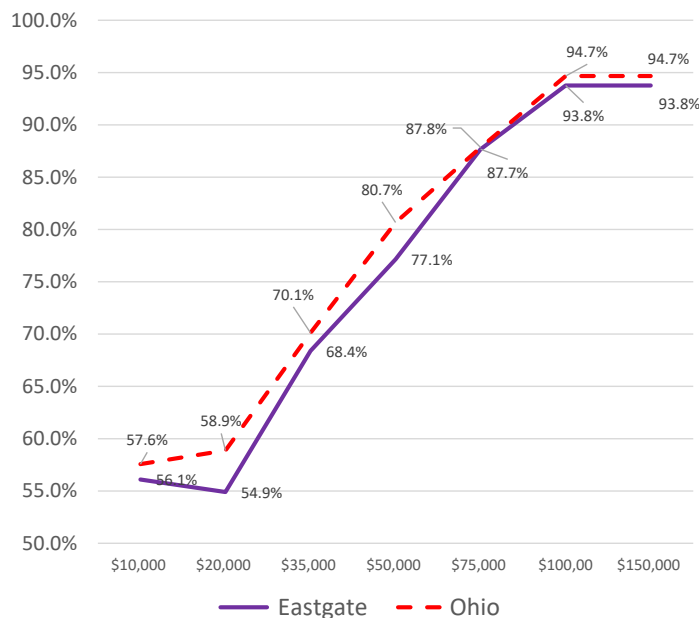
Additional access estimates were included in the Service and Infrastructure Analysis section of this report; however, such estimates were provided largely from FCC Form 477 data, whereas the information provided in this section includes the U.S. Census American Community Survey. The FCC and the American Community Survey use different methodologies to measure broadband, and we thought it important to include both in this Study. As explained previously, Form 477 data is based on reports from broadband providers; however, ACS data is based on surveys of households regarding fixed and mobile internet subscriptions.¹ Just as Form 477 data potentially overstates broadband coverage data, ACS data potentially overcounts broadband adoption in rural areas in two ways: first, by including both fixed and mobile subscriptions in household subscription rates, which are not perfect substitutes; and second by including DSL and cable among residential fixed broadband connections when service through these connections may not meet the current FCC definition of broadband of 25 Mbps download/ 3 Mbps upload.² As provided in the Connecting the Dots on Ohio’s Broadband Policy report, “[g]iven that broadband can have a general meaning—internet that is always on and faster than dial-up—and a technical meaning—25Mbps/3Mbps—it is critical to consider how broadband is measured when making comparisons across data sources.”³

Table 5.2 Internet Access by Household Income

NUMBER OF HOUSEHOLDS WITH NO ACCESS					% OF INCOME BRACKET WITH NO ACCESS			
Income Bracket	Ashtabula	Trumbull	Mahoning	Eastgate	Ashtabula	Trumbull	Mahoning	Eastgate
HH \$0-\$10k	1,414	2,843	3,550	7,807	41.70%	43.10%	44.10%	43.30%
HH \$10-\$20k	2,090	4,894	4,941	11,925	45.30%	47.60%	41.10%	44.30%
HH \$20-\$35k	2,302	4,769	5,265	12,336	33.60%	31.90%	29.50%	31.10%
HH \$35-\$50k	1,152	3,232	2,881	7,265	21.90%	24.60%	19.60%	21.90%
HH \$50k-\$75k	1,016	2,248	1,607	4,871	13.50%	13.20%	9.80%	11.90%
HH >\$75k	983	1,581	1,258	3,822	9.70%	6.70%	4.30%	6.10%

Source: Census & ACS 2019

Figure 5.1 Broadband Subscription Rates and Household Income



Source: Census ACS 2019 ; Ice Miller

include households with internet access provided by an educational institution.

“Cellular Only” refers to households with a subscription to a cellular data plan and no other type of internet subscription.

Figure 5.1 illustrates subscription rates by household income and shows a strong correlation between household income bracket and subscription rates. The Eastgate Region has slightly lower subscription rates than the State average at each income bracket level, with a larger difference between regional and state subscription rates in income brackets between \$10,000-\$20,000 in which the Region is 4% lower than the State average.

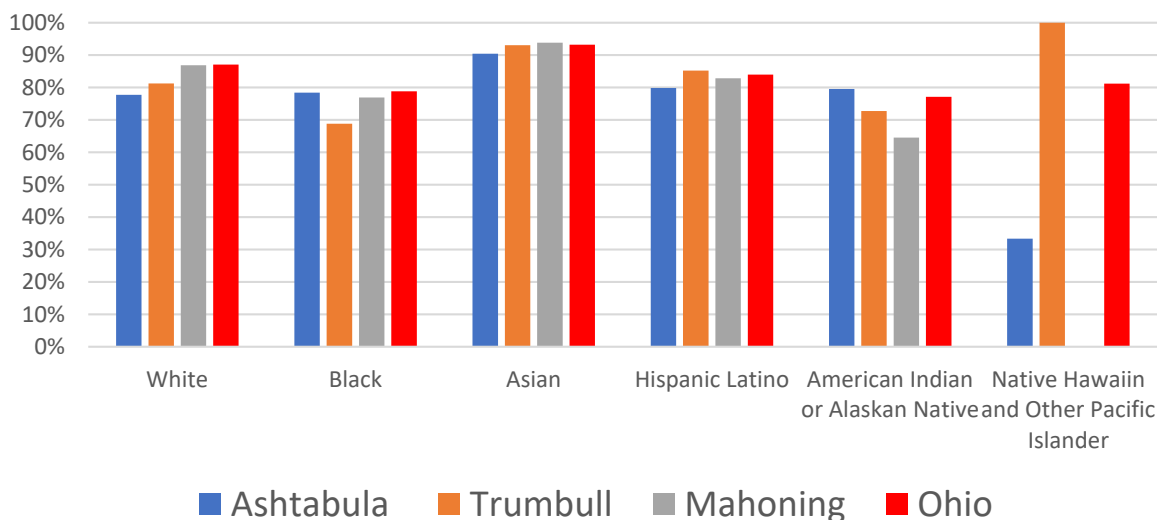
Figure 5.2 below illustrates subscription rates by race and ethnicity, by county, compared to the State average. Categories use census classifications including White, Black, Asian, Hispanic/Latino, American Indian/Alaskan Native and Native Hawaiian/Other Pacific Islander.

Table 5.3 Subscription Status

	TOTAL HOUSEHOLDS	PAID SUBSCRIPTION	NO PAID SUBSCRIPTION	CELLULAR ONLY
Ashtabula	37,832	28,875	9,294	3,734
Trumbull	85,612	66,054	19,878	8,509
Mahoning	98,472	78,970	19,912	10,812
Eastgate	221,916	173,899	49,084	23,055

Source: Census & ACS 2019

Figure 5.2 Broadband Subscription Rates by Race & Ethnicity



Source: Census ACS 2019 ; Ice Miller

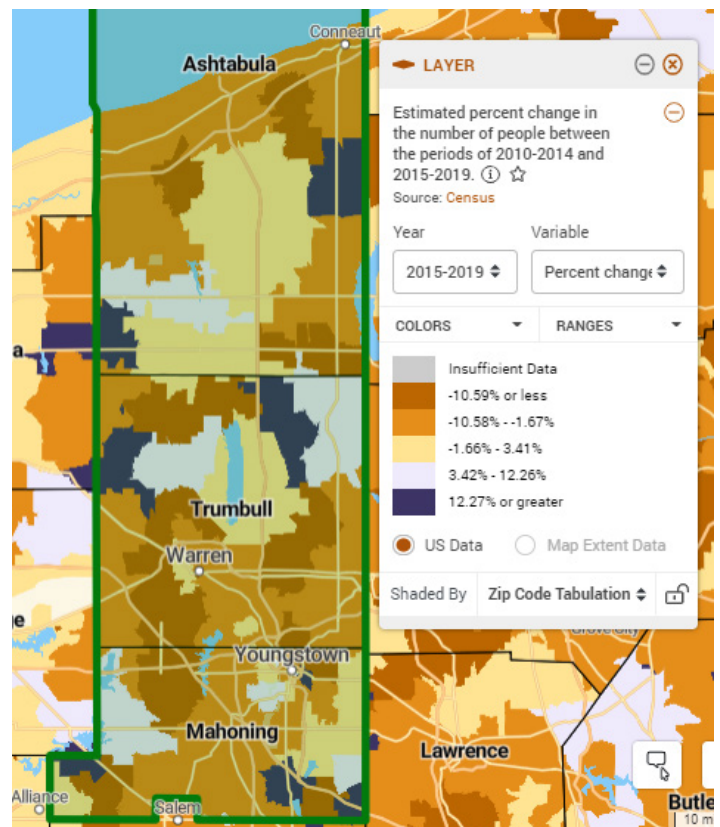
Subscriber Base (Businesses, Residents, and Both)

When analyzing broadband demand/ use trends, it is important that concentrations of the user base are understood. This includes an evaluation of population changes; occupational and industry concentrations; and entrepreneurs and the self-employed who are more likely to perform initial market research critical to test and develop entrepreneurial ideas, and continuing working once an idea comes to fruition, from home. Lastly, as remote working trends shift, especially with the impacts from COVID-19, it is important to gain an understanding of the occupational mixes in the area. This can lend insights on who may be more or less likely to take advantage from work-from-home trends and the home internet needs associated with such a shift.

As shown in Figure 5.3, while population growth has declined across the tri-county region, there have been pockets of strong growth of at least 3.42% in some areas and 12% in other areas over the last five years.

As indicated in Table 5.5, the Eastgate Region has witnessed an increase in average self-employment income per household from 2014 to 2019, by nearly 10%, with each County individually outpacing the state. Self-employment income possesses a strong correlation with home-based employees. It is worth noting this is non-farm income, which illustrates an even greater percentage of shift in potential home-based work. Additionally, the Eastgate Region includes a higher concentration of its total jobs at Firms 0-1 years old, illustrating a higher entrepreneurial culture within the Eastgate Region.

Figure 5.3 Population Change



Source: Census ACS 2019; PolicyMap

Table 5.5 Self Employment and Start-ups

	% CHANGE IN SELF EMPLOYMENT HH INCOME – 2014-2019	% OF JOBS AT FIRMS 0-1 YEARS OLD 2019
Ashtabula	35.18%	2.69%
Trumbull	33.90%	2.98%
Mahoning	20.20%	3.38%
Eastgate	29.76%	3.02%
Ohio	19.93%	2.31%

Source: Census ACS 2019; IRS 2018; Census: Longitudinal Employer – Household Dynamic

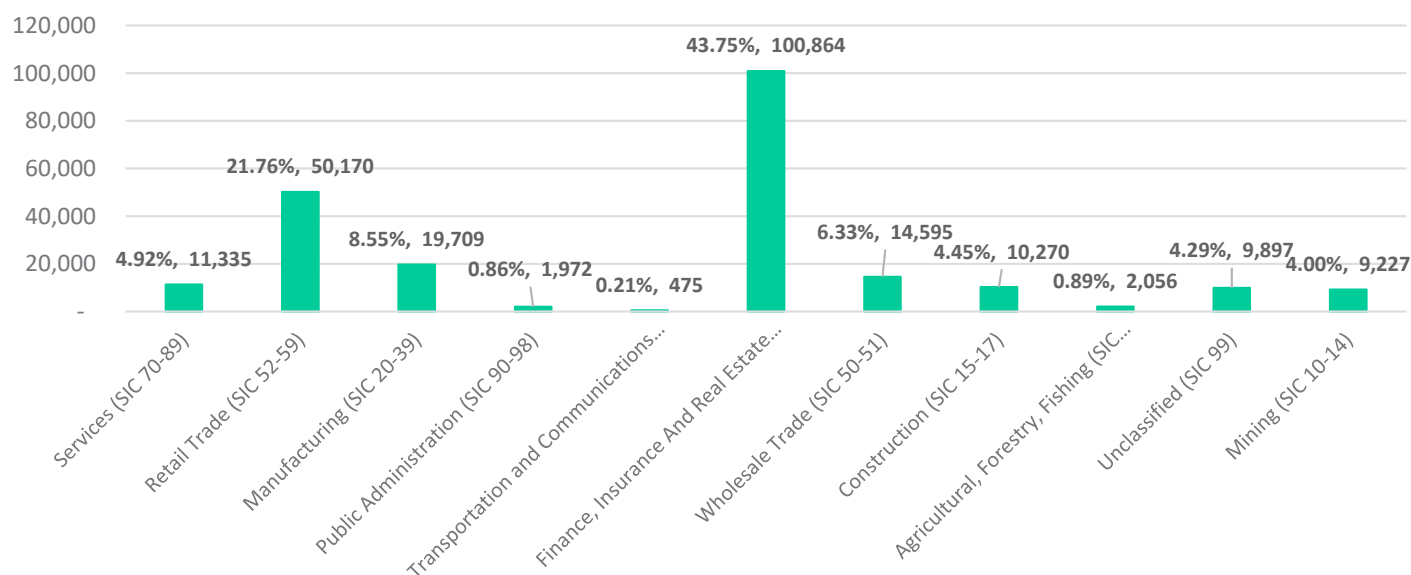
Table 5.4 Population and Job Growth

	POPULATION 2014	POPULATION 2019	% CHANGE	JOBS 2014	JOBS 2020	% CHANGE
Ashtabula	100,346	97,830	-2.51%	41,823	40,162	-3.97%
Trumbull	207,596	200,367	-3.48%	86,109	76,338	-11.35%
Mahoning	235,809	229,961	-2.48%	100,993	90,990	-9.90%
Eastgate	543,751	528,158	-2.87%	228,925	207,490	-9.36%

Source: Population estimates from Census ACS 2019, Job figures from BLS

The following figures illustrate industry and occupational concentrations by size and total jobs for the Eastgate Region. Some data is selectively compared to the State average to illustrate any uniqueness to Eastgate's employment and industry footprint.

Figure 5.4 Eastgate Jobs and % Job Share by Industry



Source: JobsOhio; Info USA-GIS Planning December 2020; Ice Miller

Figure 5.5 Eastgate Industry Employment Compared to State Average

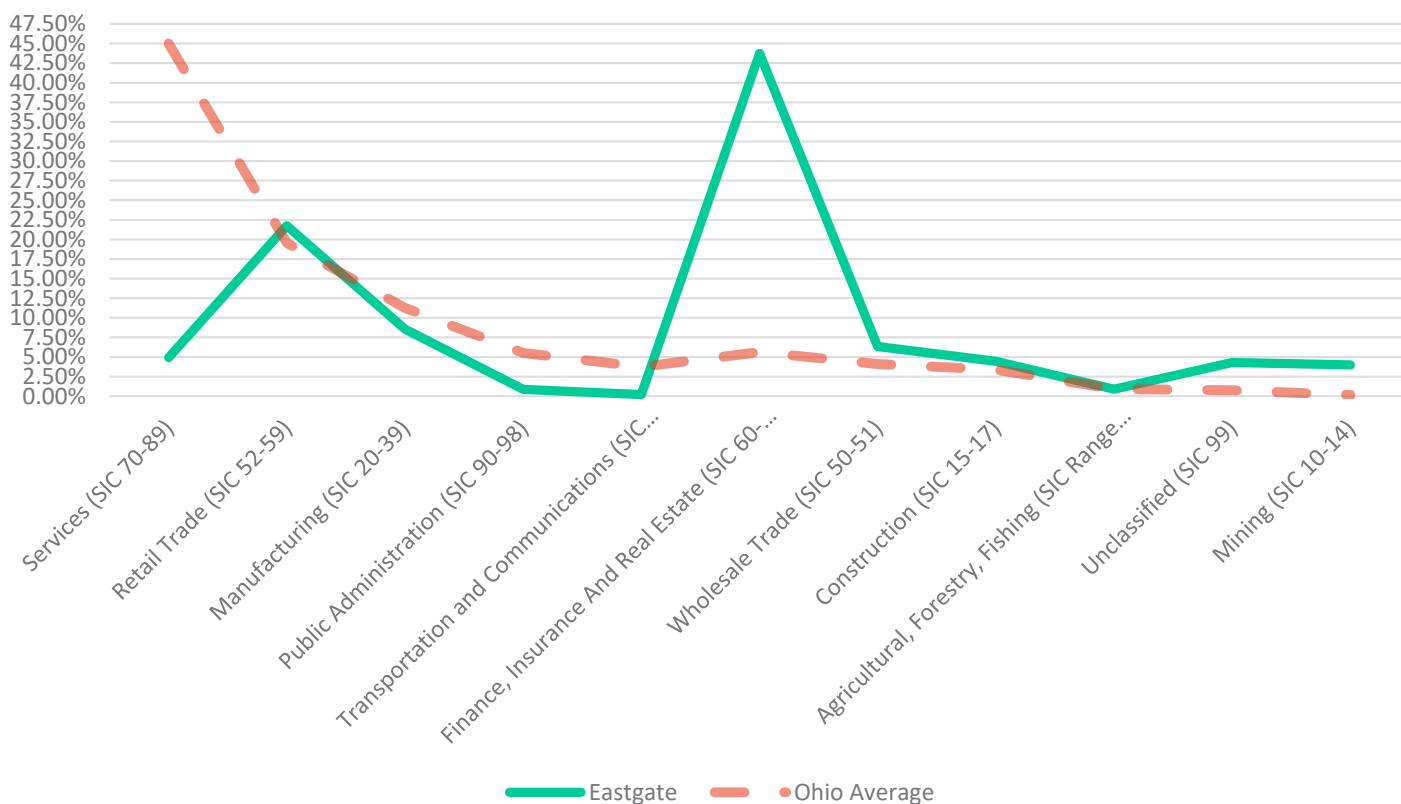
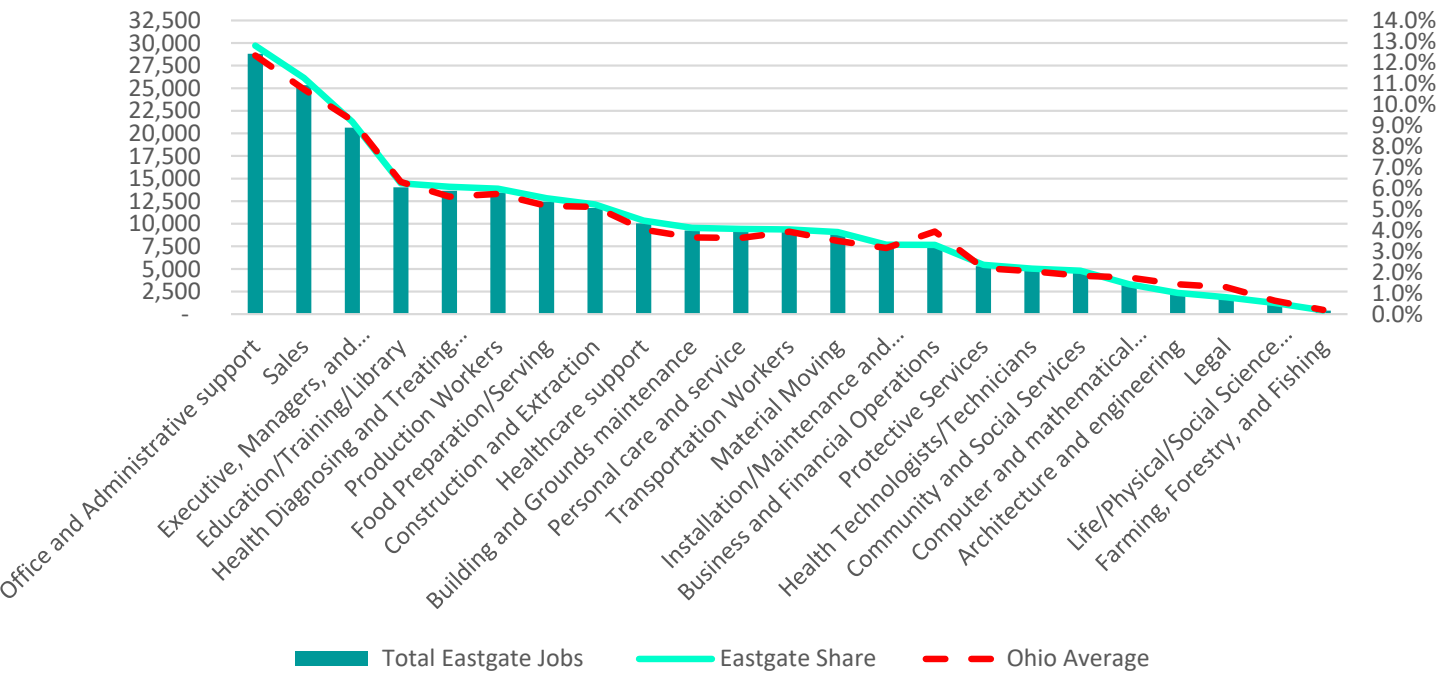


Figure 5.6 Eastgate Occupation by Total Employees & Share Compared to State Average



Source: JobsOhio; Info USA-GIS Planning December 2020; Ice Miller

Figure 5.7 Employment by Job Type

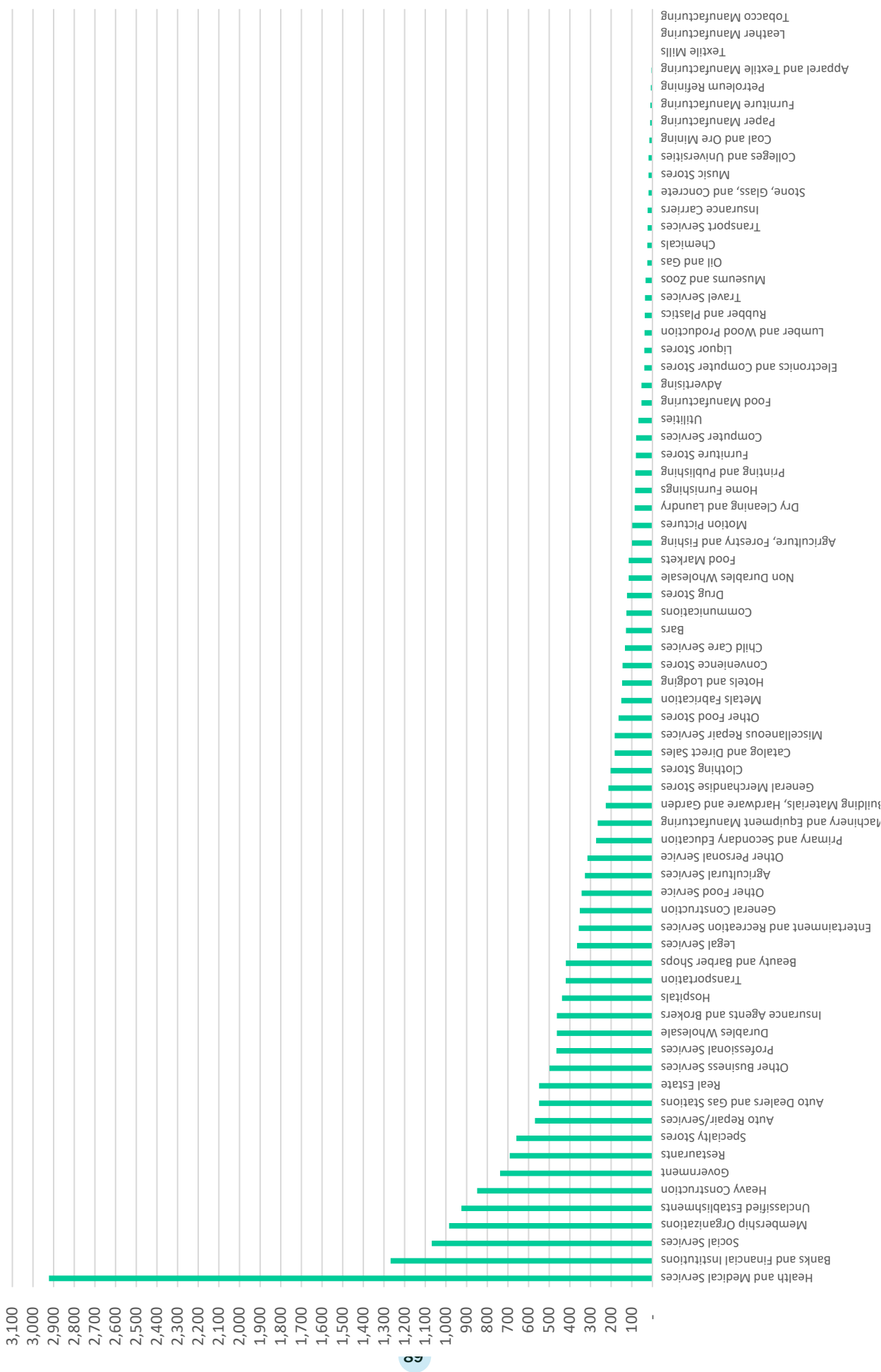
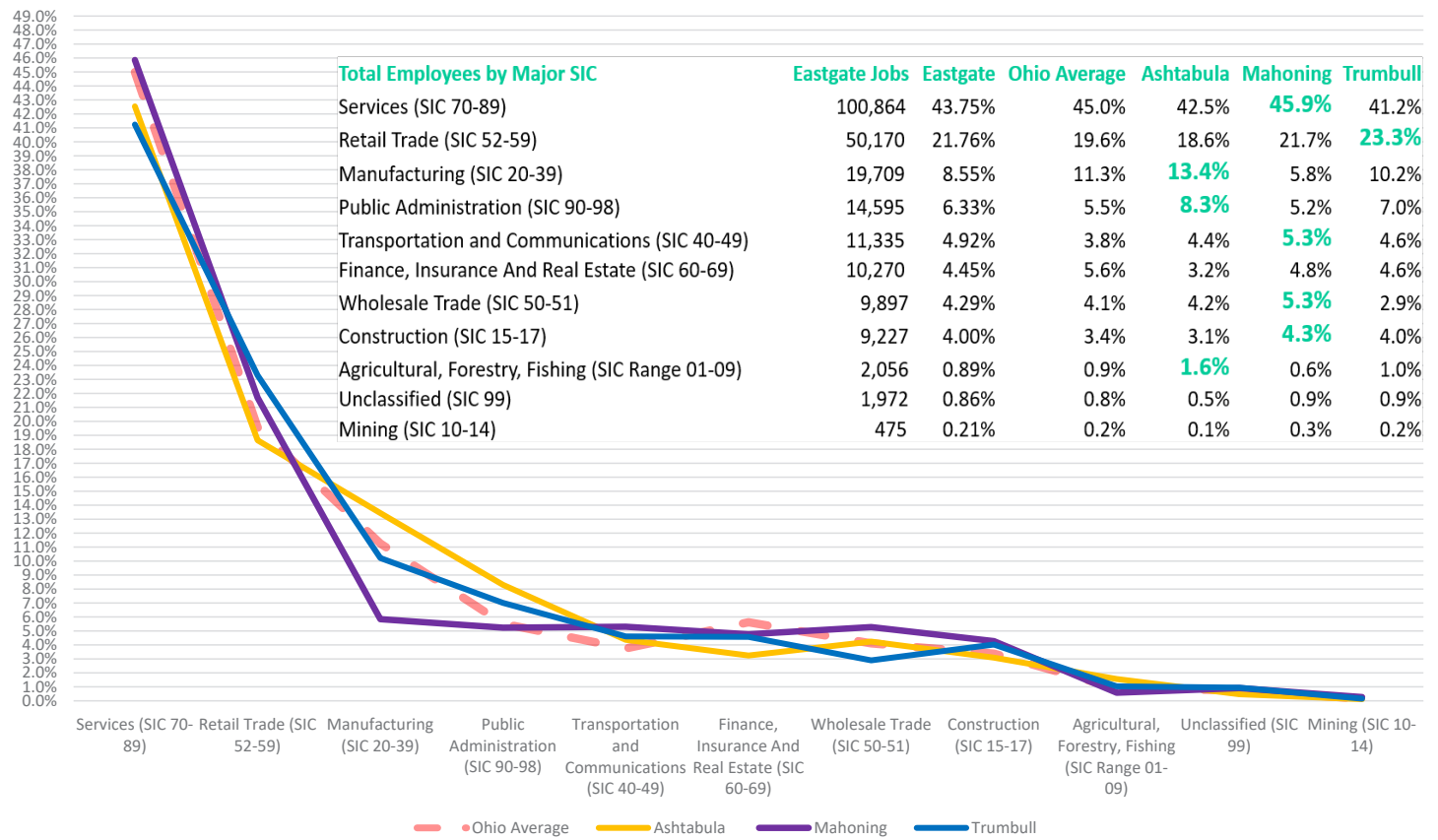


Figure 5.8 Industry Share Compared to State Average (County)



Source: JobsOhio; Info USA-GIS Planning December 2020; Ice Miller

Internet Supply and Demand

In addition to understanding household adoption and penetration from federal data, this study analyzes broadband penetration and access from an economics standpoint using social accounting matrix data. This data represents flows of all economic transactions that take place within an economy, in this case the Eastgate Region as a whole. In calculating transaction flows, the IMPLAN Social Accounting Matrix model is used to calculate activity.

In looking at broadband access as a commodity, two commodity codes are analyzed regarding broadband consumption:

- **Wired Telecommunications** – this includes expenditures on Internet service providers, using owner-operated wired telecommunications infrastructure (e.g., cable, DSL, fiber)
- **Wireless Telecommunications (except satellite)** – this includes expenditures on cellular telephone services and wireless internet service providers.

The table below illustrates the amount of local demand that is met with local supply in the region, known as the “Supply/Demand (“S/D”) Ratio”. This is done by using the total dollar value of output of the commodity produced by industries and institutions, divided by the demand of the commodity by industries, governments, and households. Demand represents the amount of estimated expenditures based on local household and business conditions. As the table demonstrates, current local wired telecommunications supply only meet 64% of local demand; and current local wireless telecommunications supply only meets 20% of local demand. Further, as depicted in the Demand (in \$) charts, 52% of local demand is from residents, 42% is from industry/ commercial, and 6% is from government, supporting the build-out recommendations included in the Project Implementation section.

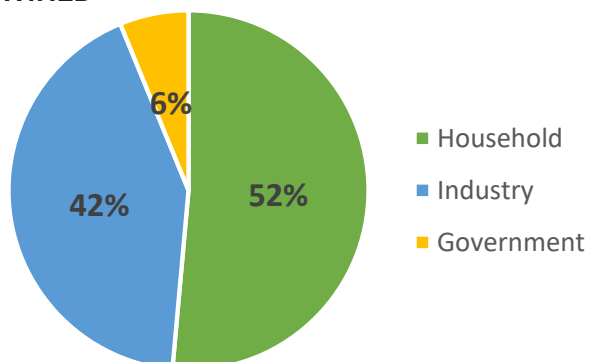
Table 5.6 Supply and Demand of Telecommunications as a Commodity

COMMODITY	NET COMMODITY SUPPLY	TOTAL GROSS COMMODITY DEMAND	DOMESTIC S/D RATIO
Wired telecommunications	\$248,445,706	\$388,441,614	64.00%
Wireless telecommunications (except satellite)	\$50,033,982	\$250,753,164	20.00%

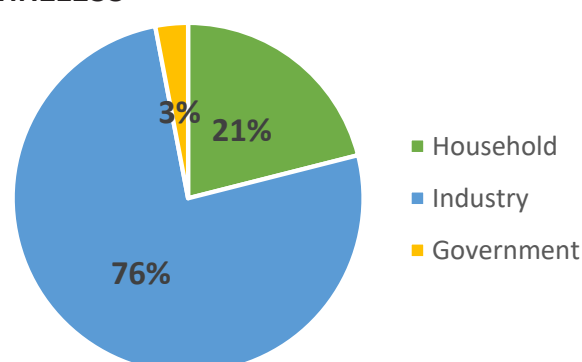
Source: IMPLAN Social Accounts – Commodity Summary

Figure 5.9 Telecommunications Demand (in \$)

WIRED



WIRELESS



Source: IMPLAN Commodity Summary; Ice Miller

Table 5.7 Internet Devices and Household Income

	TOTAL HOUSEHOLDS	HHS W/ INCOME <\$35K	% <\$35K HHS OF TOTAL HHS	HHS W/NO DEVICE	HHS % W/ NO DEVICE	HHS W/ SMARTPHONE ONLY	HHS W/ SMARTPHONE ONLY %	MEDIAN HH INCOME
Ashtabula	37,832	5,806	15%	6,300	16.65%	3,753	9.90%	\$46,700
Trumbull	85,612	12,506	15%	12,586	14.70%	6,908	8.10%	\$47,280
Mahoning	98,472	13,756	14%	13,297	13.50%	8,007	8.10%	\$46,042
Eastgate	221,916	32,068	14%	32,183	14.50%	18,668	8.40%	\$46,674
Ohio	4,676,358	516,179	11%	510,750	10.92%	339,443	7.30%	\$56,602

Source: Census; ACS 2019

Barriers to Adoption

In addition to the physical and financial availability of wired and wireless internet, comes the enabling technologies (i.e., devices) required to use the internet, such as computers, smart phones, and/ or tablets. The number of households with no internet devices similarly follow the number of households in the area making less than \$35,000 annually as there are approximately 32,068 households making less than \$35,000 annually and 32,183 without a device.

SENSIBLE PRICING FOR SERVICES PROVIDED

Another factor driven by the availability of infrastructure and providers are price points. In order to make a decision to provide broadband service, providers must analyze the return-on-investment of that decision, hence the reason the areas with the best coverage and choice are those with densely populated households and businesses. According to the Eastgate Survey, just over half of customers are either Dissatisfied (29.09%) or Very dissatisfied (21.67%) with its quality of broadband service.

In assessing the area's buying power, it is important to understand the level of burden in the Region. The Eastgate Region has a higher concentration of cost-burdened homeowners and renters, at nearly double the State average. A cost-burdened household represents one that dedicates 30% or more of its income toward a rent or mortgage. This is most problematic within households that are making less than \$35,000 per year, as not all necessity items have price variability. Further, the Eastgate

Region possesses a higher than average cost of transportation compared to Counties around the State, with an average of over 30% of income spent on transportation.

Table 5.8 Eastgate Broadband Survey, Quality of Service

COUNT OF "HOW SATISFIED ARE YOU WITH THE QUALITY OF SERVICE?"		
	#	%
Dissatisfied	153	29.09%
Neutral	99	18.82%
Satisfied	138	26.24%
Very dissatisfied	114	21.67%
Very Satisfied	22	4.18%
Grand Total	526	100%

Source: Ice Miller; ms Consultants Eastgate Survey

Source: Census; ACS 2019

Understanding Customer Broadband Demand

In analyzing a potential customer base for broadband services, we analyzed: 1) survey dissatisfaction results, 2) ACS data regarding households with no subscription, which includes those with no access, and 3) ACS data regarding households with cellular subscriptions only.

In the Eastgate Survey, price point was the largest barrier to subscribing to available broadband service at 39.7%, followed by an unreliable

connection (36.1%) and a slow connection relative to need (18%). Using the survey as a basis in comparison with Census data, the following is assumed about satisfaction and consumer demand.

Households with No Access: 39,962

Households with Access but No Subscription: 9,122

Households with No Subscription: 49,084
(total of preceding #'s)

Table 5.9 Cost Burdens of Eastgate Households

	COST BURDENED RENTERS	COST BURDENED	TOTAL BURDEN	RATE	SEVERELY COST BURDENED	SEVERELY COST BURDENED	TOTAL SEVERE BURDEN	RATE
Ashtabula	5,065	5,278	10,343	27.30%	2,443	2,347	4,790	12.70%
Trumbull	11,525	9,779	21,304	24.90%	6,057	3,869	9,926	11.60%
Mahoning	13,391	11,911	25,302	25.70%	6,166	4,400	10,566	10.70%
Eastgate	29,981	26,968	56,949	25.70%	14,666	10,616	25,282	11.40%
Ohio	66,137	551,702	617,839	13.20%	330,387	206,643	537,030	11.50%
	TRANSPORTATION COSTS AS A % OF INCOME							
Ashtabula County	32%							
Trumbull County	30%							
Mahoning County	29%							
OTHER SAMPLE COUNTY RATES								
Stark County	27%							
Cuyahoga County	23%							
Columbiana County	30%							
Lucas County	26%							
Pickaway County	26%							
Geauga County	29%							
Portage County	26%							

Source: Ice Miller; MS Consultants Eastgate Survey

Households with Cellular Only: 23,055
 Households Dissatisfied with Subscription: 77,671 (30% margin for error)
 Total Household Market: 149,810
 Household Take Rate: 25% (assumption⁵)
 Estimated Potential Customer Base in Region: 37,452

Households with no subscription and households with cellular only represent a customer base of need, providing more customer certainty. Other customers are those that may switch services through dissatisfaction. Approximately half of the Eastgate surveyed households were dissatisfied or extremely dissatisfied with internet service quality. In order to translate households dissatisfied with their subscription to potential customers a 30% margin for error was used, assuming the survey's sample size may not be completely representative of the entire Eastgate population. This means that 70% of half of the Eastgate Households are dissatisfied with service, or 77,671 households. This represents a total Household Customer base of 149,810, resulting in a total potential customer base of 37,452 with the 25% take rate applied.

Understanding Market Pricing

The pricing market for broadband services can vary greatly depending on a number of factors. Like any commodity, pricing is higher with the quality of the product and quality in broadband comes in the form of resiliency and speed. Table 5.10 overviews price variability using the Eastgate Survey, illustrating that just over 72% of those surveyed pay between \$40.01 to \$85.00 per month with an additional 17.8% paying over \$85 per month. Additionally, Table 5.10 illustrates that this price point can be a barrier to entry, as those surveyed indicated the number 1 reason respondents to do not subscribe is the price of the service (39.7%) followed closely by quality metrics such as unreliability (36%) and slow connection (18%).

Table 5.11 illustrates, by broadband technology, typical market pricing by utilizing the FCC Urban Rate Survey, which collects monthly pricing data from providers. This data is State-wide, and certain price points are weighted by market conditions. Given Eastgate is a tri-county region

and each political subdivision has varying market conditions, the average of all market weights is used to summarize the pricing market. Data was gathered for both 2018 and 2021 to illustrate how pricing trends have changed by technology.

The following are some highlights from Table 5.11:

- Speeds across all technologies are increasing on average, with average download speeds increasing by 123 megabits per second (Mbps) and average upload speeds increasing by 23 Mbps. As of 2021, the average speeds are now at 250 Mbps download and 55 Mbps upload.

Table 5.10 Eastgate Broadband Survey, Pricing and Barriers

MONTHLY HOUSEHOLD COST CATEGORY	NUMBER	%
Approximately the same (\$40.01 - \$50.00)	94	20.66%
I don't know	16	3.52%
Less per month (\$25.01 - \$40.00)	16	3.52%
More per month (\$50.01 - \$85.00)	237	52.09%
Significantly less per month (less than \$25.00)	11	2.42%
Significantly more per month (over \$85.00)	81	17.80%
Grand Total	455	

Source: Ice Miller; MS Consultants Eastgate Survey

WHY DON'T YOU SUBSCRIBE TO AVAILABLE BROADBAND INTERNET SERVICE?	NUMBER	%
I choose to access internet at another location	3	3.61%
I do not own a device which connects to the internet	1	1.20%
The connection is too slow for my needs	15	18.07%
The connection is unreliable (I am not always able to access internet services)	30	36.14%
The service is too expensive	33	39.76%
Grand Total	82	

Source: FCC Urban Rate Survey, Broadband Survey Results 2018, 2021; Ice Miller

Table 5.11 Ohio Broadband Pricing by Technology – FCC Urban Rate Survey Data 2018-2021

2021 BY TECHNOLOGY	AVERAGE OF DOWNLOAD BANDWIDTH MBPS	AVERAGE OF UPLOAD BANDWIDTH MBPS	MIN OF DOWNLOAD BANDWIDTH MBPS	MIN OF UPLOAD BANDWIDTH MBPS	MAX OF DOWNLOAD BANDWIDTH MBPS	MAX OF UPLOAD BANDWIDTH MBPS	AVERAGE OF TOTAL CHARGE	MIN OF TOTAL CHARGE	MAX OF TOTAL CHARGE
Cable	394	17	25	3	1,000	50	\$90.94	\$34.95	\$199.99
DSL	36	4	2	0	300	41	\$51.60	\$27.99	\$62.91
Fixed wireless	42	4	5	1	100	8	\$54.56	\$39.95	\$79.95
FTTH	501	170	25	2	1,000	1,000	\$80.07	\$51.77	\$130.91
Grand Total	250	55	2	0	1,000	1,000	\$68.73	\$27.99	\$199.99
2018 BY TECHNOLOGY	AVERAGE OF DOWNLOAD BANDWIDTH MBPS	AVERAGE OF UPLOAD BANDWIDTH MBPS	MIN OF DOWNLOAD BANDWIDTH MBPS	MIN OF UPLOAD BANDWIDTH MBPS	MAX OF DOWNLOAD BANDWIDTH MBPS	MAX OF UPLOAD BANDWIDTH MBPS	AVERAGE OF TOTAL CHARGE	MIN OF TOTAL CHARGE	MAX OF TOTAL CHARGE
Cable	101	8	10	1	500	50	\$71.22	\$14.99	\$250.00
DSL	16	2	1	0	80	10	\$56.21	\$41.99	\$92.94
Fixed wireless	15	1	15	1	15	1	\$91.95	\$91.95	\$91.95
FTTH	201	57	6	1	1000	940	\$74.07	\$50.00	\$119.00
Grand Total	127	32	1	0	1000	940	\$68.18	\$14.99	\$250.00
% CHANGE 2018 - 2021	AVERAGE OF DOWNLOAD BANDWIDTH MBPS	AVERAGE OF UPLOAD BANDWIDTH MBPS	MIN OF DOWNLOAD BANDWIDTH MBPS	MIN OF UPLOAD BANDWIDTH MBPS	MAX OF DOWNLOAD BANDWIDTH MBPS	MAX OF UPLOAD BANDWIDTH MBPS	AVERAGE OF TOTAL CHARGE	MIN OF TOTAL CHARGE	MAX OF TOTAL CHARGE
Cable	292%	113%	150%	200%	100%	0%	28%	133%	-20%
DSL	118%	99%	160%	-2%	275%	310%	-8%	-33%	-32%
Fixed wireless	178%	293%	-67%	0%	567%	700%	-41%	-57%	-13%
FTTH	150%	197%	317%	50%	0%	6%	8%	4%	10%
Grand Total	97%	72%	160%	-2%	0%	6%	1%	87%	-20%

Source: FCC Urban Rate Survey, Broadband Survey Results 2018, 2019, 2021; Ice Miller

- Average download speeds have increased in each technology, with the most substantial increase in Cable, at 292%.
- Average upload speeds witnessed similar increases to download speeds, with the most substantial in Fixed Wireless at 293%.
- Minimum download speeds varied by technology, with the highest increase in Fiber-to-the-home (FTTH) at 317%, followed by DSL (160%) and Cable (150%), while Fixed Wireless decreased by 67%.
- Minimum upload speeds experienced modest to no changes for DSL, Fixed Wireless and FTTH, while experiencing a significant increase in Cable at 200%.
- Maximum download speeds increased in all technologies except FTTH, with the highest increase in Fixed Wireless at 567%
- Maximum upload speeds increased significantly in Fixed Wireless (700%) and DSL (310%) while remaining modest for other technologies.
- Cable monthly pricing on average is \$90.94 (+28%), with a minimum of \$34.95 (+133%) and a maximum of \$199.99 (-20%).
- DSL monthly pricing on average is \$51.60 (-8%), with a minimum of \$27.99 (-33%) and a maximum of \$62.91 (-32%).
- Fixed Wireless monthly pricing on average is \$54.56 (-41%), with a minimum of \$39.95 (-57%) and a maximum of \$79.95 (-15%).
- FTTH monthly pricing on average is \$80.07 (+8%), with a minimum of \$51.77 (+4%) and a maximum of \$130.91 (+10%).

Table 5.12 Ohio Broadband Pricing by Ohio and Available Eastgate Providers – FCC Urban Rate Survey Data 2021

OHIO CHARGES BY PROVIDER MOST RECENT PROVIDER YEAR	AVERAGE OF DOWN-LOAD BAND-WIDTH MBPS	AVER-AGE OF UPLOAD BAND-WIDTH MBPS	MIN OF DOWN-LOAD BAND-WIDTH MBPS	MIN OF UPLOAD BAND-WIDTH MBPS	MAX OF DOWN-LOAD BAND-WIDTH MBPS	MAX OF UPLOAD BAND-WIDTH MBPS	AVERAGE OF TOTAL CHARGE	MIN OF TOTAL CHARGE	MAX OF TOTAL CHARGE	EASTGATE USAGE (FROM SURVEY)
Amplex Electric, Inc. (2021)	14	2	5	1	25	3	\$58.28	\$39.95	\$79.95	N/A
Armstrong Utilities, Inc. (2021)	396	18	25	3	1000	25	\$110.62	\$34.95	\$199.95	18%
AT&T Services, Inc. (2019)	118	103	3	1000	3	1000	\$70.47	\$56.00	\$100.00	5%
Buckeye Cablevision, Inc. (2021)	345	7	25	3	1000	10	\$107.99	\$39.99	\$199.99	N/A
Charter Communications, Inc. (2021)	480	22	100	10	940	35	\$96.66	\$69.99	\$129.99	37%
Cincinnati Bell Extended Territories LLC (2021)	219	51	2	1	1000	250	\$65.58	\$28.92	\$130.91	N/A
Cincinnati Bell Telephone Company LLC (2021)	262	62	2	1	1000	250	\$70.41	\$28.92	\$130.91	N/A
Frontier Communications Corporation (2021)	39	2	3	0	115	7	\$37.59	\$27.99	\$44.99	N/A
WideOpenWest Cleveland, LLC (2021)	370	25	50	5	1000	50	\$54.99	\$39.99	\$79.99	N/A
Windstream Ohio, LLC (2021)	234	96	25	2	1000	1000	\$57.40	\$51.77	\$81.77	15%
Grand Total	250	55	2	0	1000	1000	\$68.73	\$27.99	\$199.99	N/A
Eastgate Providers	307	59	38	254	736	515	\$83.78	\$53.18	\$127.93	75%

FCC Form 477 Data – Ohio Fixed Broadband Datasets
June 2020; Ice Miller

Table 5.12 utilizes the same Urban Rate Survey data, but illustrates speeds across all technologies by Ohio provider, with a further breakdown of current Eastgate providers participating in the Urban Rate Survey.

The data in Table 5.12 illustrates Ohio providers are averaging 250 Mbps download speeds and 55 Mbps upload speeds at an average cost of \$68.73,

with a range of \$27.99 per month minimum and \$199.99 maximum.

In order to better understand how this translates to the Eastgate Region, our team used providers identified in the Eastgate Survey results that participated in the Urban Rate Survey for either 2019, 2020 or 2021, using the most recent data for those participating. Approximately 75% of the

providers used by Eastgate Survey respondents have participated in the Urban Rate Survey over the last three years and for purposes of this analysis are referred to as “Eastgate Providers.” In looking at how prices deviate for Eastgate Providers, it is worth noting that this is Statewide price data, not specific to what these providers are actually charging in the Eastgate Region.

The resulting data in Table 5.12 illustrates Eastgate Providers are averaging 307 Mbps download speeds and 59 Mbps upload speeds at an average cost of \$83.73, with a range of \$55.18 per month minimum and \$127.93 maximum. One may conclude using Urban Rate Survey and Eastgate Resident survey data that the Eastgate Region is more strongly concentrated with higher-priced providers.

FORESEEABLE COMPETITION

In analyzing broadband access, it is important to recognize that a community may have infrastructure and devices to participate physically connect into broadband networks, however choice and competition can be major factors in price points and quality.

According to the most recent FCC Form 477 data, there are currently 50 providers in the Eastgate Region providing 12 different types of broadband technologies for both business and residential customers. Table 5.13 is a list of providers currently serving the Eastgate Region.

While a fairly large number of providers represent adequate coverage to Eastgate from a land area perspective (noting the flaws in FCC Form 477 data discussed earlier in this Study), it is important to understand the distinction between providers serving the business community and those serving the residential community. There are approximately 28 business providers and 11 residential providers in the Eastgate Region. Tables 5.14 and 5.15 provide a summary of both residential and business providers, including each provider’s average, minimum, and maximum advertised download and upload speeds (“AverageMaxAdDown,” “Min of MaxAdDown,” “Max of MaxAdDown,” “AverageMaxAdUp,” “Min of MaxAdUp,” and “Max of MaxAdUp,” respectively). Note that the speeds in the FCC Form 477 data are advertised speeds, meaning it may not reflect the actual speeds being utilized by the customer.

Table 5.13 All Providers in the Eastgate Region

2019	BLOCKS SERVED
Agile Network Builders	4,678
Armstrong Utilities, Inc.	4,361
Charter Communications, Inc.	7,451
Cincinnati Bell Any Distance Inc.	2
COMCAST CABLE COMMUNICATIONS, LLC	122
Crown Castle Fiber LLC	55
Delta Telecom Inc	290
EarthLink Business, LLC	44
EarthLink Carrier, LLC	2
Everstream Holding Company LLC	5
First Communications, LLC	47
Level 3 Communications, LLC	237
MCI Communications Corporation	40
McLeodUSA Telecommunications Services, L.L.C.	12
Network Billing Systems LLC	21
NuVox, Inc.	6
PAETEC Communications, Inc.	28
RAA Data Services, Inc.	473
Southern Light, LLC	4
Spectrotel, Inc.	2
TailWind Voice & Data, Inc.	4
THE CONNEAUT TELEPHONE COMPANY	264
U.S. TelePacific Corp.	1
ViaSat, Inc.	16,076
Voyant Communications, LLC	7
W A T C H TV	304
Windstream Ohio, LLC	4
Windstream Western Reserve, LLC	3,166
XO Communications Services, LLC	11
Zito Media, L.P.	191

TOTAL PROVIDERS 2014	TOTAL PROVIDERS 2019	% CHANGE
30	30	0%

Source: FCC Form 477 Data – Ohio Fixed Broadband Datasets June 2020; Ice Miller

Table 5.14 Eastgate Residential Fixed

TOTAL CHANGE 2014-2019							
# of Providers	Average of MaxAdDown	Average of MaxAdUp	Min of MaxAdDown	Min of MaxAdUp2	Max of MaxAdDown	Max of MaxAdUp	Blocks Served
-2	310.5	19	0.7	0.3	0	0	3,985
% CHANGE 2014-2019							
# of Providers	Average of MaxAdDown	Average of MaxAdUp	Min of MaxAdDown	Min of MaxAdUp2	Max of MaxAdDown	Max of MaxAdUp	Blocks Served
-15%	888%	590%	291%	197%	0%	0%	15%

Source: FCC Form 477 Data – Ohio Fixed Broadband Datasets June 2020; Ice Miller

Table 5.15 Eastgate Business Fixed

TOTAL CHANGE 2014-2019							
# of Providers	Average of MaxAdDown	Average of MaxAdUp	Min of MaxAdDown	Min of MaxAdUp2	Max of MaxAdDown	Max of MaxAdUp	Blocks Served
-1	261.2	14.7	0	0	0	0	4,348
% CHANGE 2014-2019							
# of Providers	Average of MaxAdDown	Average of MaxAdUp	Min of MaxAdDown	Min of MaxAdUp2	Max of MaxAdDown	Max of MaxAdUp	Blocks Served
-4%	1001%	614%	0%	0%	0%	0%	14%

Source: FCC Form 477 Data – Ohio Fixed Broadband Datasets June 2020; Ice Miller

In addition, the percent change of number of providers and speeds are illustrated from 2014 to 2019. Note that the following numbers are not the speeds - more detailed provider tables are on the following pages – these are the amount of the change. It is worth noting that this table is to be looked at differently than Table 5.13, as Table 5.13 illustrates all providers, while Table 5.14 and Table 5.15 illustrate the difference in the number of providers providing residential and/or business. A provider may stop providing residential coverage while still providing business coverage during the period.

Table 5.16 Residential Internet Providers - Residential Broadband Survey

WHO IS YOUR INTERNET SERVICE PROVIDER?	NUMBER	%
Armstrong Utilities	91	17.70%
AT&T	28	5.45%
CenturyLink	45	8.75%
Consolidated Communications	25	4.86%
Greatwave Communications	5	0.97%
I don't know	1	0.19%
Spectrum	191	37.16%
Suddenlink Communications	15--	2.92%
Windstream	75	14.59%
Xfinity	4	0.78%
Zito Media	33	6.42%
Grand Total	513	100%

Source: FCC Urban Rate Survey, Broadband Survey Results 2018, 2021; Ice Miller

Table 5.17 Residential Fixed Detail

2014 PROVIDERS	AVERAGE OF MAXADDOWN	AVERAGE OF MAXADUP	MIN OF MAXADDOWN	MIN OF MAXADUP2	MAX OF MAXADDOWN	MAX OF MAXADUP	BLOCKS SERVED
Armstrong Utilities, Inc.	100.0	5.0	100.0	5.0	100.0	5.0	2,239
AT&T Services, Inc.	6.5	0.6	0.8	0.4	18.0	0.8	5,808
CenturyLink, Inc.	17.8	1.6	0.3	0.1	50.0	5.0	5,490
COMCAST CABLE COMMUNICATIONS, LLC	150.0	20.0	150.0	20.0	150.0	20.0	106
Delta Telecom, Inc.	34.0	10.0	10.0	10.0	50.0	10.0	255
Frontier Communications Corporation	0.4	0.4	0.4	0.4	0.4	0.4	1
ORWELL TELEPHONE COMPANY	23.0	2.3	7.0	1.0	50.0	5.0	885
Suddenlink Communications	49.4	22.0	30.0	2.0	1,000.0	1,000.0	100
THE CONNEAUT TELEPHONE COMPANY	5.7	2.7	5.0	2.0	7.0	3.0	686
Time Warner Cable Inc.	50.0	5.0	50.0	2.0	50.0	5.0	8,801
W A T C H TV	3.0	0.8	3.0	0.8	3.0	0.8	304
Windstream Western Reserve, Inc	40.0	4.0	40.0	4.0	40.0	4.0	1,402
Zito Media, L.P.	50.0	5.0	50.0	5.0	50.0	5.0	105
13	35.0	3.2	0.3	0.1	1,000.0	1,000.0	26,182
2019 PROVIDERS	AVERAGE OF MAXADDOWN	AVERAGE OF MAXADUP	MIN OF MAXADDOWN	MIN OF MAXADUP2	MAX OF MAXADDOWN	MAX OF MAXADUP	BLOCKS SERVED
Armstrong Utilities, Inc.	1000.0	27.9	1000.0	25.0	1,000.0	1,000.0	2,338
Charter Communications, Inc.	940.0	35.0	940.0	35.0	940.0	35.0	7,218
COMCAST CABLE COMMUNICATIONS, LLC	987.0	35.0	987.0	35.0	987.0	35.0	117
Delta Telecom Inc	34.0	10.0	10.0	10.0	50.0	10.0	290
RAA Data Services, Inc.	15.0	4.0	10.0	3.0	20.0	5.0	473
THE CONNEAUT TELEPHONE COMPANY	500.0	500.0	500.0	500.0	500.0	500.0	264
ViaSat, Inc.	47.6	3.0	35.0	3.0	100.0	3.0	16,076
W A T C H TV	5.0	1.0	5.0	1.0	5.0	1.0	304
Windstream Ohio, LLC	1.0	0.4	1.0	0.4	1.0	0.4	1
Windstream Western Reserve, LLC	78.9	55.8	1.5	0.4	1,000.0	1,000.0	2,895
Zito Media, L.P.	200.0	15.0	200.0	15.0	200.0	15.0	191
11	345.4	22.3	1.0	0.4	1,000.0	1,000.0	30,167

Source: FCC Urban Rate Survey, Broadband Survey Results 2018, 2021; Ice Miller

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Table 5.18 Business Fixed Detail

2014	AVERAGE OF MAXADDOWN	AVERAGE OF MAXADUP	MIN OF MAXADDOWN	MIN OF MAXADUP2	MAX OF MAXADDOWN	MAX OF MAXADUP	BLOCKS SERVED
Affiniti PA LLC	0.0	0.0	0.0	0.0	0.0	0.0	2
Armstrong Utilities, Inc.	50.0	2.5	0.0	0.0	100.0	5.0	4,478
Birch Communications, Inc.	0.0	0.0	0.0	0.0	0.0	0.0	1
Broadview Networks Holdings, Inc.	0.0	0.0	0.0	0.0	0.0	0.0	1
CenturyLink, Inc.	17.8	1.6	0.3	0.1	50.0	5.0	5,490
COMCAST CABLE COMMUNICATIONS, LLC	148.6	19.8	0.0	0.0	150.0	20.0	107
Delta Telecom, Inc.	34.0	10.0	10.0	10.0	50.0	10.0	255
EarthLink Business, LLC	0.0	0.0	0.0	0.0	0.0	0.0	179
Everstream Solutions LLC	0.0	0.0	0.0	0.0	0.0	0.0	29
First Communications, LLC	0.0	0.0	0.0	0.0	0.0	0.0	16
Frontier Communications Corporation	0.4	0.4	0.4	0.4	0.4	0.4	1
GCI Communication Corp.	0.0	0.0	0.0	0.0	0.0	0.0	9,622
Level 3 Communications, LLC	0.0	0.0	0.0	0.0	0.0	0.0	22
McLeodUSA Telecommunications Services, L.L.C.	0.0	0.0	0.0	0.0	0.0	0.0	4
OneCommunity	0.0	0.0	0.0	0.0	0.0	0.0	37
ORWELL TELEPHONE COMPANY	23.0	2.3	7.0	1.0	50.0	5.0	885
Suddenlink Communications	49.4	22.0	30.0	2.0	1000.0	1000.0	100
Sunesys, LLC	0.0	0.0	0.0	0.0	0.0	0.0	5
Talk America Inc. d/b/a Cavalier Telephone also d/b/a Cavalier Business Communications also d/b/a Cavalier Telephone and TV	0.0	0.0	0.0	0.0	0.0	0.0	15
THE CONNEAUT TELEPHONE COMPANY	5.7	2.7	5.0	2.0	7.0	3.0	686
Time Warner Cable Inc.	49.8	5.0	0.0	0.0	50.0	5.0	8,833
tw telecom holdings, llc	0.0	0.0	0.0	0.0	0.0	0.0	17
US Signal Company, LLC	0.0	0.0	0.0	0.0	0.0	0.0	38
Verizon Business Global LLC dba Verizon Business	0.0	0.0	0.0	0.0	0.0	0.0	38
W A T C H TV	3.0	0.8	3.0	0.8	3.0	0.8	304
WideOpenWest Cleveland, LLC	0.0	0.0	0.0	0.0	0.0	0.0	1
Windstream Western Reserve, Inc	0.0	0.0	0.0	0.0	0.0	0.0	207
XO Communications Services, LLC	0.0	0.0	0.0	0.0	0.0	0.0	9
Zito Media, L.P.	50.0	5.0	50.0	5.0	50.0	5.0	105
28	26.1	2.4	0.0	0.0	1000.0	1000.0	31,487

Source: FCC Urban Rate Survey, Broadband Survey Results 2018, 2021; Ice Miller

CONCLUSION

The Eastgate Region possesses a variety of conditions that illustrate a need for overall broadband access, better quality services for prices paid and a product affordable to its cost-burdened residents. In addition to this, there is a large share of unmet demand for quality broadband service.

The quality of technology offered by current Eastgate providers, in the form of advertised download and upload speeds, continues to increase, illustrating the capacity and potential to provide a higher quality service to residents. However, these advertised speeds are not reaching all households, due to a number of barriers, including lower access to internet-enabled devices, a high concentration of low-income households disproportionately burdened by housing and transportation costs and a lack of physical infrastructure.

Further, emerging trends in remote working and entrepreneurship particularly in the Eastgate Region, create the need for a business-speed broadband standard for residential users; however, there remains a fairly large spread in the difference in advertised speeds offered to residents vs. businesses in the Eastgate Region. While residents do not require a full business-quality speed, enhancing the current residential download and upload service quality will allow the Region to attract and retain residents in matching today's remote work needs. Allowing more households to participate economically through work from home will help the Region create jobs and grow its economic base.

It is important that Eastgate utilize this data to properly address its customers, suppliers, and policymakers in enhancing quality access at an affordability level that allows maximum participation. This delivers a key public service necessity to residents while providing economic opportunity to the Region as a whole.

SECTION ENDNOTES

1. https://aede.osu.edu/sites/aede/files/publication_files/Connecting%20the%20Dots%20of%20Ohio%20Broadband_0.pdf.
2. https://aede.osu.edu/sites/aede/files/publication_files/Connecting%20the%20Dots%20of%20Ohio%20Broadband_0.pdf.
3. https://aede.osu.edu/sites/aede/files/publication_files/Connecting%20the%20Dots%20of%20Ohio%20Broadband_0.pdf.
4. Table R-1. All consumer units: Annual detailed expenditure means, standard errors, coefficients of variation, and weekly (D) or quarterly (I) percents reporting, Consumer Expenditure Survey, 2019
5. The 25% take rate assumption employs a 10% buffer for the typical 35% industry standard assumption. According to a Study commissioned by the Columbus Foundation Broadband Access in the City of Columbus, Ohio, June 2020, “for most markets a minimum of a 35% take rate is required to achieve a positive Total Cost of Ownership.” Further, a Feasibility Study for Multnomah County, Oregon (Fiber-to-the-Premises Feasibility Study, September 2020) utilized a 35% County-wide take-rate standard in its County-wide buildout estimates.

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NEEDS ASSESSMENT & OUTREACH

BACKGROUND

The Eastgate Regional Council of Governments (Eastgate) is conducting a Regional Broadband Feasibility Study to evaluate Broadband Internet Service throughout Ashtabula, Trumbull, and Mahoning Counties. The study will provide a comprehensive analysis of access to high speed Internet, as well as issues related to affordability, reliability, and digital literacy. The purpose of the study is to provide recommendations for enhanced and reliable Broadband Internet Service to rural areas lacking appropriate coverage, as well as urban centers that require increased speed and access. The findings of the study will help support applications for funding and guide decision-making in the region on potential physical, programmatic, and/or operational improvements.

ENGAGEMENT METHODS

The feasibility study, conducted by the project team of Ice Miller and ms consultants, includes outreach comprised of stakeholder meetings and surveying tools. Broadband data is relatively difficult to accurately collect and analyze, given the private and sometimes sensitive nature of the information. The goal of these meetings was to receive and take into consideration stakeholder concerns and input, and ensure the needs of the community are known and accounted for as the project team reviews existing broadband projects and identifies its recommendations for future opportunities.

The surveys and interviews offer a chance to put a more human lens to the data and supplement information gathered from the Federal Communications Commission (FCC) and other traditional resources.

Stakeholder Meetings

Virtual meetings were held to gather ideas and insight firsthand from communities in the region. Individuals were invited to represent their specific organization, business, or community by participating in a stakeholder discussion on specific broadband needs and challenges relative to their subject area. The eleven stakeholder meetings included the following categories:

- County, Township, and Municipal leaders from Ashtabula, Mahoning, and Trumbull Counties

- Economic and Community Development Organizations (ex: chamber of commerce, library, port authority, etc.)
- School Districts
- Broadband Service Providers
- Philanthropic Organizations
- Small Businesses

Residential Survey

The project team solicited feedback from the general public through community surveys. The surveys were hosted on Eastgate's website during the months of February and March. A PDF version of the surveys was also available to ensure that populations which continue to struggle with access to broadband were still able to share their concerns.

The survey results will be analyzed against existing data to develop a better understanding of gaps in service and/or opportunities for improvement. The survey responses also help paint a more complete picture of WHY people might not be utilizing available broadband, whether that be for quality or cost reasons. These trends in qualitative responses can be just as helpful in our research as knowing whether or not broadband is available.

The goal of the residential survey was to understand how residents throughout the three-county region utilize home internet and what challenges they may be experiencing.

Business Survey

The Business Survey targeted the industry and business community to gather feedback on the gaps in current service and needs for future commercial growth goals.

SUMMARY OF RESULTS

Summary of Respondents

A total of 733 residential surveys and 78 business surveys were completed. As shown in Figure 6.1, participants represented communities across the Eastgate region with responses coming from each of the three counties. According to optional demographic information gathered, about half of the households surveyed include a child and just as many include an adult 65 years or older. The annual household income as

Figure 6.1 Eastgate Regional Broadband Study Survey Respondents

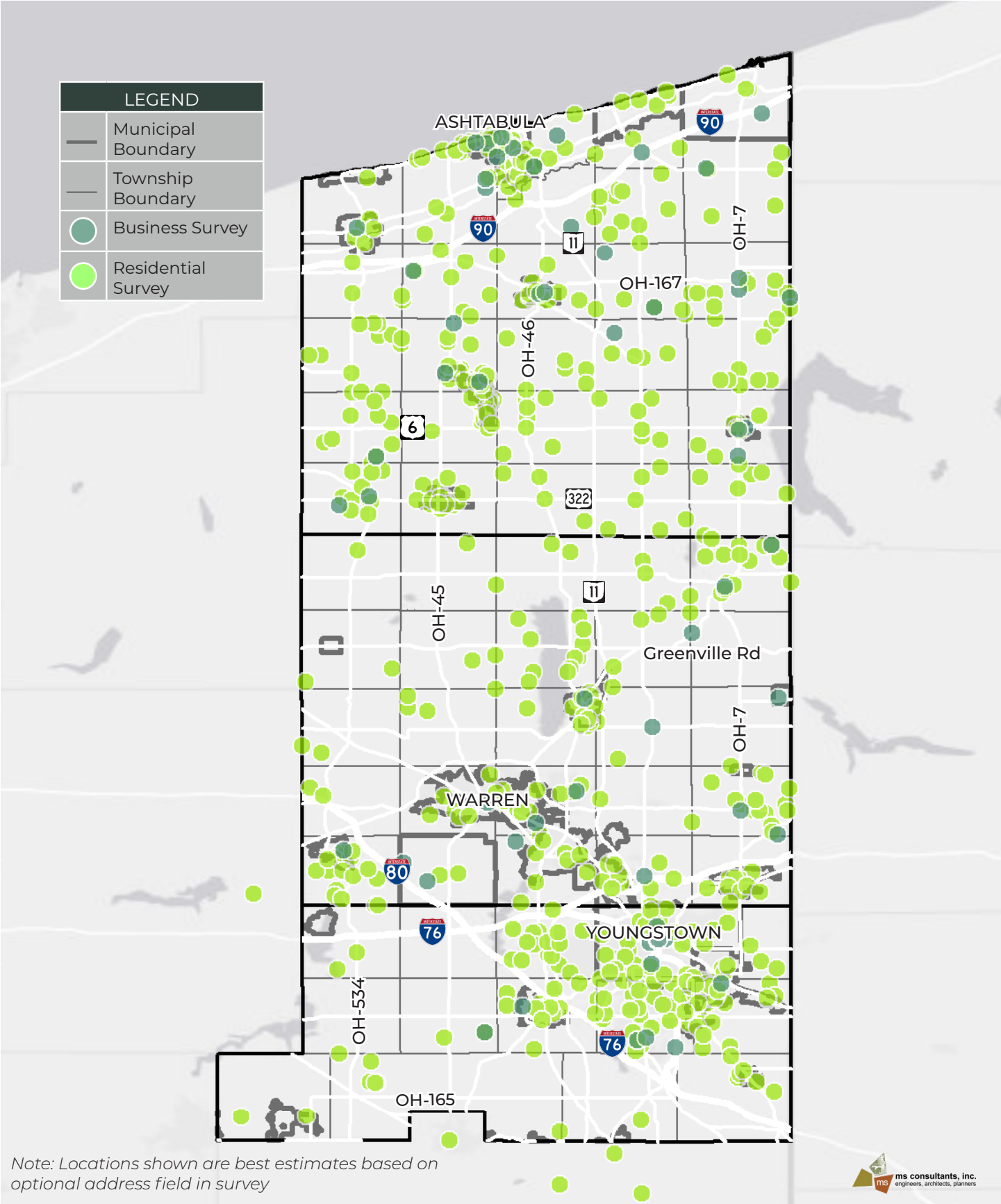
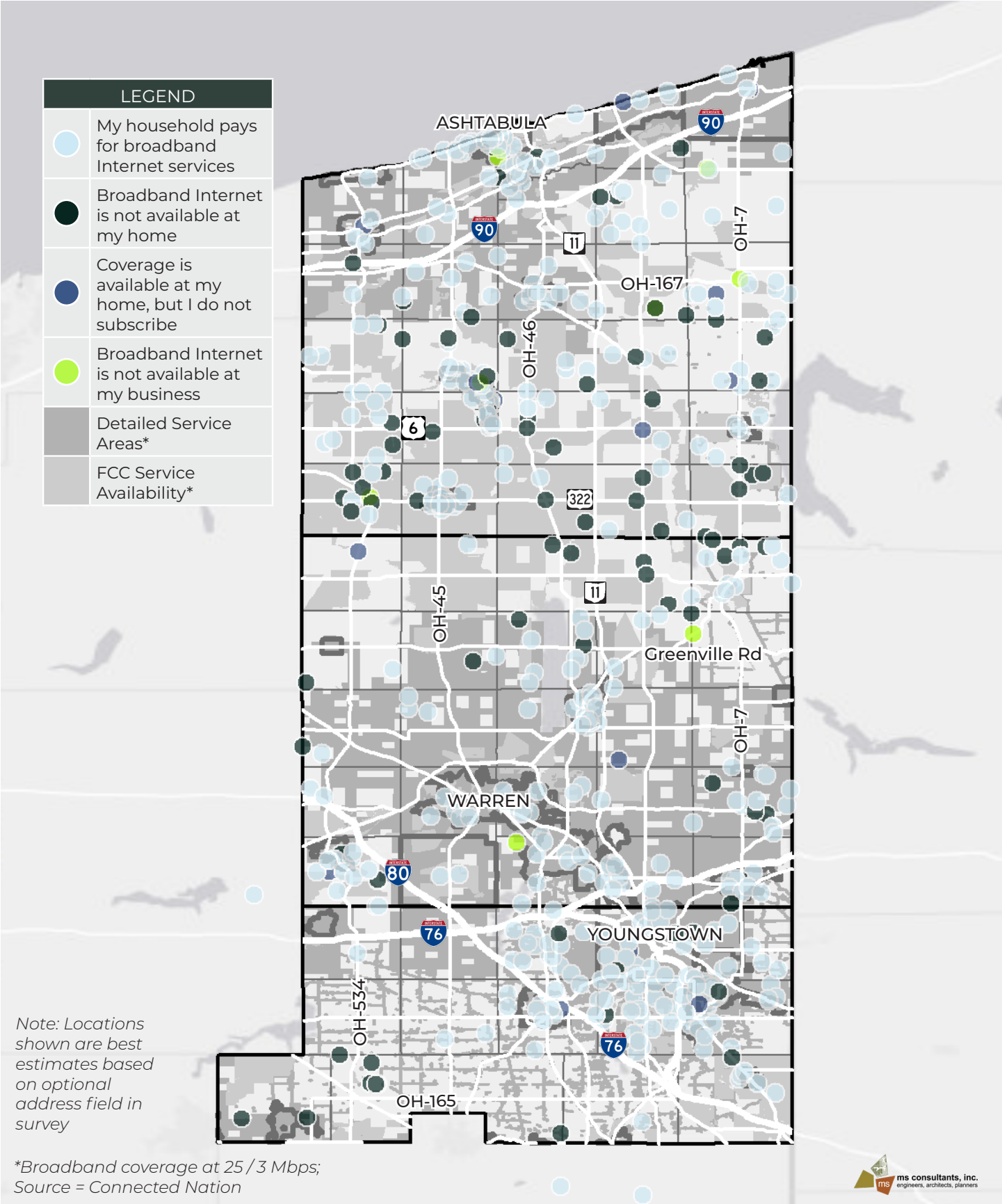


Figure 6.2 Regional Broadband Status



reported by residential survey takers was nearly evenly distributed across income brackets, as was educational attainment levels. Business surveys were completed by a wide variety of business types including education, professional services, manufacturing, government, and more.

Broadband Availability

About 17% of residential survey participants and 14% of businesses said that broadband internet is not available at their home or business, respectively (Fig. 3). For those that chose “other” to describe the status of broadband at their home or business, they said that the available broadband was at low speeds and/or unreliable.

Fig. 2 compares the status of broadband as reported by residential survey takers and the availability of broadband as reported by Connected Nation in a recent statewide analysis of FCC data. While some respondents who said they don’t have broadband availability appear to be located in pockets of unserved areas, others are located in census blocks designated as served. This information is self-reported by providers to the FCC at the census block level.

The greatest lack of broadband availability in the region, as reported by the surveys, is in Ashtabula County. Notably, a lack of broadband is not concentrated in one specific area, but appears to be a problem in communities across the county.

Access

The availability of broadband service does not guarantee subscription. Access to broadband encompasses complex issues such as affordability of subscription services and/or compatible devices, digital skills and literacy, and individual household needs. Around 3% of residential survey respondents shared that coverage is available at their home, but they do not subscribe. Of those respondents, about half said that they do not subscribe because of the cost (Fig. 3). According to the U.S. Bureau of Labor Statistics, the average American consumer spends approximately \$45.83 per month on a home internet subscription. About 72% of the residential survey respondents pay more than this per month (Fig. 3), though the service may be bundled with tv cable and/or cell service. In addition to a monthly fee, affordability may also refer to the cost of establishing or expanding connections. Stakeholders noted that the overall lower density of the region (i.e.

Figure 6.3 Survey Results: Availability & Access

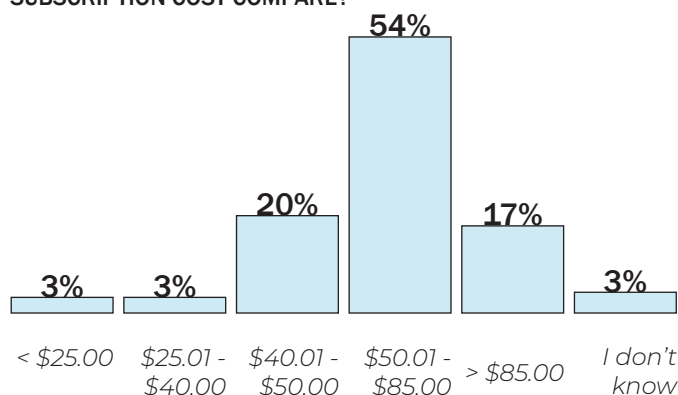
SURVEY QUESTION: HOW WOULD YOU DESCRIBE THE AVAILABILITY AND ACCESS OF BROADBAND INTERNET SERVICE AT YOUR HOME / BUSINESS?

STATUS	% OF RESIDENTIAL	% OF BUSINESS
My household / business pays for broadband internet services	77.5%	81.9%
Broadband internet is not available at my home / business location	17.5%	13.9%
Coverage is available at my home / business location, but we do not subscribe	3.0%	1.4%
Other	2.0%	2.8%

SURVEY QUESTION: WHICH OF THE FOLLOWING BEST DESCRIBES WHY YOU DO NOT SUBSCRIBE TO AVAILABLE BROADBAND INTERNET SERVICE?



SURVEY QUESTION: THE AVERAGE AMERICAN CONSUMER SPENDS \$45.83 PER MONTH ON A HOME INTERNET SUBSCRIPTION. HOW DOES YOUR HOUSEHOLD'S MONTHLY SUBSCRIPTION COST COMPARE?



households per square mile) is a reason cited by providers as to the high cost for extending service to an unserved household. The cost of lateral connections to industrial parks and commercial sites was also a barrier identified by the stakeholders.

Lower monthly fees and better quality service are improvements that would generally encourage individuals not currently using internet at their home to subscribe to broadband service. In the stakeholder meetings, additional desired improvements were discussed including training and access of compatible devices; especially for schools.

Broadband methods & Providers

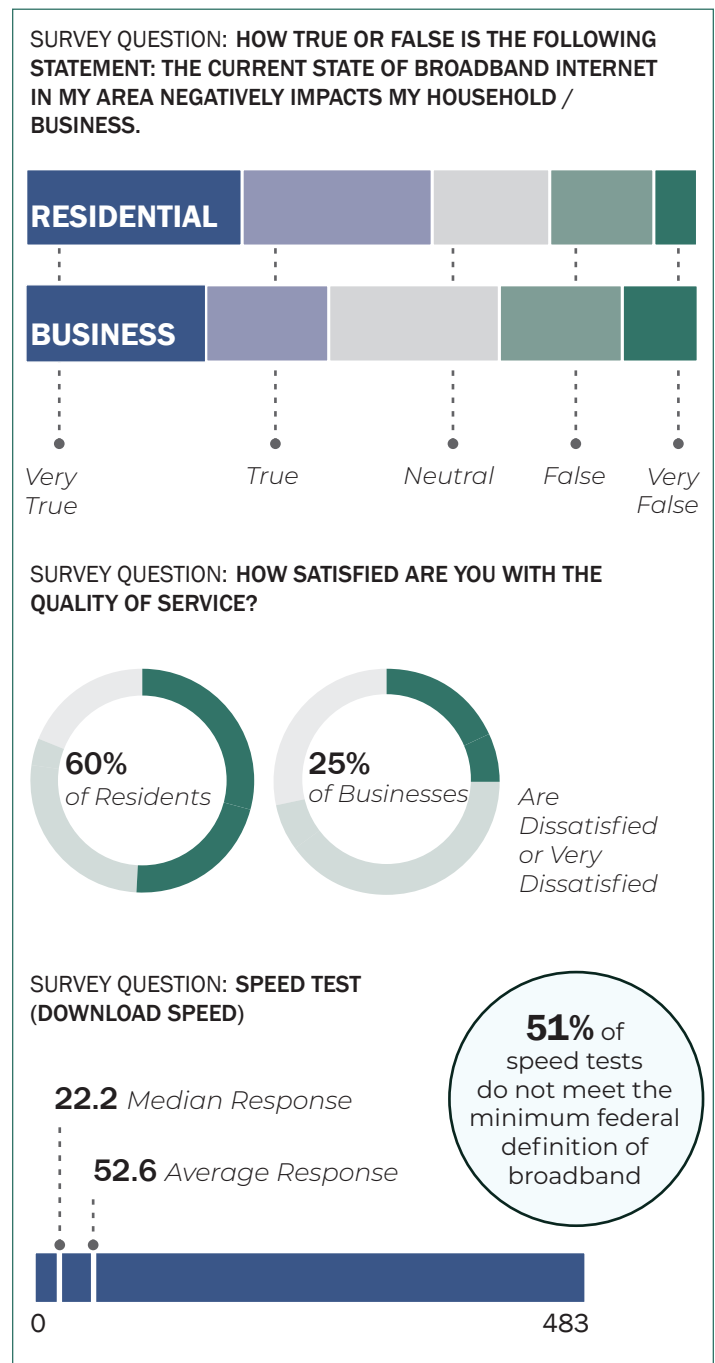
Broadband users across the region utilize different types of connections and various service providers. The primary method in which most residential survey participants access internet at their home is through wired connections - either cable (41.6%) or DSL (24%). Cable and DSL were also the top two ways in which businesses access internet. The third most common method for businesses - wired (fiber) - was selected by 16.4% of businesses surveyed compared with only 5.3% of residents. This underscores the different delivery methods between commercial and residential services. Comments received during the stakeholder meetings relative to expanding fiber networks also suggested the role of fiber as an economic development strategy for business attraction and retention, especially in downtowns and primary commercial corridors.

With regard to what provider delivers this service, the most common responses from engagement participants were Spectrum, Armstrong Utilities, CenturyLink, and Windstream. Roughly two-thirds of residential survey respondents are either dissatisfied or very dissatisfied with their provider options. A lack of choices when it comes to home internet providers was also a concern shared during stakeholder meetings.

Speed & Quality

Generally speaking, the current state of broadband in the region is negatively impacting both residents and businesses (Fig. 4). Residents are generally less satisfied with broadband in the area than businesses, though certain businesses do have significant and pressing broadband challenges. The agriculture community in

Figure 6.4 Survey Results: Speed & Quality



particular expressed concerns about the availability and quality of service in the region given technological changes in the industry.

In addition to traditional-style questions, the surveys included an opportunity to conduct a speed test. A speed test calculates the present download and upload speeds of the user's internet connection on their device. Of the approximately 441 speed tests conducted through the residential survey, slightly more than half reported a speed under the federal threshold for broadband service: 25 mbps download and 3 mbps upload.

Speed test results can be compared to advertised speeds and to existing public data on reported internet speeds. Open source internet performance data can be discovered through Measurement Lab (M-Lab) - a collaborative academic project founded in 2009 by New America's Open Technology Institute, the PlanetLab Consortium, Google, and a group of academic researchers. M-Lab provides large-scale open source measurement of the Internet to researchers, consumers, and policymakers.

Though methodology and sample size prevent a direct comparison of the survey speed test data with M-lab data, generally speaking, the M-Lab data shows much lower average speeds than the survey. Below is the breakdown of the average speed test results by county:

Trumbull

Eastgate Broadband Residential Survey: 57 Mbps Download / 26 Mbps Upload

M-Lab: 19 Mbps Download / 4 Mbps Upload

Mahoning

Eastgate Broadband Residential Survey: : 69 Mbps Download / 83

M-Lab: 35 Mbps Download / 7 Mbps Upload

Ashtabula

Eastgate Broadband Residential Survey: 46 Mbps Download / 23 Mbps Upload

M-Lab: 30 Mbps Download / 4 Mbps Upload

KEY TAKEAWAYS

- There is a need for affordable, reliable broadband service among residents and businesses
- The choice of broadband provider is currently limited and a concern of area residents and businesses
- Connect Ohio's maps seem to accurately depict service, though the FCC Form 477 coverage may exaggerate availability in some census blocks
- Cell service is very spotty across the region, particularly in rural areas
- The full report should identify creative, new models to address broadband needs locally
- There is a need for a regional resource/reference to guide local governments and organizations through implementation
- Further data collection should be done to better compare advertised speeds with actual speed test results across the region during different days and times.

07

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UTILITY FORMATION

OWNERSHIP AND OPERATION OF BROADBAND UTILITY - OPTIONS AND OPPORTUNITY

Ohio has various organizational structures authorized by law that can be created to carry out a public or quasi-public purpose, including the projects identified in the final section of this Study. Many of these entities appoint a board and make decisions within a specific focus area, such as transportation, housing, community health or education. Because these organizations typically operate in a smaller geography or singular area of focus, a broader approach spanning multiple geographies may call for a different structure. Therefore, it will be important for the region to consider which entity or entities have the broadest authority, the most consistency, and the ability to cooperate with the region and participating counties on their broadband implementation goals.

A summary of such entities is below; however, specific oversight recommendations pertaining to each project, including applicable funding mechanisms, are provided in the Project Identification section. In reviewing, it is important to keep in mind ownership versus operation: all of the following options assume public network *ownership*. That said, opportunities to partner with private entities for *operation* are also included below. Please also note that, while the system we are recommending resembles a utility, for legal purposes it would not be a utility as it is not regulated by the State of Ohio or the Federal Government as a utility, nor would it be wholly operated under the authority of Sections 4 and 6 of Article XVIII of the Ohio Constitution, which authorizes municipalities to acquire and operate public utilities.

Port Authority Ownership

We recommend the creation of a new broadband authority (the “Broadband Authority”), whose purpose would be to own and operate publicly owned broadband network infrastructure across the three-county region, as needed to ensure the consistent and thorough extension of high-speed internet service for every resident, business, and community organization. Oversight by a Broadband Authority, which would be organized for state law purposes, as a port authority, is likely to be highly beneficial as it pertains to having

broad authority, consistency, and cooperation.

Section 4582.21 -99 et. seq. of the Ohio Revised Code (the “Act”) provides the necessary authority for establishing the Broadband Authority as a port authority. Under the Act, the authorized purposes of a port authority include “activities that enhance, foster, aid, or promote transportation, economic development, housing, recreation, governmental operations, culture or research within [its] jurisdiction.”¹ The Act authorizes the formation of the Broadband Authority by any combination of a municipal corporation, township or county.”² In order to maximize the territorial jurisdiction of the Broadband Authority, ideally the Counties of Ashtabula, Mahoning and Trumbull would form the Broadband Authority, with other subdivisions joining at their discretion.³

The powers of a Broadband Authority, like any port authority are broad, and well suited to the ownership, operation, and financing of a publicly owned broadband system. These powers include:

- Acquisition of real and personal property
- The power to own, lease, sell and construct improvements to real property
- The issuance of revenue bonds for port authority facilities.
- The receipt of federal and state grants and loans and other public funds
- Operation of transportation, recreation, governmental or cultural facilities and establishment of rates and charges for port authority facilities
- The power to cooperate with other governmental agencies and to exercise powers delegated by such agencies⁴

In addition to these powers, a port authority may, with voter approval, levy up to a one mill tax on the total value of all property within its jurisdiction.⁵ This levy, in the case of a Broadband Authority formed by the three counties could be expected to raise in excess of \$3 million per year; these amounts could be used for the purposes of the Broadband Authority, to pay tax anticipation notes, or could be used to pay debt service on long term indebtedness of the Broadband Authority if the levy was tied to a bond issue.⁶

There are multiple port authorities already in existence in the region, including the Ashtabula County Port Authority; the City of Ashtabula Port

Authority; the Conneaut Port Authority and the Western Reserve Port Authority. Theoretically, any or all of these existing port authorities could serve as the overall owner of broadband facilities, assuming that a cooperative agreement could be reached by all relevant parties. However, the boards of these entities do not include representatives chosen by all three counties, and they are already engaged in important activities.

The creation of a separate Broadband Authority governed by a board that is appointed by all of its constituent entities would ensure regional cooperation and representation. Further, in order to ensure that the Broadband Authority is focused on the Broadband mission, we suggest that the entities forming the Broadband Authority consider taking advantage of provisions in Section 4582.22 of the Revised Code which restrict the powers granted to the Broadband Authority.⁷ As explored further in the Programming and Financing section of the Study, to the extent that the Broadband Authority requires additional financing resources to achieve its mission, the Broadband Authority could cooperate with existing port authorities, whereby those port authorities could use their resources, including in particular the credit enhancement available from common bond funds, to help the Broadband Authority achieve its mission.

Broadband Cooperative⁸

A cooperative can be organized under Ohio law for the purpose of obtaining a particular service in a designated area, which could be regionally or within a smaller community. A cooperative is owned and controlled by the people who use its service. Similar to the electric cooperatives that were created to address the electricity needs of rural communities, broadband cooperatives enable area residents to take control of local connectivity and service. In addition, a broadband cooperative may decrease the cost of that service for its members and can cost-effectively convert existing infrastructure into capital for broadband expansion.

Cooperatives function as a type of corporation (business or nonprofit): if used in the project area, one that would be chartered, organized, and operating under the laws of the State of Ohio. Ohio Revised Code Chapter 1729 governs Ohio cooperatives.

Case Study SEOBC

Formed in April 2020, the Southeast Ohio Broadband Cooperative (“SEOBC”) is working to provide broadband access to unserved and underserved communities in rural Ohio. Originating out of Washington County, Ohio, residents were fed up with the poor speeds and lack of service and decided it was time to stand up its own combination fiber/ fixed wireless solution. The SEOBC contracted with GEO Partners LLC to provide various build-out options. After securing funds through crowdsourcing and successfully lobbying Washington County to allocate \$50,000 of the \$3.3 million in federal CARES Act funds granted to Belpre and Marietta, the hybrid model has allowed hundreds of families to join the cooperative for a one-time \$5 fee. Cooperative members then choose the speed of their service, ranging from \$60 to \$100 per month—significantly cheaper and better quality than satellite and dial-up options in the county. With \$290 million of Governor DeWine’s proposed budget recommended for broadband expansion, the SEOBC hopes to secure additional funds to continue the cooperative’s important work.⁹

Cooperatives are controlled by a board of directors who are elected by and operate for the benefit of the member-owners. Revenues from the cooperative are divided among members.

Formation of a broadband cooperative would require significant local buy-in. The steps to cultivating such buy-in include: (1) identifying the area in which services will be offered through the collaborative; (2) identifying the stakeholders within such area who are in need of enhanced broadband service, as well as the leaders in the area that are willing to convene the member customers to incorporate the cooperative; and (3) develop a business plan, with the assistance of trusted advisors, to ensure the execution of the requisite incorporation and operation documents.

While a cooperative that could cover the entirety of the region is not a practical solution, one or more smaller cooperatives could work in concert with a region wide public network owner, like a Broadband Authority, to pool resources to ensure the delivery of service to certain areas.

“Co-ops are popular in emerging industries, such as rural broadband, because they use the power of local markets to satisfy the limited needs of a local community that might not otherwise be served by larger companies in the same low-cost way.”

- West Virginia Broadband Enhancement Council, Guide to Broadband Co-Ops (2017)

Nonprofit Organization

Any person, on their own or in concert with others, may form a nonprofit corporation under Ohio Revised Code Chapter 1702 by signing and filing with the Secretary of State articles of incorporation that set forth the requisite information.

Strengths of a nonprofit ownership model include off-setting or shifting some of the project responsibilities to a new entity governed by a Board of Directors, which can be charged with fulfilling the region's goals, such as creating a certain type of local network (e.g., open access). However, the counties are able to maintain an active role in project delivery, serving essentially as an operational agent of the nonprofit, while mitigating the effects of local political changes and pressures. Additionally, a nonprofit could contract with the Broadband Authority as a subcontractor for certain network functions; such a contract could, if structured and staffed properly, increase the resources available to the Broadband Authority and could also provide additional expertise.

Such a model may also increase grant and funding/ financing opportunities to support the development of local broadband infrastructure. For example, if the nonprofit was structured so as to focused on broadband and smart energy, it could also bring in port authorities, Energy Special Improvement District (“ESID”) and Property Assessed Clean Energy or “PACE” financing, which will be explored further in the Programming and Financing section. In addition, under the American Rescue Plan Act, state and local governments may transfer funds to private

Case Study Westfield Gas & Electric

Leyden, Massachusetts is a rural northwestern community just 96 miles west of Boston. It is a town of around 800 residents without any major state routes that had historically lacked broadband access. However, in 2010, a regional non-profit cooperative—WiredWest¹⁰—was formed in order to build high-speed broadband networks in the Berkshires. Leyden joined a few dozen other towns to form their own municipally owned utility called Municipal Light Plants. In 2017, Leyden received a \$680,000 grant from the state and finalized its network design in 2019. In January 2020, Westfield Gas & Electric¹¹ - the city of Westfield's gas and electric utility - received \$10.2 million from the FCC's CAF II auction to expand fiber networks in 20 nearby communities in western Massachusetts, including Leyden.¹² In July of 2020, the town put out a \$1 million bond issue to fund the fiber drops and installation as Westfield Gas & Electric did the heavy lifting of building the network. Whip City Fiber,¹³ a division of Westfield Gas & Electric, operates as the Internet Service Provider (ISP).¹⁴

nonprofit groups, public benefit corporations involved in passenger or cargo transportation, and special-purpose units of state or local governments.

All that being said, the nonprofit will be required to abide by nonprofit corporate requirements, including potentially, requirements of federal law if the nonprofit were to be formed as a 501(c)(3) entity or other type of entity with a federal tax advantage. The region would also need to ensure that the nonprofit serves a specific purpose that enhances the delivery of service within all or a portion of the region, and does not become an obstacle to overall progress. As addressed further in the Project Identification section, repeat feedback was received regarding lack of cohesion in addressing broadband in the region – the

region would need to ensure that the creation of a new nonprofit organization would not invite additional confusion as to local leadership and responsibilities for broadband expansion.

Community Improvement Corporation or Broadband Development Corporation

A community improvement corporation (“CIC”) is an economic development corporation organized under Chapter 1724 of the Ohio Revised Code.

Community improvement corporations are permitted under Ohio law:¹⁶

- To borrow money for any of the purposes of the community improvement corporation by means of loans, lines of credit, or any other financial instruments or securities;
- To make loans;
- To purchase, receive, hold, manage, lease, lease-purchase, or otherwise acquire and to sell, convey, transfer, lease, sublease, or otherwise dispose of real and personal property;
- To acquire the good will, business, rights, real and personal property, and other assets of any persons, firms, partnerships, corporations, joint stock companies, associations, or trusts, and to assume, undertake, or pay the obligations, debts, and liabilities of any such entity;
- To acquire, subscribe for, own, hold, sell, assign, transfer, mortgage, pledge, or otherwise dispose of the stock, shares, bonds, debentures, notes, or other securities and evidences of interest in any entity;
- To mortgage, pledge, or otherwise encumber any property acquired pursuant to the aforementioned powers;
- To become a member of or a stockholder in a development corporation formed under Chapter 1726 of the Revised Code;
- To serve as an agent for grant applications and for the administration of grants, or to make applications as principal for grants for county land reutilization corporations;
- To engage in code enforcement and nuisance abatement;
- To charge fees or exchange in-kind goods or services for services rendered to political

subdivisions and other persons or entities for whom services are rendered;

- To employ and provide compensation for an executive director to manage the operations;
- To purchase tax certificates at auction, negotiated sale, or from a third party; and
- To be assigned a mortgage on real property from a mortgagee in lieu of acquiring such real property subject to a mortgage.

CIC’s have a few advantages which may make them useful in connection with broadband projects. First and foremost, they are private corporations that may be formed by and controlled by political subdivisions. As CICs may acquire property from local subdivisions without competitive bidding, they are a good vehicle for real estate assembly in cooperation with local subdivisions.

These advantages come with limitations. Although a CIC is a private entity, every CIC is subject to annual audit by the Auditor of State, and members must comply with Ohio Ethics Laws. Further, it is doubtful that under Ohio law a CIC would be empowered to own, operate, and contract to the extent necessary to operate a broadband network.

In light of these limitations, we would recommend utilizing a CIC for property acquisition, and using a Broadband Authority or other similar entity for ownership and operation of a broadband network.

Public-Private Partnership

Explored in further detail in the Programming and Financing Section and the Project Identification section, a public-private partnership or “P3” in which the broadband expansion project is managed and operated by a third party private provider can be an appropriate solution for projects in which the public bodies seek to retain ownership of the infrastructure, but require the expertise of a private sector partner to operate it.

There are a variety of benefits to private operation of a community broadband project. Unlike a public entity, this is the provider’s “bread and butter” – the appropriate partner likely has substantial experience and significant systems in place to operate and manage a network system. Depending on its structure, a P3 likely will

Case Study:
ECFiber

Early in 2008, a group of people living in east-central Vermont who understood the importance of the internet to economic development formed ECFiber, a 501(c)3 not-for-profit corporation with the goal of providing fiber access to every premise in 23 contiguous towns and one municipality in central Vermont. ECFiber would be chartered and owned by the towns, and any excess revenues that might accrue would be given to the towns in accordance with the number of ECFiber subscribers in the town. Governance would be provided by a Board of Governors consisting of one representative and alternates from each member town, formally designated by the town's Selectboard, or governing body.

Approximately \$1 million dollars in seed financing was secured from insiders who were dedicated to building a network in their areas of Vermont. The seed financing was sufficient to establish an office and technical hub in South Royalton and to build a 20-mile pilot network in Barnard, one of the neighboring towns. Local notes were then offered to members of the community in amounts of \$2,500, and were purchased primarily by local investors in the towns to be serviced. By 2015, ECFiber had received about \$7 million from about 500 investors, and the network was being built, albeit slowly, using these funds. It was clear that while the effort was likely viable, it would take a lifetime or more to meet the goal of the project, given the slow pace of investment.

ECFiber, as established, was purely an administrative and governance organization, having no staff. Early on, therefore, it established a partnership with a like-minded organization, ValleyNet, also a not-for-profit organization that previously offered dial-up service and was interested in moving further into the Internet space.

At the beginning of 2016, ECFiber formed the first CUD, the East Central Vermont Telecommunications District in Vermont. A financial plan was put into place for four rounds of financing over four years, totaling about \$40 million in the aggregate that would allow the completion of the majority of the network. The post-2016 business plan had to assure that revenue generation was sufficient to cover scheduled interest payments as well as assist with principal repayment. ECFiber's bonding authority did not obligate the State in any way as they were not general obligation bonds: rather, they were revenue bonds, and interest payments depended upon the ability of ECFiber to maintain sufficient earnings to meet interest payments.

After the formation of its CUD, ECFiber promptly went to the capital markets and sold a \$14.5 million allotment of long-term revenue bonds. Part of the proceeds were used to retire the old debt, including the \$1 million loans by the initial investors, resulting immediately in reduced interest repayment costs. The other part of the proceeds was used to continue extending the network. Subsequently, ECFiber returned to the capital markets almost yearly and has raised to date a total of about \$41 million in long term revenue bonds, experiencing growing acceptance and lower interest rates in each tranche.

To this day, the cooperation exists, and similar groups are forming both in Vermont and New Hampshire. ECFiber has continued to raise money in order to extend the network.¹⁵

also shift network operation and maintenance responsibilities to the private entity, without divesting ownership or control (although there may be some communities in which such responsibilities can remain with the government entity and purely public ownership is feasible instead of a P3 approach).

In a P3 model, roles are clearly delineated, and each partner operates within its core competency – the public sector provides financing and land/ infrastructure management for the benefit of its constituents; the private sector performs the same tasks as would with a private network. As a result, the P3 models also divides the risk of the project between the public and private entities. While control of various components is also divided (and the balance of this division, both risk and control, between the parties is instrumental), a P3 gives the public sector additional control over its local relationships with Internet Service Providers and area broadband expansion. This division, and financial support from the public sector, can also encourage additional private investment in the region and provides revenue generation opportunities for the public sector if a network is built out in such a way that capacity can be “leased” to multiple providers at competitive rates that are less than their build-out costs would be for like infrastructure. This, in turn, provides additional provider choice to local subscribers. The public entity can also maintain sufficient network capacity for its local needs, whether governmental, commercial, and/or residential.

However, like all potential models, a P3 has its risks. Generally speaking, a P3 arrangement will struggle when the public entity takes on too much risk and not enough control of the project. It is important that public sector thoroughly evaluate, with the support of advisors, how much risk (financial, personnel, etc.) it can bear in entering into a P3 arrangement and the contracts between the parties should accurately reflect these levels. These agreements may also need adjustments as new assets and/or service are integrated into the model.

There is also a heightened administrative burden for a broadband P3, particularly at the outset. A P3 will require a public Request for Proposal (“RFP”) process, as well as vetting and approval, as further discussed in the Project Identification

Case Study Medina Fiber

Founded by Medina County, Ohio, Medina Fiber is a network providing increased data bandwidth to help businesses in the county grow and stay ahead of the competition. Originally financed through bonds and grants, Medina Fiber had its first customers come on in 2013 and was managed by the Medina County Port Authority. Fast forward to 2019 and Medina Fiber partnered with Lit Communities to finance the network in Medina County. Phase I calls for an \$8 million investment and about \$50 million to cover the entire county. As of March 2021, construction of residential fiber optic internet infrastructure broke ground in Seville—a process that was delayed due to COVID-19. The network’s first residential customers are expected to be online by June and the goal is to expand service to about 50,000 Medina County households over the next three to five years.¹⁷

section of this Study. There can also be various compliance components for a P3.

Most P3 models would be structured so that the public sector would not be active in the network’s operations. Although this is a strength to the model, particularly if local expertise is not otherwise available, it does subject the public sector to the private party’s ongoing business risks. Partner selection is highly important to ensure continuity, particularly because this arrangement can develop into a relationship more likened to that of a customer (i.e., public sector) and vendor (i.e., private sector). For this reason, private partner selection is also highly important – this additional layer to the project could incite local suspicion. There may also be a limited number of carriers that are willing to provide carrier-neutral options that don’t favor a particular provider’s operations, should that be the region’s goal.

Council of Governments

Under a Council of Governments (“COG”), a governing body of any two or more counties, municipal corporations, townships, special districts, school districts, or other political subdivisions may enter into an agreement with each other, or with the governing bodies of any counties, municipal corporations, townships, special districts, school districts or other political subdivisions of any other state to the extent that laws of such other state permit, for establishment of a regional council consisting of such political subdivisions. These structures can also borrow federal funds, generate revenue, and issue debt.

COGs are “by the governments, for the governments,” meaning they are made up of a membership of townships, cities, villages, counties, and other government authorities (transit authorities, port authorities, school districts, etc.) to combine governing powers to achieve a vision that spans across municipal boundaries. As such, a COG allows each of these subdivisions to have a voice and seat at the table in a number of areas already within their expertise, such as land use and development, zoning, economic incentives, transportation, etc. and to facilitate communication among stakeholders.

By State law, a COG does not displace any statutory powers of its members. Rather, a COG serves as a more effective way to deploy powers for projects crossing municipal boundaries in a formalized cooperative manner. Further, land ownership is not transferred to the COG or given up to the COG as part of membership. Each political subdivision retains all of its powers, properties, and discretion in how to exercise its powers and use its properties after entering a COG. While Ohio law prescribes specific requirements for COGs, COGs are a mechanism used throughout the Country.

The COG can act as the facilitator by and for the political subdivisions, including school districts that may hold spectrum frequencies, while utilizing the powers afforded to it by these other entities as partners.

For the purposes of this Study, the COG could be pre-existing, such as the Eastgate Regional Council of Governments, or a new COG could be formed for oversight. It should be noted however, that the COG has no separate powers to own

and operate broadband facilities; its role is in the nature of a facilitator/air traffic controller.

Case Study COG

Central Ohio's NW 33 Innovation Corridor Council of Governments is comprised of Union County, the City of Marysville, the Marysville-Union County Port Authority, and the City of Dublin. The COG exists to review, evaluate, and make recommendations relative to the planning and programming, the location, financing, and scheduling of public facility projects within the region that affect the development of the US-33 corridor. The COG offers an example on how communities can band together in attracting smart mobility research and development, as evidenced by its initial \$6 million award in 2016 from the U.S. Department of Transportation for the Advanced Transportation and Congestion Management Technologies Deployment Program grant. Additional funding assets include regional stakeholders such as Honda of America, The Ohio State University, and the Transportation Research Center (“TRC”). The physical infrastructure of the U.S. 33 Smart Corridor includes: (1) automated/connected vehicle infrastructure; (2) dynamic signal phasing and timing; (3) a local smart network; (4) a connected test fleet; (5) a pedestrian in crosswalk warning system; (6) connected vehicle applications; and (7) program management, maintenance, and operations. Receiving the bulk of the investments, the TRC will have \$45 million to build the first phase of a 540-acre Smart Mobility Advanced Research and Test (“SMART”) center within its grounds. Further, the TRC has secured \$124 million to invest in an advanced wind tunnel facility.¹⁸

SECTION ENDNOTES

1. *O.R.C. § 4582.21(B) | Newly created or adopting port authority definitions.* (2000). Retrieved from Ohio Legislative Service Commission: <https://codes.ohio.gov/ohio-revised-code/section-4582.21>.
2. *O.R.C. § 4582.22 | Creation of new port authority.* (2000). Retrieved from Ohio Legislative Service Commission: <https://codes.ohio.gov/ohio-revised-code/section-4582.22>.
3. Section 4582.30 of the Ohio Revised Code restricts the ability of the Counties of Ashtabula, Mahoning, and Trumbull to create a new port authority, as each of these counties is a member of a port authority. However, other provisions of the Revised Code would permit the joinder of these counties into an existing port authority, or in the alternative, would permit these entities to enter into a cooperative agreement whereby a broadband authority would be created. That being said, working with the General Assembly to remove the restrictions contained in 4582.30 on the creation of a new, separate Broadband Authority is recommended.
4. *O.R.C. § 4582.31 | Powers of port authority.* (2021). Retrieved from Ohio Legislative Service Commission: <https://codes.ohio.gov/ohio-revised-code/section-4582.31>.
5. The duration of the levy is limited to five years except when the tax is to be levied for bonded indebtedness. *O.R.C. § 4582.40 | Levying taxes.* (1989). Retrieved from Ohio Legislative Service Commission: <https://codes.ohio.gov/ohio-revised-code/section-4582.40>.
6. It is unclear whether a broadband authority created from an existing port authority by joinder would have the power to levy a tax with voter approval over the three county area. In such a case, any voted tax would limit such a port authority's ability to levy taxes for other purposes, for example economic development purposes or for operations.
7. If the Eastgate coalition determines to pursue the amendment of Section 4582.30 to authorize the establishment of a separate new three-county Broadband Authority, such a limitation could be built into the amendment language.
8. *GUIDE TO BROADBAND CO-OPS.* (2017). Retrieved from West Virginia Broadband Enhancement Council: <https://broadband.wv.gov/resources/broadband-cooperative-associations/>.
9. *Southeast Ohio Broadband Cooperative.* (2020). Retrieved from Southeast Ohio Broadband Cooperative: <https://www.seobc.us/>. See also R. Marcattilio-McCracken. (2020). *Residents in Washington County, Ohio Form Broadband Cooperative.* Retrieved from Community Broadband Networks: https://muninetworks.org/content/residents-washington-county-ohio-form-broadband-cooperative?mc_cid=5c8a3330c5&mc_eid=ed1e20ad7f. See also C. Doyle. (2021). *Ohioans are already trying to bridge the digital divide. Will state lawmakers help?* Retrieved from The Columbus Dispatch: <https://www.dispatch.com/story/news/state/2021/02/21/appalachian-ohio-high-speed-internet-broadband-divide-lawmakers-help/6757734002/>.
10. *WiredWest.* (2017). Retrieved from WiredWest: <https://wiredwest.net/>.
11. *Westfield Gas+Electric.* (2021). Retrieved from Westfield Gas+Electric: <https://www.wgeld.org/>.
12. *\$10.2M grant will help expand fiber-optic broadband from Westfield Gas + Electric.* (2019). Retrieved from MassLive: <https://www.masslive.com/news/2019/12/102m-grant-will-help-expand-fiber-optic-broadband-from-westfield-gas-electric.html>.
13. *Whip City Fiber | Fiber.* (2021). Retrieved from Whip City Fiber / Westfield Gas + Electric: <https://www.whipcityfiber.com/>.
14. S. Gonsalves. (2021). *Fiber Network is "Game-Changer" in "Backwater" Massachusetts Town.* Retrieved from Community Broadband Networks: <https://muninetworks.org/content/fiber-network-game-changer-backwater-massachusetts-town>.
15. G. Sadowsky. (2021). *ECFiber: Building a Fiber-to-Premises Network in the Rural United States.* Retrieved from CircleID: <https://www.circleid.com/posts/20210216-ecfiber-building-fiber-to-premises-network-in-rural-united-states/>.
16. *O.R.C. § 1724.02 | Powers of corporation..* (2021). Retrieved from Ohio Legislative Service Commission: <https://codes.ohio.gov/ohio-revised-code/section-1724.02>.
17. About – Medina Fiber. (n.d.). Retrieved from Medina Fiber: <https://medina.litcommunities.net/about/>. See also J. Delozier. (2019).

Medina Fiber, an open fiber network, launches in Medina County. Retrieved from The Gazette: <https://medina-gazette.com/news/181176/medina-fiber-an-open-fiber-network-launches-in-medina-county/>. See also J. Delozier. (2021). *Fiber-to-home construction begins in Seville*. Retrieved from The Gazette: <https://medina-gazette.com/news/253309/fiber-to-home-construction-begins-in-seville/>.

18. *More than \$224 million will be invested in Ohio's 33 Smart Mobility Corridor by 2020*. (2018.). Retrieved from Intelligent Transportation Systems Joint Program Office: <https://www.itskrs.its.dot.gov/its/benecost.nsf/ID/9319210e9ec192da85258305004b90f9>.

*Technology &
Trends Review*

Policy Analysis

*Service and
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Site Analysis

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PROGRAMMING & FINANCE EVALUATION

OVERVIEW

Many communities that we have worked with over the years want to launch broadband initiatives, but few are prepared to fund their projects.

The Eastgate Regional Council of Governments and its member counties have traditionally financed/ funded local infrastructure through a variety of tools. The use of these tools, and others, particularly as they relate to financing and funding broadband in the region are explored below. In accordance with the RFP, the programming and financing evaluations included in this study are focused on the operation by eligible entities including units of government, non-profits, education, and others.

As reflected elsewhere in this Study, it is our recommendation that Eastgate pursue the creation of a publicly owned broadband network along strategic routes and in targeted areas of the region. The geographic area to be served by such network is likely large and the needs of the stakeholders within the geographic area are diverse, including both densely and sparsely populated areas. Additionally, the three-county region contains a variety of political subdivisions, including counties, townships, school districts and municipalities, all of which have limited territorial jurisdiction.

Given these challenges, we recommend the creation of a new broadband authority (the “Broadband Authority”) to ensure the consistent and thorough extension of high-speed internet service for every resident, business, and community institution in the area that desires to have it. This recommendation is further detailed in the Ownership and Operation of a Broadband Utility section.

The Broadband Authority should be created as a new and separate entity to ensure its independence and dedication to its mission. The most straightforward approach would be the creation of a “port authority”, pursuant to Section 4582.21-99 et. seq. of the Ohio Revised Code (the “Act”), by one or more subdivisions, for example a township or municipality, that is not already part of an existing port authority. This Broadband Authority would then enter into cooperative agreements with subdivisions in the region to own and finance broadband facilities within its jurisdiction.

It is our view that the Act permits the creation of a Broadband Authority that includes political subdivisions already within the territories of existing port authorities by joining contiguous subdivisions into an existing or newly created port authority (by having, for example, Ashtabula County join the Western Reserve Port Authority), as such joinder is permitted by the Section 4582.26 of the Ohio Revised Code. However, due to ambiguity in the Act with respect to the territorial limits of a newly created port authority, we recommend that Eastgate explore an amendment the Act to clarify and specify exceptions to the provisions of Section 4582.30 that restrict the inclusion of political subdivisions that have created or joined an existing port.

Alternatively, if post-creation joinder is not politically or administratively feasible, existing port authority could enter into a cooperative agreement with other port authorities or jurisdictions to effectively create a new Broadband Authority.

For purposes of this discussion, we have assumed that the Broadband Authority will be created as a port authority and function as an independent entity, with all powers of a port authority under Ohio law.

BROADBAND AUTHORITY

Powers

As a port authority, the Broadband Authority would have the powers set forth in the Act. Pursuant to the Act, the authorized purposes of a port authority include “activities that enhance, foster, aid, or promote transportation, economic development, housing, recreation, governmental operations, culture or research within [its] jurisdiction.”

The powers of a Broadband Authority, like any port authority are broad, and well-suited to the ownership and financing of a publicly owned broadband system. These powers include:

- acquisition of real and personal property;
- the power to own, lease, sell and construct improvements to real property;
- the issuance of revenue bonds for port authority facilities;
- the receipt of federal and state grants and loans and other public funds;

Table 8.1 Summary of Municipal Finance Tools

PROGRAM	TYPE	DESCRIPTION	GEOGRAPHY	UTILIZATION	EXAMPLE
TAX INCREMENT FINANCING	Revenue Capture	Mechanism used to capture incremental property tax revenues to pay for public infrastructure costs, including fiber construction and other telecommunications infrastructure.	City or County	Pledge to bonds; pay directly for infrastructure	Sycamore Township, Ohio
NEW COMMUNITY AUTHORITY	Special Charge	Mechanism where a contiguous or non-contiguous set of parcels opt-in to receive a charge on economic activity (food & beverage sales, retail sales, property charge, rent charge, etc.). The charge, a “community development charge” can then pay for community facilities including “telecommunications facilities, including all facilities necessary to provide telecommunications service”	City	Pledge to bonds; pay directly for infrastructure	N/A
MUNICIPAL REVENUE BONDS	Financing	Bonds are issued by a local government and paid back by non-tax revenues, in this case special charges, value capture or project revenues. This would be best served to finance the construction of large scale fiber construction or telecommunications facility.	City or County	Large-scale financing	Fairlawn, Ohio
NEW MARKETS TAX CREDIT	Financing	Federal tax credit allocation is awarded to the project, then sold for equity to leverage a loan. This tool would be best used to pay for a fiber construction project that benefits businesses and residents.	Federal	Middle-Large Scale Financing	Conneaut, Ohio
COMMUNITY REINVESTMENT ACT	Financing	Under the Community Reinvestment Act (CRA), infrastructure investment includes facilitating the construction, expansion, improvement, maintenance or operation of essential infrastructure or facilities for health services, education, public safety, public services, industrial parks or affordable housing. Broadband is included as a form of infrastructure investment—an essential community service. An investment or loan applied to broadband infrastructure would need to be for the purpose of serving LMI individuals and/or geographies or revitalizing or stabilizing an LMI geography or nonmetro middle-income geography.	Regional	Middle-Large Scale Financing	Southwestern, Minnesota
DOWNTOWN REDEVELOPMENT DISTRICT/ INNOVATION DISTRICT	Revenue Capture	Mechanism used to capture incremental property tax revenues to reinvest in public infrastructure or provide grants to incubators or start-up businesses. This would be utilized to pay for 100-gig equipment costs and/or provide grants/loans to support a business operating a network.	City	Pledge to bonds; pay directly for infrastructure; provide grants	Columbus, Ohio
TRANSPORTATION IMPROVEMENT DISTRICTS	Special Charge	Promote intergovernmental and public-private cooperation of transportation resources and investments, with the ability to levy special assessments and issue bonds in its own name. Eligible uses of funds include telecommunications equipment.	County	Pledge to bonds; pay directly for infrastructure	Summit County

Table 8.1 Cont'd. Summary of Municipal Finance Tools

PROGRAM	TYPE	DESCRIPTION	GEOGRAPHY	UTILIZATION	EXAMPLE
BROADBAND AUTHORITY	Property Charge	A Broadband Authority has no inherent taxing power, but, if constituted as a separate entity, with the approval of the voters, it would be authorized to levy up to a one mill tax on the total value of all the property within its jurisdiction for a period of five years to pay expenses.	Regional	Operating expenses of network.	N/A
SBA 7(A) LOAN PROGRAM	Financing	The 7(a) loan program is the SBA's primary program for providing financial assistance to small businesses and can be utilized to pay for fiber construction and/or initial working capital costs. An up-to portion of the loan comes with a federal guarantee.	Project	Small-scale Financing	Falcon, Minnesota
PROPERTY ASSESSED CLEAN ENERGY FINANCING (PACE)	Financing	Project costs are paid for by a special assessment on the property, as long as the cost results in an energy savings. A City has the ability to levy a special assessment on commercial or residential property. In this case, a homeowner could finance for internet-related costs assuming the technology contributes to an energy efficiency savings, then pay the financing back over 20-30 years on its property tax bill. The same applies for commercial buildings.	City	Small-scale Financing; Homeowner subsidy	N/A

- Operation of transportation, recreation, governmental or cultural facilities and establishment of rates and charges for port authority facilities; and
- the power to cooperate with other governmental agencies and to exercise powers delegated by such agencies.

Special Purpose

Currently there are four port authorities operating within the three-county region, none of which have jurisdiction over the entire geographic area. These port authorities are generally engaged either in traditional lake port activities or in the job-creation and economic development activities that port authorities have undertaken for many years. As the ownership and operation of publicly owned broadband networking is unique and regional, and quite different from the business retention and recruiting activities that port authorities undertake, we recommend that the Broadband Authority be functionally separate, regardless of whether the Broadband Authority is established under the aegis of an existing port authority. Further, to avoid duplication of efforts and to discourage unnecessary competition with existing port authorities, we recommend that the Broadband Authority Agreement be drafted so that it expressly restricts the Broadband Authority's scope to the acquisition, ownership, and potential operation and maintenance, at the region's discretion, of publicly owned broadband networking.

Financing Options – Public Sector Options

Initially, the Broadband Authority would need to be supported financially by its constituent members/ stakeholders, including each of the three counties served by the Broadband Authority. The Broadband Authority has no inherent taxing power, but, if constituted as a separate entity, with the approval of the voters, it would be authorized to levy up to a one mill tax on the total value of all the property within its jurisdiction for a period of five years to pay expenses.*

**Note: If this tax were to be levied by an existing port authority, such a levy would count against the aggregate limit of that authority to levy a tax with the approval of the electors.*

While the Broadband Authority would have limited ability to raise funds on its own, its ownership and financing of broadband facilities would be in full cooperation with each local subdivision, with funding coming from sources provided by those subdivisions. In every case, the Broadband Authority would be utilizing its powers to fulfill its authorized purposes, primarily enhancement and promotion of economic development, housing, and governmental operations, on a case-by-case basis.

We would anticipate that the network would be managed by a private manager (the "Manager") under contract with the Broadband Authority, as further discussed in the Project Identification section. The structure and duration of such contract should take into account whether the facilities to be managed would be financed using tax-exempt revenue bonds. If they are to be financed by tax-exempt revenue bonds, the contract with the Manager would need to conform to the safe harbor provisions under the Internal Revenue Code so as to permit tax exempt financing for the network.

The Broadband Authority would be the owner of the broadband infrastructure and would be responsible for its financing. Each segment of the infrastructure would be financed with a combination of user revenues, which would be dedicated to the financing, and, to the extent those user revenues are insufficient, from other available sources.

In the case of segments to be financed by subdivisions, such as townships, cities and counties, each participating subdivision could lease the infrastructure for projects within its jurisdiction and finance the gap in infrastructure costs using revenues lawfully available to the subdivision for this purpose.

- For counties, revenues could be current sales tax revenues,** appropriated annually to make lease payments, or other revenues, including tax increment financing revenues (where appropriate) under Section 5709.78 of the Ohio Revised Code or other non-tax revenues.

***Note: If possible to segregate sales tax revenue from internet sales from the larger pool of sales taxes, a promise consider making payments from these sources could be considered as such sales would be expected to rise as a result of increased internet access*

- For municipalities, revenues could include annual appropriations from designated sources like income taxes, payments in lieu of taxes received under Sections 5709.40 or 5709.41 of the Ohio Revised Code, assessments allocable to such portions of broadband infrastructure that could be allocable to a special energy improvement project under Chapter 1710 of the Ohio Revised Code, payments received from innovation districts established under Section 5709.45 of the Revised Code, or other eligible revenue sources.
- Townships could appropriate funds annually from general revenues or designated sources like payments in lieu of taxes received under Section 5709.73 of the Ohio Revised Code.

Additionally, subject to applicable debt limitations, each subdivision could issue its general obligation bonds (or in the case of counties, sales tax revenue bonds where sales tax revenues are pledged, rather than simply appropriated pursuant to a moral obligation) to finance the broadband network infrastructure. In such instance, the subdivision itself would likely own the infrastructure.*

Financing Options – Public-Private Options

Including a private sector partner in a role more than a Manager (as discussed above) is also an option for the Broadband Authority. There are several ways to structure an arrangement with a private partner to achieve the goals and manage the risk of the Broadband Authority. In the context of the traditional public-private partnership (“P3”) model, the various structures would fall on the “design-build-finance-operate-maintain” (“DBFOM”) spectrum. The private partner can do as much (or as little) as necessary for the project to be successful, which ranges from: (i) a full “design-build-finance-operate-maintain” offering whereby the private partner builds, owns, finances and operates the broadband network infrastructure, but is subject to strict controls, clearly defined metrics,

and benchmarking and other targets of the Broadband Authority tied to the compensation received by the private partner; to (ii) a “design-build-finance” approach where the private partner would design, build and provide financing for the broadband network infrastructure, and private partner would own the broadband network and lease the network infrastructure to the Broadband Authority for a defined period of time (typically coinciding with the financing of the project), at which time ownership of the broadband network infrastructure would revert to the Broadband Authority. However, in the latter model, the Broadband Authority has responsibility to operate and maintain the broadband network, likely through a Manager as discussed above.

We would anticipate under such a model, that the contribution of the public sector could be flexibly structured to include user revenues. It is possible that user revenues from the entire network could be used to help support the structure; on the other hand, it is also possible that only a portion of the user revenues could be included in the financing model.

We recommend that the Broadband Authority explore a P3 option because: (i) the flexibility that a port authority has pairs well with a P3 model; (ii) it potentially gives access to private capital that would otherwise be unavailable or unattainable for the broadband network infrastructure; and (iii) it gives the Broadband Authority more control of the outcomes desired by tying lease and availability payments to those clearly defined metrics. Public-private partnerships between a local government unit and a private provider leverages the public sector’s ability to finance broadband projects with patient capital/ at low, long-term interest rates not available to private entities using public bonding, which can make the network affordable for area taxpayers. Public entities also may have access to grants that the private sector partners may not, such as several of the opportunities outlined below. There are also cost-savings as ownership remains with the public entity, but service and maintenance of the network and customer service remain the responsibility of the private partner. However, it cannot be reiterated enough that the distribution of risk and control between the public and private parties in a P3 is of utmost importance.

**Note: While it is not likely, a highly successful project could produce sufficient funds to enable the subdivisions to recover amounts that they paid in during the initial phase to cover initial funding gaps.*

Case Study: **GreatWave**

GreatWave Communications (“GreatWave”) is a 120-year-old telephone company based in Conneaut, Ohio that traditionally provided telephone service to rural parts of Ashtabula County. GreatWave identified the problem created by a growing demand for affordable and reliable broadband services paired with a lack of availability of such services within its customer base due to the region being overlooked by larger broadband providers. In 2016, GreatWave Communications expanded to modernize its service offerings and developed a fiber-optic network to provide its customers with broadband internet service through GreatWave Broadband Services, LLC and created a unique financing model to provide high-quality broadband services to its existing telecommunication customer base. The GreatWave project consisted of upgrading its network to a wired fiber-optic network capable of gigabit dedicated service, and built out into new “last mile” service areas, to provide phone and high-quality broadband internet services. The cost and investment of the GreatWave project totaled \$12.7 million. GreatWave operates in a low-income, non-metropolitan area designated as a Small Business Administration Hub Zone and as severely distressed by the Appalachian Regional Commission; as such the GreatWave project was eligible for New Market Tax Credits (“NMTC”). NMTCs are designed to provide stable financing to businesses in low-income areas throughout the nation. The Ohio Community Development Finance Fund (“OCDF Fund”) partnered with Development Fund of the Western Reserve (“DFWR”) and U.S. Bancorp Community Development Corporation (“US Bank”) to provide NMTC financing. OCDF Fund provided \$5 million of federal NMTC allocation, DFWR provided \$4.5 million of federal NMTC allocation, and US Bank provided the NMTC equity investment in the amount of \$3.2 million. U.S. Bank’s investment in the GreatWave project went to low-and-moderate income communities in Ashtabula and Geneva, and was categorized as a “public welfare investment” for credit purposes under the federal Community Reinvestment Act (12 U.S. Code § 2901). The GreatWave project created and retained 54 jobs, and allowed GreatWave to provide services to an additional 50 businesses and 600 residential customers per year throughout Ashtabula County. GreatWave currently provides telecommunications services to approximately 2,000 telephone customers, 1,650 cable television subscribers, and 3,200 broadband internet users throughout Ashtabula County.

GRANTS/ LOANS/ FUNDING ALLOCATIONS

In addition to the above financing approach, there is an unprecedented amount of state and federal grants and loans for broadband. These programs are summarized below. In some instances, the Broadband Authority may be the eligible applicant, while in others the Eastgate Regional Council of Governments and/ or its member counties and/ or their political subdivisions, or perhaps a public or private partner, may be the most appropriate applicant.

State

The Eastgate Regional Council of Governments and its member counties have received several forms of state-level funds for previous infrastructure projects. Current State-level

funding sources specifically eligible for broadband projects are discussed below.

STATE BUDGET REQUESTS

The Ohio Constitution requires the Governor and legislature to enact a biennial operating budget every two years in odd-numbered years. In Ohio, each fiscal year begins on July 1 and ends on June 30 the following year. For example, the current fiscal year is July 1, 2020 - June 30, 2021.

The budget starts in the executive branch. First, all state agencies must submit detailed funding requests to the Office of Budget and Management (“OBM”). After the initial requests are submitted, OBM reviews the requests and holds internal budget meetings with state agencies. OBM then meets with the Governor and staff to provide the agency requests and the Governor’s Office creates a preliminary

budget recommendation. The Legislative Service Commission (“LSC”) then drafts the Executive version of the legislation at the Governor’s recommendation, and the bill is introduced in the Ohio House of Representatives.

Once the operating budget has been introduced in the House, the House Finance Committee holds hearings with testimony invited from state agency directors, organizations, and other individuals who are interested in provisions of the state budget. While in House Finance, the legislation may be amended based on the testimony provided and the funding priorities of representatives. Once the House Finance Committee votes to pass the bill out of the Committee, it is referred to the House floor for a vote by all members of the Ohio House of Representatives.

After the operating budget has passed out of the Ohio House it goes to the Senate Finance Committee where it undergoes the same legislative process as in the House, including hearing testimony, making amendments, and then voting on its passage by the full Ohio Senate. The House then has to concur with the new version of the bill, as amended by the Senate. However, it is highly unusual for this to happen with an operating budget. As a result, the differing passed versions of the bill are referred to conference committee. Within the conference committee, legislators appointed from both chambers and both parties meet to come to an agreement on a final operating budget to enroll. The conference committee process typically takes about two weeks.

Once the House and Senate have agreed upon an operating budget, the legislation is sent back to the Governor for signature. The Governor is able to veto specific provisions of the legislation while enacting the rest of the budget. However, each veto must include a Veto Message stating why a specific line item was vetoed. If the House and Senate so choose, they can vote to override the Governor’s veto of a provision by a 3/5 majority vote in each chamber of the General Assembly.

Ohio is required to have a balanced budget so as not to incur state debt. The State’s funding is based on the General Revenue Fund (“GRF”). The GRF is mainly funded by state tax revenues and lottery profits; however, lottery profits are constitutionally required to fund education.

Within the operating budget, appropriations are broken down by each state agency, which is then divided into funding groups. There is also an individual line item for each appropriation.

Some funds within the operating budget are used to partner with businesses and nonprofit organizations contracted with the State to carry out particular services or programs needed by an agency. These appropriations can be made based on prior partnerships with such agencies or based on an entity demonstrating to members of the legislature why the government should partner with them. Specific appropriations to non-governmental organizations can be found within line-item appropriations.

Particularly as it pertains to broadband, in HB 110 (Biennial Budget for FY22/FY23), the House of Representatives included additional funding for H.B. 2, discussed further below. In the House Passed version of HB 110 from April 21, 2021, the House appropriated \$170M in FY22 and \$20M in FY23 to fund the Ohio Residential Broadband Expansion Grant Program in H.B. 2.

The State **capital budget** funds nongovernmental projects. However, unlike the state operating budget, Ohio’s legislature and Governor are not required to enact a capital budget. As a result, there have been years in which Ohio did not pass a capital budget, or scaled it back significantly because of financial constraints; however, this is unusual.

The capital budget is introduced and passed in even-numbered years and its appropriations last two years. The legislation is typically introduced in early spring and passed by late spring of the same year. Unlike the operating budget, which takes several months to maneuver the legislative process, the capital budget is usually introduced and signed by the Governor in a matter of weeks.

The capital budget is first created by OBM based on recommendations it receives from State agencies under the State’s 6-year Capital Improvements Plan. This plan is amended by the Office of Budget and Management biennially based on the recommendations of State agencies. OBM sends recommendations to the Governor, and the Governor introduces the bill in the House of Representatives. The capital budget then proceeds through the same processes in the General Assembly as the operating budget before being sent back to the Governor for signature and

any line-item vetoes.

The capital budget is funded in-part by General Revenue Fund appropriations and other state funds with tax or fees revenue, but most capital funding comes from bond proceeds. Some money in the capital budget is directed to State agencies for expenditures, while other money is directed to non-governmental entities and local governments that submit requests to fund a project.

Entities can begin the process of requesting capital budget funding after the State's operating budget has been passed. Capital appropriations request forms begin to be distributed late summer through fall of an odd-numbered year, and any group can obtain this application by contacting their local state representative or senator.

The application form requires the entity to describe the project for which they seek funding. Entities often include pictures of the needed improvements with a breakdown of the costs. Capital requests should be submitted to the applicant's state representatives and senators, and it is also wise to submit an application to the majority and minority leadership offices in the House and Senate.

As an example of technology funding the capital budget process in the Eastgate region, in SB 310 of the 133rd General Assembly:

C34565 IT Infrastructure Upgrades, \$1,000,000, Mahoning County: These funds will be used by Youngstown State University (YSU) to perform a needs assessment and redesign of its overall wireless information technology infrastructure. Currently, YSU places wireless access points throughout campus in areas with reported "dead spots." However, these are not strategically placed and do not consider population density or construction constraints due to the lack of data and the tools to acquire it. The project will address this lack of data and permit YSU to, eventually, design a more reliable and centralized wireless information technology infrastructure across campus. It will also enable better management of wireless access point campus wide and lower support costs over time.

There is not a firm deadline each year for capital budget requests as each member, caucus, and chamber set their own deadlines. However, most offices ask that applications be submitted in the late fall to early winter prior to the actual introduction of the capital budget.

HOUSE BILL 2:

A detailed summary of Ohio House Bill 2 was provided in the Policy Analysis section of this Study. \$20 million been allocated to H.B. 2, if enacted, for FY 21 (defined above). Although previous versions of the bill included \$170 million for FY22 and \$20 million for FY23, these amounts were ultimately removed. However, we remain hopeful that funding for FY22 and FY23 will remain intact in the State operating budget, summarized in the previous section.

However, even if enacted and funded, awards under H.B. 2's "Ohio residential broadband expansion grant program" will first prioritize areas without access to 10 Mbps download/ 1 Mbps upload or 25 Mbps download/ 3 Mbps upload broadband, and excludes areas where network to provide broadband service of at least 10 Mbps download/ 1 Mbps upload is in progress and scheduled to be complete within a two-year period (defined as "unserved areas"). H.B. 2 is unclear as to which data source will be utilized to depict current broadband coverage at these speed tiers. However, assuming that the State's last broadband mapping update is used as the source, the maps on the following pages depict coverage at the above speed tiers (Figures 8.1, 8.2, 8.3, 8.4, 8.5, and 8.6).

Although H.B. 2 funds should certainly be pursued, as further detailed in the Project Identification section, the region does not have a significant number of areas that will be considered "unserved" under the program, and thus may be prioritized behind applications from other areas of the state.

JOBSOHIO INCLUSION GRANT:

The JobsOhio Inclusion Grant provides financial support for projects in distressed communities and/ or for businesses owned by underrepresented populations. Decisions on grant awards under the program are based on a number of factors including company location and ownership, jobs created and/ or retained, and project fixed asset investment. Grant funds

Figure 8.1 Connect Ohio Ashtabula County Map 10 Mbps download/ 1 Mbps upload

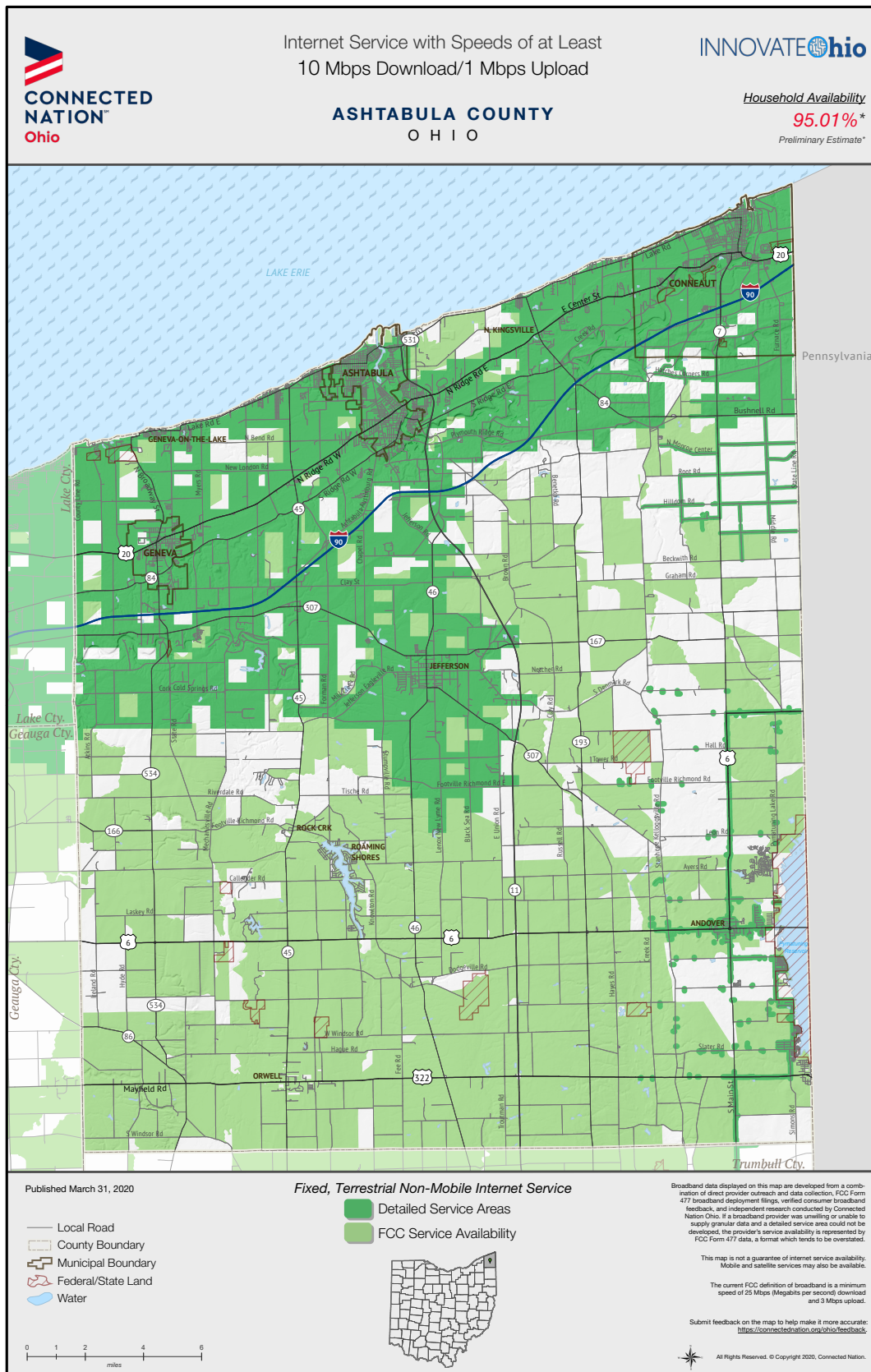


Figure 8.2 Connect Ohio Mahoning County Map 10 Mbps download/ 1 Mbps upload

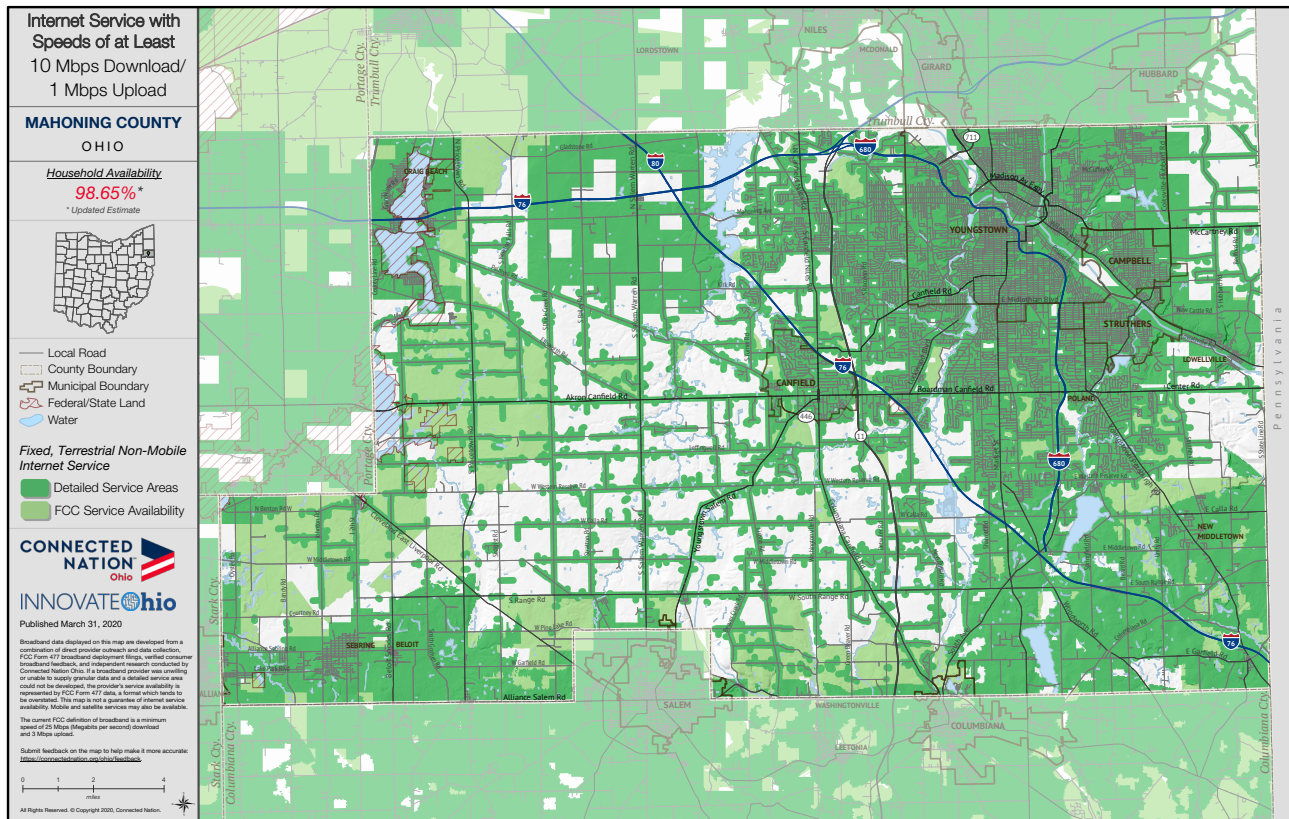


Figure 8.3 Connect Ohio Trumbull County Map 10 Mbps download/ 1 Mbps upload

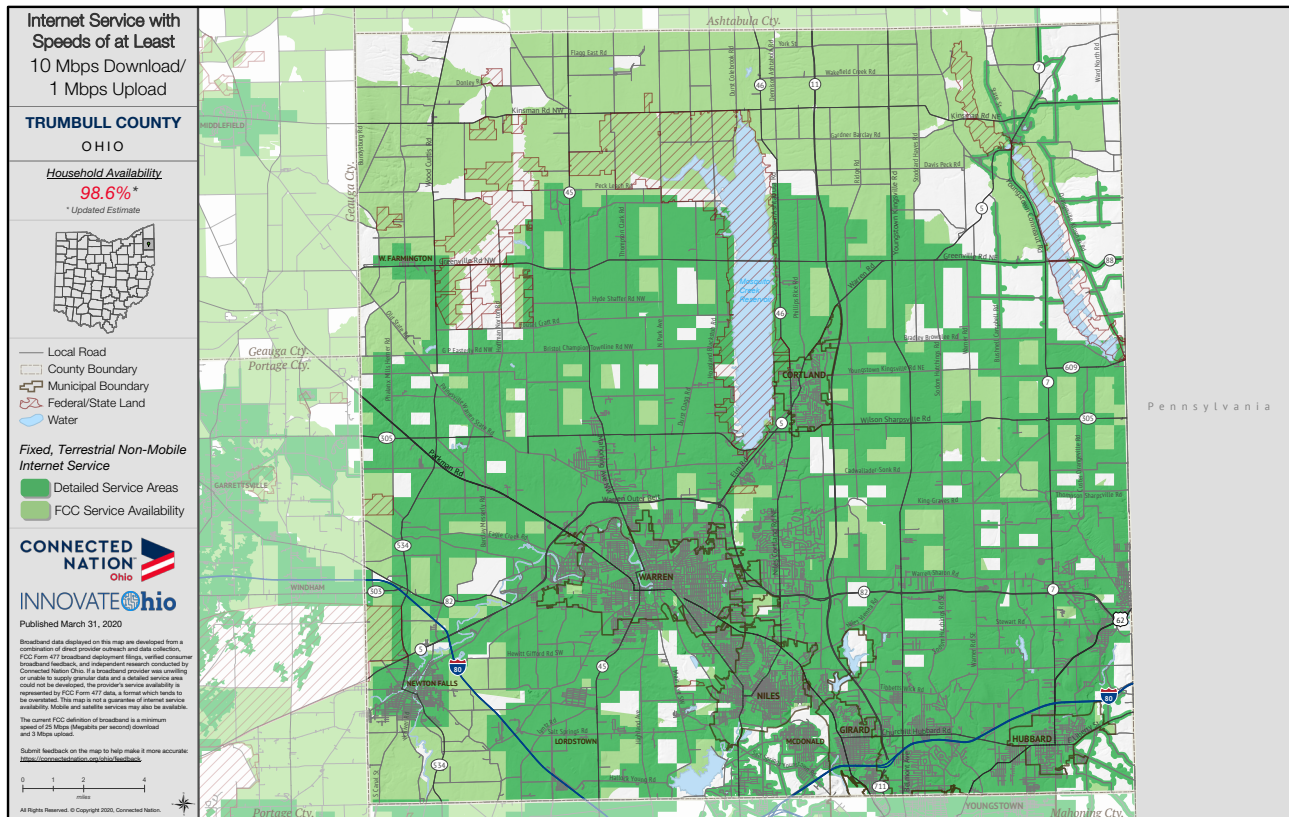


Figure 8.4 Connect Ohio Ashtabula County Map 25 Mbps download/ 3 Mbps upload

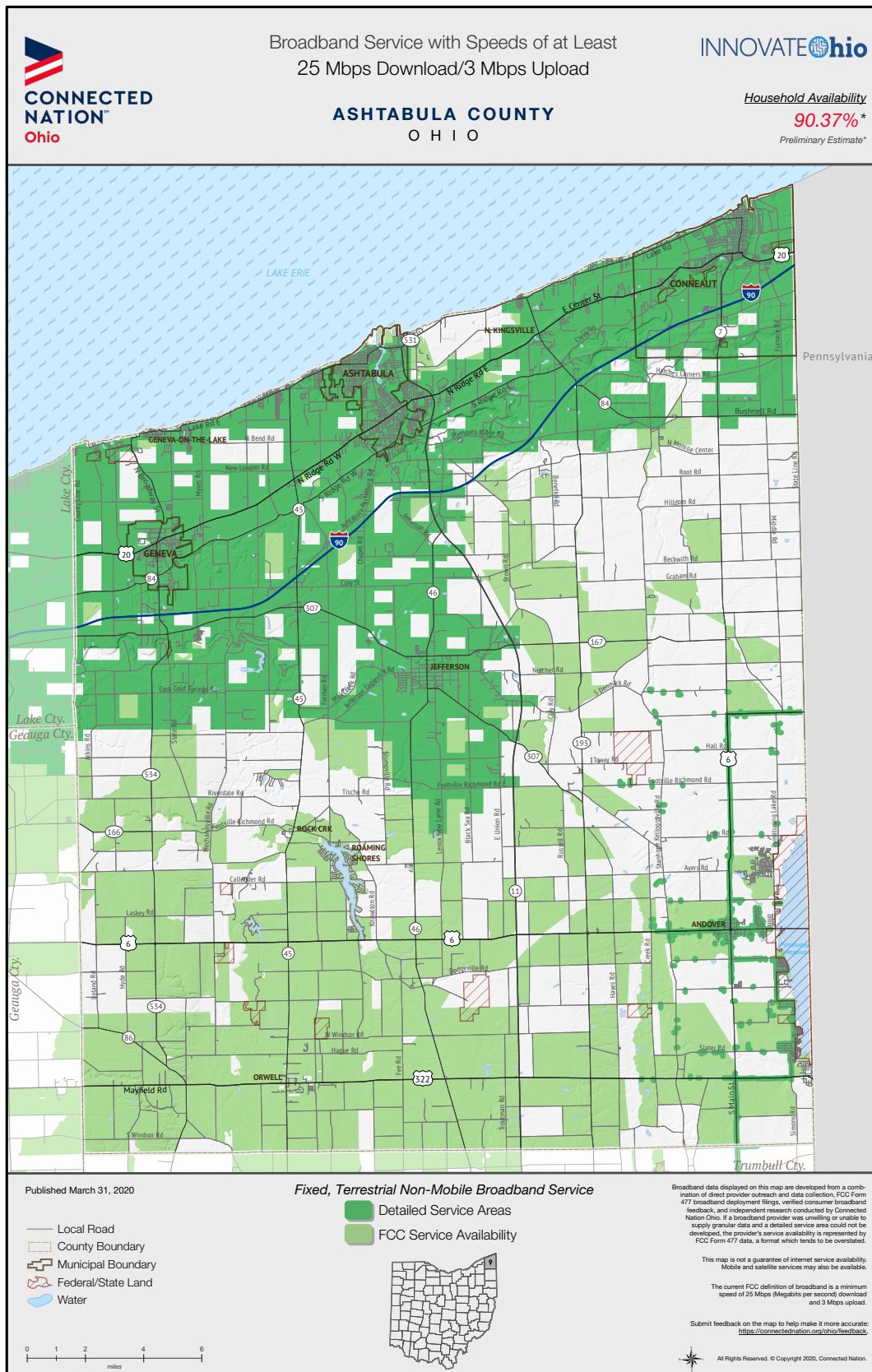


Figure 8.5 Connect Ohio Mahoning County Map 25 Mbps download/ 3 Mbps upload

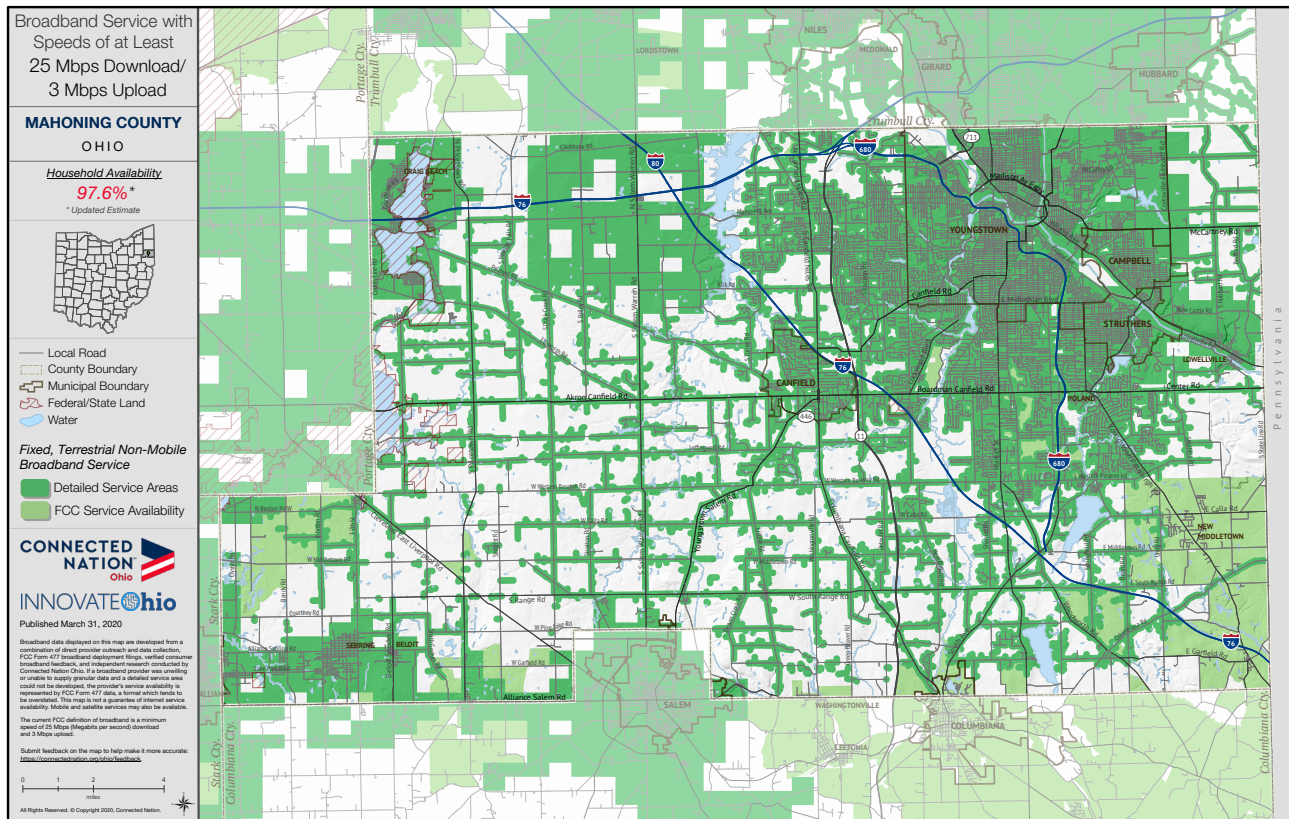
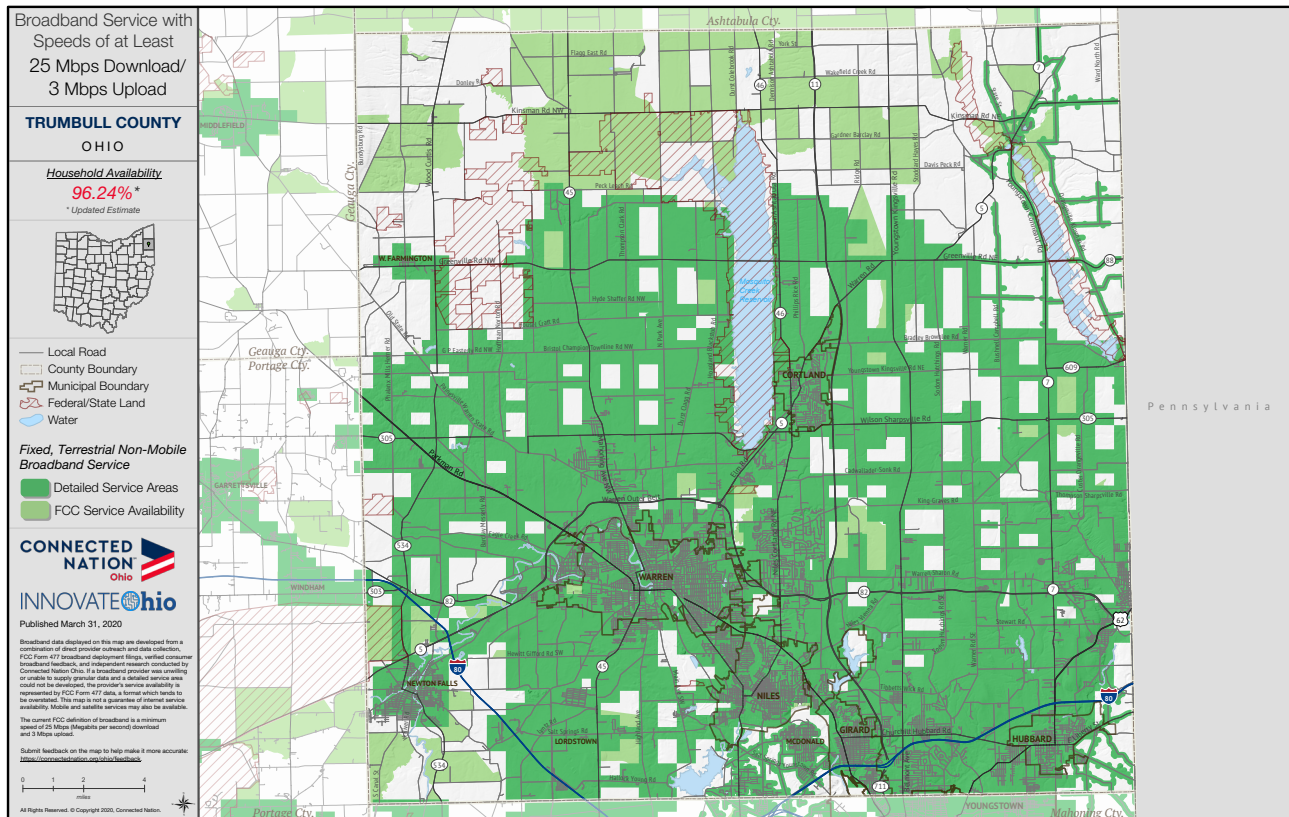


Figure 8.6 Connect Ohio Trumbull County Map 25 Mbps download/ 3 Mbps upload



Case Study: JobsOhio Inclusion Grant

WAVERLY

A last-mile internet service provider and woman-owned business, Southern Ohio Communication Services, Inc. is an example of a JobsOhio Inclusion Grant recipient that is bringing internet access to more users in a largely underserved area of Ohio. Based in Waverly, Ohio, Southern Ohio Communication Services, Inc. received \$50,000 for building and engineering costs in its \$3.8 million capital investment to provide 1 Gig optical fiber-to-the-home (“FTTH”) high-speed internet service over 64 miles to 1,300 residential and business customers in southern Ohio. This will create 5 jobs and help retain 10 jobs.²

GALLIA COUNTY

In Gallia County, Ohio, JB-Nets, LLC announced plans last year to expand broadband access to an additional 800 businesses and residents. This includes the construction of new infrastructure, an expansion of headquarters, and additional full-time jobs. Founded in 2002, JB-Nets has a mission of providing high-speed wireless internet to local residents and businesses. Assisting in the effort is the Gallia County Economic Development Office and the project is supported in part by a \$25,000 JobsOhio Inclusion Grant to be applied toward building costs for the headquarters expansion.³

JACKSON COUNTY

The Nock & Son Company is a family-owned business that—in collaboration with JobsOhio and Ohio Southeast Economic Development (“OhioSE”)—announced earlier this year that they received a JobsOhio Inclusion Grant to assist with installing broadband high-speed internet in Jackson County. The \$29,000 grant will be applied toward infrastructure and equipment costs as the company transitions the company’s digital operations.⁴

are intended to support companies with annual revenues up to \$25 million and most, if not all, qualified projects will require a company to commit to new job and payroll growth.

To be considered as an eligible project, a company must be engaged in a targeted industry including advanced manufacturing, aerospace and aviation, automotive, energy and chemicals, financial services, healthcare, food and agribusiness, logistics and distribution, technology, or military and federal. Additionally, an applicant company must demonstrate that:

- it is owned by an underrepresented populations (i.e. minority-owned, women-owned, veteran-owned, owned by a person with a disability); or
- it is certified by a state or national organization or able to verify that at least 51% of the organization is owned, managed, or controlled by the underrepresented population; and

- the project is located in a qualified distressed community as defined by an index score of 50 or greater by the Economic Innovation Group; and
- the company has been in operation for at least one year and are able to demonstrate \$100,000 in annual revenues.

Eligible costs under grant awards include land; buildings; leasehold improvements; machinery and equipment, including moving and relocation costs of such machinery and equipment; infrastructure; site development; revitalization costs including demolition, renovation, and environmental remediation; fees and material costs related to planning and feasibility studies; engineering services; employee training costs; and informational technology including hardware and industry-specific software. As demonstrated by the following case study, this grant has been used for broadband service expansion previously.

For clarity, this grant opportunity is best utilized by Eastgate-area businesses that meet the above criteria and are in need of additional broadband.

Federal

There are a variety of broadband grants available at the federal level and throughout the drafting of this Study it seemed as though new funding opportunities were continually announced. To ensure readiness for current and future federal grant applications, we recommend that all levels of government in the Eastgate region secure a System of Awards Management (SAM) number. This is a required step for any organization to secure federal grant funding and can be done through <https://www.sam.gov/SAM/>.

The Eastgate region, and its member counties, have demonstrated success in securing federal grants for a variety of infrastructure projects including funding from the U.S. Department of Transportation/ Federal Highway Administration; Economic Development Administration; the Environmental Protection Agency; and the Appalachian Regional Commission. Some of these awards have been targeted to elements of broadband expansion, such as the conduit included in the U.S. DOT BUILD Grant award for the SMART2 project. Additional federal programs for potential broadband funding are explored below, and further discussed in the Project Identification.

PRESIDENT BIDEN'S AMERICAN JOBS PLAN

At the outset, President Biden's American Jobs Plan ("AJP"), announced in Pittsburgh, Pennsylvania on March 31, 2021, must be mentioned as it has various broadband components. According to the fact sheet released by the White House, the AJP will seek to bring "affordable, reliable, high-speed broadband to every American, including the more than 35 percent of rural Americans who lack access to broadband at minimally acceptable speeds."⁵ In fact, an entire section of the Plan is dedicated to revitalizing America's digital infrastructure, as seen below:

Revitalize America's digital infrastructure:

Generations ago, the federal government recognized that without affordable access to electricity, Americans couldn't fully participate in modern society and the modern economy. With the 1936 Rural

Electrification Act, the federal government made a historic investment in bringing electricity to nearly every home and farm in America, and millions of families and our economy reaped the benefits. Broadband internet is the new electricity. It is necessary for Americans to do their jobs, to participate equally in school learning, health care, and to stay connected. Yet, by one definition, more than 30 million Americans live in areas where there is no broadband infrastructure that provides minimally acceptable speeds. Americans in rural areas and on tribal lands particularly lack adequate access. And, in part because the United States has some of the highest broadband prices among OECD countries, millions of Americans can't use broadband internet even if the infrastructure exists where they live. In urban areas as well, there is a stark digital divide: a much higher percentage of White families use home broadband internet than Black or Latino families. The last year made painfully clear the cost of these disparities, particularly for students who struggled to connect while learning remotely, compounding learning loss and social isolation for those students.

IN-DEPTH

According to the American Jobs Plan Ohio-specific fact sheet, 6.2% of Ohioans live in areas where, by one definition, there is no broadband infrastructure that provides minimally acceptable speeds. And 58.2% of Ohioans live in areas where there is only one such internet provider. Even where infrastructure is available, broadband may be too expensive to be within reach - 14% of Ohio households do not have an internet subscription.

The President believes we can bring affordable, reliable, high-speed broadband to every American through a historic investment of \$100 billion. That investment will:

- Build high-speed broadband infrastructure to reach 100 percent coverage. The President's plan prioritizes building "future proof" broadband infrastructure in unserved and underserved areas so that we finally reach 100 percent high-speed broadband coverage. It also prioritizes support for broadband networks owned, operated by, or affiliated with local governments, non-profits, and co-operatives—providers with less pressure to turn profits and with a commitment to serving entire communities. Moreover, it ensures funds are set aside for infrastructure on tribal lands and that tribal nations are consulted in program administration. Along the way, it will create good-paying jobs with labor protections and the right to organize and bargain collectively.
- Promote transparency and competition. President Biden's plan will promote price transparency and competition among internet providers, including by lifting barriers that prevent municipally-owned or affiliated providers and rural electric co-ops from competing on an even playing field with private providers, and requiring internet providers to clearly disclose the prices they charge.
- Reduce the cost of broadband internet service and promote more widespread adoption. President Biden believes that building out broadband infrastructure isn't enough. We also must ensure that every American who wants to can afford high-quality and reliable broadband internet. While the President recognizes that individual subsidies to cover internet costs may be needed in the short term, he believes continually providing subsidies to cover the cost of overpriced internet service is not the right long-term solution for consumers or taxpayers. Americans pay too much for the internet – much more than people in many other countries – and the President is committed to working with Congress to find a solution to reduce internet prices for all Americans, increase adoption in both rural

and urban areas, hold providers accountable, and save taxpayer money."

Details beyond the general fact sheet and state-specific fact sheets⁶ are not yet known; the specifics will become clearer once a bill is officially introduced in Congress. However, there has already been tension as to exactly *how* President Biden should invest the \$100 billion set aside for broadband: the Administration wants to allocate funding into government-run or nonprofit networks, while cable and telecom companies want funds to go toward investing in 5G. On April 19, 2021, President Biden met with a bipartisan group of lawmakers who are former Mayors and Governors—those who most understand the importance of broadband locally—in order to delve into the specifics. Depending on what language ultimately gets through Congress, this could be a significant opportunity for Eastgate governments to fund local broadband infrastructure. However, given its uncertainty, it is not included as a financing tool in the Project Identification section.

AMERICAN RESCUE PLAN ACT OF 2021

Broadband is also a major component of the American Rescue Plan Act of 2021, discussed previously in the Policy Analysis section, with schools, rural communities, and other entities well-positioned to benefit. Three particularly relevant funds in Rescue Plan Act are as follows:

- \$7.171 billion — Emergency Connectivity Fund
- \$219.8 billion — State and Local Fiscal Recovery Funds
- \$9.961 billion — Homeowner Assistance Fund

From a broadband access perspective, the **State and Local Fiscal Recovery Funds** of ARP are most pertinent and are delineated as follows:

- **Coronavirus State Fiscal Recovery Funds** — Through December 2024, \$219.8 billion will be made available for states, territories, and tribal governments to mitigate the fiscal effects caused by COVID-19. \$193.5 billion is provided to all 50 states and D.C.. Of this amount, \$25.5 billion is reserved for equal allocation and the remainder is to be allocated based on unemployment rates. States, territories, and tribal governments may also transfer funds to nonprofits or other entities to carry out the intended work.

- **Coronavirus Local Fiscal Recovery Funds**
— Of this \$130.2 billion, \$45.5 billion will be allocated to metropolitan cities, counties receive \$65.1 billion, and non-entitlement units of local governments receive \$19.5 billion.

The above funds may be used in a variety of ways to help households, small businesses, nonprofits, and industries suffering as a result of COVID-19. The funds may also be used for essential workers, government services, water, sewer, and—most relevant—**broadband**.

Funding will be distributed in two tranches — 50% within 60 days of the enactment of the legislation and 50% no earlier than one year later. States must distribute funding within 30 days of receipt to local governments. However, a question remains in Ohio as to which State entity will serve as the “gatekeeper” of these funds, although it is speculated that the Ohio Development Services Agency will serve in this role.

In guidance recently provided by the U.S. Department of the Treasury (the “Treasury”) ⁷—along with a fact sheet ⁸—there are three funds that may be used to support the expansion of reliable broadband infrastructure: Sec. 602, the Coronavirus State Fiscal Recovery Fund, Sec. 603, the Coronavirus Local Fiscal Recovery Fund, and Sec. 604, the Coronavirus Capital Projects Fund (CCPF). Guidance on sections 602 and 603 is provided in an Interim Final Rule. Guidance regarding CCPF in Sec. 604 is expected to be released soon and is expected to be similar to the guidance laid out in 602 and 603.

State and Local Fiscal Recovery Funds, Sec. 602 and 603

Sections 602 and 603 contain the same eligible uses with one main difference: section 602 establishes a fund for States, territories, and tribal governments, whereas section 603 establishes a fund for metropolitan cities, non-entitlement units of local government, and counties.

Sections 602(c)(1) and 603(c)(1) provide that funds may be used to make “necessary investments” in broadband infrastructure, including investments that are required to establish or improve broadband service to unserved or underserved populations (i.e., those lacking access to a wired connection that can deliver minimum speeds of 25 Mbps download and 3 Mbps upload) who are

unlikely to receive such access through private funds.

Eligible projects are those designed to deliver service that meets or exceeds equal/ symmetrical upload and download speeds of 100 Mbps. However, there may be instances in which such speeds are not practicable for a project because of geography, topography, or excessive costs that are associated with the project in question. In these instances, the project would be expected to be designed to deliver reliable service that meets or exceeds 100 Mbps download and between at least 20 Mbps and 100 Mbps upload speeds, with scalability to 100 Mbps symmetrical service. Recipients are also encouraged to prioritize investments that will use fiber optic infrastructure, where feasible; to focus on projects that deliver a last-mile connection; and to incorporate affordability options into their projects.

Under sections 602(c)(1)(A) and 603(c)(1)(A), assistance to households or populations facing negative economic impacts as a result of COVID-19 is also an eligible use, including internet access or digital literacy assistance. As it is the same with broadband infrastructure investments, when considering whether a potential use is eligible under this category, a recipient must take into consideration whether, and to what extent, the household has experienced a negative economic impact from COVID-19.

State, local, territorial, and tribal governments do not have to submit plans for how they intend to use such funds for sections 602 and 603; they are able to request funding allocated to them based on the funding formulas set forth by the Treasury. Costs for such projects must be incurred by December 31, 2024.

The Coronavirus Capital Projects Fund (CCPF), Sec. 604

The Capital Projects Fund was created to focus on the continuing need for connectivity in response to the COVID-19 pandemic, especially in rural America and low- and moderate-income communities, by helping to ensure that all communities have access to high-quality, modern infrastructure needed to succeed including reliable internet access.

The Capital Projects Fund complements the broader range of issues, including broadband

infrastructure, that is included in the \$350 billion Coronavirus State and Local Fiscal Recovery Funds.

- \$195.3 billion for states and DC;⁹
- \$65.1 billion for counties;¹⁰
- \$45.6 billion for metropolitan cities;¹¹
- \$20 billion for Tribal governments;
- \$4.5 billion for territories; and
- \$19.5 billion for non-entitlement units of local government.¹²

*Non-entitlement units of local government are generally those with populations of less than \$50,000. Jurisdictions classified as non-entitlement units will receive funds directly through their applicable state government, not directly from Treasury, and thus should not request funding through the Treasury Submission Portal, detailed below.

Capital projects are defined as investments in depreciable assets and the additional costs needed to put those assets into use. Not only does the fund support the expansion of reliable broadband, but it also provides states, territories, and tribal governments with the flexibility to use funds as they see fit to make investments in critical community hubs or other capital assets that provide reliable access to work, education, and healthcare. Eligible applicants will be required, in submitting their application, to provide a plan showing how they intend to use the allocated funds under the Capital Projects Fund consistent with the ARP and the guidance issued by the Treasury.

The Treasury will begin accepting applications for review in the summer of 2021 and soon issue additional guidance on this process. In order to request funds, one must do so through the Treasury Submission Portal (<https://home.treasury.gov/policy-issues/coronavirus/assistance-for-state-local-and-tribal-governments/state-and-local-fiscal-recovery-fund/request-funding>), obtain a DUNS number and register for a sam.gov account, both of which are discussed further in the federal grants portion of this section, and meeting other submission requirements.

From the digital inclusion perspective under the American Rescue Plan Act, the **Emergency Connectivity Fund** will be a significant benefit to low-income consumers who struggle with service and device affordability.¹³

On Friday, April 30, 2021, the FCC released a draft Report and Order (with an accompanying fact sheet), which, if adopted, would establish the rules and policies governing the Emergency Connectivity Fund Program (“ECFP”). According to the Commission’s release,¹⁴ the Emergency Connectivity Fund Program would reimburse schools and libraries for the purchase, during the COVID-19 pandemic, of laptop and tablet computers; Wi-Fi hotspots; and other eligible equipment; as well as broadband connections for students, school staff, and library patrons who would otherwise lack access to connected devices and broadband service during this time.

As of now, in order to meet the “immediate needs” of students, school staff, and library patrons, the proposed Report and Order will only allow use of ECFP funds for Wi-Fi hotspots, modems, routers, devices that combine modem and router, and connected devices. The ECFP will deprioritize reimbursing purchases made earlier in the pandemic, and cannot be used for dark fiber or new network construction, except in areas “where no service is available for purchase.”¹⁵ According to the proposed Report and Order:

The record reflects the fact that in some instances there is simply no commercially available service for purchase available to reach students, school staff, and library

Case Study CARES Act

The Windstream Pennsylvania Gigabit Project is a public-private partnership between Kinetic by Windstream and Greene County, Pennsylvania that was funded, in part, by \$1,284,549 received from the CARES Act. Additional funding was contributed by Windstream. The partnership aims to bring gigabit speeds to 7,300 homes in six communities—Bobtown, Carmichaels, Greensboro, Jefferson, Mount Morris, and Waynesburg—as well as increase speeds to existing customers in additional communities.¹⁷ Windstream also has a large presence in the Eastgate region.

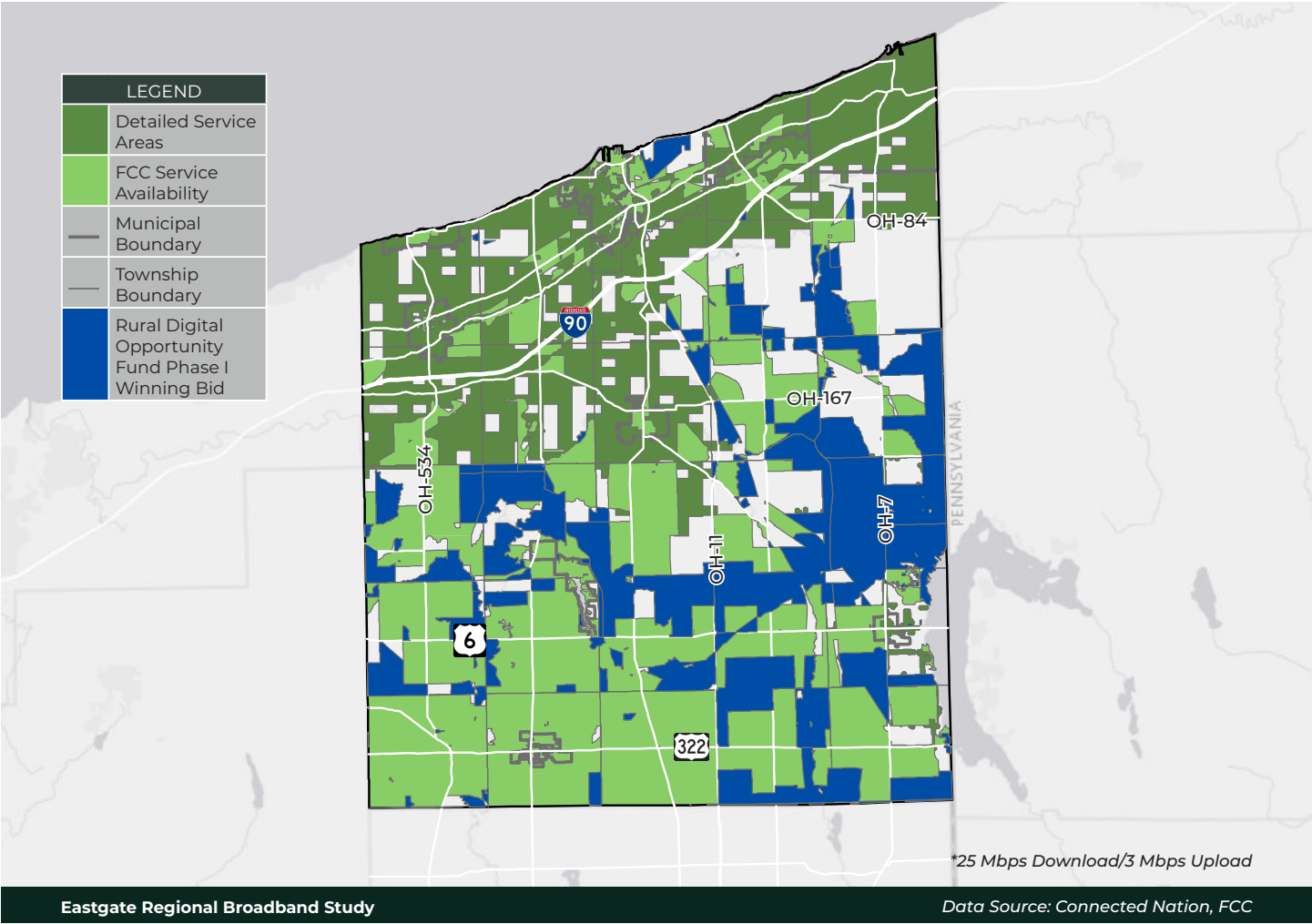
patrons in their homes. In only those limited instances, network construction (including construction of wireless networks) is the only way to quickly bring connectivity to these students, school staff, and library patrons, and we believe that the “purchase” of equipment necessary to make advanced telecommunications and information services functional is consistent with Congress’ intent to provide emergency connectivity to students, school staff, and library patrons that do not have any other options. Where there are no such services available, we will allow schools and libraries to seek Emergency Connectivity Fund Program support to construct or self-provision networks to connect students, school staff, and library patrons during the COVID-19 emergency period who would otherwise not

be connected, and we will not require schools and libraries to engage in competitive bidding.¹⁶

Requests for changes to the draft Report and Order are being made by various organizations, including clarification as to what constitutes “sufficient.” We recommend that Eastgate continue to monitor developments under this program to determine usability within the three-county region.

The purpose of the **Homeowner Assistance Fund (“HAF”)** is to prevent mortgage delinquencies and defaults, foreclosures, loss of utilities or home energy services, and displacement of homeowners experiencing financial hardship after January 21, 2020. Funds may be used for assistance with mortgage payments, homeowner’s insurance, utility payments, and

Figure 8.7 Ashtabula County RDOF Awards



other specified needs such as internet service, including broadband internet access service, as defined in section 8.1(b) of title 47, Code of Federal Regulations (or any successor regulation).

Under the statute, to participate in the HAF, each state was required to submit a notice of funds request to the Department of the Treasury by April 25, 2021. In Ohio, this was performed by the Ohio Housing Finance Authority.

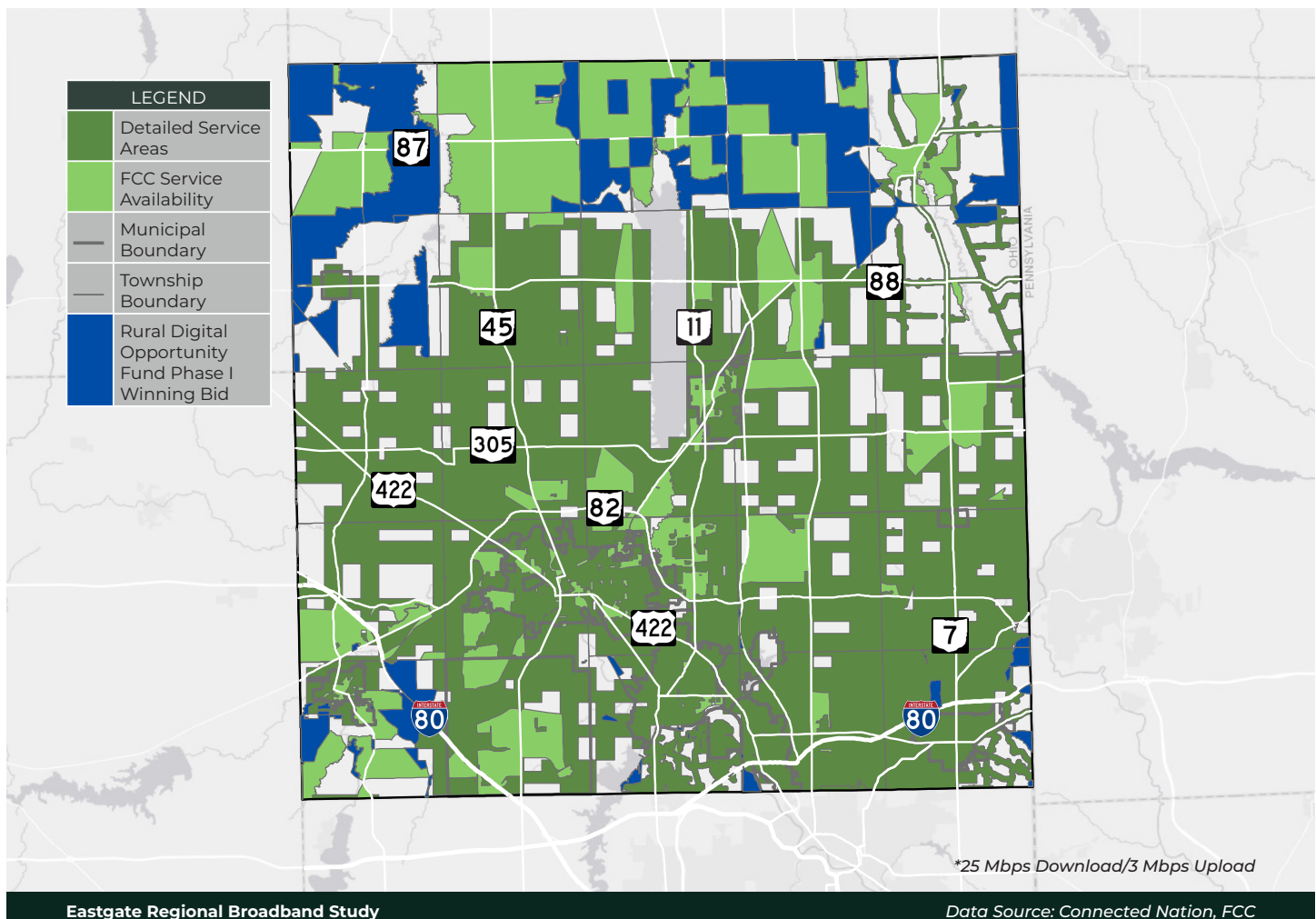
Broader guidance on the ARP is being released by the U.S. Department of Treasury on a rolling basis, but will be complete for all programs no later than May 10, 2021. It is our strong recommendation that eligible communities within the Eastgate region utilize the RFI/ RFP process included in the Project Identification section to utilize at least a portion of these funds for broadband expansion, as applicable. Although

it had an abbreviated timeline to earmark funds as compared to the ARP, the CARES Act set strong precedent for using such federal dollars for broadband.

CONSOLIDATED APPROPRIATIONS ACT

On December 27, 2020, the Consolidated Appropriations Act of 2021 was signed into law, allocating over \$900 billion for various COVID-19 relief programs. Included in the legislation was a \$3.2 billion fund (the “Emergency Broadband Benefit Program” or “EBB”) to help Americans afford home internet service during the pandemic. The Act directs the Federal Communications Commission (FCC) to use the money to set up the Emergency Broadband Benefit Program, which would allow eligible low-income households to receive a monthly discount on broadband. This program is addressed

Figure 8.8 Trumbull County RDOF Awards



in further detail in the Policy and Project Identification sections of this Study.

FEDERAL COMMUNICATIONS COMMISSION

Rural Digital Opportunities Fund (“RDOF”)

The FCC’s Rural Digital Opportunities Fund (“RDOF”) program was previously discussed in the Policy Analysis section as the FCC’s Universal Service Fund program formerly known as the Connect America Fund, and the High-Cost Fund prior to that moniker.

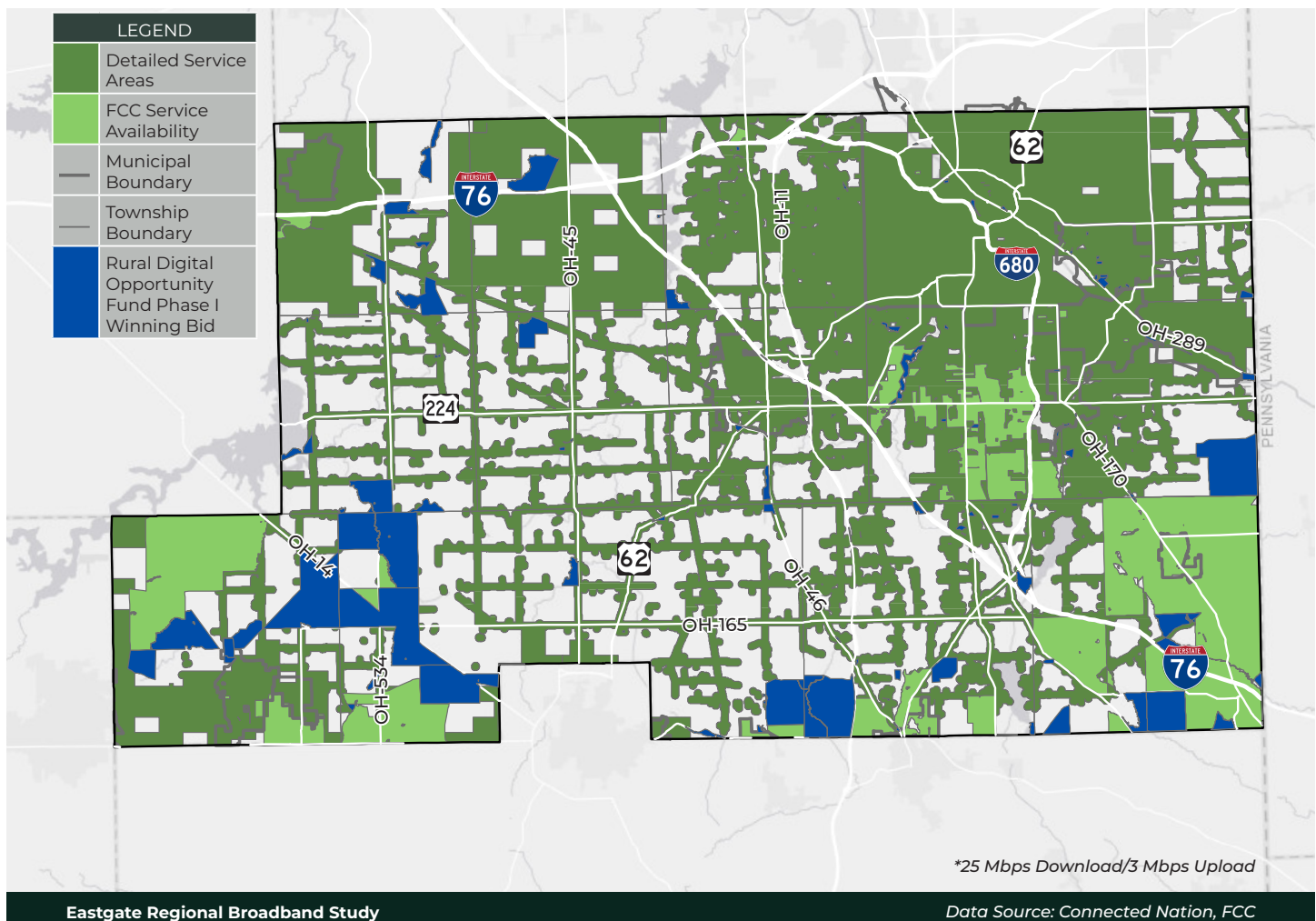
Adopted in August 2019, the FCC established the \$20.4 billion Rural Digital Opportunity Fund to bring high-speed fixed broadband service to rural homes and small businesses. In January 2020, the FCC adopted the RDOF Report and Order to create the framework and build on success on the success of the Connect America Fund (“CAF”)

Phase II auction,¹⁸ as previously discussed in the Policy Analysis section of the Study.

RDOF is a two-round reverse action for \$20.4 billion in subsidies that will be allocated over the next 10 years in equal monthly installments.

- **Phase I** of RDOF provides \$16 billion to target areas that are “wholly unserved” by broadband at 25 Mbps download/ 3 Mbps upload. Approximately 5.3 million unserved homes and businesses in the U.S. fall within these parameters.
- **Phase II** of RDOF provides \$4.4 billion to target areas that are “partially unserved” and any areas not won in Phase I, after the FCC updates its availability data through the Digital Opportunity Data Collection discussed in the Policy Analysis section of this Study.¹⁹

Figure 8.9 Mahoning County RDOF Awards



Recipients of RDOF funds must:²⁰

- Offer commercially at least one voice and one broadband service meeting the relevant service requirements to all locations within the awarded area within a specified timeframe;
- Accept the deployment schedule to be determined by the carrier and not the FCC;
- File with the Universal Service Administrative Company (“USAC”) annual reports and build-out milestone certifications as well as data on the locations with available service; and
- Offer at least one broadband and voice service at rates that are reasonably comparable to the rates for similar service in urban areas.

Bidding to the RDOF program was conducted by census block and the weighting system favored bids for higher-speed, lower-latency service (which has since been criticized).²¹ RDOF recipients can use any fixed broadband service (i.e., fixed wireless, fiber, etc.), but will need to deploy at least 25 Mbps download/ 3 Mbps upload service and complete and offer such service to 40% of the required locations in a state by the end of the third year; an additional 20% of locations in subsequent years; and 100% of locations by the end of the sixth year. There will be auditing and penalties for failing to meet build-out requirements.

The application process for providers was two-stage—a short-form application followed by a long-form application. For the short-form application, entities seeking to participate in the auction were required to:

- Demonstrate two years of experience providing a voice, broadband, and/or electric distribution or transmission service and submit one year of audited financials; or
- Submit three years of audited financial with the short-form application and a letter of interest from an eligible bank willing to issue a letter of credit for a specified amount.

Applicants were also required to provide high-level technical information to demonstrate that they have the qualifications to meet the applicable performance tier and latency requirements.

Once an entity won a bid, they or their designee was required to perform the following:

- Provide a long-form application containing additional information about qualifications, funding, and the network that they intend to use to meet their obligations;
- Submit a letter from an eligible bank committing to issue a letter of credit and, upon notification that the entity is ready to be authorized, obtain a letter of credit from an eligible bank that reminds open and covers disbursements until compliance with certain service milestones is complete and verified; and
- Within 180 days of being announced as a winning bidder, certify they are eligible telecommunications carriers in any areas for which they seek support and submit relevant documentation.

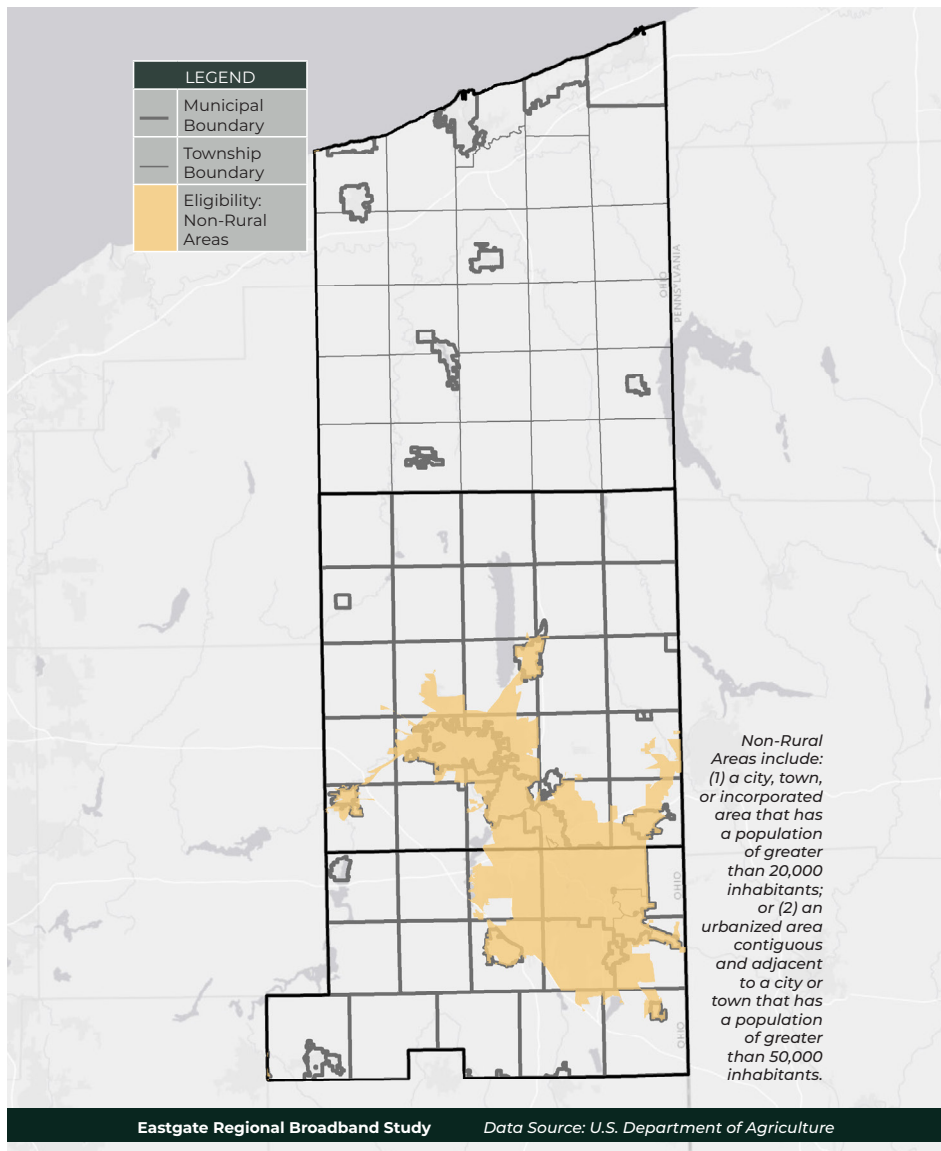
The RDOF awards in the Eastgate regions are provided below:

ASHTABULA COUNTY	LOCATIONS	AWARD
CCO Holdings, LLC	799	\$801,348.00
Connect Everyone LLC	548	\$569,157.00
LTD Broadband LLC	1,046	\$1,748,222.00
Windstream Services LLC, Debtor-In-Possession	285	\$287,184.00
	2,678	\$3,405,911.00

MAHONING COUNTY	LOCATIONS	AWARD
Armstrong Telephone Company - Northern Division	50	\$18,696.50
CCO Holdings, LLC	335	\$307,660.90
Connect Everyone LLC	190	\$393,766.47
LTD Broadband LLC	372	\$435,462.00
Mercury Wireless, Inc.	108	\$42,318.90
Windstream Services LLC, Debtor-In-Possession	20	\$37,356.00
	1,075	\$1,235,260.77

TRUMBULL COUNTY	LOCATIONS	AWARD
Armstrong Telephone Company - Northern Division	15	\$3,363.60
CCO Holdings, LLC	1,133	\$960,546.10
Connect Everyone LLC	81	\$166,382.34
LTD Broadband LLC	285	\$656,172.00
Windstream Services LLC, Debtor-In-Possession	110	\$151,086.00
	1,624	\$1,937,550.04

Figure 8.10 USDA rurality



Although RDOF will heighten connectivity in the region, it will be several years before networks built under the program are available, and the build-out priority of the recipient providers in the Eastgate region has yet to be seen. Windstream and LTD Broadband have projected fiber RDOF deployments; however, Windstream has stated that RDOF funds likely will not cover the full cost of the project.²² In addition, LTD Broadband's RDOF award has been met with skepticism. Regardless, the company maintains that it will provide service of at least 1 Gbps download and 500 Mbps upload in its RDOF deployments.²³ As a result of these considerations and other criticisms of the program,²⁴ communities in the Eastgate region may seek to act sooner and our recommendations in the Project Implementation section are not dependent on RDOF.

USDA RURAL UTILITY SERVICE (RUS):

Housed within the U.S. Department of Agriculture ("USDA"), the Rural Utilities Service ("RUS") provides infrastructure improvements to rural communities ranging from water and waste treatment to electric power and telecommunications services—collectively improving the quality of life for rural residents. Programs within USDA—each further detailed below—include:

- Community Connect Grants;
- Distance Learning & Telemedicine Grants;
- ReConnect Grant Program;

- Rural Broadband Access Loan and Loan Guarantee Program; and
- Telecommunications Infrastructure Loans & Guarantees.

Community Connect Grants²⁵

Community Connect Grants provide financial assistance to facilitate broadband service expansion in rural, economically challenged communities where service does not currently exist at speeds of 10 Mbps download/1 Mbps upload. Eligible applicants to the Community Connect Grant include incorporated organizations, federally recognized tribes, state and local government, and any other legal entity including cooperatives, private corporations, or limited liability companies.

Funds under Community Connect may be used for a variety of purposes including:

- the construction, acquisition, or leasing of facilities, spectrum, land, or buildings used to deploy broadband service;
- the cost of providing free broadband service to community facilities for two years; and
- the improvement, expansion, construction, or acquisition of a community center to provide online access to the public (less than 10% of the grant amount—or up to \$150,000—may be used for this purpose).

Beyond eligibility baselines and acceptable uses of funding, other grant considerations include, but are not limited to:

- buildings constructed with Community Connect funds must be located on property owned by the awardee;
- leasing expenses will only be covered through the advance of funds period included in the award documents;
- grantees must have legal authority to provide, construct, operate, and maintain the proposed facilities or services;
- partnerships with federal, state, local, private, or non-profit entities are encouraged; and
- matching funds of at least 15% from non-federal sources are required.

The current application window for Community Connect closed on December 23, 2020. To-date,

there have not been any awards in Ohio.

Distance Learning and Telemedicine Grants²⁶

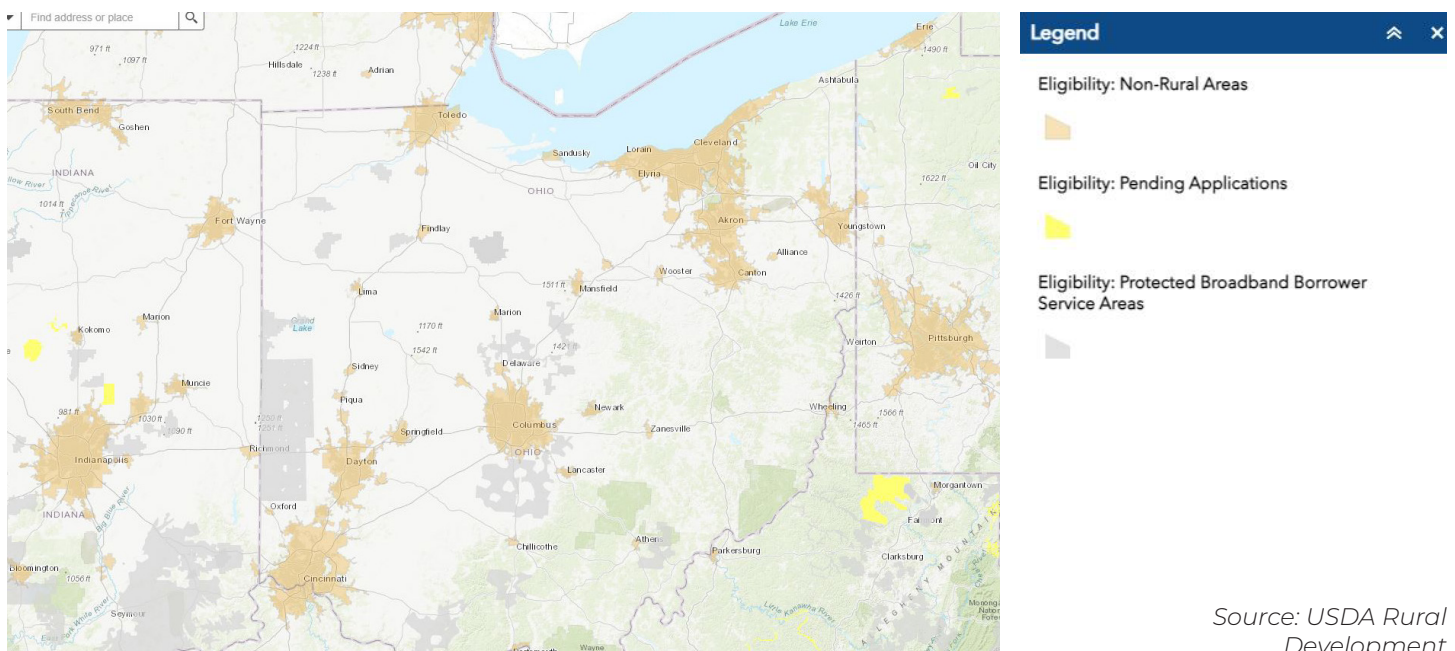
The Distance Learning and Telemedicine (“DLT”) program helps rural communities use telecommunications in order to connect and overcome remoteness and low population density. In FY21, Congress allocated \$57 million in DLT funding. After applying \$18 million to award projects from the prior fiscal year, approximately \$44.5 million is available—a combination of funds not allocated from the previous year in addition to the new funds allocated for FY21.

For both the distance learning and telemedicine programs, eligible applicants include most state and local government entities, federally recognized tribes, non-profits, for-profit businesses, and a variety of other entities. A minimum 15% match is required for grant-only awards and it cannot be supplied by another federal source. Although matching contributions generally are required to be in the form of cash, match can be in-kind in the form of a grant-eligible contribution.

Eligible uses of DLT grant funds include:

- acquisition, and legal ownership, of eligible capital assets such as;
 - » broadband facilities (limited to 20% of the grant);
 - » Broadband facilities must undergo substantial environmental review;
 - » audio, video, and interactive video equipment;
 - » terminal and data terminal equipment;
 - » computer hardware, network components, and software; and
 - » inside wiring and other infrastructure to further distance learning and telemedicine services;
- acquisition of instructional programming that is a capital asset; and
- acquisition of technical assistance and instruction for using eligible equipment.

In scoring applications, “rurality” based on 2010 census population is 40 of the total possible 120 points (i.e., the applicant area cannot be too close in proximity to a non-rural area). Funded applications must receive a score of at

Figure 8.11 ReConnect Program Service Area Map

Source: USDA Rural Development

least 20 on rurality. Applicants can confirm the “rurality” of the community using 2010 Census population data from the Census website, while the determination of the proximity of urban areas should be made using the DLT Map included in the application materials, which is also based on the 2010 Census.²⁷

Ultimately, through its DLT program, USDA is seeking projects that are sustainable and meet the long-term needs of a rural area.

The Eastgate region has success with the DLT program previously in each of the three counties participating in this Study.²⁸ Applications are currently being accepted for the DLT program and the deadline is June 4, 2021. Applications are accepted through the Grants.gov portal, available at: <https://www.grants.gov>.

ReConnect Loan and Grant Program²⁹

The ReConnect Loan and Grant program offers loans, grants, and loan/grant combinations to facilitate broadband deployment in rural areas that lack 10 Mbps download / 1 Mbps upload, or higher, on a consistent 24/7 basis.³⁰ In facilitating the expansion of broadband services and infrastructure, the ReConnect program seeks to fuel long-term rural economic development and opportunities such as precision agriculture, a technology that requires a robust broadband connection.

Funds under the ReConnect program are awarded to projects with a financially stable business model to bring high-speed broadband to rural homes, businesses, farms, ranches, and community facilities such as first responders, health care, and schools, in rural areas. For purposes of the program, rural areas are those *not* located within: (1) a city, town, or incorporated area that has a population of greater than 20,000; or (2) an urbanized area adjacent to a city or town that has a population greater than 50,000.

Areas eligible for the program have been those in which 90% of the households to be served do not have access to broadband service at speeds of at least 10 Mbps download/ 1 Mbps upload. Mobile/cellular and satellite services were not to be considered in determining access to broadband. Applicants were also required to propose to build a network within 5 years of available funds that is capable of providing broadband service to every household, farm, and business located in the proposed funded service area. Note, however, that there is a challenge process for area providers, conceptually similar to that found within Ohio House Bill 2.

Eligible applicants include states and local governments, including any agency, subdivision, instrumentality, or political subdivision thereof; corporations; limited liability companies and limited liability partnerships; cooperative

organizations; and others less applicable to the Eastgate region. The entity that applies for the funding must own the resultant infrastructure.

Awards are to be used to fund the construction or improvement of facilities required to provide fixed broadband service, including fixed wireless; to fund reasonable preapplication expenses in an amount not to exceed five percent of the award; and to fund the acquisition of an existing system that does not currently provide sufficient access to broadband for upgrading that system to meet the requirements of this regulation.

The ReConnect pilot program was established in 2018 with a \$600 million allocation. Congress funded an additional \$550 million in 2019 and another \$555 million the year following. The CARES Act most recently provided another \$100 million for the program. In the most recent round, for 100% grant awards, up to \$200,000,000 was available and the maximum amount that could be requested in an application was \$25,000,000. A 25% match was also required. For 50% loan and 50% grant awards, up to \$200,000,000 was available and the maximum that could be requested was equal loan and grant amounts up to \$25,000,000 each. For 100% loan awards, up to \$200,000,000 was available and the maximum amount that could be requested was \$50,000,000.

The Reconnect program awarded over \$661 million in 2019 and \$673 million in 2020.³¹ There were 161,000 in 2019 premises passed in 2019 and 113,000 in 2020, demonstrating an increase from \$4,100 to approximately \$6,000 to pass a home, business, or community anchor institution.³²

The second application window opened on January 31, 2021 and several entities in the Eastgate region contemplated responding. Although the application deadline is now closed, on February 26, 2021, USDA published the Reconnect Program Regulation, which codifies the program's policies and procedures.³³ As such, we anticipate a third round of ReConnect broadband loans and grants incorporating the basic eligibility from previous funding rounds outlined above.

For future rounds of the program, applicants are encouraged to work with their Governor's offices to submit information as to where state funding has been provided – this will be the first round in which Ohioans need to consider State funds

with the passage of H.B. 2. Note further that areas that have received federal grants or FCC funds to provide broadband service (i.e., CAF or RDOF) have been restricted from funding if such funding is principally to construct facilities throughout the area that provide broadband service at the threshold level under this program.

Rural Broadband Access Loan and Loan Guarantee Program³⁴

The Rural Broadband Access Loan and Loan Guarantee Program furnishes loans and loan guarantees for the costs of construction, improvement, or acquisition of facilities and equipment needed to provide broadband service to eligible rural areas.

Eligible applicants to the Loan and Loan Guarantee Program include corporations, limited liability companies, cooperatives or mutual organizations, state or local governments, and federally recognized tribes. However, the proposed funded service areas must be completely contained within a rural area or composed of multiple rural areas where at least 15% of the households are unserved; no part of the proposed funded service area has three or more incumbent service providers; and no part of the area overlaps with the service area of current RUS borrowers.

Eligible uses of loan and loan guarantee funds include:

- the construction, improvement, and acquisition of facilities required to provide service at the broadband lending speed including facilities required for providing other services through the same facilities;
- the cost of leasing facilities required to provide service at the broadband lending speed; and
- acquisition, depending on the circumstances.

The application period for the Rural Broadband Access Loan and Loan Guarantee Program is closed, but new application windows are announced on a regular basis. However, due to the significant amount of grant funds available for broadband projects, we do not recommend that the Eastgate region pursue such loans or loan guarantees, unless fully necessary.

Telecommunications Infrastructure Loans & Loan Guarantees³⁵

The Telecommunications Infrastructure Loans & Loan Guarantees program provides financing for the construction, maintenance, improvement, and expansion of telephone service and broadband in rural areas. Cost-of-money loans from RUS are available as are hardship loans and loan guarantees of up to 80%, which allow private lenders to extend credit to qualified borrowers in rural areas.

Eligible entities include state and local governments; federally recognized tribes; non-profits including cooperatives and limited dividend or mutual associations; and for-profit businesses that are corporations or limited liability companies. An eligible area for the Telecommunications Infrastructure Loans and Loan Guarantees is a rural area or town with 5,000 or less residents; an area without telecommunications facilities; or an area where the applicant is the recognized telecommunications provider.

Additional eligibility requirements include:

- borrowers must have legal authority to provide, construct, operate, and maintain the proposed facilities or services;
- all facilities financed with the aid of federal dollars must be used for a public purpose; and
- recipients may not duplicate similar services available in the same area.

Partnerships with other federal, state, local, private, and non-profit entities are also encouraged.

Eligible uses of Telecommunications Infrastructure Loan and Loan Guarantee funds include improvements; expansions; construction; acquisitions, in certain cases; and refinancing, in certain cases.

Applications for the program are accepted year-round.³⁶ However, similar to the Rural Broadband Loan and Loan Guarantee Funds, due to the significant amount of grant funds available for broadband projects, we do not recommend that the Eastgate region pursue such loans or loan guarantees, unless fully necessary.

APPALACHIAN REGIONAL COMMISSION

The Appalachian Regional Commission (“ARC”) is an economic development partnership agency of the federal government and 13 state

governments, including Ohio, that focuses on 420 counties across the Appalachian Region. ARC’s mission is to strengthen economic growth in the area. It does so by providing grants, publishing research, and sponsoring learning experiences.³⁷

*Partnerships for Opportunity and Workforce and Economic Revitalization (POWER)*³⁸

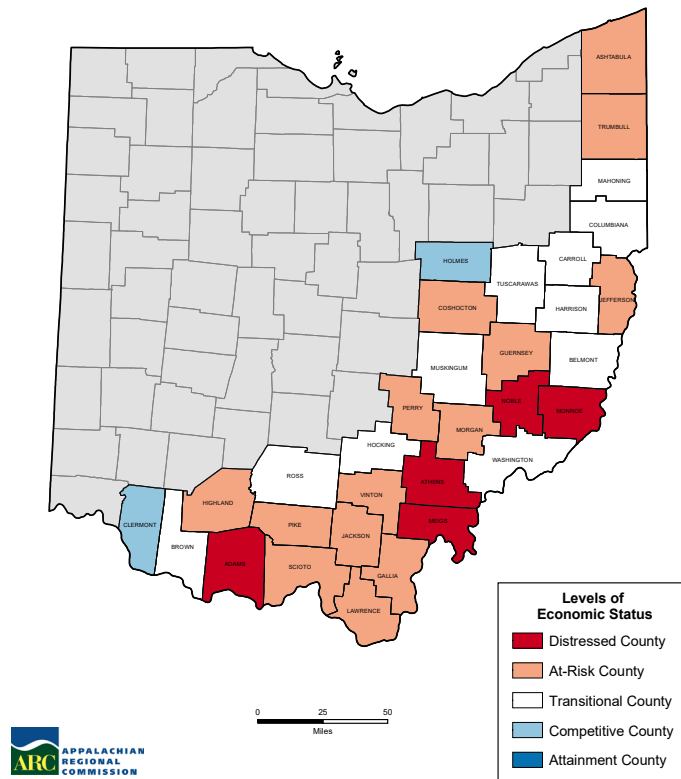
The Partnerships for Opportunity and Workforce and Economic Revitalization (“POWER”) provides funding for planning grants and implementation grants to help communities that have been negatively affected by the loss of jobs due to the decline of the coal industry.

To date, the POWER initiative has invested over \$238 million to support 293 projects across 353 communities. Collectively, these investments helped create or retain 26,000+ jobs, leveraged more than \$1.1 billion in additional private investment, and prepared workers and students for opportunities in growing sectors.

Although the application window is currently closed, the following information from the most recent Notice of Funding Opportunity (“NOFO”) may be helpful for any future rounds:

- The POWER initiative only allowed one application per cycle per applicant (i.e., applicants cannot apply individually as county, and then as three-county regional applicant).
- A Local Development District (i.e., Eastgate Regional Council of Governments) or Local School District was able to apply as lead applicant/ fiscal agent (and had to assume all legal responsibility for the project). This may be a good approach if an applicant does not have sufficient staff/ procedures/ reporting capabilities to manage the award on its own.
- The overall POWER project team membership could be comprised of, but was not limited to, the following types of organizations: state, regional, and local economic development organizations; local governments; planning organizations and development districts; labor unions and labor-management apprenticeship programs; state and local workforce agencies; institutions of higher education, including (but not limited to) community colleges and other job training and adult education providers; not-for-profit and community-

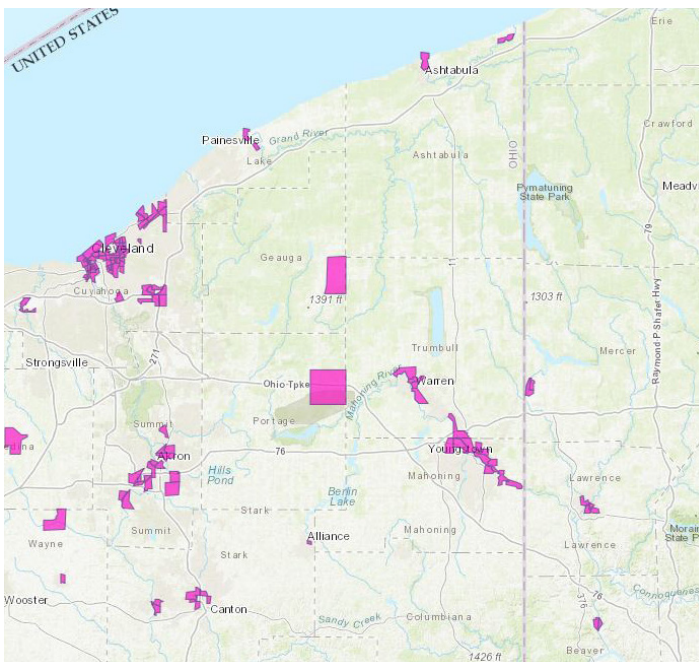
Figure 8.12 County Economic Status in Appalachian Ohio, Fiscal Year 2021



based organizations; chambers of commerce, industry and trade associations, local and regional business owners, and other representatives from the private sector.

- The applicant was required to make a strong case that the project area has been impacted by the decline in the coal economy/ is a coal-impacted community. Information to aid in content development was available on ARC's website. Applicants could also include data points/ media coverage/ etc. to help demonstrate why the funding was needed, and how the project would respond to the difficulties facing the community. ARC's Chartbook, which incorporates ACS data, is also a helpful resource for labor participation rates and more.
- Match was required for all projects based on the counties that are proposed to be served. As of now, Ashtabula and Trumbull are considered at-risk counties and Mahoning is transitional. Match could be in the form of in-kind, cash, loans, or other grants, and it could also be a combination. Match could also be provided by project partners and/ or from other federal sources, so long as the agency approved of such as in advance. Finally, the match was required to be expended during project period (i.e., cannot be funding used prior to the POWER award).

Figure 8.13 Opportunity Zones in the Eastgate Region



Source: HUD

- ARC has a preference for diverse project partnerships, so long as there is certainty that the identified project team can execute the project.
- Additional points were available if a project leveraged Opportunity Zones, and there are several in the Eastgate region (Figure 8.19).
 - » Up to one-third of funds provided for the POWER FY21 program were available to fund broadband deployment projects that enhance access to broadband service.
 - » Grant requests for deployment projects could be up to \$2.5 million, with priority given to projects with evidence of leveraged funding for the overall project.
 - » At least 65% of the project's budget was required be directed to the actual deployment of broadband infrastructure. Projects budgets that directed more than 35% of their funds to activities not directly

IN-DEPTH

The Eastgate Council of Governments was awarded a \$1,450,000 POWER Grant in October 2020 for the Youngstown Strategic & Sustainable, Medical & Manufacturing, Academic & Arts, Residential & Recreational, Technology & Training (SMART2) Network program. The project will install over 10 miles of fiber conduit in downtown Youngstown as the first step toward establishing a broadband network that can support businesses, healthcare, education, and residents working and learning remotely. The SMART2 Network is a collection of infrastructure improvements designed to revitalize the Youngstown central business district. It will help reverse decades of outward migration and disinvestment by providing the basic infrastructure needed to support and attract business. The project will capitalize on over \$50 million in recent public and private investments. Matching funds are being provided through a BUILD grant from the U.S. Department of Transportation, a surface transportation block grant, Youngstown State University, Mercy Health, and other public and private partners. The conduit is projected to serve 212 business locations and create 119 new jobs.³⁹

associated with deployment of broadband infrastructure were to follow the same guidelines as implementation projects and did not qualify for broadband deployment funding.

Should later rounds become available in the Power initiative, we strongly encourage the Eastgate region to contact State officials early on in the process as they can serve as a resource to help compile a response. Current contacts in the State of Ohio include:

Governor's ARC Representative:

John Carey, Director

Governor's Office of Appalachia

Email: john.carey@development.ohio.gov

ARC State Program Manager:

Julia Hinten, Appalachia Program Manager
Community Services Division

Ohio Development Services Agency

Email: julia.hinten@development.ohio.gov

Peter Voderberg

Director

BroadbandOhio

Email: Peter.Voderberg@development.ohio.gov

DEPARTMENT OF COMMERCE, NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION ("NTIA")

NTIA's Broadband Infrastructure program was established by the Consolidated Appropriations Act of 2021 with \$288M in grant funding for the deployment of broadband infrastructure to eligible areas of the country.⁴⁰ This program targets P3s as grants will be awarded to covered partnerships between a state, political subdivisions of a state, and providers of fixed broadband service.⁴¹

A covered partnership may include multiple providers of fixed broadband service and a provider may participate in more than one covered partnership.⁴² NTIA will prioritize, as instructed under the Act, applications for projects that are designed to: (1) provide broadband service to the greatest number of households in an eligible service area; (2) provide broadband service to rural areas; (3) cost-effectively provide broadband service; or (4) provide broadband service with a download speed of at least 100 Mbps and an upload speed of at least 20 Mbps.⁴³

For definition purposes, "covered broadband project" has the meaning of a competitively and technologically neutral project for the displacement of fixed broadband that provides qualifying broadband service in an eligible area.⁴⁴ An eligible service area is defined as a census block where broadband service is not available at one or more households or businesses within the block.⁴⁵

Applications must be submitted by the government entity, naming the partner that

will be providing the broadband service.⁴⁶ All applicants must have current registrations in SAM and Grants.gov and provide a DUNS number. When submitting an application, the covered partnership must include in the application, a description of the partnership, the project proposed, including cost and the speed of the broadband service, and the service area of the project.⁴⁷ Applicants must also disclose other federal or state support that the broadband service provider has received.⁴⁸

Grants will be awarded on a competitive basis to applications able to provide service with service at speeds of at least 25 Mbps download and 3 Mbps upload and latency sufficient to support real time applications.⁴⁹ Grant funds can be used for, but are not limited to:⁵⁰

- cost of long-term leases of facilities required to provide qualifying broadband service, including IRUs;
- costs of construction, improvements, acquisition of facilities and equipment, and middle and last mile networks; and
- reasonable pre-application costs do not exceed \$50k.

NTIA will prioritize, as instructed under the Act, applications for projects that are designed to: (1) provide broadband service to the greatest number of households in an eligible service area; (2) provide broadband service to rural areas other than: (i) a county, city, or town that has a population of more than 50,000 residents; and (ii) the urbanized area contiguous and adjacent to a city or town of more than 50,000 residents; (3) be cost-effective in providing broadband service; (4) provide broadband service with a download speed of at least 100 Mbps and an upload speed of at least 20 Mbps; and (5) any other covered broadband project that meets program requirements.⁵¹ In evaluating applications, NTIA will review those that trigger a merit review based on three categories: (1) project purpose and benefits; (2) project viability; and (3) project budget and sustainability.⁵²

Project Purpose and Benefits. Reviewers will consider the number of total households, businesses, and community institutions the project will connect and receive broadband; the total number of unserved households; and the total number of households, businesses,

IN-DEPTH

Applications are now being accepted for NTIA's Broadband Infrastructure program. Complete applications must be received via www.grants.gov by 11:59 p.m. (EDT) on August 17, 2021 and award announcements will be announced by November 29, 2021.⁶⁷

and community institutions that will receive broadband at speeds greater than the qualify requirement, and whether there is already service providers in the area.⁵³ Further, projects that deploy middle-mile networks must prioritize connecting to last mile networks that are serving unserved households and prove the incremental value to the last mile connection to the middle-mile connection.⁵⁴ Applications will be also reviewed from a pricing standpoint of services being offered compared to existing services where applicants should demonstrate that the price is competitive and affordable.⁵⁵

Project Viability

Technical Approach and Related Network Capacity and Performance. Applications will be evaluated based on the comprehensiveness and appropriateness of the technical solution for the community need, the proposed tech solution, and the ability of the proposed network to provide satisfactory capacity and scalability.⁵⁶ The networks that have higher end-user speeds with the potential for an increase in future capacity/bandwidth will receive greater consideration.⁵⁷ Further, additional consideration will be given for construction that is shovel ready and can be completed within a one-year period.⁵⁸

Applicant's Organizational Capability. Applicants will be reviewed on: (1) whether it has the organizational capability to undertake and complete the project;⁵⁹ (2) applicant's expertise and experience of the project management team and previous track record of projects similar to size as well as the organization's capacity and readiness will be considered;⁶⁰ and (3) strategy and partnership outlook and how it complements the applicant's capacity and approach.⁶¹

Project Budget and Sustainability. Reviewers will evaluate clarity, level of detail, reasonableness

of its costs, comprehensiveness, and whether the allocated funds are enough to complete the tasks listed in the project.⁶² When considering the sustainability of the project, applicants need to demonstrate that the project will be sustained beyond the award period, with the ability to scale and integrate over time.⁶³ There is no requirement for cost sharing or matching funds, however, NTIA will favor applications that contribute a nonfederal cost match of at least 10% of total eligible cost of the project via cash or in-kind contributions.⁶⁴

NTIA expects to award grants under this program within the \$5M to \$30M range. If a covered partnership is requesting amounts outside of this range, they must provide an explanation for such variance.⁶⁵ Under the governing law, the award period is for one year from the initial receipt of the grants, but NTIA may extend this period if the partnership certifies that it has a plan for use of the grant funds, construction is underway, or extenuating circumstances require an extension.⁶⁶

DEPARTMENT OF COMMERCE, ECONOMIC DEVELOPMENT ADMINISTRATION

The U.S. Economic Development Administration (“EDA”) is a bureau within the U.S. Department of Commerce and its mission is to lead the federal economic development agenda by promoting innovation and competitiveness as well as preparing American regions for growth and success in the global economy.⁶⁸ To that end, the EDA has a multiple programs that can be utilized for broadband, which are further detailed below. Before applying for EDA funds, we recommend contacting the following individual who represents Ohio:

Ellen Heinz, M.Ed., OhioCED
Economic Development Representative – Ohio
U.S. Department of Commerce
Economic Development Administration
Chicago Regional Office
230 S. Dearborn St., Suite 3280
Chicago, IL 60604

*Public Works*⁶⁹

The Public Works program helps revitalize, expand, and upgrade physical infrastructure in

distressed communities in order to enable the community to attract new industry, encourage business expansion, diversify their economies, and generate jobs and investment. Program investments are attributed to a variety of projects, such as technology-based facilities that utilize distance learning networks, smart rooms, and smart buildings; multitenant manufacturing; business and industrial parks with fiber optic cable; and telecommunications and development facilities.

In order to be eligible for funding under the program, a project must demonstrate:

- alignment with at least one of the EDA’s investment priorities;
- potential to increase the capacity of the community to promote job creation and private investment in the area;
- likelihood that the project will achieve its anticipated outcomes; and
- financial and management capacity to successfully implement the proposed project.

There are no submission deadlines for the Public Works program. Applications will be accepted on an ongoing basis until the publication of a new Notice of Funding Opportunity, cancellation of the current NOFO, or all available funds have been expended. EDA intends to review applications within 60 days of receipt.

*Economic Adjustment Assistance*⁷⁰

The Economic Adjustment Assistance (“EAA”) program provides technical, planning, public works, and infrastructure assistance to regions experiencing adverse economic impacts from a decline in manufacturing, changing trade patterns, natural disaster, environmental changes, and regulations, and more. The program provides state and local entities with either:

- strategy grants to support the development, updating, or refinement of a Comprehensive Economic Development Strategy (“CEDS”); or
- implementation grants to support the execution of activities identified in a CEDS.

Specific activities can be funded as separate investments or as multiple elements of a single investment. As the most flexible program within the EDA, the EAA uses the following criteria in determining grant recipients:

- ability to achieve the desired results;
- ability to quickly create jobs;
- extent to which the project would enable the region to become more prosperous;
- the relative economic distress of the region;
- the applicant's performance under previous federal financial assistance awards; and
- the comparative feasibility of the applicant to achieve its intended outcomes.

As part of the CARES Act, Congress also provided EDA with approximately \$1.5 billion for economic development assistance programs to help communities “prevent, prepare for, and respond to coronavirus.”⁷¹ The EDA made those funds available for communities negatively-impacted by COVID-19 in a variety of ways, such as innovation grants “focused on technology innovation activities that will help communities prevent, prepare [for], and respond to the coronavirus pandemic.” EDA CARES Act Recovery Assistance is administered under the authority of the Economic Adjustment Assistance program.

Among the variety of uses, communities can access the EDA CARES Act Recovery Assistance funds to construct public works and facilities that will support economic recovery, including the deployment of broadband for purposes including supporting telehealth and remote learning for job skills. Funds from the CARES Act are almost entirely expended, so if a community is interested in seeking them for a project, we recommend contacting the representative provided above in short order.

As expressed above, EDA funding generally requires projects to align with a region's Comprehensive Economic Development Strategy. Broadband expansion is prominently featured in the Eastgate Regional Council of Government's 2020–2022 CEDS, and Eastgate has prior success with this program, securing a \$400,000 grant to respond to the coronavirus pandemic by providing support for the growth of the logistics, electric vehicle transportation, and advanced manufacturing technologies sectors, with an emphasis on workforce development and infrastructure; and developing a comprehensive strategic response plan to mitigate future disruptions in critical material supply chains.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Community Development Block Grants

The Community Development Block Grant (“CDBG”) program provides annual grants on a formula basis to states, cities, and counties to develop housing and expand economic opportunities, primarily for low- and moderate-income people.⁷² Authorized under the Housing and Community Development Act of 1974, the CDBG program was designed to:

- empower communities to design and implement strategies tailored to their needs;
- emphasize consolidated planning in order to strengthen partnerships between government of all levels and the private sector; and
- provide technical assistance activities.

Eligible CDBG grantees include cities of Metropolitan Statistical Areas (“MSAs”); metropolitan cities with populations of 50,000+ people; qualified urban counties with populations of at least 200,000; and states and insular areas. The Eastgate region includes the Youngstown-Warren-Boardman MSA, including Mercer County in Pennsylvania.

CDBG funds can be used for a variety of activities including, but not limited to:

- acquisition of real property;
- relocation and demolition;
- rehabilitation of residential and non-residential structures;
- construction of public facilities and improvements;
- public services;
- activities relating to energy conservation and renewable energy resources; and
- provision of assistance to profit-motivated businesses to carry out economic development and job creation/retention activities.

CDBG funds may also be used to install wiring, fiber optic cables, and permanently affixed equipment such as receivers for areas to receive broadband/internet access.⁷³

Within the CARES Act, Congress provided \$5

billion for the CDBG Program to go to states, metropolitan cities, urban counties, and insular areas. At least 70% of every grant must be expended for activities that benefit low- and moderate-income people by providing housing; a permanent job; a public service, including digital skills classes; or access to new or significantly improved infrastructure. The remaining 30% may be used to eliminate blighted conditions or address an urgent need for which the grantee has no other funding.

DEPARTMENT OF TRANSPORTATION (“DOT”)

RAISE Grant

The Consolidated Appropriations Act of 2021 appropriated \$1 billion to be awarded by the U.S. Department of Transportation for Rebuilding American Infrastructure with Sustainability and Equity (“RAISE”) Grants.⁷⁴ The grants are capital investments that will have a substantial impact at the local or regional level.⁷⁵ Additionally, when awarding this money, DOT will not award more than \$30 million for eligible planning, preparation or design of eligible projects that don’t result in construction with FY 2021 RAISE funding, of which a minimum of \$10 million will be awarded to projects located in or directly benefiting areas of persistent poverty.⁷⁶

The FY 2021 Appropriations Act states that RAISE grants may not be less than \$5 million unless located in a rural area, then it’s a \$1 million floor with a stipulation of grants not being greater than \$25 million.⁷⁷ Additionally, a single state cannot be awarded more than 10% (\$100M) of the funds made available for RAISE grants and no more than 50% shall be awarded to rural and urban projects.⁷⁸ Funds will be available for obligation (starts when applicant and DOT enter into a written agreement) through September 30, 2024.⁷⁹ Further, all RAISE funds must be used by September 30, 2029 or they will no longer be available for the dedicated project.⁸⁰

Eligible applicants for RAISE grants are local, state, tribal and U.S. territories, governments, **including port authorities, transit agencies, metropolitan planning organizations**, and other various state or local subdivisions.⁸¹ Additionally, more than one state or jurisdiction can submit a joint application as long as an applicant is identified as the primary point of contact and primary recipient.⁸²

Eligible projects for RIASE grants are surface transportation capital projects that include but are not limited to: (1) highway, bridge, or other road projects eligible under title 23, United States Code; (2) public transportation projects eligible under chapter 53 of title 49, United States Code; (3) 11 passenger and freight rail transportation projects; (4) port infrastructure investments (including inland port infrastructure and land ports of entry); (5) intermodal projects; and (6) projects investing in surface transportation facilities that are located on Tribal land and for which title or maintenance responsibility is vested in the Federal Government.⁸³ Such projects will be evaluated on safety, environmental sustainability, quality of life, economic competitiveness, state of good pair, innovation, and partnership.⁸⁴ Additionally DOT will assess/ prioritize transportation projects that are coordinated with economic development, affordable housing, water and waste infrastructure, power and electric infrastructure, land use plans, and broadband.⁸⁵

Out of the factors that DOT will use to evaluate the project applications, innovation is of importance as it deals with broadband. When assessing such projects, DOT will consider the extent to which the applicant uses innovative strategies including, innovative technologies, project delivery, or financing.⁸⁶ Within innovative technologies is the deployment of broadband and the installation of high-speed networks concurrent with the transportation project construction (i.e., dig-once implementations, as discussed in the Policy Analysis section of this Study).⁸⁷

Activities that are eligible under RAISE planning grants are the planning, preparation, or design of eligible capital projects.⁸⁸ In addition, activities related to multidisciplinary projects or regional planning may include: (1) development of master, comprehensive, or corridor plans; (2) planning activities related to the development of a multimodal freight corridor; (3) development of port and regional port planning grants, including State-wide or multi-port planning within a single jurisdiction or region; and (4) risk assessments and planning to identify weaknesses and address the transportation system’s ability to withstand probable occurrence or recurrence of an emergency or major disaster.⁸⁹ Under the NOFO, a project is designated as urban if located

within an urbanized area with a population greater than 200,000 in the 2010 census; if a project is located outside an urbanized area with the same population standards, it is designated as a rural project.⁹⁰

Broadband deployment as a standalone project is not eligible, however, if the construction of transportation project will allow concurrent installation of high speed broadband networks, the applicant should such activities and how they support the innovative selection criteria.⁹¹

Additionally, areas of persistent poverty is any county that has consistently had greater than or equal to 20% of the population living in poverty during the preceding 30 years as measured by the 1990 and 2000 decennial census; any census tract with a poverty rate of at least 20%; or any territory of the U.S.⁹² Under the RAISE grants, there is no minimum grant size for planning projects relating to poverty areas and the secretary of DOT may increase the federal share of 80% to pay for certain costs.⁹³

A proposed project may contain multiple components that may be carried out by other parties besides the applicant. Each applicant is limited to three applications.⁹⁴ Instructions for the submission, content and form of submission can be found at: www.transportation.gov/RAISEgrants. The project narrative should be clear and entail information necessary for DOT to determine that the project satisfies the requirements set forth by DOT as well as provide a detailed statement of work, project schedule, budget, and include a table of contents including maps and project location.⁹⁵

Each applicant before submitting their application must be registered in SAM, provide their unique identifier, and maintain a current SAM registration with updated information.⁹⁶ Each applicant selected for a RAISE grant must submit quarterly progress reports and federal financial reports in addition to collecting and reporting to DOT information on the project's performance based on indicators DOT identifies related to program goals.⁹⁷

*Infrastructure for Rebuilding America (INFRA) Grant Program*⁹⁸

The U.S. Department of Transportation recently announced applications for the FY21 round of the Infrastructure for Rebuilding America ("INFRA")

discretionary grant program to fund significant national and regional transportation projects.⁹⁹ Approximately \$889 million is available in funding.

DOT seeks to use the INFRA program to encourage innovation in three areas to build transformative projects: (1) the deployment of innovative technology and expanded access to broadband; (2) use of innovative permitting, contracting, and other project delivery practices; and (3) innovative financing.

Eligible applicants include:

- a State or group of States;
- a metropolitan planning organization that serves an Urbanized Area (as defined by the Bureau of the Census) with a population of more than 200,000 individuals;
- a unit of local government or group of local governments;
- a political subdivision of a State or local government;
- a special purpose district or public authority with a transportation function, including a port authority;
- a Federal land management agency that applies jointly with a State or group of States;
- a tribal government or a consortium of tribal governments; or
- a multi-State or multijurisdictional group of public entities.

Eligible projects include highway freight projects carried out on the National Highway Freight Network (23 U.S.C. § 167); highway or bridge projects carried out on the National Highway System (NHS), including projects that add capacity on the Interstate System to improve mobility or projects in a national scenic area; railway-highway grade crossing or grade separation projects; or a freight project that is (1) an intermodal or rail project, or (2) within the boundaries of a public or private freight rail, water (including ports), or intermodal facility.

For the first time, the federal government is also evaluating projects on whether they were planned as part of a comprehensive strategy to address climate change or whether they support strategies to reduce greenhouse gas emissions. Additionally, racial equity will be

part of the selection criterion to the extent that project sponsors have completed equity-focused community outreach and/or are focused on supporting underserved communities.

For large projects, the INFRA grant must be at least \$25 million, compared to at least \$5 million for small projects. Statutory requirements outline that 10% of funds are served for small projects and at least 25% must be available for rural projects.

Eligible projects costs include reconstruction, rehabilitation, acquisition of property, environmental mitigation, construction contingencies, equipment acquisition, and operational movements directly related to system performance.

Applications for the INFRA grant closed on March 19, 2021. According to the FY 2020 fact sheet, no awards were granted in Ohio.¹⁰⁰ However, it should be monitored in future years.

Case Study **Chicago Connected**

The City of Chicago has been a leader in closing the digital gap for residents living in larger cities. On June 25, 2020, Mayor Lori E. Lightfoot announced the Chicago Connected program, which aims to provide free, high-speed internet to the homes of Chicago Public School students over a four-year period.¹⁰¹ Estimated to cost upwards to \$50 million during the first four years, Chicago has teamed up with the Chicago School District and numerous philanthropist to bring the program online. Additionally, Chicago Connect has worked with Internet Service Providers to identify households in need. The City analyzed several factors indicating priority of need such as students who are eligible for free lunches, have special needs, have experienced homelessness, and reside in neighbors with the highest hardship based on the University of Illinois at Chicago Hardship Index.¹⁰² To many, the benefits of the program outweigh the costs, including increasing access to online learning, college applications, training and workforce development, and other critical government services. While Chicago Connect started with the goal to fund internet access for 100,000 students, it has since expanded eligibility to 228,000.¹⁰³ To date, the program has enrolled 40,000 families.

Case Study **Covington Connect**

Covington, Kentucky has partnered with ISPs and housing authorities to provide Wi-Fi access points, fiber, and apartment complex connectivity.¹⁰⁴ In July 2020, the City and six partners—including Cincinnati Bell and the Covington Housing Authority—set out to create the Covington Connect initiative to extend internet access to low- and moderate-income families. The initiative planned to provide Wi-Fi through three different avenues: (1) neighbor access points that allow connectivity in a finite area, (2) fiber installation, and (3) focused connections for large apartment complex through coordination with the Housing Authority. The initiative initially aimed to invest \$2.5 million, including \$1-\$1.25 million in funding for the installation of 125 neighborhood access points, approximately \$700,000 in financing fiber connectivity construction, and more. The City has also used federal funding from the CARES Act to support a portion of the project costs. Almost a year after the City rolled out the program, the statistics have already demonstrated increased connectivity. Recent data has shown over 600 Covington residents have signed on to the Covington Connect program over 8,000 times in a 30-day period.¹⁰⁵ Along with increased Wi-Fi connectivity, Covington is providing 1,900 families with new computers.

Case Study Oakland

Oakland, California has not only expanded internet connectivity to residents; it has also made the experience interactive. Previously with 94,000 residents without an internet connection, Oakland started creating Wi-Fi hotspots throughout the City.¹⁰⁶ Unlike other programs, Oakland has unveiled and implemented its initiatives with interactive online maps that allow residents to locate new hotspots coming online and learn about other opportunities such as adding internet access points to existing streetlights, laying new fiber optic cables, and connecting the city through the Bus Rapid Transit or “BRT” networks.¹⁰⁷ Oak Wi-Fi created 13 new Wi-Fi zones by mid-November of 2020 and has continued its efforts into 2021.

PUBLIC, NONPROFIT AND PHILANTHROPIC FUNDED

Project funding for broadband access and digital equity and inclusion initiatives may also be available through area nonprofits and philanthropies, as well as other public sector organizations.

Community Foundation of Mahoning County

The Mahoning Valley COVID-19 Response & Stabilization Fund, a joint effort of the Community Foundation of the Mahoning Valley, The Raymond John Wean Foundation, and The Youngstown Foundation, received 29 applications related to technology equipment and remote learning/telehealth in 2020–2021. A total of 16 applications were funded by at least one Foundation, which is 55 percent of all tech applications submitted. The submitted funding requests demonstrated area needs for devices including laptops and tablets; enhanced internet connectivity, both fiber and wireless; and funding for virtual programming for telehealth and remote learning.

Foundation for Appalachia Ohio (“FAO”)

The Foundation for Appalachia Ohio is partnering with Facebook Connectivity and T-Mobile to deploy resources to help short-term connectivity needs through expanding hotspot lending programs with public libraries and deploying Ruckus M510 access points to community-serving organizations. These access points can connect to existing ethernet connections and also include T-Mobile data service. Each device can serve 30-50 users at a time. The devices are the property of the grantee upon receipt and the first 12 months of data service through T-Mobile are covered through a combination of grant dollars and T-Mobile account credits. FAO has partnered with a wide range of organizations on the access points – libraries, youth-serving organizations, food pantries, other community centers, as well as municipal partnerships working to expand public Wi-Fi services. Any entities within the Eastgate region that are interested in learning more about this program are recommended to contact Kelly Morman at FAO at kmorman@ffao.org.

NFL Foundation

Although we never envisioned referencing the NFL in a broadband Study, the Inspire Change initiative, the National Football League’s social justice initiative, has provided more than \$95 million in support of programs focused on education, economic advancement, police and community relations, and criminal justice reform. As part of its ten-year \$250 commitment in this initiative, the NFL announced earlier this year that it was providing 13 grants—totaling \$4.3 million—to **nonprofits across the country to help close the digital divide**. Grant recipients include national organizations such as Boys & Girls Clubs of America and United Way Worldwide, as well as regional organizations. Further, the program supports organizations that are not based in NFL cities. As such, there may be an opportunity for Eastgate should the NFL provide additional grants within the digital divide space.

Mobile Beacon Connect for Success Grant

Connect for Success is a program that gives people the necessary tools to bring the internet to those students who need it the most.¹⁰⁸ Schools can utilize the Connect for Success grant through Mobile Beacon’s Connect for Success donation program to bring a mobile learning lab that will aid in professional development for teachers and

help students connect for the future in order to help close the homework gap.¹⁰⁹ The program provides schools with up to 25 laptops and 4G LTE devices with free high-speed internet for 12 months, of which they can apply for ongoing unlimited LTE internet service for \$10/month afterwards.¹¹⁰

In order to apply for the grant, applicants must be a school, college, or university in an eligible city that falls within Sprint's 4G LTE service area and the applicant must use the service for a minimum of 20 hours a week.¹¹¹ **Youngstown, Ohio is an eligible area for this grant.** If an applicant is awarded a grant, they must submit two reports during the first year that include feedback from teachers, administration, and students.¹¹²

COST MODEL

As detailed in the Project Identification section of this Study, there are particular areas in the region in which we recommend that Eastgate consider network deployment. Network construction includes one-time and ongoing capital expenditures ("CAPEX") as well as operating expenditures ("OPEX"). The amount of such expenditures, however, will be dependent on the structure of the network: for a fiber build, whether the fiber optics are buried or strung aurally; for a wireless build, whether infrastructure is collocated on existing assets or require new tower construction. The number of premises to be served and the distance between them will also impact costs.

Estimated cost parameters and considerations for underground/ buried fiber, overhead/ aerial fiber, and fixed wireless network construction are provided (Tables 8.2 and 8.3) in order to assist the region in generating **approximate build-out costs**. However, as also discussed further in the Project Identification section, **a comprehensive engineering study should be performed** once projects are identified to determine true costs and assist the region in prioritizing local projects.

General Cost Parameters for Fiber Network Construction

The following cost parameters are provided on a per foot basis for more granular analysis. However, in certain network builds, cost may instead be determined on a per mile basis.

Case Study Resident-Funded

Community connectivity efforts have not been limited to larger metropolitans and urbanites. The rural town of Lyme, New Hampshire has ushered in the LymeFiber initiative with the goal of providing "universal coverage" to its 1,852 residents.¹¹³ The idea started when twelve locals formed the Committee for Fiber Optic Infrastructure in Lyme to bridge the gap between the internet have's and have not's.¹¹⁵ Before selecting fiber, the Committee evaluate other internet options such as existing DSL services, fixed wireless providers, and satellite services. Each, however, have limitations in hilly Lyme that fiber does not. DSL services in Lyme rely on decades-old copper telephone wires that vary in quality and data-speed-routing capability.¹¹⁶ Fixed wireless services succumb to Lyme's rolling topography that blocks line-of-sight signals on which wireless relies. Satellite services have similar line-of-sight shortcomings, along with service caps on the amount of data one may receive without additional fees.¹¹⁷ Conversely, fiber-optic services connect residents and businesses directly to the source and eliminate many of the environmental interferences that impede alternatives. The LymeFiber community-centered project offers households and businesses fiber optic internet data services with download speeds from 25 Mbps to as much as 800 Mbps. It is estimated to cost up to \$2.5 million to build. However, the Lyme residents hope to plan to maintain the LymeFiber program with monthly utility fees starting at \$72.¹¹⁸ As of January 2021, over 530 households and business registered for services and over 180 have been connected.

As the region considers underground fiber network construction, best practice is to install as much capacity as economically feasible at the outset since much of the build-out costs relate to the labor, equipment, engineering, etc. that is expended on an underground fiber build. Increasing the number of conduits or fiber strands during the network construction can significantly increase long-term network capacity with a relatively small incremental investment in materials. However, such increase does create less-obvious changes in the project. For example, increasing the fiber count from 96 or 144 strands to 288 strands would require a larger handhold splice box and trays. Similarly, increasing from two 1 ¼" conduits to pulling three conduits or adding a 2" conduit increases the time and effort for the driller and the per foot cost of the project. Other considerations could include the ability to pull certain types of fiber varying distances through various sizes of conduit. The tighter the fit, the more opportunity to accidentally stretch or break the fiber. It is for these reasons that detailed network engineering by a trusted entity is provided to the region.

Overhead/ aerial builds will be better suited for certain locations over others. In the Eastgate region, Trumbull County may be particularly well-positioned for aerial fiber expansion due to the presence of three municipal electric/ public power operations with existing infrastructure, which can serve as collaborative partners in cost-effective broadband expansion. Whereas, in other locations throughout the region, the cost between an aerial and an underground fiber built may generally be comparable. In such locations, a significant consideration will be the capacity that can be put in the ground compared to overhead fiber builds.

More capacity equates to more fiber that can be leased or sold to monetize the network and its ongoing operations, as well as more fiber that can be leveraged by the local government for its economic development and Smart City purposes. In an open access model, as discussed in the Project Identification section, additional capacity can also lead to additional provider options in the community. Further, fiber and/ or conduit swaps (fiber or conduit in exchange for other fiber or conduit) may allow a local network to be expanded into other jurisdictions or regions, or to

Table 8.2 Underground / Buried Fiber

COST APPROXIMATIONS PER FOOT INCLUDE:	
Size of Conduit	1 ¼" - \$0.54
	1 ½" - \$0.65-\$0.70
	2" - \$1.05
	4" - \$5-5.50
Number of Fiber Strands (ribbon fiber similar price):	96 - \$0.75 144 - \$1.35 288 - \$1.90
Network Engineering:	\$1 without identification of all utilities \$2 with identification of all utilities
Labor	\$8-10 pulling 1-2 conduit (1 ¼" or 2" conduits) \$13-16 pulling 1-2 conduit (4" conduits)
Cost of handhole splice box and splice trays:	For 288 fiber strands - \$450 96-144 fiber strands - \$275
*The distance between handhole splice boxes will also need to be considered:	Rural: approximately every 1,000' Urban: approximately every 3-400'
Splicing fiber (joining two fibers) as it is constructed:	~\$1,500 -3,000 per splice
Annual maintenance costs (not break/fix costs) for utility locators:	Rural Networks: ~\$100-200 per mile Urban Networks: ~\$800-1,200 per mile
Fiber and equipment costs for fiber construction from the street into homes:	Customer Premises Equipment of standard quality and features: \$150-200 per home
Fiber drop:	~\$15 per foot (~\$1,800-\$2,400 per home) from the street into the home; however, the number of miles and houses per mile within a community may impact these approximations.
Expenses can also include land acquisition.	

Table 8.3 Overhead / Aerial Fiber

COST APPROXIMATIONS PER FOOT INCLUDE:	
Fiber costs are similar to underground installations; however, fiber comes with or without armor covering and, in the overhead environment, armored is more protection against squirrel chews. Conduit is only used for overhead in very limited conditions.	
Strand wire to hang fiber on poles:	\$1,000 per 5,000 feet (i.e., \$.20 per foot)
Engineering costs incurred by the contractor:	~\$0.90/foot
Engineering costs charged by the utility (can vary by utility provider):	~\$1-2/foot
Make-ready costs (i.e., the costs of getting an existing utility pole ready for the fiber) assessed by an electric utility are higher in urban areas compared to rural.	One rule of thumb for a per foot estimate of overhead engineering and make-ready cost would be ~\$3.00 per foot (~\$10,000-\$20,000 per mile)
Overhead attachment hardware:	Average ~\$2 per foot
Labor to pull fiber along poles:	~\$1.75-\$2.25 per foot
Ongoing annual payments per pole:	~\$7.00-\$15.00 per pole (average 30-35 poles per mile urban and 20-25 per mile rural)
Fiber and equipment costs for fiber construction from the street into homes:	Customer Premises Equipment of standard quality and features: \$150-200 per home
Fiber drop:	~\$15 per foot (~\$800-\$900 per home) from the street into the home; however, the number of miles and houses per mile within a community may impact these approximations.
Expenses can also include pole attachment fees.	

specific businesses or education centers without incurring any cost.

While there are likely to be additional costs that are challenging to predict without network engineering, such as radio frequency equipment, electrical paths, and more, the above provides an overview of the cost considerations in macro tower deployment.

Table 8.4 New Macro Tower Pre-Construction Costs

APPROXIMATELY \$50,000+ TOTAL COST FOR PRE-CONSTRUCTION, BROKEN OUT AS FOLLOWS:	
Zoning and Entitlement:	~\$20,000
Title Fees:	~\$1,750
Legal Fees (e.g., searches and insurance):	~\$3,000
Survey Fees:	~\$5,500
State Historic Preservation Office ("SHPO") (e.g., zoning survey if needed and as-built drawings):	\$3,000
Federal Aviation Administration ("FAA") Filing Fees (including NEPA costs):	\$325
FCC Registration Fees:	\$1,500
Environmental/Phase 1 Study:	\$1,350
Site Acquisitions:	\$5,000
Drawings – Architecture and Engineering	~\$3,500
Surveying and Engineering Drawings:	~\$3,000
Contingencies - Zoning (5%):	~\$2,696
Building Permit Fees:	~\$1,500
Soil Reports and Testing:	~\$4,500

Table 8.5 New Macro Tower Construction Costs

APPROXIMATELY \$500,000+ TOTAL COST FOR CONSTRUCTION, BROKEN OUT AS FOLLOWS:	
Pre-Construction Prep Fee:	~\$2,500
Utility Coordination:	~\$1,000
Tree Clearing & Grading:	~\$10,000
Fences & Gates:	~\$15,000
Landscaping:	~\$5,000
Access Road Improvements:	~\$5,000
Signage:	~\$50
Antenna / Radio Equipment:	~\$20,000
Construction – General:	~\$15,000
Electrical and Lighting:	~\$50,000
Electrical Distribution System:	~\$16,500
Electrical Over/Underground:	~\$24,000
Electrical – Grounding:	~\$7,500
Telco. Placement/ Utilities:	~\$2,000
Drawings - As Built:	~\$750
Project Supervision:	~\$5,000
Inspection Services:	~\$2,000
Tower Structure / Mounts:	~\$75,000
Tower Foundation:	~\$60,000
Tower Erection:	~\$12,000
Tower Delivery & Transport:	~\$10,000
Contingencies - Construction (15%)	~\$52,245
Cable Ladder / Support Coax / Ports:	~\$10,000
Wireless Distribution Equipment:	~\$100,000

SECTION ENDNOTES

1. Michael Solitro, *Rural Communities Launch Publicly Owned Fiber Networks*, Broadband Communities Magazine, (Mar./Apr. 2021), [Rural Communities Launch Publicly Owned Fiber Networks \(bbcmag.com\)](https://www.bbcmag.com/rural-communities-launch-publicly-owned-fiber-networks/).
2. *Southern Ohio Communication Services, Inc. Expands Services*. (2021.). Retrieved from Jobs Ohio: <https://www.jobsohio.com/news/posts/southern-ohio-communication-services-inc-expands-services/>.
3. *JB-Nets, LLC, Wireless Internet Provider in Gallia County Plans Expansion of Broadband Services* (September 2, 2020.). Retrieved from Ohio Southeast Economic Development: <https://ohiose.com/news/jb-nets-llc-wireless-internet-provider-in-gallia-county-plans-expansion-of-broadband-service/>.
4. *JobsOhio and Community of Oak Hill Team-Up To Provide High-Speed Internet to Nock & Son Company*. (January 28, 2021.). Retrieved from Ohio Southeast Economic Development: <https://ohiose.com/news/jobsohio-and-community-of-oak-hill-team-up-to-provide-high-speed-internet-to-nock-son-company/>.
5. *FACT SHEET: The American Jobs Plan*. (March 31, 2021.). Retrieved from U. S. White House: <https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/31/fact-sheet-the-american-jobs-plan/>.
6. *White House Releases State-by-State Fact Sheets to Highlight Nationwide Need for the American Jobs Plan*. (April 12, 2021.). Retrieved from U. S. White House: <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/12/white-house-releases-state-by-state-fact-sheets-to-highlight-nationwide-need-for-the-american-jobs-plan/>.
7. *Coronavirus State and Local Fiscal Recovery Funds*. (n.d.). Retrieved from U. S. Treasury: <https://home.treasury.gov/policy-issues/coronavirus/assistance-for-state-local-and-tribal-governments/state-and-local-fiscal-recovery-funds>.
8. *FACT SHEET: The Coronavirus State and Local Fiscal Recovery Funds Will Deliver \$350 Billion for State, Local, Territorial, and Tribal Governments to Respond to the COVID-19 Emergency and Bring Back Jobs*. (May 10, 2021.). Retrieved from U. S. Treasury: <https://home.treasury.gov/system/files/136/SLFRP-Fact-Sheet-FINAL-1-508A.pdf>.
9. *Coronavirus State and Local Fiscal Recovery Funds Allocations to State Government*. (May 10, 2021.). Retrieved from U. S. Treasury: <https://home.treasury.gov/system/files/136/Allocation-Methodology-for-States-508A.pdf>.
10. *Coronavirus State and Local Fiscal Recovery Funds Allocations to Counties*. (May 10, 2021.). Retrieved from U. S. Treasury: <https://home.treasury.gov/system/files/136/Allocation-Methodology-for-Counties-508A.pdf>.
11. *Coronavirus State and Local Fiscal Recovery Funds Allocations to Metropolitan Cities*. (May 10, 2021.). Retrieved from U. S. Treasury: <https://home.treasury.gov/system/files/136/Allocation-Methodology-for-Metropolitan-Cities-508A.pdf>.
12. *Coronavirus State and Local Fiscal Recovery Funds Allocations to Non-Entitlement Units of Local Government*. (May 10, 2021.). Retrieved from U. S. Treasury: <https://home.treasury.gov/system/files/136/Allocation-Methodology-for-NEUs-508A.pdf>.
13. *FACT SHEET: Emergency Connectivity Fund Program report and Order – WC Docket No. 21-93*. (April 30, 2021.). Retrieved from Federal Communications Commission: <https://docs.fcc.gov/public/attachments/DOC-372069A1.pdf>.
14. *ACTING FCC CHAIRWOMAN ROSENWORCEL UNVEILS PROPOSED RULES FOR EMERGENCY CONNECTIVITY FUND*. (April 30, 2021.). Retrieved from Federal Communications Commission: <https://docs.fcc.gov/public/attachments/DOC-372066A1.pdf>.
15. *FACT SHEET: Emergency Connectivity Fund Program Report and Order – WC Docket No. 21-93 (at ¶ 35)*. (April 30, 2021.). Retrieved from Federal Communications Commission: <https://docs.fcc.gov/public/attachments/DOC-372069A1.pdf>.
16. *Id.* at ¶ 39.
17. Weinschenk, Carl. *Windstream Pennsylvania Gigabit Project Funded, in Part, Through CARES Act*. (April 13, 2021.). Retrieved

from Telecompetitor: <https://www.telecompetitor.com/windstream-pennsylvania-gigabit-project-funded-in-part-through-cares-act/>.

18. *FCC Launches \$20 Billion rural Digital Opportunity Fund*. (February 7, 2020.). Retrieved from Federal Communications Commission: <https://www.fcc.gov/document/fcc-launches-20-billion-rural-digital-opportunity-fund-0>.
19. *Rural Digital Opportunity Fund*. (n.d.). Retrieved from Universal Service Administrative Company: <https://www.usac.org/high-cost/funds/rural-digital-opportunity-fund/>.
20. *Auction 904: Rural Digital Opportunity Fund*. (n.d.). Retrieved from Federal Communications Commission: <https://www.fcc.gov/auction/904/factsheet>.
21. Rivkin-Fish, Ziggy. *Digital Beat: Is the FCC's reverse auction fatally wounded or just bloodied?* (April 29, 2021.). Retrieved from Benton Institute for Broadband & Society: https://www.benton.org/blog/fcc%E2%80%99s-reverse-auction-fatally-wounded-or-just-bloodied?utm_campaign=Newsletters&utm_source=sendgrid&utm_medium=email.
22. Dano, Mike. *Some big RDOF winners lean away from fixed wireless*. (February 5, 2021.). Retrieved from Light Reading: <https://www.lightreading.com/opticalip/some-big-rdof-winners-lean-away-from-fixed-wireless/d/d-id/767204>.
23. Hardesty, Linda. *The biggest RDOF winner LTD Broadband responds to naysayers*. (February 11, 2021.). Retrieved from Fierce Telecom: <https://www.fiercetelecom.com/telecom/biggest-rdof-winner-ltd-broadband-responds-to-naysayers>.
24. Crosby, Misty and Reid, Tom. *Re: Concerns regarding RDOF Phase 1 auction results, WC Docket Nos. 19-126 and 10-90*. (February 18, 2021.). Retrieved from National Exchange Carrier Association: <https://prodnet.www.neca.org/publicationsdocs/wwpdf/21921buckeye.pdf>.
25. *Community Connect Grants*. (n.d.). Retrieved from U. S. Department of Agriculture: <https://www.rd.usda.gov/programs-services/community-connect-grants>.
26. *Distance Learning & Telemedicine Grants*. (n.d.). Retrieved from U. S. Department of Agriculture: <https://www.rd.usda.gov/programs-services/distance-learning-telemedicine-grants>.
27. *Distance Learning and Telemedicine Grant Program Application Guide Fiscal Year 2021*. (n.d.). Retrieved from U. S. Department of Agriculture: https://www.rd.usda.gov/sites/default/files/fy2021_dlt_app_guide.pdf.
28. *Distance Learning and Telemedicine Grant Recipients*. Map. (n.d.). Retrieved from ArcGIS: <https://ruraldevelopment.maps.arcgis.com/apps/webappviewer/index.html?id=15a73830555645ae93d2fa773ed8e971>.
29. *ReConnect Loan and Grant Program*. (n.d.). Retrieved from U. S. Department of Agriculture: <https://www.usda.gov/reconnect>.
30. *Rural eConnectivity Program*. (February 26, 2021.). Retrieved from Federal Register: <https://www.federalregister.gov/documents/2021/02/26/2021-03443/rural-econnectivity-program>.
31. *Program Overview*. (n.d.). Retrieved from U. S. Department of Agriculture: <https://www.usda.gov/reconnect/program-overview#:~:text=During%20the%20second%20round%20of,2020%20ReConnect%20Program%20Awardees%20page>.
32. Ross, Steven S. *Bandwidth Hawk: Get Ready for USDA ReConnect Round Three*. (March/April 2021.). Retrieved from Broadband Communities: https://www.bbcmag.com/rural-broadband/bandwidth-hawk-get-ready-for-usda-reconnect-round-three?utm_source=sendgrid&utm_medium=email&utm_campaign=Newsletters.
33. *Rural eConnectivity Program*. (February 25, 2021.). Retrieved from Regulations.gov: <https://www.regulations.gov/document/RUS-20-TELECOM-0023-0001>.
34. *Rural Broadband Access Loan and Loan Guarantee*. (n.d.). Retrieved from U. S. Department of Agriculture: <https://www.rd.usda.gov/programs-services/rural-broadband-access-loan-and-loan-guarantee>.

35. *Telecommunications Infrastructure Loans & Loan Guarantees*. (n.d.). Retrieved from U. S. Department of Agriculture: <https://www.rd.usda.gov/programs-services/telecommunications-infrastructure-loans-loan-guarantees>.
36. *RD Apply*. (n.d.). Retrieved from U. S. Department of Agriculture: <https://www.rd.usda.gov/programs-services/rd-apply>.
37. *Appalachian Regional Commission*. (n.d.). Retrieved from Appalachian Regional Commission: <https://www.arc.gov/>.
38. *ARC's POWER Initiative*. (n.d.). Retrieved from Appalachian Regional Commission: <https://www.arc.gov/arcs-power%20initiative/#:~:text=The%20POWER%20%28Partnerships%20for%20Opportunity%20and%20Workforce%20and,to%20the%20changing%20economics%20of%20America%E2%80%99s%20energy%20production>.
39. *POWER Award Summaries by State As of October 2020*. (October 2020.). Retrieved from Appalachian Regional Commission: <https://www.arc.gov/wp-content/uploads/2021/01/POWER-Award-Summaries-by-State-as-of-October-2020-UPDATE-1.13.2021.pdf>.
40. BroadbandUSA, National Telecommunications and Information Administration, *Notice of Funding Opportunity: Broadband Infrastructure Program Executive Summary*, https://broadbandusa.ntia.doc.gov/sites/default/files/2021-05/NTIA%20Broadband%20Infrastructure%20Grant%20Program%20NOFO.Final__0.pdf (last visited June 3, 2021).
41. *Id.*
42. *Id.*
43. *Id.*
44. *Id.*
45. *Id.*
46. *New NTIA Grants, POTs and PANs Broadband for All* (Mar. 21, 2021), [New NTIA Grants | POTs and PANs \(potsandpansbyccg.com\)](https://potsandpansbyccg.com).
47. BroadbandUSA, National Telecommunications and Information Administration, *Notice of Funding Opportunity: Broadband Infrastructure Program Executive Summary*, https://broadbandusa.ntia.doc.gov/sites/default/files/2021-05/NTIA%20Broadband%20Infrastructure%20Grant%20Program%20NOFO.Final__0.pdf (last visited June 3, 2021).
48. Kevin Taglang, *NTIA Has Millions for Broadband Infrastructure*, Benton Institute for Broadband & Society (May. 21, 2021), [NTIA Has Millions for Broadband Infrastructure | Benton Institute for Broadband & Society](https://bentoninstitute.org/ntia-has-millions-for-broadband-infrastructure).
49. BroadbandUSA, National Telecommunications and Information Administration, *Notice of Funding Opportunity: Broadband Infrastructure Program Executive Summary*, https://broadbandusa.ntia.doc.gov/sites/default/files/2021-05/NTIA%20Broadband%20Infrastructure%20Grant%20Program%20NOFO.Final__0.pdf (last visited June 3, 2021).
50. Kevin Taglang, *NTIA Has Millions for Broadband Infrastructure*, Benton Institute for Broadband & Society (May. 21, 2021), [NTIA Has Millions for Broadband Infrastructure | Benton Institute for Broadband & Society](https://bentoninstitute.org/ntia-has-millions-for-broadband-infrastructure).
51. BroadbandUSA, National Telecommunications and Information Administration, *Notice of Funding Opportunity: Broadband Infrastructure Program Executive Summary*, https://broadbandusa.ntia.doc.gov/sites/default/files/2021-05/NTIA%20Broadband%20Infrastructure%20Grant%20Program%20NOFO.Final__0.pdf (last visited June 3, 2021).
52. Kevin Taglang, *NTIA Has Millions for Broadband Infrastructure*, Benton Institute for Broadband & Society (May. 21, 2021), [NTIA Has Millions for Broadband Infrastructure | Benton Institute for Broadband & Society](https://bentoninstitute.org/ntia-has-millions-for-broadband-infrastructure).
53. *Id.*

54. *Id.*
55. *Id.*
56. *Id.*
57. *Id.*
58. *Id.*
59. *Id.*
60. *Id.*
61. *Id.*
62. *Id.*
63. *Id.*
64. *Id.*
65. BroadbandUSA, National Telecommunications and Information Administration, *Notice of Funding Opportunity: Broadband Infrastructure Program Executive Summary*, https://broadbandusa.ntia.doc.gov/sites/default/files/2021-05/NTIA%20Broadband%20Infrastructure%20Grant%20Program%20NOFO.Final__0.pdf (last visited June 3, 2021).
66. Kevin Taglang, *NTIA Has Millions for Broadband Infrastructure*, Benton Institute for Broadband & Society (May. 21, 2021), [NTIA Has Millions for Broadband Infrastructure | Benton Institute for Broadband & Society](https://www.bentoninstitute.org/ntia-has-millions-for-broadband-infrastructure/).
67. BroadbandUSA, National Telecommunications and Information Administration, *Notice of Funding Opportunity: Broadband Infrastructure Program Executive Summary*, https://broadbandusa.ntia.doc.gov/sites/default/files/2021-05/NTIA%20Broadband%20Infrastructure%20Grant%20Program%20NOFO.Final__0.pdf (last visited June 3, 2021).
68. *Overview*. (n.d.). Retrieved from U. S. Economic Development Administration: <https://www.eda.gov/about/>.
69. *Public Works Program*. (n.d.). Retrieved from U. S. Economic Development Administration: www.eda.gov/pdf/about/Public-Works-Program-1-Pager.pdf.
70. *Economic Adjustment Assistance Program 1-Pager*. (n.d.). Retrieved from U. S. Economic Development Administration: <https://www.eda.gov/pdf/about/Economic-Adjustment-Assistance-Program-1-Pager.pdf>.
71. *Coronavirus Aid, Relief, and Economic Security Act Frequently Asked Questions*. (n.d.). Retrieved from U. S. Economic Development Administration: <https://www.eda.gov/files/coronavirus/CARES-Act-flyer.pdf>.
72. *Community Development Block Grant Program*. (January 22, 2021.). Retrieved from U. S. Department of Housing and Urban Development: https://www.hud.gov/program_offices/comm_planning/cdbg.
73. *Can Community Development Block Grant (CDBG) funds be used to fund broadband/telecommunications projects? If so, how?* (January 2016.). Retrieved from HUD Exchange: <https://www.hudexchange.info/faqs/programs/cdbg-entitlement-program/broadband-infrastructure/can-community-development-block-grant-cdbg-funds-be-used-to-fund/>.
74. *Notice of Funding Opportunity for the Department of Transportation's National Infrastructure Investments (i.e., the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grant Program) under the Consolidated Appropriations Act, 2021*. (April 13, 2021.). Retrieved from U.S. Department of Transportation: <https://www.transportation.gov/sites/dot.gov/files/2021-04/FY%202021%20RAISE%20grants%20NOFO%20%28Final%29.pdf>.

75. *Id.*

76. *Id.*

77. *Id.*

78. *Id.*

79. *Id.*

80. *Id.*

81. *Id.*

82. *Id.*

83. *Id.*

84. *Id.*

85. *Id.*

86. *Id.*

87. *Id.*

88. *Id.*

89. *Id.*

90. *Id.*

91. *RAISE 2021 Applications FAQs*. (May 3, 2018.). Retrieved from U.S. Department of Transportation: <https://www.transportation.gov/RAISEgrants/2021-raise-application-faqs>.

92. *Notice of Funding Opportunity for the Department of Transportation's National Infrastructure Investments (i.e., the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grant Program) under the Consolidated Appropriations Act, 2021*. (April 13, 2021.). Retrieved from U.S. Department of Transportation: <https://www.transportation.gov/sites/dot.gov/files/2021-04/FY%202021%20RAISE%20grants%20NOFO%20%28Final%29.pdf>.

93. *Id.*

94. *Id.*

95. *Id.*

96. *Id.*

97. *Id.*

98. *U.S. Department of Transportation Announces FY 2021 Round of the Infrastructure for Rebuilding America (INFRA) Grant Program*. (March 17, 2021.). Retrieved from U.S. Department of Transportation: <https://www.transportation.gov/buildamerica/financing/infra-grants/infrastructure-rebuilding-america>.

99. *Notice of Funding Opportunity for the Department of Transportation's Infrastructure For Rebuilding America (INFRA) Pro-*

- gram for Fiscal Year 2021*. (February 17, 2021.). Retrieved from U.S. Department of Transportation: https://www.transportation.gov/buildamerica/sites/buildamerica.dot.gov/files/2021-02/FY%202021%20INFRA%20NOFO_0.pdf.
100. *INFRA 2020 Fact Sheet*. (n.d.). Retrieved from U.S. Department of Transportation: https://www.transportation.gov/buildamerica/sites/buildamerica.dot.gov/files/2020-06/INFRA%202020%20Fact%20Sheet_1.pdf.
101. *Chicago Launches Groundbreaking Initiative to Bridge Digital Divide, Providing Free High-Speed Internet Access to Over 100,000 CPS Students*. (June 25, 2020.). Retrieved from City of Chicago Office of the Mayor: https://www.chicago.gov/city/en/depts/mayor/press_room/press_releases/2020/june/CPSInternetAccess.html.
102. *Fact Sheet: Chicago Community Area Economic Hardship Index (2017)*. (December 3, 2019.). Retrieved from Great Cities Institute, University of Illinois at Chicago: <https://greatcities.uic.edu/wp-content/uploads/2019/12/Hardship-Index-Fact-Sheet-2017-ACS-Final-1.pdf>.
103. *Providing Fast and Free High-Speed Internet for Students who Need it the Most*. (n.d.). Retrieved from Chicago Public Schools: <https://www.cps.edu/strategic-initiatives/chicago-connected/>.
104. Hassert, Dan. *\$2.5MM Covington Connect to close digital divide*. (July 8, 2020.). Retrieved from City of Covington: <https://www.covingtonky.gov/news/2020/07/08/-25mm-covington-connect-to-close-digital-divide>.
105. Hassert, Dan. *124 'hotspots' expand free Wi-Fi access*. (January 15, 2021.). Retrieved from City of Covington: <https://www.covingtonky.gov/news/2021/01/15/124-hotspots-expand-free-wi-fi-access>.
106. *OAK WiFi – A Small Step to Closing the Digital Divide*. (n.d.). Retrieved from City of Oakland: <https://www.oaklandca.gov/topics/oakwifi#:~:text=About%20OAK%20WiFi,-94%2C000%20residents%20in&text=OAKWIFI%20is%20an%20initiative%20that,close%20the%20digital%20divide%20below>.
107. *OAK WiFi: New Beginning II*. (n.d.). Retrieved from ArcGIS: <https://www.arcgis.com/apps/MapSeries/index.html?appid=966902e58939421dbb9a7eb5637c4c65>.
108. *Connect for Success Grant Application*. (n.d.). Retrieved from Mobile Beacon: <https://www2.mobilebeacon.org/connect-for-success-application>.
109. *Id.*
110. *Connect for Success: Student Access Donation Program*. (n.d.). Retrieved from Mobile Beacon: <https://www.mobilebeacon.org/connect-for-success/>.
111. *Connect for Success Grant Application*. (n.d.). Retrieved from Mobile Beacon: <https://www2.mobilebeacon.org/connect-for-success-application>.
112. *Connect for Success – Donation Program Availability*. (n.d.). Retrieved from Mobile Beacon: <https://www.mobilebeacon.org/connect-for-success-program-availability/>.
113. Lippman, John. *With providers slow to bring in high-speed internet, Lyme residents footed the bill themselves*. (January 9, 2021.). Retrieved from Valley News: <https://www.vnews.com/LymeFiber-seeks-to-replicate-ECFiber-model-with-fiber-to-the-home-high-speed-internet-telecom-network-in-Lyme-38130815>.
114. *Frequently Asked Questions about LymeFiber*. (n.d.). Retrieved from Lyme Fiber: <https://www.lymefiber.net/faq/>.
115. *Id.*
116. *Id.*
117. *Bringing Fiber-Based Internet Service to Lyme, New Hampshire*. (n.d.). Retrieved from Lyme Fiber: <https://www.lymefiber.net/>.

*Technology &
Trends Review*

Policy Analysis

*Service and
Infrastructure
Analysis*

Site Analysis

*Market
Analysis*

*Needs
Assessment
and Outreach*

*Utility
Formation
Study*

*Programming
and Finance
Evaluation*

*Project
Identification*

PROJECT IDENTIFICATION

OVERVIEW

As the Market Analysis clearly demonstrates, local supply is not meeting local demand for broadband. When identifying implementation projects, fundamental questions must be answered about network ownership, management, and operation in advance of comprehensive cost analyses, business planning and financing evaluation. Our intent was to answer such fundamental questions through this Study and the content that follows. However, a thorough cost model, business plan, and financial plan should be developed once the Eastgate region selects the model(s) to implement from the recommendations below. For the projects in which Eastgate will be working with a private partner, such plans should be conducted with the partner to ensure accuracy and transparency.

Various needs were identified by area residents, businesses, and community organizations through the Needs Assessment portion of the Study, as well as ongoing communication with the Eastgate Regional Council of Governments and its member counties throughout the process. To address these needs, we have delineated short-, mid-, and long-term projects for the region below. We estimate that the short-term project recommendations could be deployed from approximately June 2, 2021 through August 31, 2021; mid-term project recommendations could be deployed from approximately June 2, 2021 through December 31, 2021; and long-term project recommendations could be deployed from approximately June 2, 2021 through December 31, 2024. However, all of the recommended projects will require local buy-in.

SHORT-TERM:

Although network build-out is necessary within the Eastgate region, this will be a costly, timely endeavor and many constituents need connectivity now. The following section provides short-term recommendations to connect folks as quickly as possible while the region explores longer term connectivity solutions. The recommendations are summarized as follows:

1. Identify the Eastgate Regional Council of Governments as the regional broadband convener & coordinator and incorporate additional staff support to implement the projects.

2. Assist in marketing low-cost offerings currently available through broadband providers, and assist with sign-ups for the FCC's Emergency Broadband Benefit (EBB) Program.
3. Maintain a comprehensive regional asset inventory, including digital inclusion programs.
4. Review and potentially revise or enact municipal Right-of-Way ordinances.
5. Adopt a regional Dig-Once Policy.
6. Establish partnerships among public entities including affordable housing, education, healthcare, transit, libraries, and Information Technology Centers, to address specific broadband access and digital equity/inclusion needs.
7. Encourage build-out by existing providers through applications to Ohio's Residential Broadband Expansion Grant Program and NTIA's Broadband Infrastructure Program.

PROJECT RECOMMENDATION 1:

Identify the Eastgate Regional Council of Governments as the regional broadband convener & coordinator and incorporate additional staff support to implement the projects.

Consistent feedback was received from the various stakeholders that there is a need for coordination, communication, and leadership when it comes to regional broadband activities. Further, while there are numerous recommendations below, few can come to fruition without a strong leader/ convener/ coordinator.

The State of Ohio was in a similar position prior to launching BroadbandOhio. Per the Ohio Broadband Strategy released in December 2019:

Goal: Identify an executive branch state agency to house a state broadband office. The current internet landscape is decentralized in Ohio. No single agency or office has full oversight over internet expansion within the state. The administration will create a new office of broadband in order to optimize expansion

efforts and leverage federal programs to expand internet access. This office may serve as a single contact point for state agencies and program managers as well as private businesses and internet providers as they work to expand high-speed internet in Ohio.¹

In March 2020, Ohio Governor Mike DeWine created BroadbandOhio, an office housed within the Development Services Agency that is dedicated to improving high-speed internet access across the state. Establishing this office was a pillar of the Ohio Broadband Strategy. BroadbandOhio will implement the State's strategy and be a point of contact for all broadband projects in Ohio.

We recommend a similar approach to BroadbandOhio being taken within the Eastgate region, through the creation of a Regional Broadband Office/ a regional lead as the Eastgate Regional Council of Governments. Eastgate will then implement the recommendations in this Study and be a point of contact for all broadband projects in the region.

The Eastgate Regional Council of Governments offers a unique set of proven attributes and capabilities that qualify it to serve as the Regional Broadband Council for the area. As a multi-service entity that already delivers a variety of federal, state, and local programs, the Eastgate Regional Council of Government serves as an effective tool through which federal and state governments provide planning and financial resources at the local and regional level. Using the regional council for broadband management, the region can capitalize on its strong community relationships, administrative capacity and decades of experience administering federal and state funding. Eastgate's natural role is that of a convener, resource provider and technical expert, which lends itself seamlessly to regional broadband deployment management.²

Eastgate can identify important players and guide the involved parties toward a common solution. Further, its public focus allows us to work with a constant eye for equity and the public interest. As referenced in the Programming & Finance section, Eastgate already receives and administers a variety of state and federal funding programs and grants. It can attribute this experience to assisting local governments understand the regulatory requirements, develop

the expertise necessary to be capable partners, and navigate broadband grant processes.

Eastgate should continue to designate a page on its website to broadband, similar to the approach with the business and residential studies performed under this study. This page can serve as an online information repository for the region including this Study, area broadband maps, and additional resources such as funding/ financing tools and sample policies identified in this Report.

Utilizing an informal hub and spoke approach, Eastgate can be supported by local organizations serving a similar role within their communities. These organizations include, but are not limited to the Ashtabula County Broadband Task Force,³ Youngstown/ Warren Regional Chamber, Ashtabula Community Action, and the Oak Hill Collaborative. In addition, member city Councils should consider creating their own Broadband Committee, which could have larger representation in the regional groups. Further, since COVID, state and local workforce boards have had to figure out how to provide services online; how to upskill their own staff with digital skills; and how to identify the digital skills that employers are looking for, and then weave them into existing job training programs. Such entities can also be strong partners in the area of digital inclusion.

In this role, we envision Eastgate fulfilling many of the following project recommendations, including distributing and assisting in sign-ups for the low-cost broadband offers in the following section.

Eastgate is currently staffed with highly capable project developers and expert planners, but including a new broadband-specific focus may require hiring additional staff. To assist in immediate implementation of the recommendations provided, this recommendation was provided to Eastgate in advance of completing the Study in order to allow Eastgate to explore its option to supplement staff via the American Connection Corps.

THE AMERICAN CONNECTION CORPS

The American Connection Corps is an effort connecting 50 young fellows in 12 states to their hometowns for a two-year pilot project to increase digital access and inclusion in their communities by coordinating local partners



to access federal and state resources for broadband access or delivering digital literacy to marginalized members of the community. The program will be led by Land O'Lakes in conjunction with Lead for America (LFA) and funded through the support of Heartland Forward and 19 additional partner organizations. LFA will select, train and place leaders in two-year, full-time paid fellowships with local institutions (e.g. local governments, nonprofits, community foundations).

Applicants must have earned their bachelor's degree no earlier than 2011, are between the ages of 21 and 30, and are legally authorized to work in the US. Applicants must also have a strong connection to the state in which they serve. A strong connection could be: (a) where you were born and/or raised, (b) where your family resides, (c) where you went to, or currently attend, college, (d) somewhere you lived in the past, or (e) a place you are committed to make your home long term.

Applications for fellows opened on April 27, 2021. The deadline to apply was May 15, 2021.

Individuals will be matched with their host organization in mid-to-late June. Organizations interested in hosting an American Connection Corps fellow were asked to submit an interest form. Because the application deadlines preceded the release of this Study, this recommendation was provided to Eastgate in advance of completing the Study and an interest form has been submitted.⁴

AMERICORPS VISTA

Far predating the American Connection Corps, AmeriCorps has been placing members in digital equity/ inclusion opportunities for years and may provide an additional path for Eastgate to supplement its capacity to implement the recommendations provided herein. The AmeriCorps VISTA (Volunteers in Service to America) program is a federal anti-poverty program administered by the Corporation for National and Community Service.⁵ AmeriCorps VISTA members are full time volunteers, ages 18 and older who are U.S. Citizens and committed a year of full-time service to help support communities develop lasting solutions to help curve poverty in the United States.⁶

Members in the program serve in an office setting environment where they gain experience

IN-DEPTH

The leadership of the Oak Hill Collaborative recognizes that the most critical need in our community is digital inclusion and equity - the opportunity for the less fortunate to participate in our increasingly computerized world, something they are sorely lacking at this time. The Collaborative attempts to ameliorate all aspects of the Digital Divide, starting with education, and including access to affordable Internet and computer hardware and software. The Collaborative utilizes its talents and resources to help adults and students, particularly in socio-economic distressed areas in the Mahoning Valley. It also act as community champion for all matters relating to the Digital Divide, working with others toward the same goal.

One of the Collaborative's stated goals is to act in a leadership capacity as Community Champion by continuing to serve on multiple committees and working groups with the Eastgate Council of Governments and Mahoning County to advance Digital Inclusion and improve broadband access; and to continue to act as spokesman for the Valley with regional, state, and national organizations.

Oak Hill Collaborative is fulfilling this goal by: (1) navigating residents on the Emergency Broadband Benefit Program, discussed further below; (2) refurbishing and reselling devices, in part in partnership with PCs for People; (3) teaching adult technology classes and workshops, as well as raspberry pi computer classes in schools; (4) advising local governments and other institutions on broadband; and (5) serving as a community digital inclusion advocate. It is for the above reasons that we believe they will be an important partner to Eastgate on broadband.

and leadership skills through capacity building activities such as fundraising, grant writing, researching, and volunteer recruitment.⁷ Any nonprofit organization, educational institution, or state or local government agency with a project concept designed to alleviate poverty within a community is eligible to apply sponsor a VISTA project.⁸ If an organization is considering sponsoring a VISTA project, it is important that they identify how the project and VISTAs will help their organization and community build a sustainable program designed to lift individuals out of poverty.⁹

Step 1: Preparation

When applying, a host organization must demonstrate its plan for the following project elements:

- » Community involvement: The organization must engage low-income community members that will be served to help plan the project.
- » Supervision: Who in the organization will supervise the VISTA(s)? How much time will that individual have to supervise?
- » Site Location: Where will the VISTA(s) serve? Does the organization have the space and equipment to support additional persons?

VISTA Support: Is the organization prepared to help a VISTA relocate?

Recruitment: If approved, how will the organization fill its VISTA positions?

Step 2: Application Process

- » VISTA applications can be submitted anytime throughout the year, although project start-ups generally take place four to five times a year.¹⁰
- » **The Concept Paper:** To apply for a project, the organization must submit a concept paper via the eGrants system to the Corporation for National and Community Service office in Ohio.¹¹ In the concept paper, the organization must demonstrate that the project: helps people overcome poverty, brings individual empowerment to the community, and includes outcome-based reporting that measures the actual impact of the project on those being served.¹²

- » **The application:** If approved by the state office, the applicant will be invited to submit an application to the state office where they will approve or disapprove within 10 business days.¹³
- » **Final Approval and Memorandum of Agreement:** If approved, a Memorandum of Agreement is signed between the Corporation for National and Community Service and the organization.¹⁴

Step 3: Supervisor Training

Once approved, the organization will select supervisor(s) and they will undergo training.

Step 4: Recruiting VISTAs

The organization will then post a description of the project and the VISTA assignment description in the Corporation for National Community Service's online recruitment system via eGrants.

Step 5: VISTA Selection and Approval

After selecting a candidate for a position, the organization will submit their applications and a pre-service orientation travel information form for each candidate to the state office for approval.

Step 6: VISTA Training

The candidate will participate in pre-service orientation lasting 3-4 days.

Step 7: Project Implementation

During the first year of the project, the supervisor is required to complete quarterly progress reports. In years to follow, reporting may be reduced to two reports a year.

Step 8: Closeout

Once the project ends, a final project progress report and any financial reports will be submitted.

PROJECT RECOMMENDATION 2:

Assist in marketing low-cost offerings currently available through broadband providers, and assist with sign-ups for the FCC's Emergency Broadband Benefit (EBB) Program.

As identified in the prior section, we recommend that one of the roles of the Eastgate Regional

Council of Governments, through its supplemental staff support for broadband, whether through the American Connection Corps or otherwise, and its local supporting organizations should first be to distribute information regarding existing low-cost broadband offers to eligible populations.

The National Digital Inclusion Alliance (“NDIA”)—an organization that provides a collaborative voice for home broadband access, public broadband access, personal devices and local technology training and support programs—provides a list of current low-cost offers from Internet Service Providers, including available locations and application instructions, to aid low-income families.¹⁵ NDIA also intends for the list to inform community leaders, service providers, libraries, media, and others who may give guidance to individuals. The following low-cost provider offerings are available in Ohio:

AT&T: AT&T offers “Access” providing low-cost Internet service for eligible households.¹⁶ This includes free installation and in-home Wi-Fi with Internet service charged at \$10 per month or less based on the maximum speed available at the household up to 25 Mbps. No contract or deposit is required. To qualify, applicants must participate in the Supplemental Nutrition Assistance Program (“SNAP”) or receive Supplemental Security Income (“SSI”).

Spectrum: Spectrum offers “Spectrum Internet® Assist” to provide Internet access and assistance for qualified households in need.¹⁷ This includes free Internet modem, high-speed Internet at 30 Mbps, no data caps, and no contracts. For eligibility, at least one member of the household must be a recipient of the National School Lunch Program, Community Eligibility Provision, or SSI.

PC’s for People: PCs for People is a nonprofit that primarily provides used electronics to people in need. However, it has also helped over 96,000 families connect to the Internet. PCs for People partnered with Mobile Beacon to create a program called “Bridging the Gap” that brings access to families under the 200% poverty level. *\$15/month*

In addition, Aging Connected is a national campaign to bridge the digital divide and assist older adults access essential public health information and more through affordable, accessible Internet.¹⁹ Aging Connected’s tool,

<https://oats.org/agingconnected/>, offers a simple three-step process from providing location information, to comparing and selecting providers.

EMERGENCY BROADBAND BENEFIT AND OTHER SUPPORT SERVICES THROUGH OHIO’S REMOTEDX CONNECTIVITY CHAMPIONS OFFICE

In addition to the existing provider options, we recommend that the Eastgate Regional Council of Governments, through its supplemented staff support and in coordination with Ohio’s RemotEDx Connectivity Champions office, assist individuals in signing up for the FCC’s Emergency Broadband Benefit, discussed previously in the Policy Analysis and Programming and Financing Evaluation sections.

The goal of the EBB is to help Americans afford home internet service during the pandemic through a monthly discount on broadband connections and a one-time discount on a device such as a laptop, desktop, or tablet. The EBB Program provides up to \$50 per month for broadband service (before taxes) for households that are Lifeline eligible (households can apply for and receive discounts through the EBB Program in addition to their Lifeline benefit); are eligible for existing discount broadband programs; have children eligible for the free and reduced school lunch program; have a household member who is a Pell Grant recipient; or have a household member who has experienced substantial loss of income since February 29, 2020 and the household had a total income in 2020 below \$99,000 for single filers and \$198,000 for joint filers. The program also includes certain bundled services, except video. It is important to note that being in arrears with a provider for existing broadband service does *not* disqualify a household from the EBB Program. A participating provider must also certify that eligible households will not be required to pay an early termination fee if the household agrees to enter into a service contract, nor subject to a mandatory waiting period.

The discounts through the EBB program will be applied directly to the consumer’s monthly bill. The full list of EBB-participating providers in Ohio is in the following chart, several of which have a presence in the Eastgate Region, including AT&T and Windstream Communications.

Emergency Broadband Benefit Program enrollment opened on May 12, 2021

and is slated to close six months after the Secretary of Health and Human Services determines that the COVID-19 pandemic emergency is over or when the \$3.2 billion appropriated by Congress has been exhausted, whichever occurs first. At such time, customers must “opt in” to ongoing service from the provider before being charged service at a non-discounted rate.

Eligible households can enroll in the program directly through a participating broadband provider or through USAC at getemergencybroadband.org. The Emergency Broadband Support Center is live from 9am-9pm ET (7 days a week) at 833-511-0311 or EBBHelp@USAC.org. The FCC is also providing an EBB toolkit (https://www.fcc.gov/emergency-broadband-benefit-outreach-toolkit?utm_medium=email&utm_campaign=Newsletters&utm_source=sendgrid) and released a video that details the EBB application process: https://www.youtube.com/watch?v=Ga9a2E77Rog&ab_channel=FederalCommunicationsCommission. Despite these resources, rollout of the EBB program has been problematic and difficult for many household that would like to participate. It quickly became clear that trusted, on-the-ground support will be needed in order for the benefits of this program to be fully realized.

Ohio’s RemotEDx Connectivity Champions powered by the Management Council is currently assisting Ohioans sign up for the Emergency Broadband Benefit Program, either directly through an ISP or through USAC, in partnership with the Ohio Department of Job & Family Services. In the first week of the program’s launch, RemotEDx Connectivity Champions assisted approximately 50-80 households per day through its call center. RemotEDx Connectivity Champions also created an Ohio-specific spreadsheet from the EBB list released by the FCC to use instead of the criticized “Companies Near Me” link to accurately determine the available ISP, and follows up with families every 48 hours to ensure they were able to enroll in the program.

We recommend that the Eastgate Council of Governments, through its supplemented staff and in coordination with local support organizations, assist in notifying area residents of the EBB, and then direct residents to RemotEDx

Case Study K-12 Broadband Connectivity Grant

On January 13, 2021, Lt. Governor Jon Husted announced the pilot program at Riverside Local School District in Logan County and funded through Ohio’s K-12 Broadband Connectivity Grant.¹⁸ This initiative aims to provide affordable high-speed internet access to a student population that is largely underserved by broadband. To do so, Riverside teamed up with OARnet and PCs for People to use a new fixed wireless technology on school property that can bring broadband access to approximately 600 households in three surrounding towns. The plan is to use the school’s infrastructure through OARnet to broadcast a wireless signal out to surrounding communities through an antenna situated on the lights of the school’s football field. Families that sign up will pay as low as \$15 per month for service and receive speeds estimated at 50 Mbps download and 5 Mbps upload with no contract and no added equipment fees.

Connectivity Champions for assistance in signing up for the program so as not to stretch Eastgate’s limited broadband staff too thin and enable them to focus on other implementation goals herein. Specifically, we recommend that the Eastgate Council of Governments coordinate with Joe Mancini of RemotEDx Connectivity Champions, who is a Eastgate-region resident, to assist in signing families up for this program.

Joseph E. Mancini

RemotEDx Connectivity Champion
Coordinator

[RemotEDx](#)

[The Management Council](#)

joe.mancini@managementcouncil.org

It is again important to note, however, that the EBB is a short-term program and early estimates project the allocated funds to cover approximately four months of service for eligible consumers. As a result, this will not displace

Table 9.1 Participating EBB Providers in Ohio

BROADBAND PROVIDER NAME	SERVICE TYPE
Access Wireless	Mobile
AirVoice Wireless	Mobile
American Broadband and Telecommunications Company	Mobile
Amplex Internet	Fixed
AT&T	Fixed/Mobile
Ayersville Telephone Company	Fixed
Bascom Communications	Fixed
Benton Ridge Telephone Company	Fixed
Boost Mobile	Mobile
Buckeye Broadband	Fixed
Charter (Spectrum)	Fixed
The Chillicothe Telephone Company	Fixed
Cincinnati Bell Telephone Company	Fixed
Comcast (Xfinity)	Fixed
Consolidated Fiber	Fixed
Cox	Fixed
EmpowerCLE	Fixed
enTouch Wireless	Mobile
Frontier Communications	Fixed
Gen Mobile	Mobile
good2go mobile	Mobile
human-I-T	Mobile
Life Wireless	Mobile
Massillon Cable TV (MCTV)	Fixed

BROADBAND PROVIDER NAME	SERVICE TYPE
Mediacom	Fixed
Metro by T-Mobile	Fixed/Mobile
MetroNet	Fixed
MetaLINK Technologies	Fixed
Middle Point Home Telephone Company	Fixed
Nextlink Internet	Fixed
PCs for People	Mobile
Point Broadband	Fixed
Q Link Wireless	Mobile
Sano Health	Mobile
Selectel Wireless	Mobile
StandUp Wireless	Mobile
Suddenlink	Fixed
TDS Telecommunications Corporation	Fixed
Telephone Service Company	Fixed
T-Mobile USA	Fixed/Mobile
TM Telecomm Corp	Fixed/Mobile
TracFone Wireless	Mobile
TruConnect	Mobile
Verizon	Fixed/Mobile
Windspeed Broadband	Fixed
Windstream	Fixed
Wabash	Fixed
WATCH Communications	Fixed
WOW! Internet Cable and Phone	Fixed

Denotes provider offering connected devices
(Laptop, Desktop, or Tablet)

the need for the additional mid- and long-term recommendations for affordable connectivity solutions in the area that follow.

PROJECT RECOMMENDATION 3: Maintain a comprehensive regional asset inventory, including digital inclusion programs.

The Site Analysis portion of this Study identified a variety of assets that may be utilized to better facilitate broadband network construction and operation.

Now that the foundation has been laid, we recommend that the Eastgate Regional Council of Governments, in its role as the regional convener and with support from County organizations, create and maintain on its website a comprehensive broadband asset inventory for the region. This inventory could be completed through use of an external consultant or by Eastgate's augmented staff in accordance with

our first recommendations, either way building off of the information gathered throughout this Study.

As stated in the Ohio Broadband Strategy, “[s] strategically accessing and building towers within rural areas throughout the state will allow for greater distribution of wireless solutions. Especially focusing on unserved locations can bring high-speed internet solutions to these areas.”²⁰ Aligning with this recommendation, we recommend that Eastgate provide a centralized repository of space available for access/ lease for wireless broadband expansion (e.g., rooftops, including those of affordable housing structures, per the later recommendation regarding partnerships; streetlights; municipal electric poles; etc.), as well as wired expansion (e.g., dark fiber; existing conduit, such as that in the Smart2 Project; etc.) in the region. Once created, this asset inventory can be utilized in the RFI/ RFP process recommended later in this section, providing access to the assets identified in the region in order to accelerate buildout in strategic locations. Such infrastructure can then be leased to providers for low- or no-cost to facilitate deployment.

Funding under the American Rescue Plan could be used to create a vertical asset inventory if the vertical asset inventory is woven into a comprehensive plan to use and deploy broadband infrastructure on the inventoried vertical assets.

We further recommend that Eastgate, through its American Connected Corps member, also perform a digital inclusion program inventory for the region, including digital skills training programs from basic to advanced; low-cost computer and internet offerings, such as through PC's for People; area partnerships to support digital inclusion; and other support services, such as hot spot lending. Access to these services should then be compared to transportation services available locally to ensure that the populations in need of support are able to access them accordingly, and incorporated into the comprehensive broadband asset inventory.

For example, the Oak Hill Collaborative in Youngstown has taught a wide variety of classes designed to develop high-level skills as well as familiarize residents and students with technology, such as basic computer literacy,

Figure 9.1 EBB Sample Flyer



The flyer is titled "Emergency Broadband Benefit" and features three images at the top: a woman on a phone, a woman at a computer, and a child at a computer. The text is organized into sections: "What is it?", "Who is eligible?", "THREE WAYS TO APPLY", and "HAVE QUESTIONS? NEED HELP?". It includes a list of benefits, eligibility criteria, and application steps. Logos for BroadbandOhio, Emergency Broadband Benefit, OLC Ohio Library Council, and RemotEDx Connectivity Champions are at the bottom.

Emergency Broadband Benefit

What is it?

The Emergency Broadband Benefit is a temporary FCC program to help households struggling to afford internet service during the pandemic. The benefit provides:

- Up to \$50/month discount for broadband services;
- Up to \$75/month discount for households on qualifying Tribal lands; and
- A one-time discount of up to \$100 for a laptop, desktop computer, or tablet purchased through a participating provider.

Who is eligible?

A household is eligible if one member of the household:

- Has an income that is at or below 135% of the Federal Poverty Guide lines or participates in certain government assistance programs;
- Receives benefits under the free and reduced-price school lunch or breakfast program;
- Received a Federal Pell Grant during the current award year;
- Experienced a substantial loss of income due to job loss or furlough since February 29, 2020; or
- Meets the eligibility criteria for a participating provider's existing low-income or COVID-19 program.

THREE WAYS TO APPLY

1. Contact your preferred participating provider directly to learn about their application process.
2. Go to [GetEmergencyBroadband.org](https://www.ohio-k12.org/remotedx) to submit an application and to find participating providers near you.
3. Complete a mail in application and send it along with proof of eligibility to: Emergency Broadband Support Center P.O. Box 7081 London, KY 40742

HAVE QUESTIONS? NEED HELP?

Contact the **Connectivity Champions** directly by webform at <https://www.ohio-k12.org/remotedx>, by email or text at connectme@ohio-k12.org, and by phone at 844-K12-OHIO (844-512-6446).

5.7.2021

BroadbandOhio

EMERGENCY BROADBAND BENEFIT

OLC
OHIO LIBRARY COUNCIL

RemotEDx
Connectivity Champions
Powered by Management Council

cybersecurity, programming/coding, social media marketing for small businesses, drone operation, video game development, accounting and bookkeeping, Smartphones for Seniors, Bible Apps, and other assorted classes. Other organizations to be inventoried include, but are not limited to libraries, housing authorities, and nonprofit and philanthropic organizations, as discussed further below.

Similarly, as detailed in the Service and Infrastructure section of the Study, through its Digital Opportunity Data Collection, the FCC is asking consumers to “share their broadband experience” in order to “implement long-overdue improvements to the agency’s broadband data and mapping tools.”³¹ The FCC has also released a speed test app (“FCC Speed Test App”) to measure speeds through Android and iOS devices in order to further aid in its broadband data collection and deployment efforts.³²

We recommend that Eastgate, with support from County organizations, lead the effort to submit area coverage information to the FCC, starting with the information gathered through the Needs Assessment portion of this Study, and by encouraging residents to utilize the FCC Speed Test App and www.fcc.gov/BroadbandData.

PROJECT RECOMMENDATION 4: Review and potentially revise or enact municipal Right-of-Way ordinances.

As additionally discussed in the Policy section of this Study, in Ohio, local municipalities are granted authority under O.R.C 4939 to create and administer comprehensive rules and regulations in order to manage and administer the use and occupancy of what often is the most economically valuable asset of a jurisdiction, its public right-of-way. Within the Ohio statutes, public right-of way is referenced as “Public Way” and includes the surface of, and the space within, through, on, across, above, or below, any public street, public road, public highway, public freeway, public lane, public path, public alley, public court, public sidewalk, public boulevard, public parkway, public drive, public easement, and any other land dedicated or otherwise designated for a compatible public use, which is owned or controlled by a municipal corporation, excluding a private easement.

Often called Right-of-Way (“ROW”) Ordinances,

Case Study Northeast Michigan Asset Inventory

In Northeast Michigan, communities have taken inventory of private and public vertical assets to assist ISPs in locating towers for possible internet service deployment. Funded by the Michigan Prosperity Initiative and Department of Agriculture, the project identified and cataloged assets that are available for the location and expansion of high-speed internet infrastructure. Connected Nation Michigan completed the inventory, field work, and web portal creation, available at: <http://connectmycommunity.org/nemcog-vertical-assets/>. Providers, residents, and businesses can identify Vertical Assets and Broadband in Northeast Michigan.²¹

such municipal rules and regulations are commonly found in sections of local municipal codes dealing with street and sidewalk occupancy and use. ROW Ordinances can be enacted by any local Ohio municipality and should be designed to establish set standards or ROW use by all entities who may occupy the public way and encourage the greatest amount of build coordination and complimentary use as possible. Under O.R.C. § 4939, municipalities are also allowed to recoup the actual and direct costs associated with ROW use by utilities and other users, as well as certain expenses incurred to draft their ordinances.

Traditionally, ROW Ordinances will provide for general ROW use and occupancy rules, outline costs to access/use/construct in the ROW, define permitting applications procedures, codify permitting regulations, detail municipal enforcement mechanisms to ensure proper use and effective restoration, provide for any available municipal indemnities/insurance/bonding, and list general construction procedures. ROW Ordinances contribute to the provision of a coordinated and orderly use of the ROW and provide users and potential users with a literal “rules of the road” approach necessary to incentivize coordination and control the use

Case Study: **Franklin County Digital Equity Coalition**

At the beginning of the COVID-19 pandemic, a number of Franklin County, Ohio organizations started what is now known as the Franklin County Digital Equity Coalition (“FCDEC”).²² The FCDEC created the Digital Equity Framework to serve as a guide for members of the coalition and others to help level the digital divide for all.²³ There are five goals outlined in the Framework, which provide a structure for the work by breaking digital equity into individual issues that can be addressed through different strategies. Included among the goals:²⁴

Broadband affordability: The goal is to expand the affordable, reliable, high-speed home internet options for all residents of Franklin County through four strategies: (1) gather additional accurate data on broadband coverage and adoption rates throughout Franklin County; (2) work with ISPs to increase the enrollment in existing broadband offerings to low-income residents; (3) evaluate the current neighborhood pilot projects; and (4) increase the number of provider options that are available to residential customers by encouraging new providers to enter the market.²⁵

Device Access: The goal is to create a sustainable stream of high-quality, reliable digital devices that are at a low-cost to Franklin County residents (new and refurbished) by: (1) ongoing computer donation commitments; (2) launching a computer refurbishing program that focuses on sourcing devices locally and creating tech jobs for residents of the county; and (3) pursuing partnerships with technology companies with the hopes of providing new devices and a discount at scale.²⁶

Digital Life Skills and Tech Support: The goal is to implement an integrated digital life skills/ tech support network.²⁷ The strategies to do so consist of: (1) a systematic asset mapping in order to develop an inventory of digital life skills and tech services being offered throughout the county; (2) once the inventory is complete, a gap and equity analysis that identifies the support needs and populations that are being underserved and where opportunities might exist; and (3) develop a service delivery model that uses the strengths and offerings of different providers to connect residents to the skills and resources they need.²⁸

The coalition also released an RFP using funding from the CARES Act to identify a last mile service provider with requirements of 50 Mbps download (\$15/month) speeds.²⁹ After reviewing the respondent RFPs, the coalition decided on two proposals: (1) Starry, a Boston area fixed wireless ISP, will provide millimeter wave service in the near east neighborhood; and (2) Motorola will serve the south side neighborhood using CBRS and modems that are installed in households.³⁰ Both networks will be using the city’s fiber.

of limited space, and allow the municipality to efficiently manage its resources as necessary to ensure that the cost and expense of ROW ownership remains reasonable.

Consistency of rules and regulations among regional municipalities is highly suggested as to allow private providers who consistently find it necessary to design builds that cross municipal boundaries the greatest ability to deploy infrastructure quickly and efficiently, without the need to adjust standards and permitting approaches. Often neighboring municipalities do find that they have certain geographic, aesthetic, design, or space limitations that keep the details of their respective ROW Ordinances from being identical, but substantial similar processes and formats can be achieved and are beneficial. A possible approach would be to have Eastgate or another regional entity work with outside experts to design a standard template ordinance that could be easily customized for individual municipalities, but still provide similar construction, use and occupancy procedures and rules.

We highly recommend that each municipal jurisdiction within the region review its codified ordinances to determine whether existing language is conducive to state-of-the-art ROW management and currently in line with state and federal law.

PROJECT RECOMMENDATION 5:

Adopt a regional Dig-Once Policy.

A major cost barrier to broadband expansion, particularly wired broadband, is the cost of excavating existing roadways or otherwise digging, boring, or trenching into the ground. We recommend that Eastgate, working with the Counties and the applicable engineers' offices, develop a regional dig once policy encouraging conduit to be installed when public rights-of-way are excavated or otherwise opened.

As provided in the Policy Analysis section, a dig-once policy is a common sense method to reducing the cost of infrastructure deployment. However, installation should not be limited to infrastructure for use by broadband providers – the Counties and their local political subdivisions should also seek to have dedicated conduit installed in the right-of-way for future broadband needs.

Recently, the U.S. DOT FHWA released a memorandum encouraging State DOTs to consider practices that can further broadband deployment including minimizing repeated excavation of the roadway, coordinating with broadband utilities during highway construction, and integrating trenchless technologies into construction practices, as appropriate.³³ As a result, we recommend that the Eastgate region also coordinate with ODOT and DriveOhio on such policy.

PROJECT RECOMMENDATION 6:

Establish partnerships among public entities.

As stated in the Policy Analysis section, partnerships and collaboration are particularly important to encourage effective policy development and enactment including partnerships with healthcare, local education and workforce providers, and/or public libraries. Such partnerships can help address the broadband access and digital equity needs of the region. In its role as the regional broadband convener, Eastgate should also facilitate partnerships with key public entities for broadband expansion and digital equity and inclusion opportunities, such as the following:

AFFORDABLE HOUSING

As previewed in the vertical asset inventory recommendation, there are opportunities to expand both broadband access and adoption through partnerships with affordable housing organizations including the Ashtabula Metropolitan Housing Authority, Youngstown Metropolitan Housing Authority, and the Trumbull Metropolitan Housing Authority.

Broadband access can be expanded to housing units and the surrounding community by ensuring that housing facilities are equipped with broadband access, and then facilitating rooftop leasing at such housing facilities, particularly towers, to expand area wireless coverage. This opportunity is further heightened with CBRS spectrum, which can overcome the traditional need for “line of sight” in fixed wireless deployments, as discussed in the Policy Analysis section.

One approach to funding these projects could be utilizing Community Development Block Grants

as identified in the Programming and Financing section of the Study. For example, the CARES Act specifically authorized public housing authorities to use such funds to pay for devices for families with school-aged children, telehealth needs, and job-seeking individuals, as well as internet services.

Broadband adoption can be facilitated by equipping facilities/ requiring that new facilities that use public funds are designed and equipped with connectivity that is provided to residents at no-cost as part of their lease. For example, under the Emergency Broadband Benefit, public housing authorities are able to “bulk purchase” internet services (which most other entities are prohibited from doing under this program) to ensure service affordability. In such approach, eligible households can have their monthly rent reduced by the EBB discount amount referenced above.

Some communities around the country are evaluating opportunities to EBB sign ups with local utility assistance programs and incorporating internet services into local utility assistance programs generally. We recommend that Eastgate area community action agencies and others that oversee similar programming consider the same in order to ensure that low-income residents seeking internet assistance secures the fastest, most reliable service for their household (whether through EBB, an existing low-cost option through area providers, or a utility assistance program).

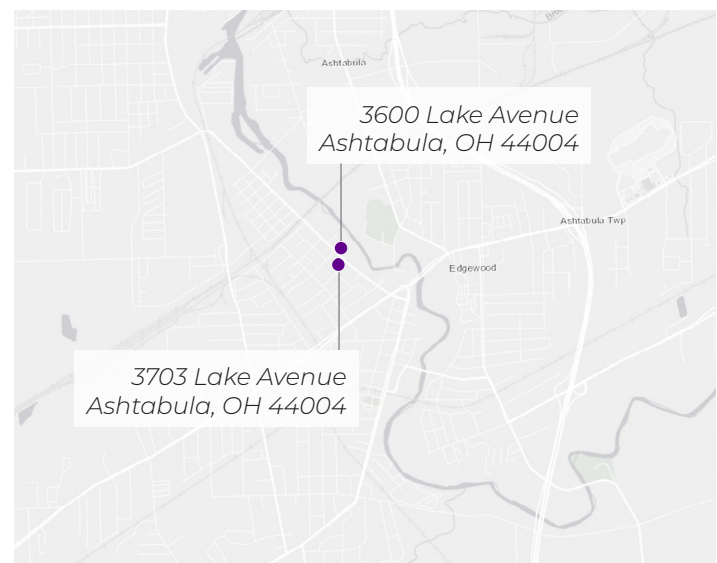
Additional support for broadband-focused housing authority projects is available through HUD’s ConnectHome initiative. ConnectHome is a public-private collaboration designed to lessen the digital divide for residents living in HUD-assisted housing.³⁵ To ensure all families are given the resources to succeed in the 21st century, efforts to bridge the digital divide must include the three legged-stool of digital inclusion (internet connectivity, digital literacy, and access to affordable devices) and the training and guidance needed for new users to use these tools in a beneficial way.³⁶

HUD’s ConnectHome initiative originally started as a pilot program that was launched in 2015 to address the homework gap for students in grades K-12 living in public and Indian housing.³⁷ While in school, such students have access to the

Case Study CMHA & Charter Communications

In Cleveland, Ohio, the Cleveland Metropolitan Housing Authority (“CMHA”) has partnered with Charter Communications/ Spectrum to provide high-speed internet access to residents living in 19 of CMHA’s properties.³⁴ Spectrum announced its partnership with CMHA on February 22, 2021, and hopes to start bringing internet access to thousands of Clevelanders. Some worry that this partnership will sound better than it works and lead to ineffective internet options. However, Spectrum has indicated that it plans to also provide boosted common area interest connectivity and network security for individual residents. While the CMHA and Spectrum have not yet determined cost for CMHA housing residents, CMHA representatives have generally stated that it will be low.

Figure 9.2 Ashtabula Metropolitan Housing Authority



Case Study Cleveland ConnectHome

In Cleveland, Ohio the Cuyahoga County Metropolitan Housing Authority has experienced success with the ConnectHome initiative. The housing authority used their already existing channels of community influence with local and national partners to build partnerships of their ConnectHome effort.⁴⁹ In doing so, they were able to access a range of community resources and expertise through the Cleveland Public Library, National Digital Inclusion Alliance, American Library Association, local non-profit organizations, Catholic Charities Hospital, and local companies. The partnerships illustrate the importance of laying the groundwork, sharing your goals with the community, and including the community in the process by having community meetings where you can engage potential stakeholders and create a forum for discussing digital inclusion.

internet, but once they go home, the internet is often unavailable due mostly to the cost of the service, devices, or both.³⁸ In order to address this problem, HUD issued a Federal Register Notice asking public housing authorities and tribes to join together with their local municipal leadership to close the gap in their communities.³⁹ Twenty-eight communities were selected to participate in the pilot program where they worked hand-in-hand with private sector stakeholders that made commitments to support the work.⁴⁰ Since its start, ConnectHome has brought 37% of HUD-assisted households with children in participating communities reliable internet access.⁴¹

Thanks to the success of the pilot program, HUD in 2017, asked EveryoneOn, its nonprofit partner, to lead the expansion program, ConnectHomeUSA.⁴² The goal of ConnectHomeUSA is to reach 100 communities by 2021 by connecting residents to the digital age.⁴³ As of today, there are 56 communities participating in the program who have

helped connect over 52,000 households to broadband.⁴³ The participating communities have helped residents apply for jobs, obtain health information, participate in civic life while still closing the homework gap for their K-12 residents.⁴⁵ Further, ConnectHomeUSA creates a platform for community leaders, local governments, nonprofit organizations, and private industry to join together and provide free or low-cost broadband access, devices, and digital literacy training.⁴⁶

During the first year of ConnectHome, HUD and EveryoneOn collaborated with pilot communities and federal partners to identify key insights from their experiences about how to best leverage public-private partnerships.⁴⁷ The collaboration resulted in the creation of the ConnectHomeUSA playbook.⁴⁸ There is a total of twelve playbooks as follows:

1. Asses the landscape and assemble your core planning team;
2. Cultivate and leverage partnerships;
3. Select your population and conduct a baseline survey to understand the needs;
4. Organize your first local convening;
5. Develop initial action plan;
6. Three-legged stool of digital inclusion: Connectivity;
7. Three-legged stool of digital inclusion: Devices;
8. Three-legged stool of digital inclusion: Digital Literacy;
9. Secure outside funding;
10. Engage Residents;
11. Engage Community Institutions; and
12. Track your progress and share your success

We recommend that Eastgate, in its convenor role, along with Public Housing Authorities or housing providers that are interested in joining ConnectHomeUSA monitor www.connecthomeusa.org for updates regarding 2021 applications.

K-12 AND HIGHER EDUCATION

The need for enhanced partnerships with schools for broadband access and adoption was specifically referenced in the community engagement meetings, particularly with

Ashtabula County stakeholders. From the higher education perspective, Youngstown State University ("YSU") has been highly participatory in the Study's information gathering process and should continue to be a partner at the table for future broadband expansion and digital inclusion projects in the region.

Partnerships with education for broadband access can be delineated into two categories: (1) physical assets (i.e., hotspots; backbone networks), and (2) intangible assets (i.e., Educational Broadband Service; LTE service).

Emergency Connectivity Fund

The FCC's recently announced Emergency Connectivity Fund, discussed in Policy Analysis section, seeks to allow community anchor institutions to provide devices and connectivity to students by reaching families where they live.⁵⁰ By providing \$7.171 billion to schools and libraries to secure free broadband service (and connected devices) for students and patrons at their homes, this funding will give the opportunity to distribute laptops and tablets into the hands of students, libraries and visitors, and staff members who currently lack these devices in their home.⁵¹

The focus of this fund is to close the "Homework Gap" so that children who have not had access to virtual classrooms can go online for class and conduct their schoolwork. One study found that, due to the pandemic and the consequences that followed with it with the move to remote e-learning, on average, students could lose anywhere from five to nine months of learning with students of color at a great risk of six to twelve months behind.⁵² Local feedback throughout this Study also identified that some schools were never able to transition to remote learning during the pandemic due to insufficient access to connectivity and/ or devices at home.

The FCC's recently adopted Order established rules and policies that will govern the ECF. The rules define eligible equipment and services, service locations, eligible uses, and reasonable support amount for funding provided.⁵³ Further, the rules designate the Universal Service Administrative Company (USAC) as the administrator for the program with FCC oversight.⁵⁴

Eligible Schools and Libraries for ECF

The FCC-adopted rules provides that all schools,

libraries, and consortia of schools and libraries that are eligible for support under the E-Rate program (Communications Act) are also eligible for support through the ECF.⁵⁵ Excluded from the list of eligible schools and libraries are for-profit schools and libraries, schools and libraries with endowments over \$5 million, libraries that share a budget with schools, and library or library consortium that are not eligible for assistance under the Library Services and Technology Act ("LSTA").⁵⁶ For clarification purposes, eligible schools and libraries do not need to be participating in E-Rate, but should be prepared to demonstrate eligibility under the program rules in order to receive support from ECF.⁵⁷

Eligible Equipment and Services

Under the ECF, Wi-Fi hotspots, modems, routers, devices, and connected devices (laptop computers and tablet computers) are eligible for support.⁵⁸

Location and User Limitations

The FCC has determined that it will not place a restriction on user location as students, staff, and library patrons will be using their devices at home or, if they don't have access to reliable internet service at their home, at a location where they can receive reliable internet, such as community centers, churches, and any other off-premise location where they can engage in remote learning.⁵⁹ However, under the Rule, schools and libraries are prohibited from reimbursements for eligible equipment and services purchased solely for the use of the school or library.⁶⁰

Regarding the limitations for per-location and per-user under the ECF, the FCC has stated that it will not allow an eligible entity to apply for support for more than one fixed broadband connection per location as well as the purchase of more than one Wi-Fi hotspot per student, staff member, or library patron during the declared COVID-19 emergency.⁶¹

Application Process

The application process under the ECF will provide funding to schools and libraries for purchases during the coming 2021-2022 school year of eligible equipment and services to be used by students, staff, and library patrons who otherwise lack access to such equipment.⁶² If additional funding remains available after disbursement to eligible schools and libraries for educational purposes, schools and libraries will be

reimbursed for the costs that they have incurred in purchasing equipment and services during the pandemic.⁶³

In Ohio, RemotEDx will be taking the Emergency Connectivity Fund under its purview, similar to its assistance with the Emergency Broadband Benefit program, outlined above. We recommend that Eastgate coordinate with RemotEDx ensuring that eligible institutions in the region participate in this program, and encourage local conversations with schools and libraries about requesting these funds to extend or create bulk purchase agreements with providers.

Educational Broadband Service

Educational Broadband Service (EBS) is a 2.5GHz band of spectrum that is divided into broadband radio service and wireless educational broadband service that was set aside by the FCC for the public good.⁶⁴

FCC rules allow an EBS license holder to lease 95% of the capacity of their licensed spectrum to a commercial user for commercial deployment of advanced wireless services in an agreement that generates new sources of revenue for the license holder.⁶⁵ The remaining 5% must be reserved by the EBS license holder for educational usage.⁶⁶ The educational usage requirement may be satisfied by either the EBS licensee/lessor through the usage of commercial wireless broadband services provided by the commercial lessee over the EBS channels for educational purposes at a discounted cost or no cost.⁶⁷

When a holder of an EBS license enters a lease, the lease term is good for 30 years as long as the above requirements of 5% are met.⁶⁸ When entering a lease, the 5% will be added as a capacity entitlement provision, at no cost to the licensee, thus being used as a cost-free service and free use of equipment.⁶⁹ Leases should contain provisions that include automatic pro rata increases or decreases in licensed spectrum coverage.⁷⁰

On July 10, 2019, the FCC adopted rules to overhaul the spectrum assigned to EBS.⁷¹ One major change that was brought by the new rule was to bring EBS spectrum under the same application process and licensing rules that are available to other spectrum.⁷² One note to mention is the so called use it or lose it requirement where holders of site-specific

licenses must provide minimum service without any interruption for a period of more than 180 days.⁷³ This rule went into effect on September 28, 2020, and any EBS license holder that was not providing the minimum service requirement on that date and failed to do so by March 21, 2021, lost their license.⁷⁴

The 2019 EBS rules states that these so called overlay EBS licenses will be auctioned off in September of 2021, allowing any qualified entity to operate on any unused EBS spectrum.⁷⁵ The FCC will release an inventory of available spectrum some time before the auction.⁷⁶

LTE

Some schools across the country are also exploring the feasibility of standing up their own private LTE networks; while others are looking for opportunities to purchase at-home internet. Several schools in the region have already distributed hotspots to students, particularly to address connectivity needs during COVID-19; however, there was general consensus in the community engagement/ needs assessment portion of the Study that this is a stop-gap measure for the region's ongoing connectivity challenges. Longer term measures for these challenges are addressed in the mid- and long-term sections that follow. The region should also continue to follow the E-rate program, summarized in the Policy Analysis section, for potential expansion of off-campus access.

LIBRARIES

It is without question that libraries are instrumental partners in broadband access and digital inclusion in any community, and the Eastgate region is no exception. Area libraries provide access through public computing sites and hotspot lending programs, and assist in bridging the broadband knowledge gaps locally through programming and classes.

Standing the Eastgate Regional Council of Governments up as the go-to broadband source in the region will, hopefully, alleviate/ better distribute some of the responsibility that has been borne by the library systems in addressing digital inclusion. However, the libraries will remain key partners in Eastgate's efforts, particularly in reaching populations on the wrong side of the digital divide in order to disseminate applicable project information, such as the low-cost

provider options and EBB program. Libraries also participate in the E-rate program, which, if expanded to include off-campus access, may further help fill connectivity gaps within the region. Further, library systems have access to additional grant funds, particularly through the Institute of Museum and Library Services (“IMLS”); some of which support digital inclusion programming.

Most recently, IMLS announced \$15 Million in American Rescue Plan Act grants available to provide direct support for museum and library services to address community needs created or exacerbated by the COVID-19 pandemic. Proposals to the program can continue, enhance, or expand existing programs and services, or launch new ones to address emergent needs and unexpected hardships. Aligned with the recommendations contained in this Project Implementation section, successful projects under the program may include those that seek to:

- Advance digital inclusion through approaches that may include, but are not limited to, improving digital platforms, online services, connectivity (e.g., hotspots), and creating digital literacy programs, as well as creating new processes and procedures needed to sustain a robust online environment.
- Build community-focused partnerships, networks, and alliances with organizations with an emphasis on complementing, rather than duplicating, resources and services.

- Support the creation and delivery of online and in-person educational, interpretive, and experiential programs and exhibitions for learners of all ages.
- Provide trusted spaces for community engagement and dialogue to foster recovery and rebuilding.

Applications to the program are due June 28, 2021, with award announcements anticipated in October 2021. Additional information on this grant and other library-specific funding opportunities is also available on the IMLS website at: <https://www.imls.gov/>.

TRANSPORTATION

In accordance with the potential build out routes identified in the long-term recommendations in this section, we recommend that the region coordinate planning projects to anticipate network build along transportation corridors. This is of particular importance in the City of Youngstown given the Smart2 BUILD Grant and opportunity to create a “smart corridor,” similar to the US-33 Corridor discussed previously in this study. Once the requisite conduit and fiber are installed, such corridors can also serve as autonomous vehicle testing sites, incorporating small cell facilities and road-side units (“RSUs”). This approach can provide for an additional economic development opportunity in the region.

However, implementation of such initiatives will require coordination with the Ohio Department of Transportation/ DriveOhio, the Western Reserve Transit Authority (“WRTA”) and the

Case Study: **School LTE Networks**

Not all municipal broadband efforts have resorted to fiber or conventional Wi-Fi hotspot solutions to broaden internet access. Some have leveraged Long-Term Evolution, or “LTE,” technology, which is a standard for wireless data transmission that uses different radio interfaces to connect. Recently in Illinois, a school district installed a \$300,000 private LTE network to deliver internet access to students.⁷⁷ Collinsville Community Unit School District #10 teamed up with IT solutions provider, STEPcg, to provide broadband access to around 500 students. With CARES Act funding, the partnership built a network with Nokia and Cambium Networks technology tied to an LTE broadband tower constructed at an elementary school. The network leverages four Nokia CBRS microcell installations that offer four-square miles of cellular wireless coverage in Fairmont City and State Park, Illinois. Collinsville Community selected LTE after the FCC approved the use of private LTE by cities and school districts. After beginning the project in August 2020, Collinsville and STEPcg completed construction, installation, and testing in February 2021. The network went live in March 2021.

Eastgate Regional Council of Governments in its role as the broadband convener and given its involvement with Transit Development Plans, and doing so may provide dig-once opportunities for all entities. As explore further below, funding for projects under such partnership(s) may be available through the U.S. DOT RAISE grant, detailed in the Programming and Financing section.

There are also digital inclusion opportunities through transportation partnerships, such as parking Wi-Fi enabled buses in low-income areas after hours in order to provide service.

PHILANTHROPY

In accordance with the Programming and Financing section, there are additional opportunities, particularly for funding projects, through partnerships with philanthropic organizations. Similar to many areas of Ohio, there are a significant number of registered nonprofit organizations in the Eastgate region – over 630.⁸⁰ Nonprofit organizations provide a variety of functions when it comes to broadband in the region, from funding to digital literacy/ digital skills training, to access to devices, and more. Similar to the sentiment of the region overall, the Needs Assessment interviews highlighted that many of such efforts are disjointed and lack coordination, at times leading to service duplication.

INFORMATION TECHNOLOGY CENTERS (ITCS)

Information Technology Centers (“ITCs”) provide Ohioans with another avenue to digital resources and we recommend their inclusion in the area’s broadband partnerships.

INFOhio, a division of the Management Council of the Ohio Education Computer Network, delivers automation services and expertise directly to participating schools through 18 ITCs. ITCs contract directly with participating schools and are connected into OARnet, which, as detailed in the Policy Analysis section, offers speeds up to 100Gbps to state and local governments, research institutions, medical centers, community anchor institutions, education institutions, and the Ohio Supercomputer Center. The ITCs then work with private ISPs in order to provide service to the education facility.

The ITCs in the Eastgate region include the Area Cooperative Computerized Educational Service

Case Study Wi-Fi Buses

Last year, the Sacramento Regional Transit District (SacRT) partnered with the California State Transportation Agency (CalSTA) and the City of Sacramento to equip buses with free wireless hotspots in communities with limited high-speed internet access. Starting in May 2020, the pilot program ran for 60 days with 10 “Wi-Fi Buses” provided access free of charge with a range of up to 1,800 feet and each bus providing 3.5 hours of wireless broadband service at two locations per day, totaling 140 locations a week. This effort was part of the state’s efforts to support distance learning and close the digital divide given that 1 in 5 California students lack high-speed internet access and almost half of low-income households lack broadband service at home.⁷⁸

Duncanville Independent School District (“ISD”) in Duncanville, Texas networked four school buses with internet transmitters to connect students at home.⁷⁹ The “Wi-Fi on Wheels” mobile initiative can travel from neighborhood to neighborhood to respond dynamically to connection shortfalls occurring in various parts of the town. In addition, Duncanville ISD used school funds to purchase nearly \$3 million in laptops, iPads, and Wi-Fi hotspots to provide children in need with the tools to connect to its bus-provided Wi-Fi. Through Wi-Fi on Wheels and device funding, Duncanville has been able to begin closing the local digital gap that has disproportionately impacted kids in economically-disadvantaged homes.

System (ACCESS), serving Columbiana and Mahoning Counties;⁸¹ and the Northeast Ohio Management Information Network (NEOMIN), serving Ashtabula and Trumbull Counties.⁸² ACCESS currently serves 26 school districts, two educational service centers, nine non-public schools, one Special Education Regional Resource Center, and The Public Library of Youngstown & Mahoning County.⁸³ Similarly, NEOMIN currently provides five core services: library services, fiscal services, student services, Educational Management Information Systems (EMIS) services, and network/email services in its footprint.⁸⁴ Like ACCESS, NEOMIN is wholly owned by its member school districts and governed by a Board of Directors comprised of member school superintendents.

In the Eastgate region, agreements could be made to provide ACCESS and NEOMIN, if they are interested, additional flexibility in serving local governments. This agreement could be between the oversight entity identified in the Utility Formation section, the ITC, and a private fiber provider. In addition, as nonprofit organizations, ITCs may have access to federal funding opportunities that may not otherwise be available to the counties, and some have the technical capabilities to build and operate fiber networks. All of the above can contribute to the longer term recommendations of this Study, which follow below.

PROJECT RECOMMENDATION 7:

Encourage build-out by existing providers through applications to Ohio's Residential Broadband Expansion Grant Program and NTIA's Broadband Infrastructure Program.

Historically, governments were forced to be reactive as opposed to proactive when it pertained to broadband build-out within their communities – they simply had to wait until the private provider built out. We have already reached the tipping point in broadband access in which, if a large carrier has not yet expanded service to an area, they are unlikely to do so due to a perceived inability to create a return on investment. As a result, and as reflected in the Service and Infrastructure section of the Study, service availability varies within the three counties – those areas that are more populous show stronger service coverage than less dense, more rural areas of the region. This aligns with the broadband access experience across Ohio and the United States.

As depicted on the maps provided in the Service and Infrastructure section (Figures 3.8, 3.9, 3.10), there is existing private fiber in the region; however, much of this fiber is for commercial purposes. FCC Form 477 data for June 2020

Case Study: **GATEway Fiber**

In Ohio's Miami Valley, communities and private partners aligned to create Gigabyte Access for Technology and Education ("GATEway Fiber") serving eight communities in Southern Montgomery County. The goal of GATEway Fiber is to bring a fiber optic network to individuals and businesses in the region as an alternative to national ISPs.⁸⁵ The Miami Valley Communications Council ("MVCC"), which is comprised of representatives from Southwestern Ohio towns like Centerville, Germantown, Kettering, Moraine, Oakwood, Springboro, and West Carrollton, joined forces with the regional ISP Independents Fiber Network ("IFN").⁸⁶ Together, MVCC and IFN have embarked on a \$3 million project to install 44 miles of fiber optic network capable of providing businesses and communities in the Miami Valley with high-speed internet access. The MVCC provided the \$1.4 million funding for Phase I of the project necessary to install 17 miles of new fiber and conduit. They completed Phase I in 2020. As of April 2021, the partnership has commenced Phase II to replace limited capability existing fiber. IFN is reportedly providing \$1.8 million in private capital to fund Phase II.⁸⁷ MVCC and IFN expect to complete Phase II by late summer 2021. In January 2020, the MVCC was notified they were the recipient of a Smart 50 Award recognizing innovative smart city projects due to their GATEway Fiber Project. The Smart 50 Awards honor the 50 most transformative smart projects each year.

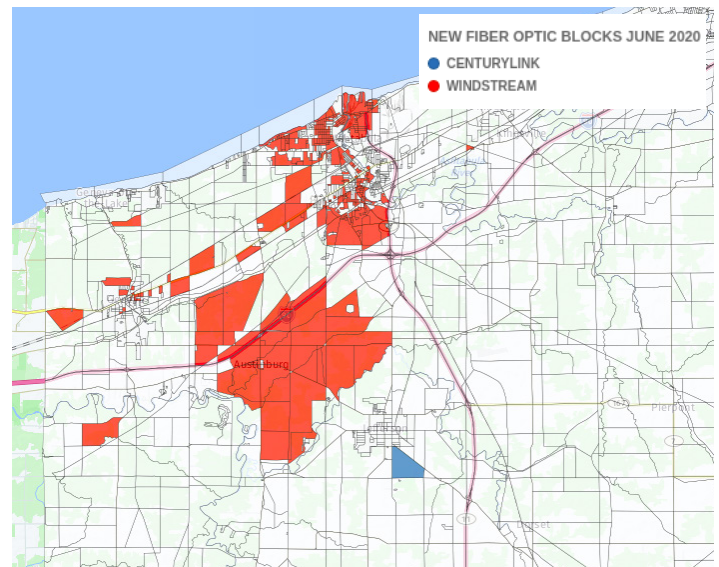
depicts 353 census blocks in the region as having new fiber service since the December 2019 data submission: 341 of these blocks are located in Ashtabula County and 340 of the 341 are served by Windstream. The remaining census blocks are served in a scattered fashion by CenturyLink and Armstrong. There is no new fiber depicted in southern Ashtabula or northern Trumbull Counties. Existing residential fiber coverage in the area prior to June 2020 was also available through GreatWave Communications, particularly around Ashtabula, N. Kingsville, Geneva, and Austinburg; and via Armstrong in suburban areas of Mahoning County.

Some of the increases in fiber from December 2019 to June 2020 may be marginal additions, such as adding homes on the other side of a dividing-line street; however, it is more likely substitution of Fiber to the Premises (“FTTP”) in replacement of for asymmetrical digital subscriber line (“ADSL”, or more simply, DSL, as discussed in the Technology & Trends section). As a result, although depicted as a “new fiber build,” it is more accurately described as a conversion of existing network (i.e., same poles, same support wires, etc.).

However, this does indicate changes in service availability in the area, which should be accounted for when it comes to short-term opportunities for the region. For example, several survey responses received through the Needs Assessment portion of the Study that stated that “broadband internet is not available at my home” were confirmed to have service available. Therefore, we recommend that Eastgate and area supporting organizations encourage folks who reach out regarding a lack of broadband to contact area providers to ensure that build out has not occurred since their last communication with the provider.

Regardless, this is again a short-term measure for a longer term issue. The Project Team received consistent feedback from residents and businesses through our community engagements that additional provider choice is needed in order to enhance speed and lower service costs locally. Two approaches that the Eastgate region can take to encourage local provider expansion and enhance competition among private entities in the shorter term include:

Figure 9.3 Ashtabula County: First Time with Fiber Broadband, June 2020



Source: Federal Communications Commission, *Connect Your Community*

- (1) subsidizing costs through grant/ loan funds or financing, such as through the tools identified in the Programming and Financing section of the Study, and attributing this Study to the applications as additional support for area expansion; and/ or
- (2) reducing costs of build-out through expedited permitting, processes, etc., such as through the enactment of Right-of-Way and Dig-once policies as discussed above.

The latter of these approaches is addressed earlier in the short-term recommendations; the former could be achieved through applications to the Ohio Residential Broadband Expansion Grant Program, which will be established through recently enacted H.B. 2, and the NTIA's new Broadband Infrastructure Program. Both of these programs *require* private provider involvement.

A detailed summary of Ohio House Bill 2 was provided in the Policy Analysis section of this Study, and additional details were included in the Programming and Financing section.

In considering this funding source it is important to remember that it will first prioritize areas without access to 10 Mbps download/ 1 Mbps upload or 25 Mbps download/ 3 Mbps upload broadband, and excludes areas where network to provide broadband service of at least 10 Mbps

download/1 Mbps upload is in progress and scheduled to be complete within a two-year period (defined as “unserved areas”) (see Exhibit A).

Although H.B. 2 funds should be pursued, as further detailed in the Project Identification section, the region does not have a significant number of areas that will be considered “unserved” under the program, and thus may be prioritized behind applications from other areas of the state. However, financial or in-kind contributions under the program can include funds received or approved under any other federal or state government grant or loan program. As a result, we recommend that the region coordinate with area broadband providers listed in the Provider List by County (Graphic A) to submit application(s) to the NTIA program, and then contribute these dollars as potential match to a later application to the Ohio Residential Broadband Expansion Grant Program. An application to the NTIA program can include multiple providers should Eastgate pursue a regional submission, and/or a provider can participate in multiple applications should individual applications from across the region be submitted. Applications are due August 17, 2021. Complete details on the program, including steps to apply, are including in the Programming and Financing section.

MID-TERM:

The following section provides mid-term recommendations to support the region’s longer term connectivity solutions. The recommendations are summarized as follows:

8. Establish New Broadband Authority to assist in funding additional regional buildout.
9. Consider launching Innovation Districts in areas with a Historic Building or Historic District, designated at the local, state, or federal level.

PROJECT RECOMMENDATION 8:

Establish New Broadband Authority to assist in funding additional regional buildout.

As detailed in the Ownership and Operation of a Broadband Utility section, we recommend the creation of a new Broadband Authority whose

Case Study Innovation District

Canton, Ohio approved legislation on October 1, 2018 to fund and finalize agreements to create and manage a local Innovation District. Together with private venture company JumpStart, Inc. and the Stark Community Foundation, Canton agreed to provide \$266,000 a year to fund the Innovation District in its downtown.⁹⁰ To be eligible for state tax abatements, the Innovation District is geographically limited to 12 blocks and provides high-speed broadband access. Because Canton’s project included a Downtown Redevelopment District and Innovation District, Canton may use funds to finance grants or loans to technology-oriented business and incubators that provide services or capital to businesses in the Innovation District.⁹¹ Stark County officials have recognized the benefits of the Innovation District that “combining affordable, historic real-estate with modern infrastructure and business support resources in a centralized urban location is an attractive proposition to both innovative companies and the type of employees they seek to hire.”⁹² The public-private partnership has contracted with Canton-based Agile Networks to maintain the new broadband network.

purpose would be to own and operate publicly owned broadband network infrastructure across the three-county region, organized for state law purposes as a port authority. We recommend the creation of this Broadband Authority in the mid-term recommendations because its role would be to ensure the consistent and thorough extension of high-speed internet service for every resident, business, and community organization, particularly in areas in which build-out has not occurred through the measures described in the short-term recommendations. Such Authority could also assist in funding some of the long-term broadband expansion recommendations that follow.

A similar model was launched in June 2020 when the Lawrence County Port Authority established the Southern Ohio Broadband Initiative in order to take advantage of state funding to bring broadband access to the County and surrounding counties.⁸⁸ For additional information on this recommendation, please refer back to the Ownership and Operation of a Broadband Utility.

PROJECT RECOMMENDATION 9:

Consider launching Innovation Districts in areas with a Historic Building or Historic District, designated at the local, state, or federal level.

Any area with a historic building should consider a Downtown Redevelopment District (“DRD”) - Innovation District (“ID”), not only for connectivity, but also for business incubation.

Under State law,⁸⁹ Innovation Districts provide a mechanism to collect increased property tax value and use it to modernize geographic areas through technology, research and development, and business incubation. Innovation Districts require the presence of a historic building or historic district, designated at the local, state, or federal level, that is or will be rehabilitated and the delivery of 100 gigabits per second broadband to the project site – an area located entirely within a Downtown Redevelopment District, enclosed by a continuous boundary. Once those requirements are met, increased property tax revenues generated over a 10-30 year period (depending on school district approval) can be used to pay for infrastructure, provide grants to incubators and loans to small businesses, and

conduct research and development activities.

IDs cannot be larger than 10 acres; therefore, the Eastgate COG should consider downtowns with historic buildings or districts as candidates for ID establishment to create “corridors of incubation/technology hubs.” In particular, in the mid-term, the region should target those areas that can gain access to OARnet, such as through its points of presence in Youngstown, Ohio, in order to achieve the required 100 Gbps connectivity. However, in the long-term, should the region pursue the additional fiber build out recommended along Rt. 7 and/ or Rt. 11, eligible areas along such route could also be explored as an Innovation District location. Ultimately, however, the region will need to partner with a local private provider that can connect into such backbone networks in order to provide last-mile service to the targeted area.

Management of broadband assets and the attraction of cutting edge companies can be done at these sites and funded through proceeds of the ID. It is important to note that only incremental tax revenue can fund an ID, although additional investment can be provided through private providers; therefore, they are best structured around an existing project that will result in incremental property value.

LONG-TERM:

The following section provides long-term recommendations to support connectivity solutions. The recommendations are summarized as follows:

10. Issue a Request for Information and/ or Request for Proposals to support public-private partnership(s) for fiber and wireless expansion, including soliciting ideas for the following:
 - 10.1 Regional Backbone Fiber Expansion along Route 7 and Route 11, Supplemented with East to West Connectivity along the Ohio Turnpike, 88 and 305 to ensure additional service to Townships and building off of the regional backbone(s):
 - » Conneaut to Pierpont Township to Kinsman Township to Brookfield to Hubbard to Liberty Township/ Girard to Niles to Warren to Newton Falls to the Turnpike

- » Conneaut to Pierpont Township to Kinsman Township to Brookfield to Hubbard interconnected at 304 into Youngstown to Boardman
 - » Conneaut to Pierpont Township to Kinsman Township with East-West connections on 88 at Vernon and on 305 at Hartford in order to address Bristol, Mecca, and Johnston Townships on 88 and Champion and Bazetta Townships along 305
 - » Ashtabula to 224 eastward into Poland Township and westward into Canfield, then connect into conduit along 224 in Canfield
- 10.2 Broadband access expansion to agricultural regions in Southern Ashtabula County, South of 90; and Northwest Trumbull County
- 10.3 Lateral connections in downtown Warren, Ohio in Trumbull County
- 10.4 Network expansion for Smart City implementations and affordability for residents in Youngstown

PROJECT RECOMMENDATION 10:

Issue a Request for Information and/ or Request for Proposals to support public-private partnership(s) for fiber and wireless expansion.

To continue to address broadband access and adoption gaps, we recommend that Eastgate, as the regional convener, release a Request for Information (“RFI”) and/ or Request for Proposals (“RFP”) in order to solicit responses for potential strategies and partnerships to expand affordable, high-speed broadband in the region. Although this is listed as a “long-term” solution, this is not to imply that consideration of, including through release of an RFI/ RFP, could/ should not occur in short-order – simply that the build-out is not an immediate solution to local connectivity needs.

We recommend that such RFI/ RFP encourage respondents to utilize the assets shown to be available through the comprehensive asset inventory compiled in the first phase of project implementation. Further, we recommend that respondents be required to detail how they will coordinate with the various partners

also established under the short-term recommendations above, and coordinate with the region/ counties/ municipalities on dig-once implementations. Once drafted, the RFI and/ or RFP could serve as a template for the Counties and their communities as they also solicit projects for targeted locations/ routes further identified below.

We also recommend that the RFI/ RFP seek information from respondents to ensure that any build-out will bring as much benefit to the area end-users, particularly in terms of affordability and competitive speeds, and that Eastgate has measures in place to receive information on such pricing and performance from awardee(s).

As showcased by the following case studies, the RFI/ RFP process has been utilized across the country and across diverse population sizes.

While an RFI is not necessary in the process and the region could issue an RFP at the outset, an RFI allows for industry input and additional idea generation in advance of committing to a specific implementation plan. The adage is that “innovation always out paces policy/ government,” and an RFI can help ensure that the region is accounting for all possible network solutions. That said, the focus of the RFI/ RFP should be on area fiber expansion, with the potential for hybrid last-mile networking solutions.

FIBER

As identified in the Technology & Trends section of the Study, fiber networks can take several forms and support government, commercial, or residential users, or a combination thereof. The recommendations provided in this Project Identification section assume an end goal of residential access, with commercial and governmental needs addressed in the process.

A recent study highlighted the cost of installing a fiber network as one of the primary reasons most communities select different solutions.⁹⁶ A fiber network build is not an immediate, nor a low-cost solution. However, while the initial expense can be high, such expansion provides additional control of the infrastructure and long-term cost savings.

To further support a dig-once implementation, we also recommend that exploration of an “open access” regional interconnected fiber network model be incorporated into the RFI/ RFP process,

Case Study: **RFI / RFP Process****CUYAHOGA COUNTY, OHIO**

The Office of Innovation and Performance of Cuyahoga County, the County's lead agency on digital inclusion, released a Request for Information in November 2020 to solicit ideas for strategies and partnerships for construction, operation, ownership, and financing to expand affordable, high-speed broadband in the County. The County received 19 responses to the RFI ranging from traditional large fixed and mobile carriers to smaller cable and fixed wireless providers, tower companies, broadband consultants/ engineering firms, broadband construction groups, nonprofits, and a public library. Responses to the RFI were expected to include new product and pricing options, including low- and no-cost community internet service solutions.⁹³

LE SUEUR COUNTY, MINNESOTA

Located 90 miles southwest of Saint Paul, Minnesota, Le Sueur County assembled a diverse group of citizens, local officials, and business leaders to improve broadband for thousands of residents and putting the county on track to potentially see full fiber coverage by the end of the decade. With 11 whole or partial cities in the county and under 29,000 residents, broadband infrastructure outside of the population centers is generally poor, which was a problem for residents, businesses, and farmers looking to remain competitive. As a result of efforts of a local coalition, there have been four complementary projects, one of which is a fiber build. The other three are supported by CARES Act funds, one of which is for additional fiber infrastructure via a partnership with MetroNet, a fixed wireless provider. Efforts to improve local connectivity started in 2017 when the County secured \$50,000 from the Blandin Foundation to perform a feasibility study. Le Sueur County then used the feasibility study as the basis for issuing an RFP to partner with ISPs to apply for a Border-to-Border Broadband grant operated by the Minnesota Department of Employment and Economic Development Program, leading to a successful partnership that covered about 250 homes. As such, a partnership was also formed with BevComm which remains active as both entities look to pursue expansions should additional funds become available. The county has also installed free public Wi-Fi access to seven areas around the county.⁹⁴

NEW YORK CITY, NEW YORK

In March 2021, New York City Mayor Bill de Blasio released an RFP for the telecom industry to create affordable broadband service options through a coordinated system of access of up to 100,000 city assets, prioritizing areas identified by the City's Task Force on Racial Inclusion and Equity. Further, the City will accelerate the buildout of 5G and make 7,500 street poles available for mobile carriers to build out their networks in underserved areas. Collectively, these initiatives will reach millions of residents across all five boroughs and expand access to high-speed, reliable internet. The NYC Internet Master Plan details that 18% of New Yorkers—or 1.5 million people—have neither a home nor a mobile internet connection.⁹⁵

as opposed to disjointed locally owned networks. An open access fiber network is made available, or “open,” to a range of service providers, which can include traditional ISPs, enterprise-level services, cellular providers, as well as government, healthcare, and education networks. This approach enables a network to potentially be utilized for more than internet services and enhances customer internet choice – which, as detailed above, is a need in the region.⁹⁹

We further recommend exploration of operating such network through a Public-Private Partnership in which the public sector owns, controls, and pays for the infrastructure, including the fiber, conduits, and/ or the Network Operations Center (“NOC”). However, the network design, build, operation, maintenance, and likely marketing, is undertaken by an independent, neutral private party, unless a compelling case exists in a locality to take on all of these components. As discussed in previous sections of the Study, there are several benefits, but also considerations in a public-private partnership. Generally, the public sector benefits from the private sector’s expertise and experience delivering broadband services to end-users and physical and financial assets, and reduces the risk from the public entity single-handedly taking on network development. The private sector benefits can include expedited processes, enhanced access to public infrastructure and data, and faster access to new and/ or expanded markets. From our community engagements it was not indicated that such expertise is available within the Eastgate Regional Council of Government and the appropriate advisors should be engaged to ensure appropriate risk allocation.

Through an open access model, the region can leverage public-private partnerships in order to provide broadband infrastructure to the identified residential and commercial end users in need of enhanced access, backed by public financing and oversight, and then make the lines available for lease to multiple private sector service providers.

An open access approach also facilitates digging once because, after the network owned by the public entity is constructed, it is made available to diverse service providers, reducing the need to dig up rights-of-way when a new provider enters the market.¹⁰⁰ This benefits the providers

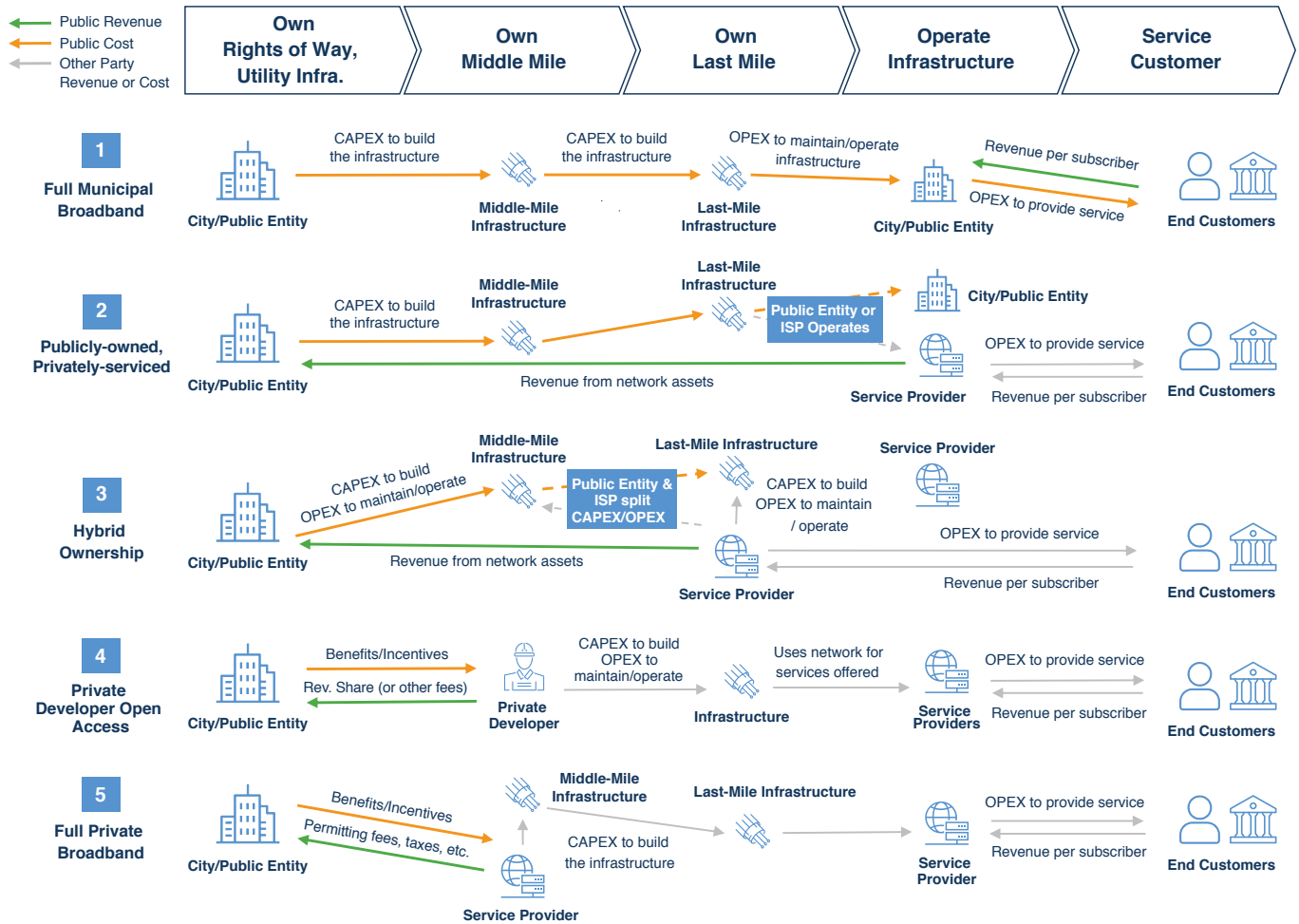
by reducing build out costs and enhancing their speed to market without the expense or risk of network construction. Ideally, the provider would then utilize its cost savings to provide other community benefits, such as marketing their services locally, enhancing build-out in locations beyond the open access network, and/ or offering digital inclusion programming. Regardless, despite such seemingly large benefits, there are some providers that simply will not participate and will remain highly protective of their independently funded, built, and operated networks.

On the internet service side specifically, in an open access network, broadband access would be provided on a wholesale basis to multiple service providers, which can range in size, service footprint, type of end-user served, etc. ISPs access the network only to deliver service to residents and businesses in the region. Other models, such as the Ammon, Idaho case study that follows, have used software defined networking (“SDN”) for their open access solutions, which also enables end users to easily change their service provider to meet their connectivity needs.

Case Study **FairlawnGig**

In Fairlawn, Ohio, FairlawnGig is a service offered to businesses and households along a government-owned network, stretching for 151 miles. Fairlawn reportedly took \$10.1 million out of its general fund without payback requirements or levying taxes or assessments on its residents to fund the development of FairlawnGig.⁹⁷ After its initial success, Summit County officials approved entering into a grant agreement with Fairlawn for \$6.5 million to fund the expansion of the City’s FairlawnGig network to include Summit County’s criminal justice and public safety agencies.⁹⁸ The community is leasing space on the Medina County Fiber Network. Fairlawn invested \$10 million to install fiber on every street and—as of late April—47% of households and businesses have signed up for the service.

Figure 9.4 Municipal Broadband Programs



Source: US Ignite & altman solon, "Broadband Models for Unserved and Underserved Communities" (2020)

Case Study Open Access

Many industry experts have lauded Ammon, Idaho's open-access network model as having one of the more innovative municipal broadband solutions.¹⁰¹ Since 2011, Ammon has been building an open-access fiber-to-the-home network that offers internet services from a variety of ISPs. The network leverages Ammon's own fiber optic network, which provides government, business, and residents better connection and more options in ISPs. In particular, Ammon uses a Software Defined Networking infrastructure, an approach to network management that enables dynamic, programmatically efficient network configuration, to offer its residents the option of four different ISPs.¹⁰² This creates competition that helps keep local prices reasonable with the average rate for 100 Mbps per second capacity service at around \$10 per month.¹⁰³

The key to Ammon's reasonably priced open-access network is owning and maintaining the infrastructure, such as the fiber optic lines. By covering infrastructure costs, Ammon removes that barrier to entry, enabling more ISPs to compete, which drives down ISP fees. Although the cost to build the network supporting Ammon's nearly 14,000 residents was around \$1 million, Ammon estimated that the open-access network could save the city and its schools, businesses, and residents approximately \$43.6 million over a 25-year period.¹⁰⁴

Case Study Fiber-to-the-Home

Wilson, North Carolina has offered many communities a successful proof of concept for developing and deploying Fiber-to-the-Home (FTTH) internet access to residents. In 2008, Wilson began building its FTTH network called "Greenlight."¹⁰⁵ As a result, Wilson became the first gigabit city—that is, a city with ultra-high-speed broadband available citywide at speeds of one gigabit per second or faster—in North Carolina. To build the Greenlight network, the city financed construction using \$29 million in Certificates of Participation in 2007 and 2008. After construction of the FTTH network was complete, the City's original plan was to offer 10 Mbps per second symmetrical service. Greenlight had already signed up 1,840 subscribers when the network became available. However, within 15 months, over 4,600 families and businesses had subscribed. This substantially boosted Wilson's efforts to recoup the construction costs. For example, Greenlight's first operating profit came in October 2010—less than two years after construction completed and less than a year after the 2008 economic crash. Greenlight's increasing subscribership has continued to keep money in the local economy and has reportedly saved Wilson more than a million dollars per year.

Case Study: **Ohio Municipal Fiber****DUBLINK**

“Dublink” is a P3 between the City of Dublin and Fishel for a municipal-owned commercial fiber/conduit and Wi-Fi system for economic development. Leased to telecommunications/ private sector. Private entities are granted access to the fiber system through indefeasible rights-of-use (IRUs). Dublink users are offered: (1) Various forms of delivery; (2) Choice of Internet Service Provider/ competition; and (3) Access to high-speed, low-cost bandwidth. City has experienced growth in businesses and residents in the City, economic development, and future-proofed infrastructure.

VELOCITY BROADBAND BLUE

Hudson is one of Ohio’s first Gigabit cities, offering high-speed and 100% fiber-optic broadband and voice services to local businesses. This empowers local businesses to better compete as City-owned and operated Velocity Broadband provides speeds up to 10 Gigabits per second. The concept of Velocity Broadband was born in 2014 and deployment began to business areas and commercial zones in 2015, connecting its 100th customer in 2017 and 200th customer in 2018. To fund the project, the City initially invested \$800,000 in capital expenditures.¹⁰⁶ By 2016, the City had invested more than \$2.3 million to create Velocity Broadband.¹⁰⁷ However, Hudson considered these costs against the long-term savings that Hudson’s consultants estimated would increase to \$6.5 million if the City chose to take on the role as an internet service retail provider rather than building Velocity Broadband.¹⁰⁸ In 2019, Velocity Broadband Blue was announced—an initiative to offer 1 Gig service to all homes and home offices along the existing fiber network for \$68/month. Deployment for Velocity Broadband Blue began in April 2019.

Figure 9.5 Community-Centered Wireless Infrastructure Networks: Public-Private Partnership (P3) Structure



Source: Community-Centered Wireless Infrastructure Networks (HR&A, US Ignite, & SIP)

Overall, we recommend a regional network approach and soliciting input through the RFI/ RFP to include some or all of the following projects, either in one release or a phased solicitation led, in-part, by the Counties and/ or their participating communities:

PROJECT RECOMMENDATION 10.1:

Regional Backbone Fiber Expansion along Route 7 and Route 11, Supplemented with East to West Connectivity along the Ohio Turnpike, 88, and 305 to ensure additional service to Townships

As depicted in the Site Analysis section, private fiber is shown to exist along Rt. 7 and Rt. 11; however, there are many nearby residential addresses that are still unserved, signaling that the fiber along these routes is not used for residential service, but likely for commercial utilization. Expanded last-mile residential service will ultimately need to connect into a backhaul network and fiber expansion along Rt. 7 and Rt. 11 could service this purpose.

Similar to the recommendation in the short-term section above, we recommend that initial outreach be made to the existing providers along these routes to determine whether there are opportunities to partner and/ or lease existing conduit and/ or fiber. For example, GreatWave Communications and Windstream each have shown interest and recent expansion in the region. GreatWave Communications is providing residential service through a lit fiber network on Rt. 7 from Conneaut to approximately one mile south of Hammond Corners Road and approximately five miles north of Pierpont Township. GreatWave also has fiber assets from Conneaut westward to North Kingsville. Once GreatWave's Conneaut build is complete, they also anticipate further expansion westward down the N. Ridge route into Ashtabula, which would feed into the Rt. 11 recommendation that follows. Collaboration on a backbone network could encourage additional build-out by such providers and reduce the cost of doing so.

However, if such lease opportunities are not available, are insufficient to reach all three counties, or if the region simply seeks to take a more proactive approach to ensuring broadband availability, we recommend that Eastgate, as the regional convener, explore

partnership with DriveOhio, BroadbandOhio, and potentially the Ohio Turnpike for backbone fiber expansion in the region. The State of Ohio has shown increasingly more innovation and interest in broadband projects and, as the official Metropolitan Planning Organization ("MPO"), the Eastgate Regional Council of Governments already works in concert with the Ohio Department of Transportation.

Unlike private industry, the public sector has patient capital and is tasked with serving the needs and economic viability of the community. Just as we do not expect a return on investment from parks, roads, recreation centers and other community services, we recommend that broadband infrastructure be similarly viewed as a long-term strategy for community and economic health.

Funding for this expansion may be available through use of ARP funds, as detailed in the Programming & Financing section, as well as the State Capital Budget in 2022, outlined in the Policy Analysis section. Entities can begin the process of requesting capital budget funding after the State's operating budget has been passed, which is anticipated to occur by June 30, 2021. Request forms begin to be distributed in the late summer through the fall of an odd-numbered year, and any group can obtain this application by contacting their local state representative or senator.

Additional federal grant funds could also be pursued, such through EDA or the U.S. DOT RAISE Grant, both of which are detailed in the Programming & Financing section of this Study. Eligible applicants for RAISE are local, state, tribal and U.S. territories, governments, including port authorities, transit agencies, metropolitan planning organizations, and other state or local subdivisions.¹⁰⁹ Additionally, more than one state or jurisdiction can submit a joint application as long as an applicant is identified as the primary point of contact and primary recipient of funds.¹¹⁰ Although broadband deployment as a standalone project is not eligible for RAISE, if the construction of a transportation project will allow concurrent installation of high-speed broadband, the applicant should describe such activities and how they support the innovative selection criteria.¹¹¹ Initial outreach to ODOT/ DriveOhio should explore whether applicable construction projects

are anticipated on these identified routes, supporting an application to the RAISE program.

With the appropriate partnership, the north to south backbone network(s) along Rt. 7 and Rt. 11 could be supplemented east to west along the Ohio Turnpike. The Ohio Turnpike too has shown significant effort in increasing connectivity along the route, *and* this would enable backbone connectivity to areas with additional expansion opportunities including Newton Falls, which has a municipal electric operation that may allow for faster expansion; Lordstown, which has pursued previous iterations of the RAISE grant (formerly the BUILD grant; and the City of Canfield, which has existing conduit through a recent build.

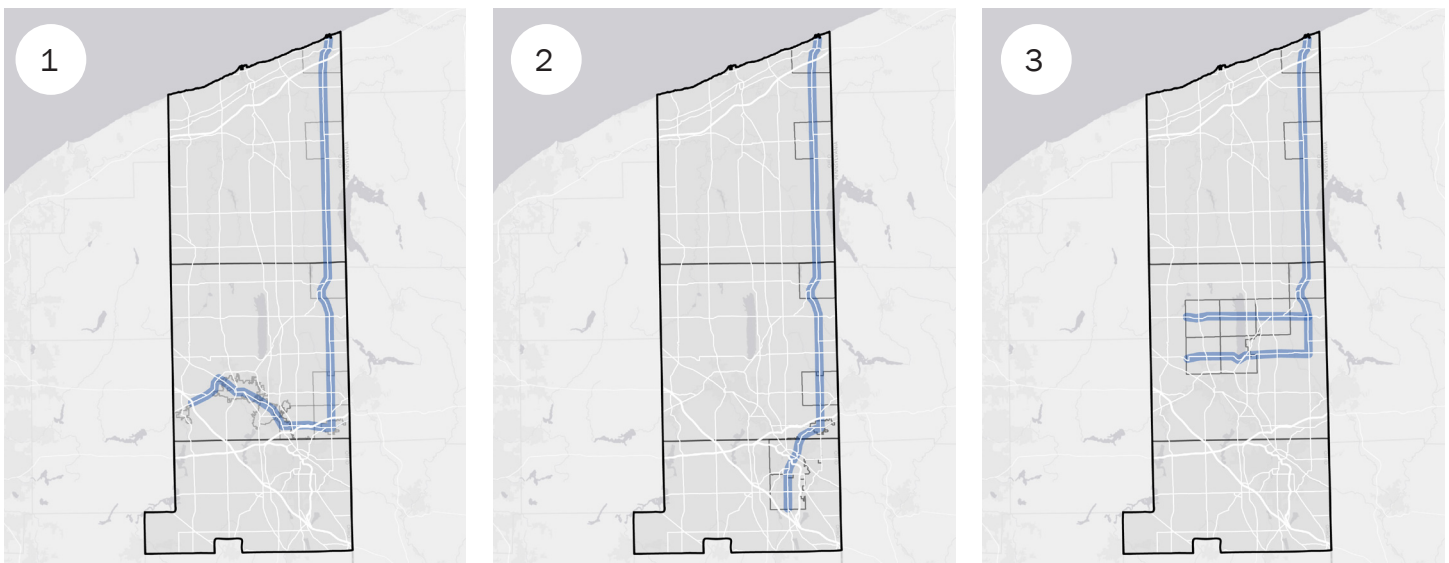
Route 7

Rt. 7 is an opportune build-out route due to its existing, standard 2-lane structure which makes it easier to provide fiber on- and off-ramps for last-mile connections. Rt. 7 will also already have electricity and other supporting utilities to enable network operation. South of downtown Youngstown, Rt. 7 becomes Market Street, which is where the SMART 2 BUILD grant conduit will, in-part, be located (and the Rt. 7 network could feed into this conduit for additional local expansion). In addition, the Rt. 7 route could connect into both DRS/ Involta data centers in Youngstown, and then to Mercy Health in Boardman and downtown Youngstown to support the healthcare technology needs. Mercy

Case Study WeConnect

Many municipalities and power providers across Ohio, as well as certain other states, have found success in providing internet services to their districts. Some cities, like Westerville, Ohio, have started to offer home internet as a utility service. Through its utility entity, WeConnect, Westerville connects ISPs to residents through the city's 60 miles of fiber optic network.¹¹² Westerville utilizes WeConnect as "its fourth utility" because WeConnect supports itself through its own revenues rather than via city subsidies. Initially, the city invested \$5.4 million to build the WeConnect Community Data Center that houses up to 230 cages for data servers. This Community Data Center hooks up to Westerville's fiber optic network, which links ISPs providing services to Westerville residents. Through WeConnect, ISPs do not have to pass on fiber hookup fees and related service charges onto residents. WeConnect offers residents and businesses download speeds that WeConnect says "would put Google to shame."¹¹³

Figure 9.6 Build-Out Route Options for Route 7



Health in Youngstown is located near an Involta data center, allowing for additional connections.

In addition to supplementing healthcare facilities, the Rt. 7 route provides opportunities for local education connectivity. ACCESS ITC, identified in the short-term recommendation as a partnership opportunity, is also connected into at least one of the Involta facilities in Youngstown. Their network then connects into the schools within their footprint. Once the Rt. 7 build reaches downtown Youngstown it has the opportunity to connect into OARnet's 100-gig connection.

Due to the existing infrastructure in and around the community, we recommend that the Rt. 7 network commence in Conneaut in Ashtabula County. Community engagement session meetings suggested that the main issue in Conneaut is affordability, which aligned with the survey results: all Conneaut-submitted surveys stated that service is available, but several said that they do not subscribe (likely due to affordability). Additional provider choice in the community could help drive costs down, especially considering that much of the existing fiber is business-only fiber through Everstream (although Windstream has a residential presence and both of these entities should be approached regarding potential partnership, as discussed above). The route could encompass the options shown in Figure 9.25, soliciting ideas and feedback through the RFI/ RFP process:

For the reasons highlighted throughout this Study, we again recommend coordination with the municipal electric/ public power operations for additional local expansion. There are three municipal electric/ public power operations within the region, all of which are of which are located in Trumbull County: the Cities of Hubbard, Newton Falls, and Niles. There are significant dig-once opportunities in working with a municipal electric given its existing easements and infrastructure. The fiber network contemplated under the RFI/ RFP process could then provide the backhaul network to the public power poles, where needed.

Route 11

A difference between Rt. 7 and Rt. 11 is that Rt. 11 is "limited access." As a result, it may not have the existing utilities that are available to Rt. 7. However, Rt. 11 runs the length of Ohio, ending in East Liverpool on the Ohio/ West Virginia

Figure 9.8 Build-Out Route Options for Route 11

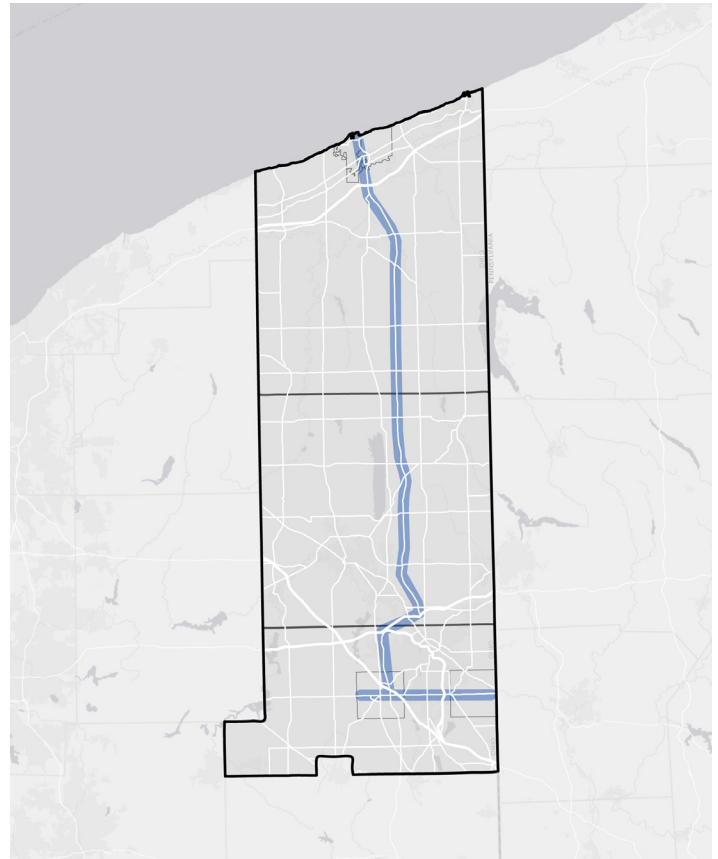
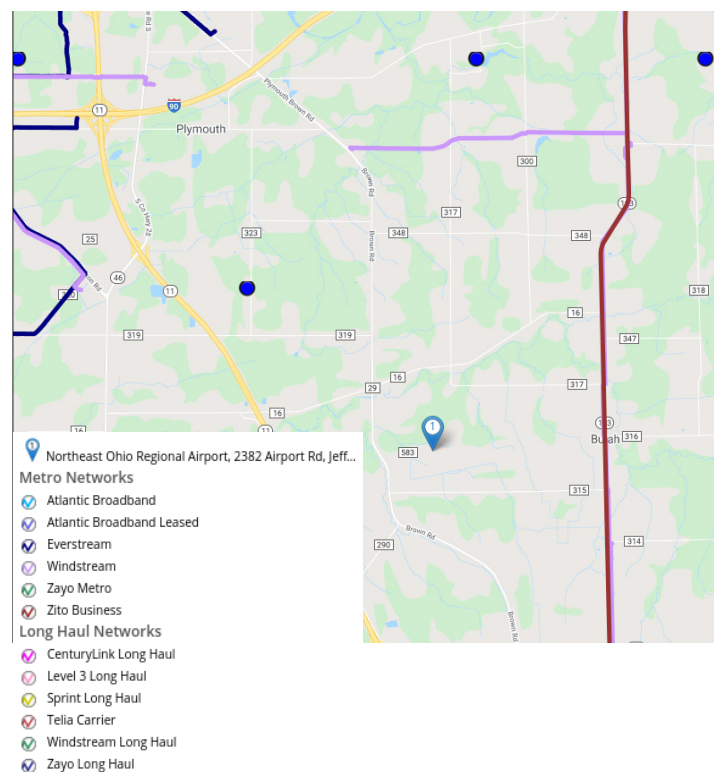


Figure 9.7 Airport FiberLocator Map



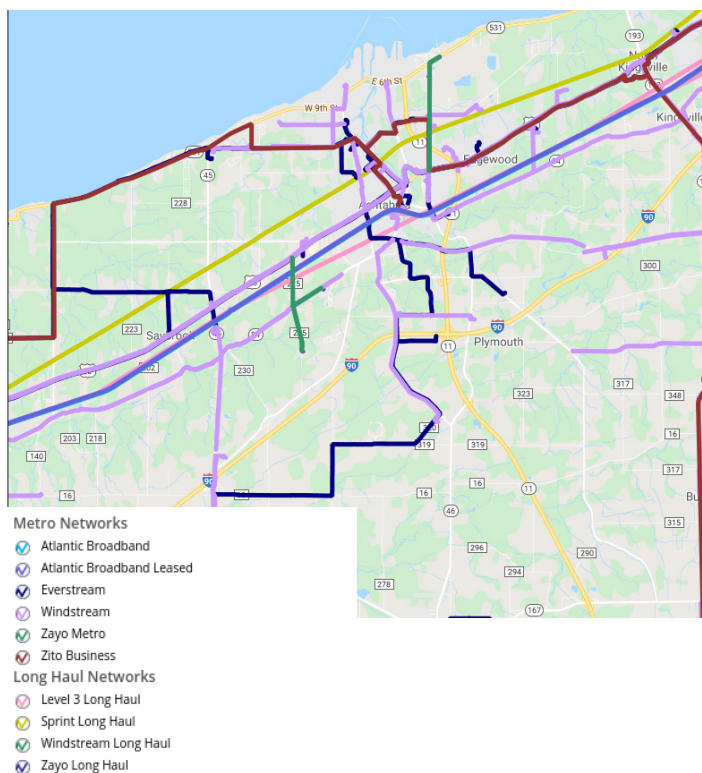
border, which may allow for additional expansion into Columbiana County and beyond in the Appalachian region.

Due to the existing infrastructure in and around the community, we recommend that the Rt. 11 network build commence in the City of Ashtabula. One of the identified needs in Ashtabula is the evaluation of a fiber loop around downtown – this network could build off of such loop and the full route could encompass the following options. This would also bring additional fiber access closer to the Northeast Ohio Regional Airport, which will reduce the cost of connecting the airport.

We recommend soliciting ideas and feedback through the RFI/ RFP process for the routes displayed in Figure 9.8.

If both routes are pursued, the Rt. 7 and Rt. 11 networks could meet in downtown Youngstown, connecting into the DRS/ Involta data center(s) and/ or the OARnet point of presence at Youngstown State, further supplementing area connectivity as mentioned above. The expectation would then be that additional last-mile build out in the region, such as those projects listed below,

Figure 9.10 City of Ashtabula FiberLocator Map



connect to the backbone(s) established along Route 7 and/ or Route 11 and utilize existing assets maintained in the comprehensive inventory. American Rescue Plan funds could be designated by the counties for those projects that align with the recent federal guidance, supplemented with the applicable funding/ financing tools identified in the Programming and Financing section of this Study.

PROJECT RECOMMENDATION 10.2:

Broadband access expansion to agricultural regions in Southern Ashtabula County, South of 90; and Northwest Trumbull County

As detailed in the Technology and Trends section of the report, high-speed connectivity facilitates

Figure 9.9 Farms in Eastgate Region



“smart” agriculture, enabling GPS soil mapping; seed and fertilizer counts; irrigation and grain-bin monitoring; and precision farming.

The amount of agricultural facilities in Ashtabula County east of Rt. 11 provides another use case for additional fiber along Rt. 11 and northwest Trumbull County also demonstrates ample farming presence.

In order to fund targeted last-mile expansion into these areas, we recommend that the Counties pursue a future round of the ReConnect grant. As provided in the Programming and Financing section of the Study, the ReConnect program offers loans, grants, and loan/ grant combinations to facilitate broadband deployment in rural areas that lack 10 Mbps download / 1 Mbps upload, or higher, on a consistent 24/7 basis.¹¹⁴ In facilitating the expansion of broadband services and infrastructure, the ReConnect program seeks to fuel long-term rural economic development and opportunities such as precision agriculture, a technology that requires a robust broadband connection. Funds under the ReConnect program are awarded to projects with a financially stable business model to bring high-speed broadband to rural homes, businesses, farms, ranches, and community facilities such as first responders, health care, and schools, in rural areas. For purposes of the program, rural areas are those *not* located within: (1) a city, town, or incorporated area that has a population of greater than 20,000; or (2) an urbanized area adjacent to a city or town that has a population greater than 50,000.

Historically, applicants have been required to propose to build a network within 5 years of available funds that is capable of providing broadband service to every household, farm, and business located in the proposed funded service area.

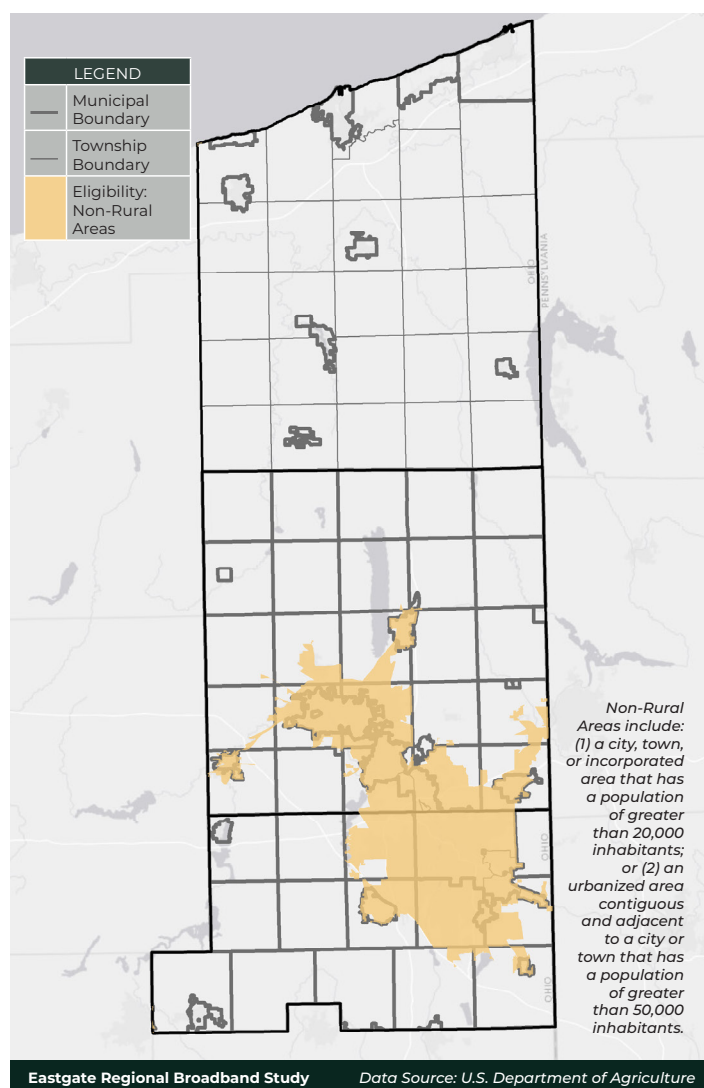
Eligible applicants include states and local governments, including any agency, subdivision, instrumentality, or political subdivision thereof; corporations; limited liability companies and limited liability partnerships; cooperative organizations; and others less applicable to the Eastgate region. The entity that applies for the funding must own the resultant infrastructure.

Awards are to be used to fund the construction or improvement of facilities required to provide fixed broadband service, including fixed wireless; to fund reasonable preapplication expenses in an

amount not to exceed five percent of the award; and to fund the acquisition of an existing system that does not currently provide sufficient access to broadband for upgrading that system to meet the requirements of this regulation.

For future rounds of the program, applicants are encouraged to work with their Governor’s Offices to submit information as to where state funding has been provided – this will be the first round in which Ohioans need to consider State funds with the passage of H.B. 2. Similar to the recommendation regarding expansion along Rt. 7 and Rt. 11, we recommend that Ashtabula and Trumbull Counties coordinate with BroadbandOhio on a potential application and lay the groundwork for such application through a

Figure 9.11 ReConnect Program: Non-Eligible Areas



local RFI/ RFP that seeks information on providing broadband service to every household, farm, and business located in the eligible service areas.¹¹⁵

PROJECT RECOMMENDATION 10.3:

Lateral connections in Downtown Warren, Ohio in Trumbull County

Last-mile, lateral connections were identified as a gap in the Needs Assessment portion of the Study. Expanding off of the Rt. 7 and/ or Rt. 11 backbone network expansion detailed above, utilizing a municipal-level RFI/ RFP process, we recommend that the City of Warren solicit information regarding fiber expansion, particularly for businesses, within its jurisdiction. Already, there are multiple fiber providers in/ through the City of Warren, several of which have shown interest previously in other states and/ or region of Ohio in partnering with local jurisdictions.

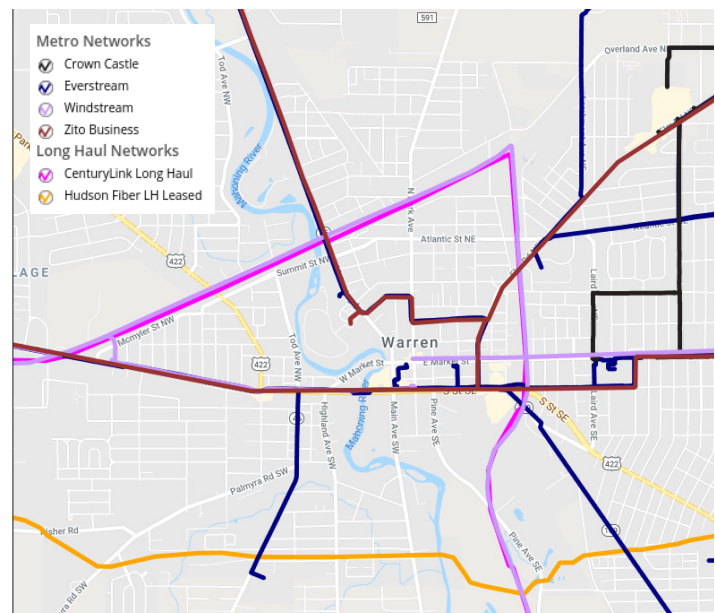
Further, there may be an opportunity for Warren expand last-mile residential by ensuring such fiber connectivity is extended to area towers/ vertical infrastructure to provide a hybrid fiber/ fixed wireless network locally, and then the City, through a public-private partnership, contract with a third party for last-mile residential wireless and/ or fiber to the home in surrounding suburbs. Such opportunity should be encompassed in the City's RFI/ RFP.

PROJECT RECOMMENDATION 10.4:

Network expansion for Smart City implementations and affordability for residents in Youngstown

We recommend considering "Smart City"/ Connected Autonomous Vehicle testing within the City of Youngstown, incorporating the conduit through the Smart2 BUILD grant. In particular, we recommend fiber installed along the transit/ community corridors in downtown Youngstown, such as Market Street and Mahoning Avenue, in accordance with the transit/ transportation partnership opportunities described the short-term recommendations above. We further recommend that such fiber be extended into neighboring areas, such as along Mahoning Avenue into Austintown, to ensure regional network availability and ongoing economic growth.

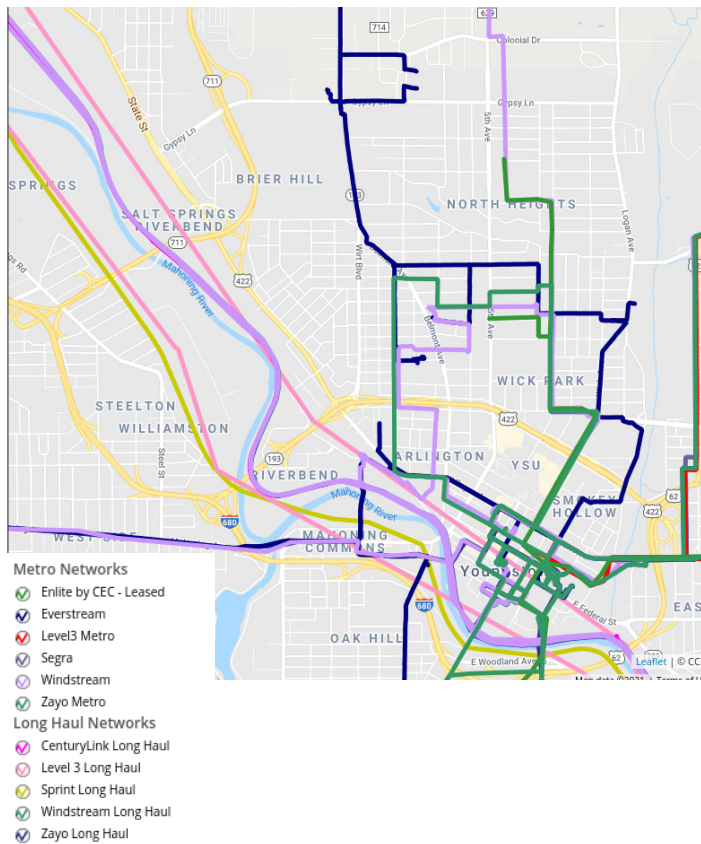
Figure 9.12 City of Warren FiberLocator Map



Case Study Michigan Moonshot Initiative

In Southeastern Michigan, the private-public partnership Merit Network has begun the Michigan Moonshot Initiative to provide broadband access to underserved communities.¹¹⁶ The Initiative hopes to install Wi-Fi hardware to 50 sites across Washtenaw and Wayne Counties. The Initiative utilizes the Merit Network's nearly 4,000 miles of fiber optics network. Private partners Toyota and Cisco are funding the project and providing hardware to public entities such as the Detroit Public Library, for whom the Initiative has already delivered broadband. The program has been a priority for many local officials, such as Washtenaw County Commissioner Jason Maciejewski, who said that they "must do whatever we can to close the digital divide for [their] students."¹¹⁷

Figure 9.13 Youngstown Smart² FiberLocator Map



The Smart2 grant is projected to expand conduit access from Federal Street to Madison Avenue; South Avenue to Vindicator Square in the Front Street reconstruction; Commerce Street to Fifth Avenue in the Federal Street reconstruction; Federal Street to Fifth Avenue in the Commerce Street reconstruction; Front Street to Commerce Street in the Phelps Street reconstruction; Fifth Avenue to Walnut Street in the Rayen Avenue reconstruction; and Fifth Avenue to Covington Street in the Park Avenue reconstruction. As of now, Federal Street and Fifth Avenue demonstrate limited fiber availability and such conduit should be leased out to providers, so long as none of the BUILD grant parameters restrict otherwise, to expand local access.

Building off of the backbone networks and any new innovation districts, as described above, to further support connected/ autonomous vehicle testing in and around the City of Youngstown, we further recommend consideration of a mesh wireless network to provide additional, affordable service to end users.

Case Study: **East Cleveland Pilot Project**

In April 2021, Ohio Governor Mike DeWine and Lieutenant Governor Jon Husted announced a pilot project in East Cleveland to expand reliable, low-cost high-speed internet for up to 2,000 families. This public-private partnership, led by BroadbandOhio, includes Case Western Reserve University, Connect, Cuyahoga County, Eaton Corporation, East Cleveland City Schools, GE Lighting-a Savant company, Greater Cleveland Partnership, InnovateOhio, Microsoft, OARnet, PCs for People, University Hospitals, and the Urban League of Cleveland. Over 1,000 households will be connected in Phase 1 with plans to scale up to 2,000 households, all of which will pay \$15/ month for internet speeds of 50 Mbps download/ 10 Mbps upload. This pilot program includes \$650,000 in financial investments with additional investments forthcoming. These investments come from BroadbandOhio, Cuyahoga County, Eaton Corporation, GE Lighting, Greater Cleveland Partnership, InnovateOhio, Microsoft, and PCs for People. PCs for People will serve as the internet provider, distributing antennas and modems to residents while Case Western Reserve University, Connect, East Cleveland City Schools, OARnet, and University Hospitals assist with technical infrastructure.¹¹⁸

SUMMARY OF RECOMMENDED PROJECTS

TIMELINE	RECOMMENDATION
SHORT-TERM	1. Identify the Eastgate Regional Council of Governments as the regional broadband convener & coordinator and incorporate additional staff support to implement the projects.
	2. Assist in marketing low-cost offerings currently available through broadband providers, and assist with sign-ups for the FCC's Emergency Broadband Benefit (EBB) Program.
	3. Maintain a comprehensive regional asset inventory, including digital inclusion programs.
	4. Review and potentially revise or enact municipal Right-of-Way ordinances.
	5. Adopt a regional Dig-Once Policy.
	6. Establish partnerships among public entities including affordable housing, education, healthcare, transit, libraries, and Information Technology Centers, to address specific broadband access and digital equity/ inclusion needs.
	7. Encourage build-out by existing providers through applications to Ohio's Residential Broadband Expansion Grant Program and NTIA's Broadband Infrastructure Program
MID-TERM	8. Establish New Broadband Authority to assist in funding additional regional buildout.
	9. Consider launching Innovation Districts in areas with a Historic Building or Historic District, designated at the local, state, or federal level.
LONG-TERM	10. Issue a Request for Information and/ or Request for Proposals to support public-private partnership(s) for fiber and wireless expansion, including soliciting ideas for the following:
	10.1 Regional backbone fiber expansion along Route 7 and Route 11, supplemented with East to West Connectivity along the Ohio Turnpike, 88, and 305 to ensure additional service to Townships and building off of the regional backbone(s): <ul style="list-style-type: none"> » Conneaut to Pierpont Township to Kinsman Township to Brookfield to Hubbard to Liberty Township/ Girard to Niles to Warren to Newton Falls to the Turnpike » Conneaut to Pierpont Township to Kinsman Township to Brookfield to Hubbard interconnected at 304 into Youngstown to Boardman » Conneaut to Pierpont Township to Kinsman Township with East-West connections on 88 at Vernon and on 305 at Hartford in order to address Bristol, Mecca, and Johnston Townships on 88 and Champion and Bazetta Townships along 305) » Ashtabula to 224 eastward into Poland Township and westward into Canfield, then connect into conduit along 224 in Canfield
	10.2 Broadband access expansion to agricultural regions in Southern Ashtabula County, South of 90; and Northwest Trumbull County
	10.3 Lateral connections in downtown Warren, Ohio in Trumbull County
	10.4 Network expansion for Smart City implementations and affordability for residents in Youngstown

SECTION ENDNOTES

1. *The Ohio Broadband Strategy*. (n.d.). Retrieved from Innovate Ohio: https://innovateohio.gov/wps/wcm/connect/gov/bde9a8ce-5f93-4a04-b937-102788469bdb/OhioBroadbandStrategy_121919.pdf?MOD=AJPERES&CONVERT_TO=url&CACHEID=ROOTWORKSPACE.Z18_M1HGGIK0N0JO00QO9DDDDM3000-bde9a8ce-5f93-4a04-b937-102788469bdb-mYuKib6.
2. Eastgate, due to its role in the process so far and the likelihood it will play a critical part in the efforts resulting from this Study, will likely be at the center of the Region's future broadband material acquisitions and bandwidth deployment projects. Eastgate is a logical choice to operate as a proxy for broadband equipment and service purchasing and acquisition functions that may be required by local units of government. While not all political subdivisions in the Region will have the requisite state and local regulatory authorizations to subscribe to and participate in such mechanism, some certainly do. We would highly suggest, when possible, also utilizing Eastgate as a procurement manager and coordinator to vet project details and offers, and as a clearing house for the sharing of economic and technical information regarding both infrastructure and services.
3. Broadband Taskforce. (n.d.). Retrieved from Ashtabula County, Ohio: <http://www.co.ashtabula.oh.us/767/Broadband-Taskforce>.
4. Visram, T. *Land O'Lakes is rallying young people to return to their hometowns to build better broadband*. (April 27, 2021). Retrieved from Fast Company: https://www.fastcompany.com/90629489/land-olakes-is-rallying-young-people-to-return-to-their-hometowns-to-build-better-broadband?utm_source=sendgrid&utm_medium=email&utm_campaign=Newsletters.
5. *Is AmeriCorps VISTA Right for Your Organization? A Guide to Becoming an AmeriCorps VISTA Project Sponsor*. (n.d.). Retrieved from AmeriCorps: https://www.nationalservice.gov/sites/default/files/documents/Is_VISTA_Right_for_Your_Organization.pdf.
6. *Id.*
7. *Id.*
8. *Id.*
9. *Id.*
10. *Id.*
11. *Id.*
12. *Id.*
13. *Id.*
14. *Id.*
15. *Free & Low-Cost Internet Plans*. (n.d.). Retrieved from National Digital Inclusion Alliance: <https://www.digitalinclusion.org/free-low-cost-internet-plans/>.
16. *Access from AT&T*. (n.d.). Retrieved from AT&T: <https://www.att.com/internet/access/>.
17. *Spectrum Internet Assist*. (n.d.). Retrieved from Spectrum: <https://www.spectrum.com/internet/spectrum-internet-assist>.
18. Bell, R. *Husted Announces Broadband Connectivity Pilot Project at Rural School District, Expanding Broadband to Several Ohio Communities in NW Ohio*. (January 13, 2021). Retrieved from The Mount Vernon Grapevine: <http://www.themountvernon-grapevine.com/index.php/2021/01/13/husted-announces-broadband-connectivity-pilot-project-at-rural-school-district-expanding-broadband-to-several-ohio-communities-in-nw-ohio/>.
19. *Homepage*. (n.d.). Retrieved from AGING Connected: <https://agingconnected.org/>.

20. *The Ohio Broadband Strategy*. (n.d.). Retrieved from Innovate Ohio: https://innovateohio.gov/wps/wcm/connect/gov/bde9a8ce-5f93-4a04-b937-102788469bdb/OhioBroadbandStrategy_121919.pdf?MOD=AJPERES&CONVERT_TO=url&CACHEID=-ROOTWORKSPACE.Z18_M1HGGIK0N0JO00QO9DDDDM3000-bde9a8ce-5f93-4a04-b937-102788469bdb-mYuKib6.
21. *New Tool Developed to Help Improve High-Speed Internet Access in Northeast Michigan*. (October 29, 2019). Retrieved from Connection Nation Michigan: <https://connectednation.org/michigan/2019/10/29/new-tool-developed-to-help-improve-high-speed-internet-access-in-northeast-michigan/>.
22. *FRANKLIN COUNTY DIGITAL EQUITY COALITION FRAMEWORK*. (March 2021). Retrieved from Columbus Metropolitan Library: <https://www.columbuslibrary.org/sites/default/files/uploads/docs/Franklin%20County%20Digital%20Equity%20Framework.pdf>.
23. *Id.*
24. *Id.*
25. *Id.*
26. *Id.*
27. *Id.*
28. *Id.*
29. Machles, M. *Franklin County, Ohio Aims to Address Digital Equity in Urban Areas*. (April 22, 2021). Retrieved from Community Broadband Networks: <https://muninetworks.org/content/franklin-county-ohio-aims-address-digital-equity-urban-areas>.
30. *Id.*
31. *ACTING CHAIRWOMAN ROSEWORCEL ESTABLISHES BROADBAND DATA TASK FORCE*. Press Release. (February 17, 2021). Retrieved from Federal Communications Commission: <https://docs.fcc.gov/public/attachments/DOC-370049A1.pdf>.
32. Kelly, M. *The FCC wants you to test your internet speeds with its new app*. (April 12, 2021). Retrieved from The Verge: <https://www.theverge.com/2021/4/12/22379848/fcc-speed-test-app-google-apple-download-broadband-maps-coverage>.
33. *Subject: State DOTs Leveraging Alternative Uses of the Highway Right-of-Way Guidance*. Memorandum. (April 27, 2021). Retrieved from Department of Transportation: https://www.fhwa.dot.gov/real_estate/right-of-way/corridor_management/alternative_uses_guidance.cfm.
34. *CMHA partners with Charter Communications to provide Spectrum Internet to residents in 19 properties*. (March 3, 2021). Retrieved from Cleveland.com: <https://www.cleveland.com/news/2021/03/cmha-partners-with-charter-communications-to-provide-spectrum-internet-to-residents-in-19-properties.html>.
35. *HUD Connect Home*. (n.d.). Retrieved from Department of Housing and Urban Development: <https://connecthome.hud.gov/>.
36. *Id.*
37. *Id.*
38. *Id.*
39. *Id.*
40. *Id.*
41. *Id.*

42. *Id.*
43. *Id.*
44. *Id.*
45. *Id.*
46. *Id.*
47. *Connect Home Playbook*. (n.d.). Retrieved from Department of Housing and Urban Development: <https://connecthome.hud.gov/sites/images/uploads/2016/11/ConnectHome-Playbook-Web.pdf>.
48. U.S. Dept. of Housing and Urban Dev., *Connect Home: Playbook*, <https://connecthome.hud.gov/playbook> (last visited June 2, 2021).
49. *Connect Home Playbook*. (n.d.). Retrieved from Department of Housing and Urban Development: <https://connecthome.hud.gov/sites/images/uploads/2016/11/ConnectHome-Playbook-Web.pdf>.
50. Rosenworcel, J. *Establishing the Emergency Connectivity Fund to Close the Homework Gap*, WC Docket No. 21-93. (n.d.). Retrieved from Federal Communications Commission: <https://docs.fcc.gov/public/attachments/FCC-21-58A2.pdf>.
51. *Id.*
52. Starks, G. *Establishing the Emergency Connectivity Fund to Close the Homework Gap*, WC Docket No. 21-93. (n.d.). Retrieved from Federal Communications Commission: <https://docs.fcc.gov/public/attachments/FCC-21-58A4.pdf>.
53. *FCC TO LAUNCH \$7.17 BILLION CONNECTIVITY FUND PROGRAM*. Press Release. (May 10, 2021). Retrieved from Federal Communications Commission: <https://docs.fcc.gov/public/attachments/DOC-372311A1.pdf>.
54. *Id.*
55. *REPORT AND ORDER: Establishing Emergency Connectivity Fund to Close the Homework Gap*, WC Docket No. 21-93. (May 11, 2021). Retrieved from Federal Communications Commission: <https://docs.fcc.gov/public/attachments/FCC-21-58A1.pdf>.
56. *Id.*
57. *Id.*
58. *Id.*
59. *Id.*
60. *Id.*
61. *Id.*
62. *Id.*
63. *Id.*
64. *How to apply for Educational Broadband Service (EBS)*. (November 2019). Retrieved from Internet Society: https://www.internet-society.org/wp-content/uploads/2019/12/How_to_apply_for_EBS.pdf.
65. *The EBS Spectrum*. (n.d.). Retrieved from EBSspectrum.org: <http://www.ebsspectrum.org/resources/about-ebs/>.

66. *EBS Leases*. (n.d.). Retrieved from EBSspectrum.org: <http://www.ebsspectrum.org/resources/ebs-leases/>.
67. *Id.*
68. *The EBS Spectrum*. (n.d.). Retrieved from EBSspectrum.org: <http://www.ebsspectrum.org/resources/about-ebs/>.
69. *Id.*
70. *EBS Leases*. (n.d.). Retrieved from EBSspectrum.org: <http://www.ebsspectrum.org/resources/ebs-leases/>.
71. *An Update on the Educational Broadband Service Band and Upcoming FCC Auction*. (January 22, 2021). Retrieved from JD Supra: <https://www.jdsupra.com/legalnews/an-update-on-the-educational-broadband-8926839/>.
72. *Id.*
73. *Id.*
74. *Id.*
75. *Id.* There was a priority window that closed in September 2020 for federal Indian tribes and Alaska native villages that intend to serve rural tribal lands and out of those applications, the FCC has granted more than 150 applications.
76. *Id.*
77. Schaffhauser, D. *Private LTE Network Delivers Student Connectivity in Ill. District*. (April 14, 2021). Retrieved from Spaces 4 Learning: <https://spaces4learning.com/articles/2021/04/14/private-lte-network-delivers-student-connectivity-in-ill-district.aspx>.
78. *The WiFi Bus Pilot Comes to an End*. (July 1, 2020). Retrieved from Sacramento Regional Transit District: <https://www.sacrt.com/apps/sacrt-buses-equipped-with-wi-fi-to-help-with-distance-learning/>.
79. Paykamian, B. *Texas School District Gets Creative to Close Digital Divide*. (January 27, 2021). Retrieved from Government Technology: https://www.govtech.com/education/k-12/texas-school-district-gets-creative-to-close-digital-divide.html?utm_term=READ%20MORE&utm_campaign=Ohio%20Invests%20in%20Opioid%20Detection%20Tech%20for%20Investigators%2C%20Washington%20State%20Auditor%5Cu2019s%20Office%20Issues%20Breach%20Warning&utm_content=email&utm_source=Act-On%20Software&utm_medium=email.
80. *National Center for Charitable Statistics (NCCS) at the Urban Institute; IRS. PolicyMap*.
81. *ACCESS / Overview*. (n.d.). Retrieved from ACCESS Council: <https://www.access-k12.org/>.
82. *NEOMIN.org*. (n.d.). Retrieved from Northeast Ohio Management Information Network: <https://www.neomin.org/>.
83. *What is ACCESS?*. (February 24, 2020). Retrieved from ACCESS Council: <https://www.access-k12.org/domain/3>.
84. *About*. (n.d.). Retrieved from Northeast Ohio Management Information Network: <https://www.neomin.org/about.htm>.
85. Marcattilio-McCracken, R. *GATEWay Fiber is Miami Valley, Ohio's Door to the Future*. (August 28, 2021). Retrieved from Community Broadband Networks: <https://muninetworks.org/content/gateway-fiber-miami-valley-ohios-door-future>.
86. Spicker, K. *Next phase of \$3 million of fiber optic network project launches*. (April 8, 2021). Retrieved from Dayton Daily News: <https://www.daytondailynews.com/local/phase-ii-of-3-million-of-fiber-optic-network-project-launches/413HPAG3RZB-PDB6URM26P5VVQA/>.
87. *Id.*

88. Harrison, H. *Rural broadband initiative approved*. (June 16, 2020). Retrieved from The Ironton Tribune: <https://www.irontribune.com/2020/06/16/rural-broadband-initiative-approved/>.
89. *Definitions for sections 5709.45 to 5709.47*. (September 29, 2017). Retrieved from Ohio Legislative Service Commission: <https://codes.ohio.gov/ohio-revised-code/section-5709.45>.
90. Byer, K. *Canton innovation district gets green light for funding*. (October 1, 2018). Retrieved from MyTownNEO: <https://www.mytownneo.com/news/20181001/canton-innovation-district-gets-green-light-for-funding>.
91. *County Advisory Bulletin 2016-05*. (September 2016). Retrieved from County Commissioners Association of Ohio: <https://ccao.org/wp-content/uploads/CAB2016-05%2009-08-16.pdf>.
92. *Canton Officially Launches Downtown Innovation District, Announces Support from JumpStart*. (October 3, 2018). Retrieved from Cision PR Newswire: <https://www.prnewswire.com/news-releases/canton-officially-launches-downtown-innovation-district-announces-support-from-jumpstart-300723242.html>.
93. *Request for Information (RFI) Partnership for Deployment of Broadband Services in Cuyahoga County, Ohio*. (January 15, 2021). Retrieved from Cuyahoga County, Ohio: https://cuyahogacounty.us/docs/default-source/innovation-performance/digitalinclusion-rfi.pdf?sfvrsn=23ec9f39_4.
94. Marcattilio-McCracken, R. *How One Minnesota County Got on Track to Become Most Connected in State*. (January 15, 2021). Retrieved from Institute for Local Self-Reliance: https://ilsr.org/how-one-minnesota-county-got-on-track-to-become-most-connected-in-state/?utm_campaign=Newsletters&utm_source=sendgrid&utm_medium=email&mc_cid=209cec8918&mc_eid=e-d1e20ad7f.
95. *A Recovery for All of Us: Mayor de Blasio Announces Major Next Steps to Close the Digital Divide in NYC*. (March 3, 2021). Retrieved from City of New York: <https://www1.nyc.gov/office-of-the-mayor/news/150-21/recovery-all-us-mayor-de-blasio-major-next-steps-close-digital-divide-in>.
96. Kirby, D. *City report will look at where public infrastructure can play a role in broadband access*. (December 1, 2020). Retrieved from Technically Media: https://technical.ly/baltimore/2020/12/01/broadband-report-update/?mc_cid=76976c979e&mc_eid=e-d1e20ad7f.
97. *FairlawnGig Fact Sheet*. (n.d.). Retrieved from Fairlawn Gig: <https://www.fairlawngig.net/wp-content/uploads/2019/05/fairlawn-gig-fact-sheet-FINAL.pdf>.
98. Poston, E. *Summit County approves expansion of FairlawnGig*. (August 20, 2020). Retrieved from Akron.com: <https://www.akron.com/articles/summit-county-approves-expansion-of-fairlawngig/>.
99. Bawtree-Jobson, B. *Open-Access Networks Make Smart Cities Viable*. (2020). Retrieved from Broadband Communities: https://www.bbcmag.com/broadband-applications/open-access-networks-make-smart-cities-viable?mc_cid=5c8a3330c5&mc_eid=e-d1e20ad7f.
100. *Id.*
101. Trostle, H. *And the Award for Community Broadband Network of the Year Goes to-- Ammon, Idaho!* (August 19, 2016). Retrieved from Community Broadband Networks: <https://muninetworks.org/content/and-award-community-broadband-network-year-goes-ammon-idaho>.
102. Gonzalez, L. *Ammon Continues to Expand Open Access Network, Super-Affordable Rates Attract Attention*. (June 13, 2019). Retrieved from Community Broadband Networks:
103. *FAQ*. (n.d.). Retrieved from City of Ammon Fiber Optics: <https://www.ammonfiber.com/faq.html>.

104. Chao, B., & Pietrzak, L. *The Cost of Connectivity in Ammon, Idaho*. (January 22, 2020). Retrieved from New America: <https://www.newamerica.org/oti/reports/cost-connectivity-ammon-idaho/>.
105. Marcattilio-McCracken, R., & Mitchell, C. *Wilson Hits a Fiber-to-the-Home Run with Greenlight Municipal Broadband Network*. (December 2020). Retrieved from Institute for Local Self-Reliance: https://cdn.ilsr.org/wp-content/uploads/2020/12/Wilson-Case-Study-12-07-2020.pdf?utm_source=sendgrid&utm_medium=email&utm_campaign=Newsletters.
106. Marek, S. *Utopia Fiber gets \$52.5M in funding to expand its network*. (February 23, 2021). Retrieved from Fierce Telecom: https://www.fiercetelecom.com/telecom/utopia-fiber-gets-52-5m-funding-to-expand-its-network?utm_source=sendgrid&utm_medium=email&utm_campaign=Newsletters.
107. Gonzalez, L. *Hudson Lays Out Details for Its Municipal Gigabit Network*. (August 13, 2015). Retrieved from Community Broadband Networks: <https://muninetworks.org/content/hudson-lays-out-details-its-municipal-gigabit-network>.
108. Schleis, P. *City of Hudson builds its own Internet company, offers 1 gigabit speed*. (March 1, 2016). Retrieved from Akron Beacon Journal: <https://www.beaconjournal.com/article/20160301/NEWS/303019208>
109. Gonzalez, L. *Hudson Lays Out Details for Its Municipal Gigabit Network*. (August 13, 2015). Retrieved from Community Broadband Networks: <https://muninetworks.org/content/hudson-lays-out-details-its-municipal-gigabit-network>.
110. *Notice of Funding Opportunity for the Department of Transportation's National Infrastructure Investments (i.e., the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grant Program) under the Consolidated Appropriations Act, 2021*. (April 13, 2021). Retrieved from Department of Transportation: <https://www.transportation.gov/sites/dot.gov/files/2021-04/FY%202021%20RAISE%20grants%20NOFO%20%28Final%29.pdf>.
111. *Id.*
112. *RAISE 2021 Applications FAQs*. (n.d.). Retrieved from Department of Transportation: <https://www.transportation.gov/RAISEgrants/2021-raise-application-faqs>.
113. Nesbitt, J. *Westerville opens nation's first municipal data center*. (March 7, 2012). Retrieved from ThisWeek Community News: <https://www.thisweeknews.com/article/20120307/news/303079589>
114. WeConnect Connectivity. (n.d.). Retrieved from We Connect Data Center: <https://weconnectdatacenter.com/connectivity/>.
115. *Rural eConnectivity Program, 7 CFR 1740*. (February 26, 2021). Retrieved from Federal Register: <https://www.federalregister.gov/documents/2021/02/26/2021-03443/rural-econnectivity-program>.
116. The Counties should then consider the proposed amount per location pass in comparison to previous ReConnect grant awards to ensure that their application(s) would be competitive.
117. Marcattilio-McCracken, R. *Launch of Michigan Moonshot Community Access Network Brings Wi-Fi to Critically Unserved Areas*. (December 8, 2020). Retrieved from Community Broadband Networks: https://muninetworks.org/content/launch-michigan-moonshot-community-access-network-brings-wi-fi-critically-unserved-areas?mc_cid=d83f582dcc&mc_eid=ed1e20ad7f.
118. *Id.*
119. *Governor DeWine, Lt. Governor Husted announce broadband expansion project in East Cleveland*. (April 7, 2021). Retrieved from Ohio Academic Resources Network: https://www.oar.net/press/governor_dewine_lt_governor_husted_announce_broadband_expansion_project_east_cleveland.

EXHIBIT A

REGIONAL AND COUNTY LEVEL MAPS AT DIFFERENT SPEED TIERS

Figure 1 Broadband coverage in Eastgate region at 10 Mbps download/ 1 Mbps upload

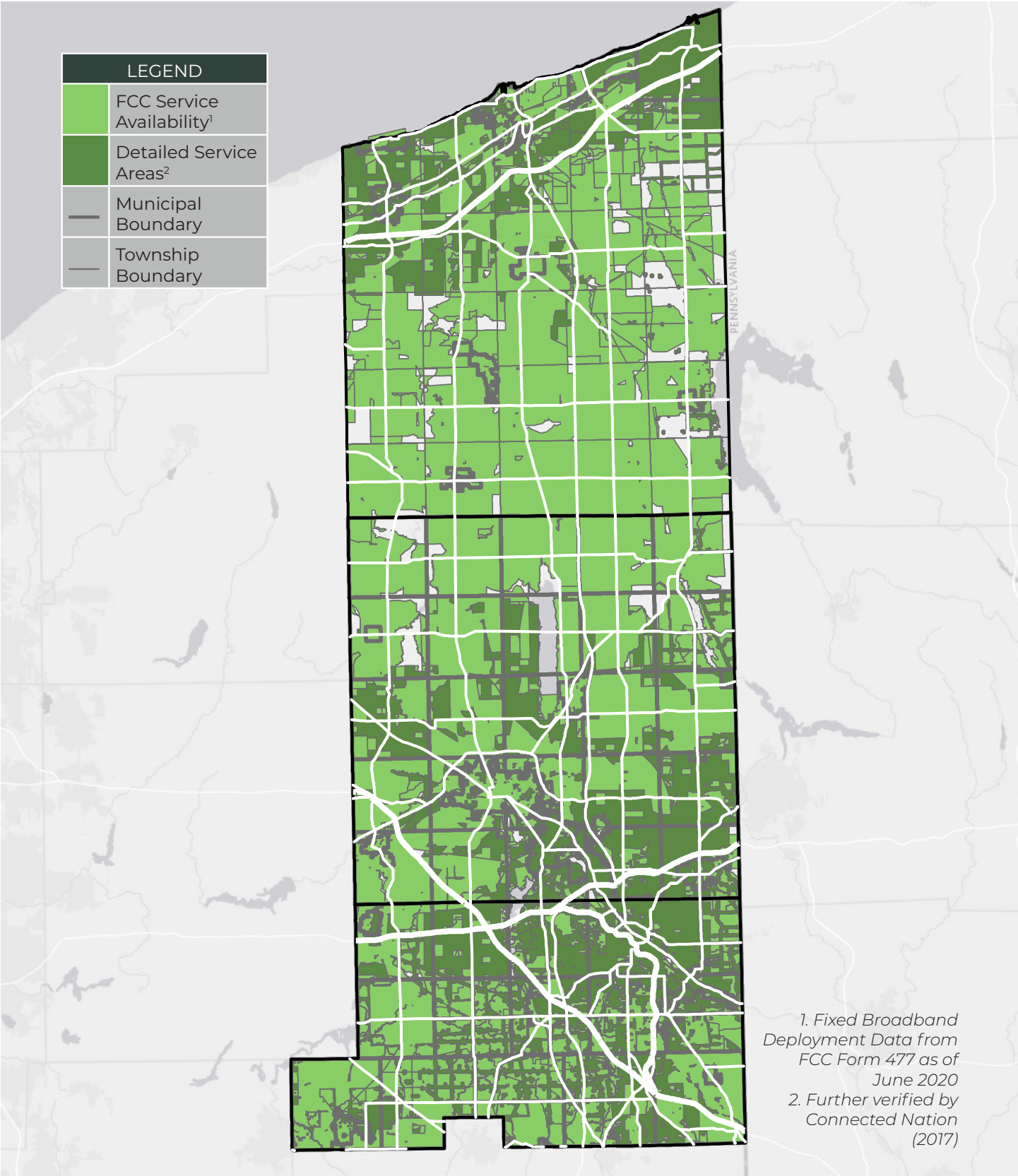


Figure 2 Broadband coverage in Eastgate region at 25 Mbps download/ 3 Mbps upload

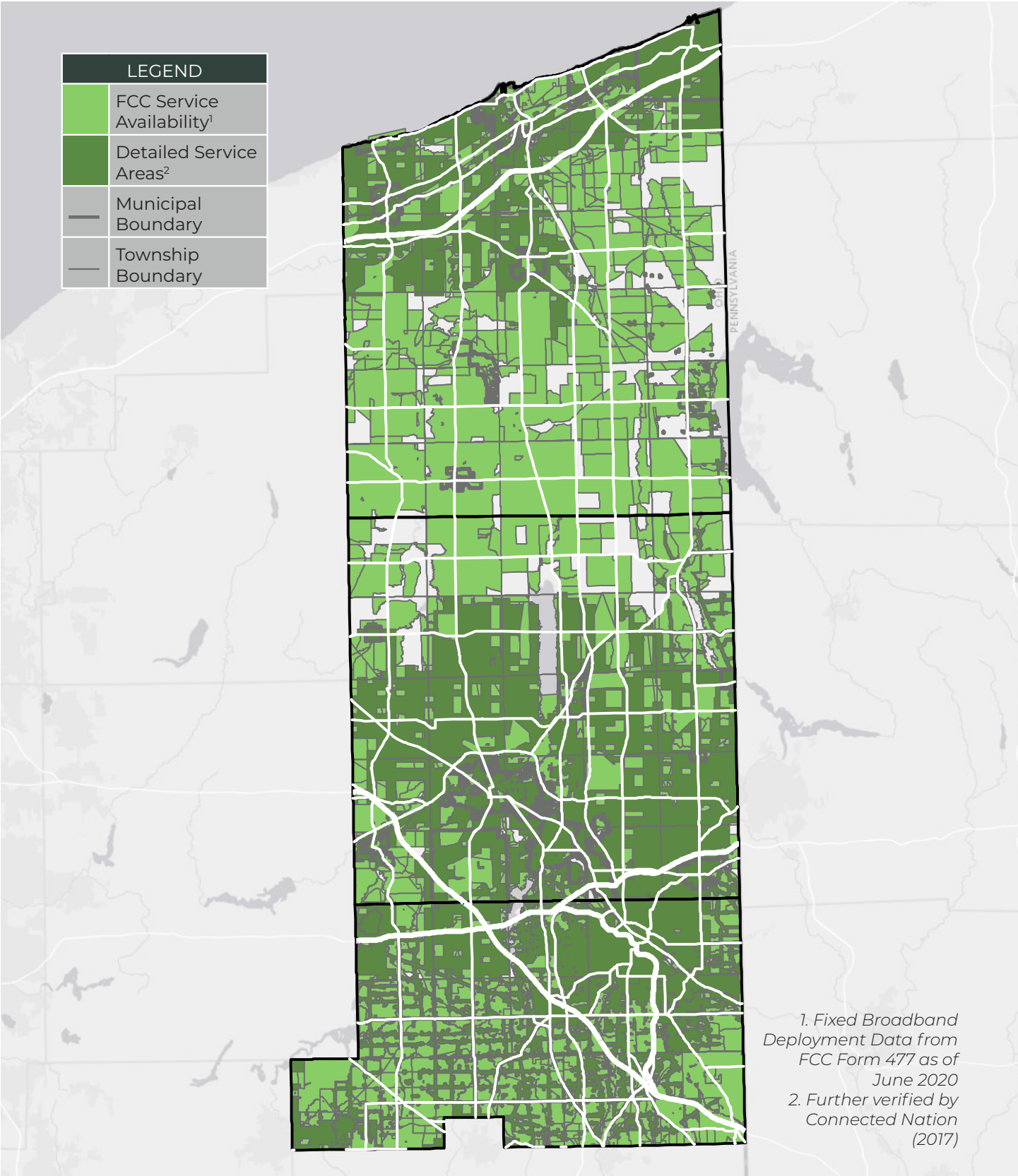


Figure 3 Broadband coverage in Eastgate region at 50 Mbps download/ 5 Mbps upload

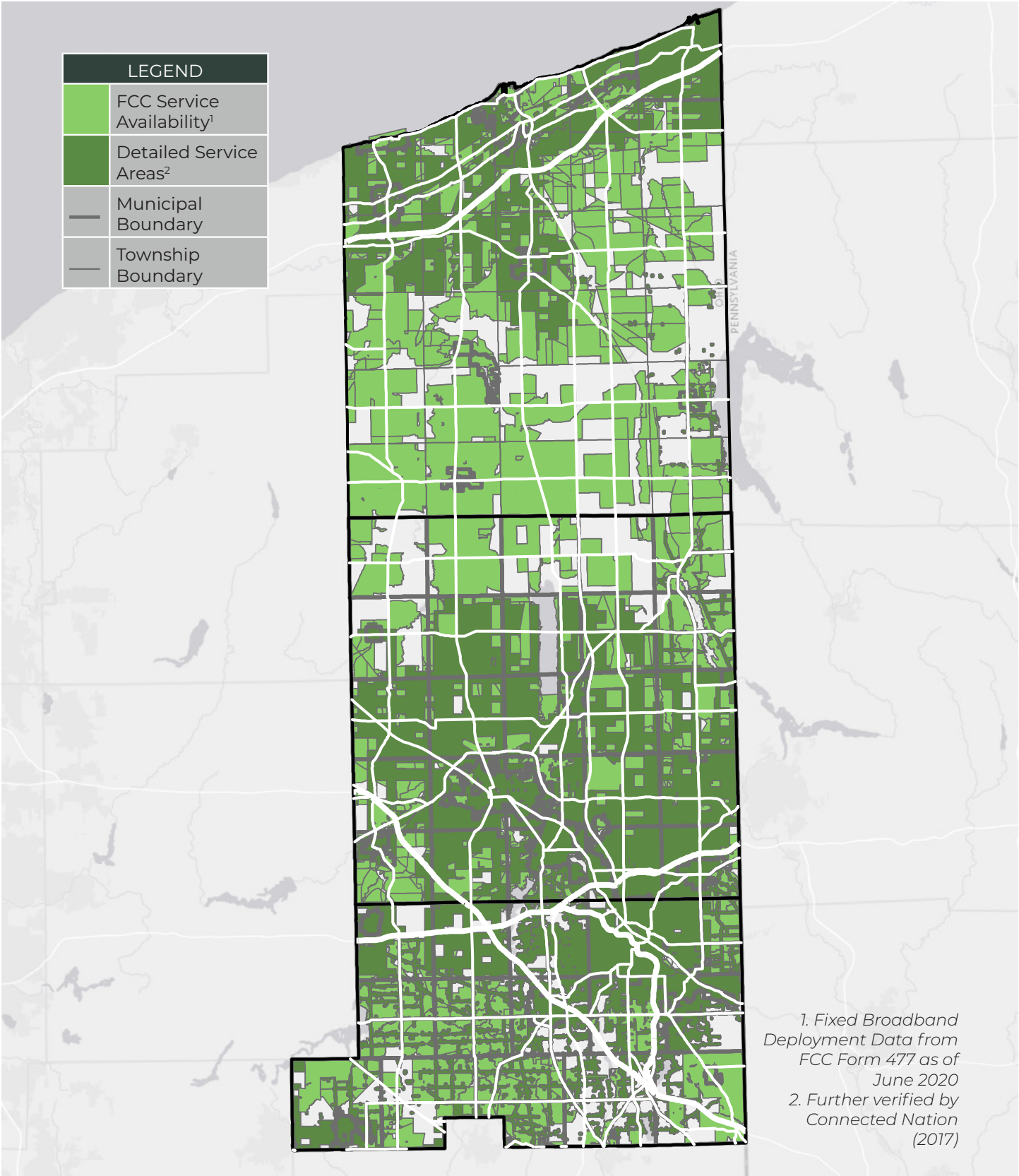


Figure 4 Broadband coverage in Eastgate region at 100 Mbps download/ 10 Mbps upload

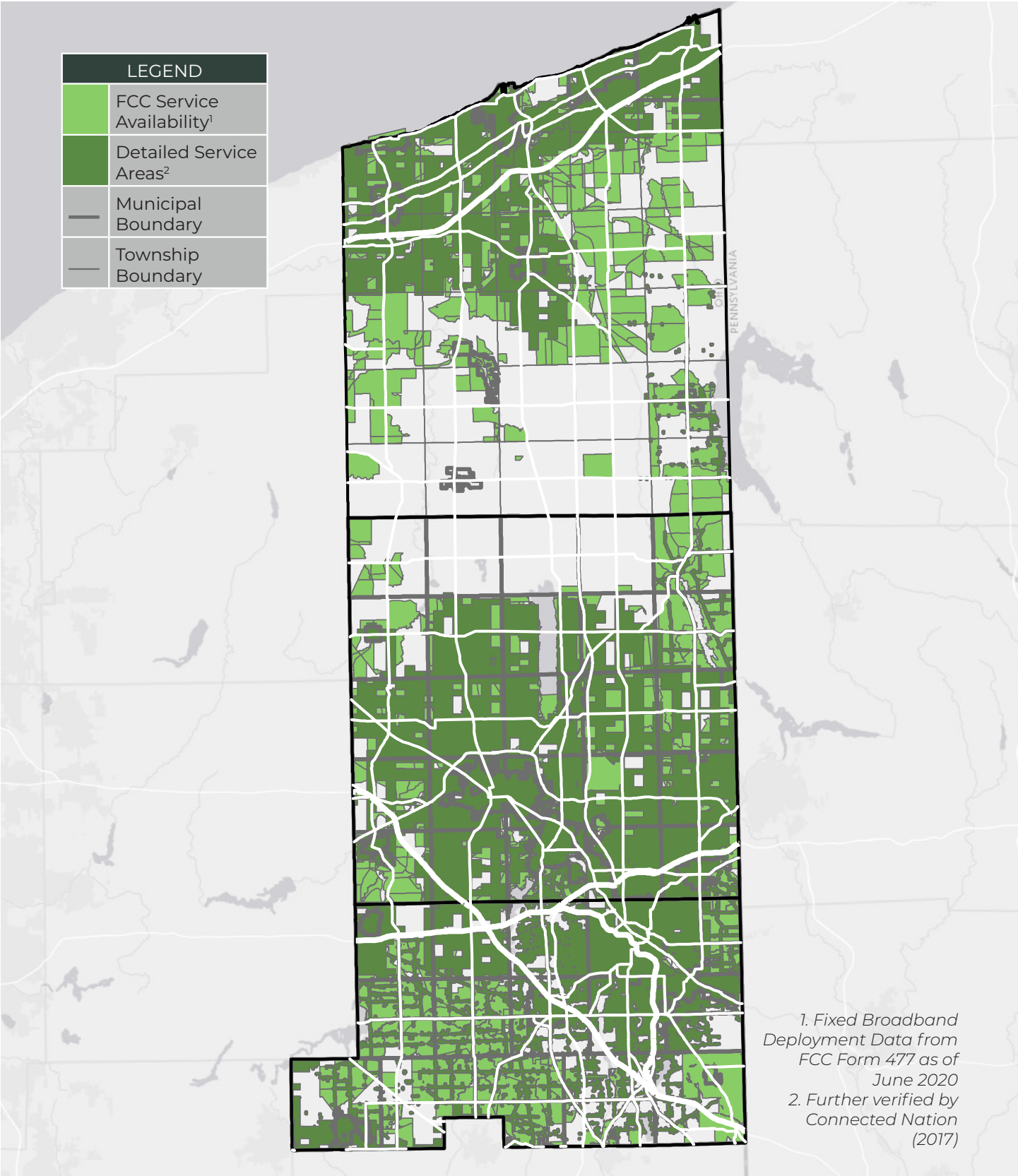


Figure 5 Broadband coverage in Ashtabula County at 25 Mbps download/ 3 Mbps upload

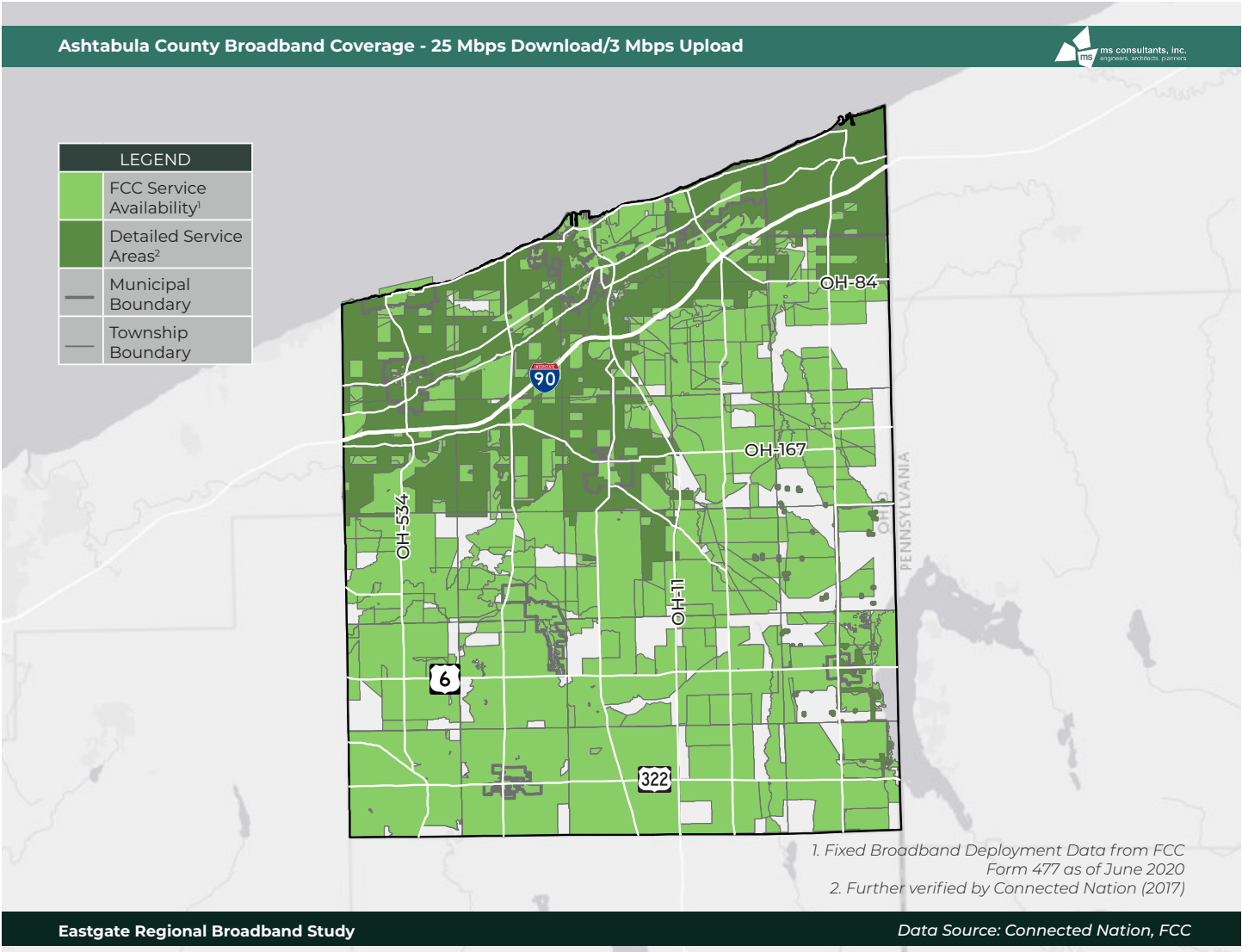


Figure 6 Broadband coverage in Ashtabula County at 50 Mbps download/ 5 Mbps upload

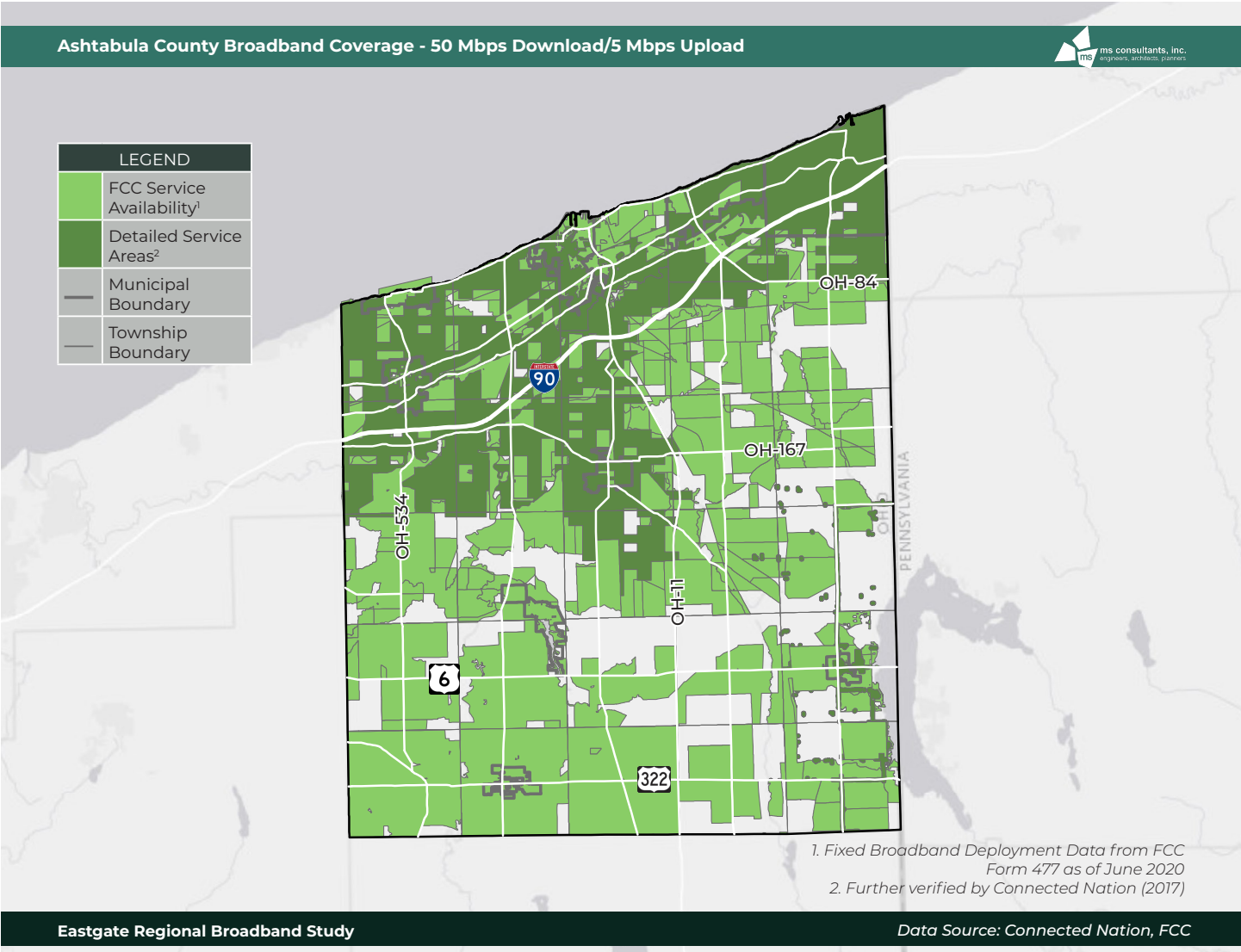


Figure 7 Broadband coverage in Ashtabula County at 100 Mbps download/ 10 Mbps upload

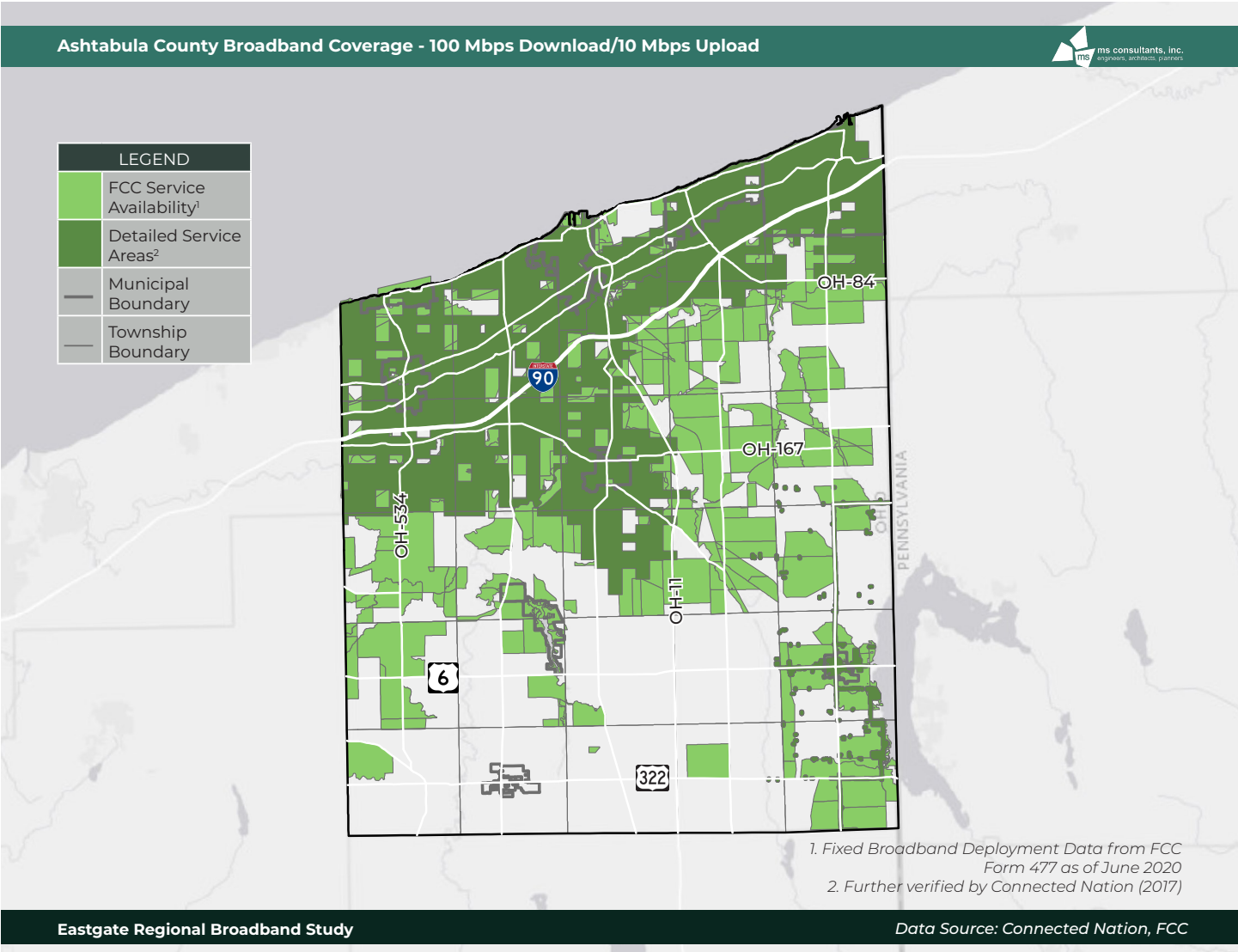


Figure 8 Broadband coverage in Trumbull County at 25 Mbps download/ 3 Mbps upload

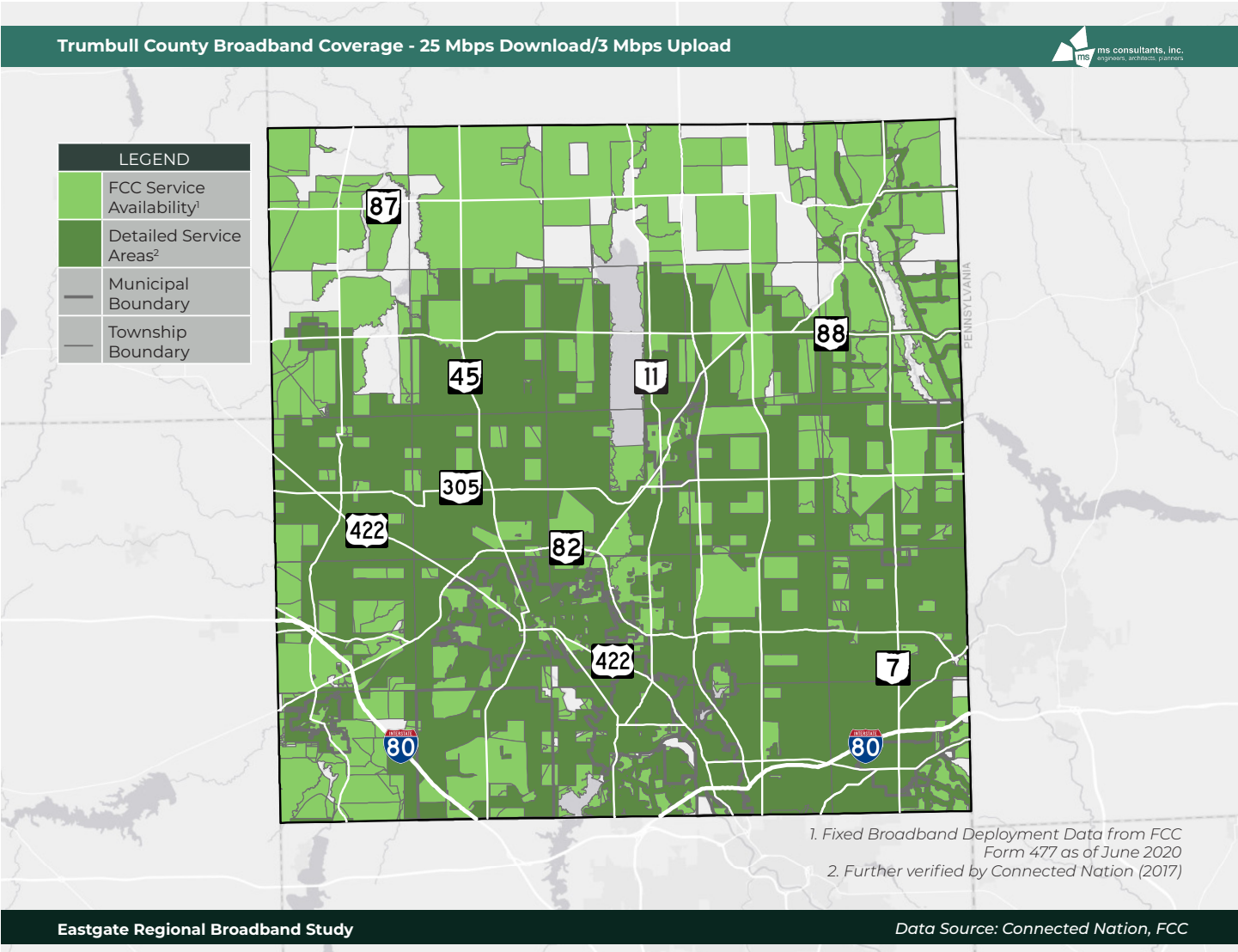


Figure 9 Broadband coverage in Trumbull County at 50 Mbps download/ 5 Mbps upload

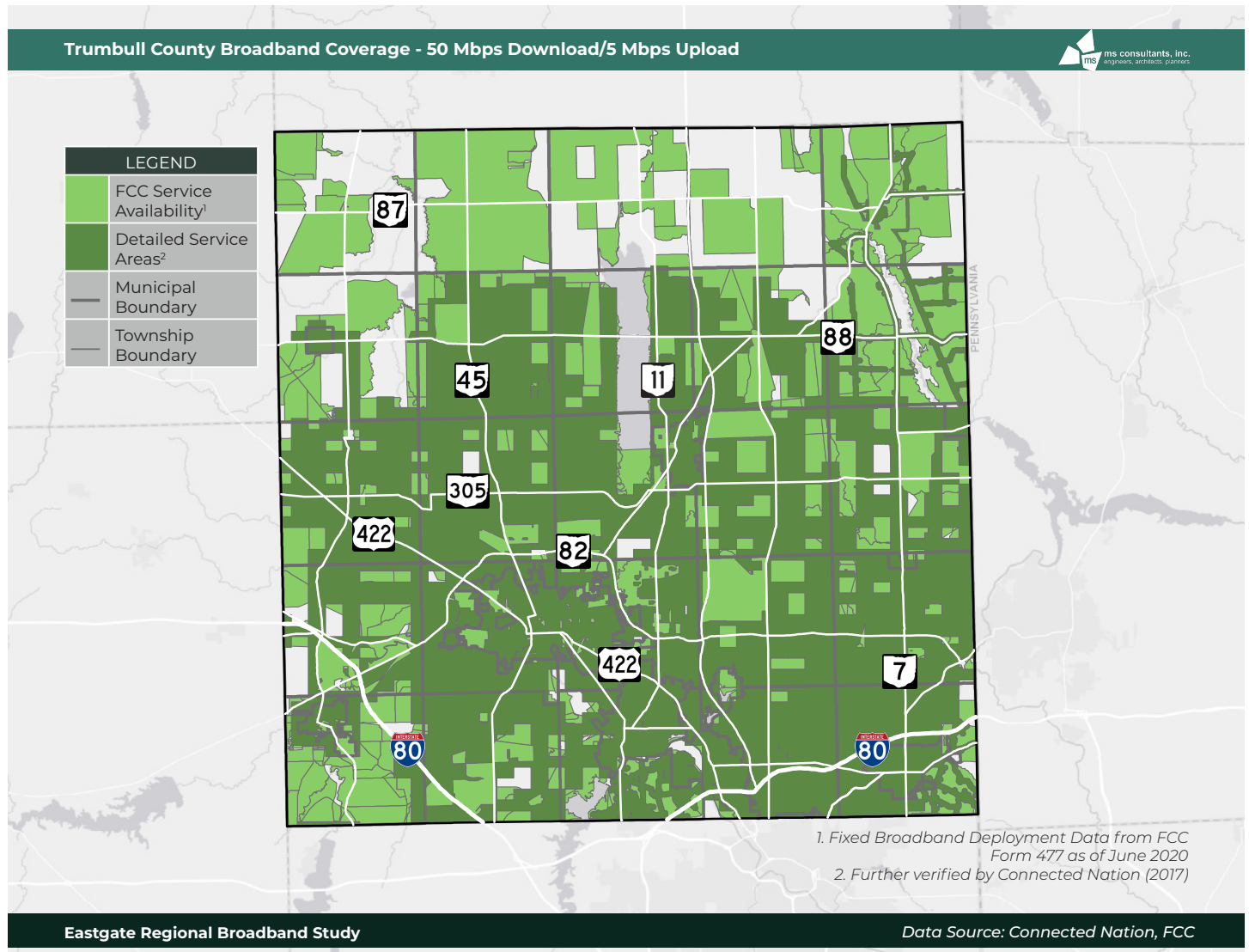


Figure 10 Broadband coverage in Trumbull County at 100 Mbps download/ 10 Mbps upload

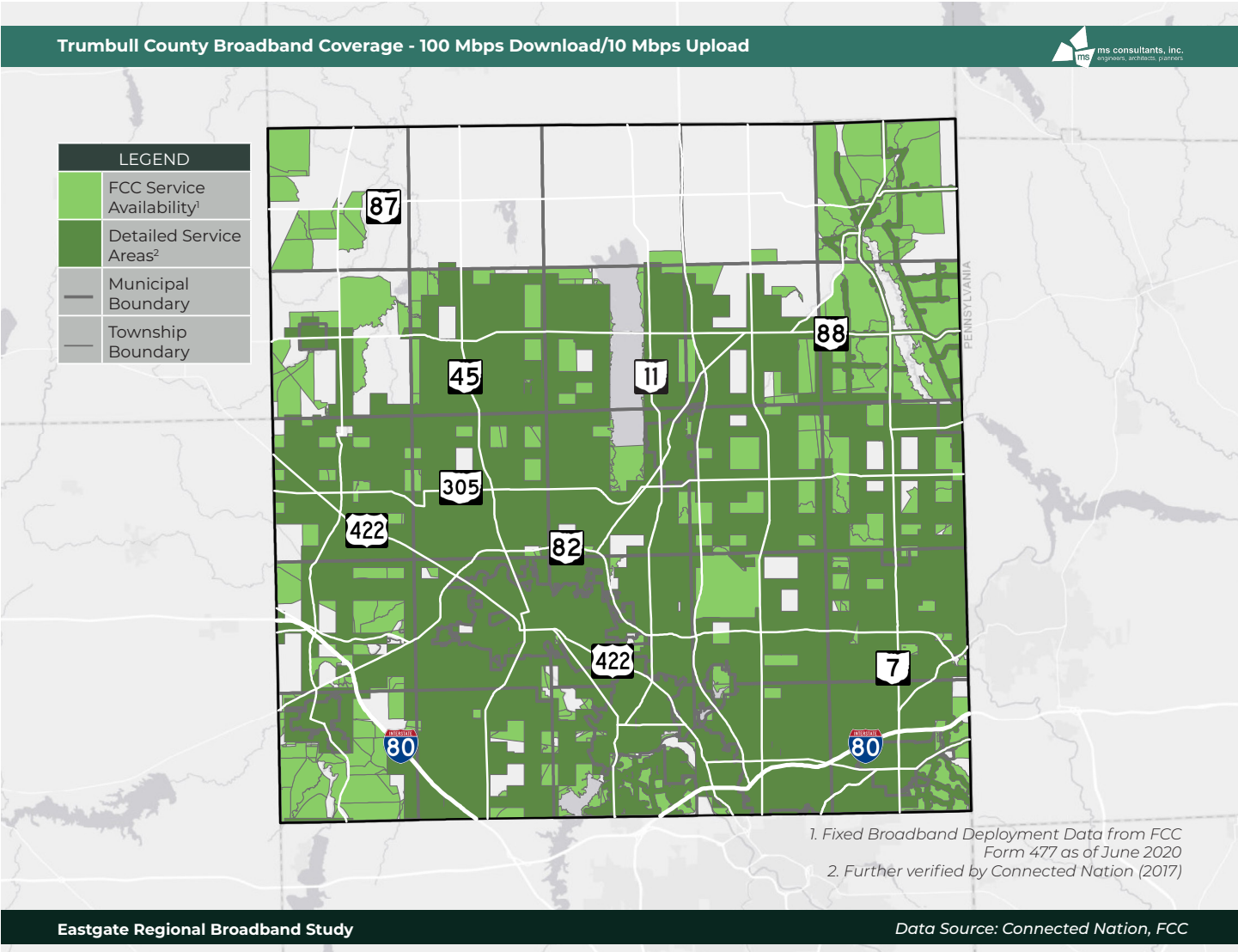


Figure 11 Broadband coverage in Mahoning County at 25 Mbps download/ 3 Mbps upload

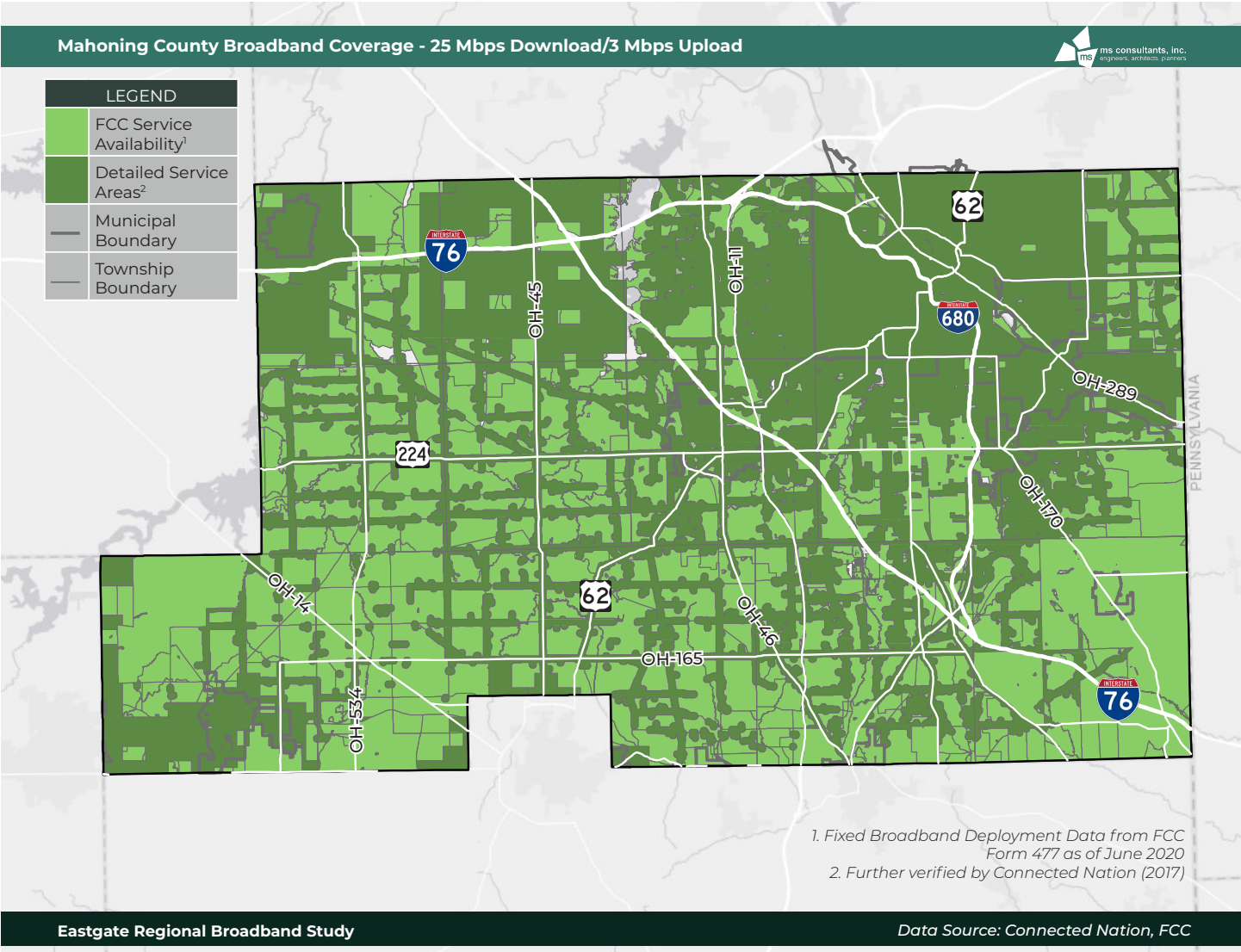


Figure 12 Broadband coverage in Mahoning County at 50 Mbps download/ 5 Mbps upload

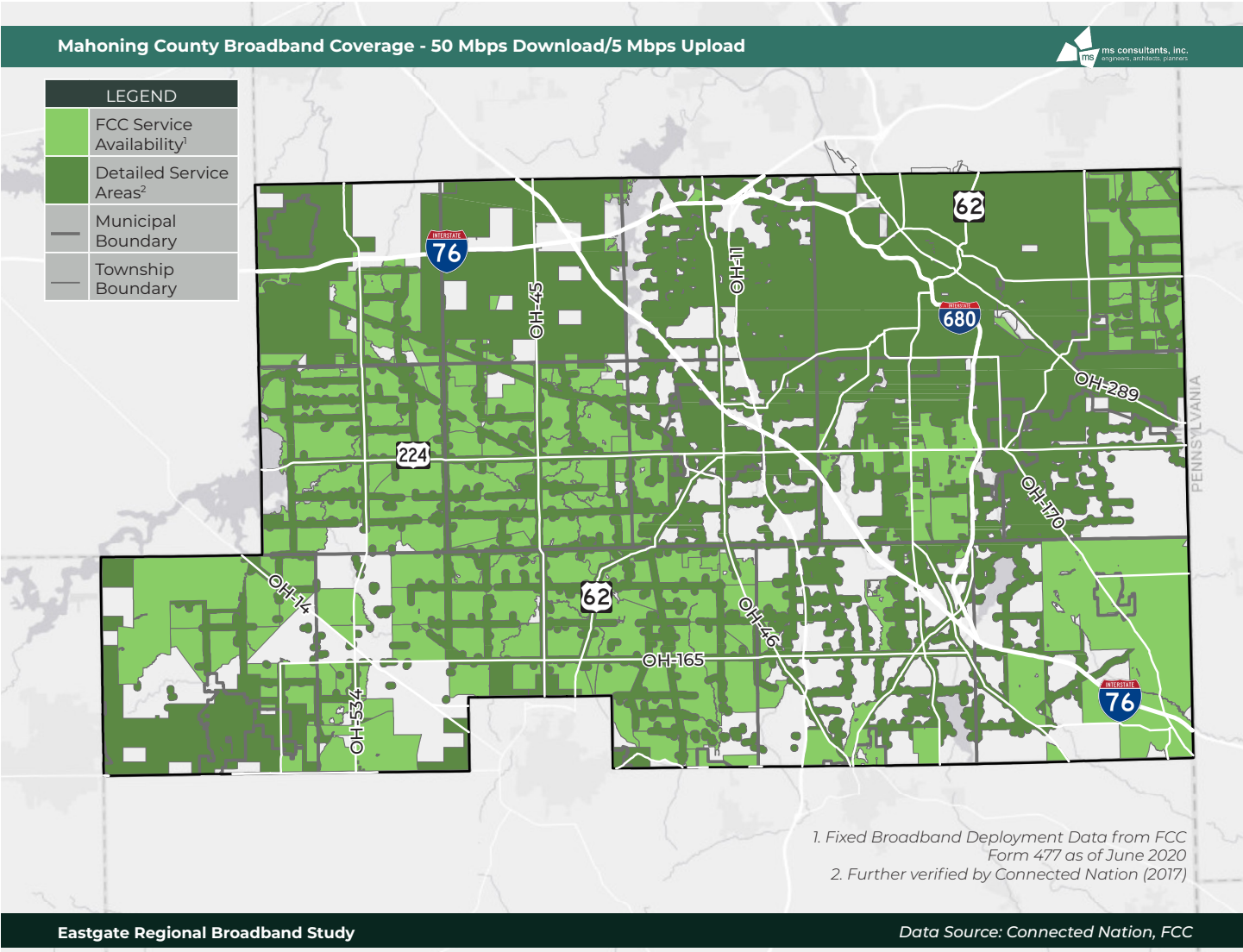


Figure 13 Broadband coverage in Mahoning County at 100 Mbps download/ 10 Mbps upload

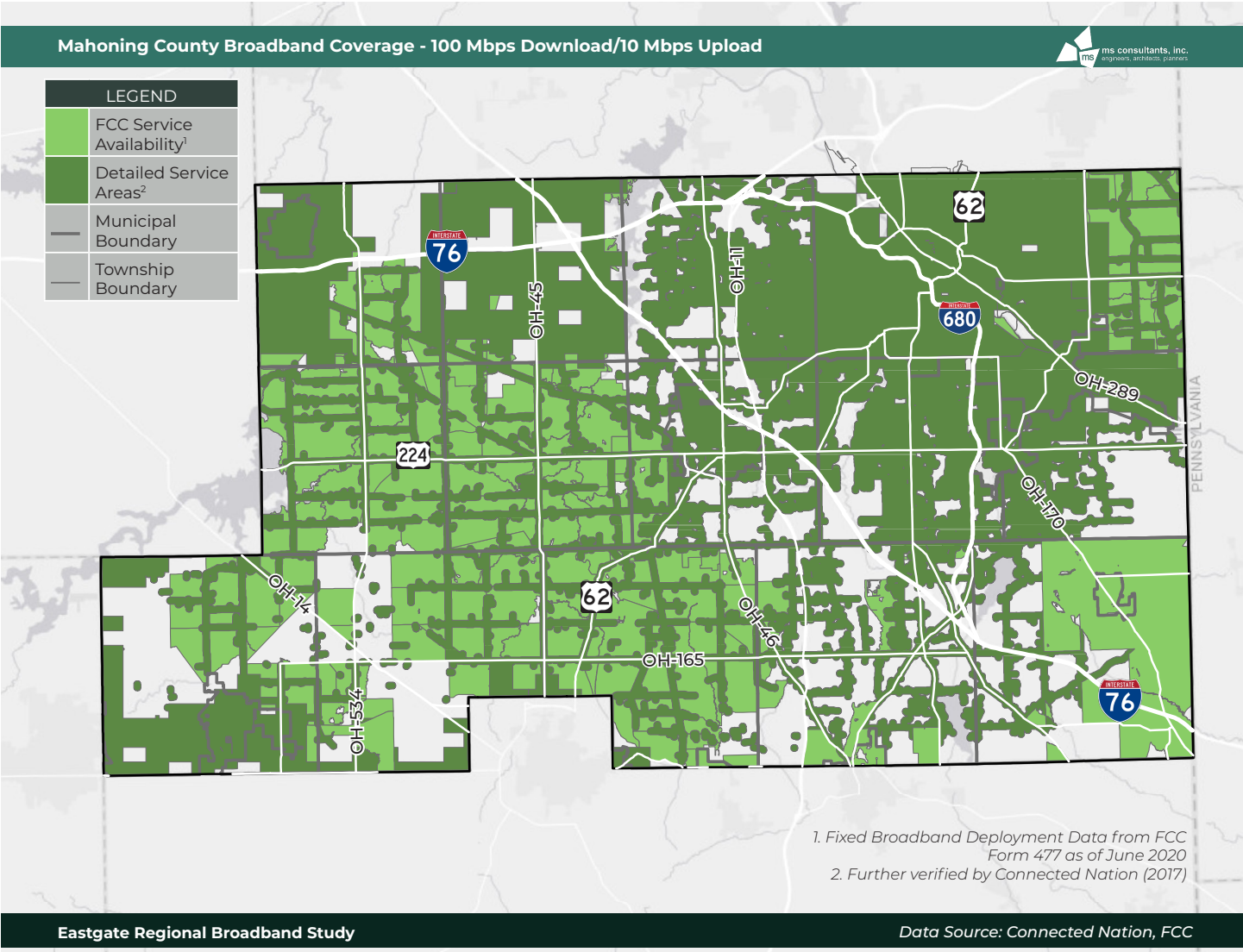


EXHIBIT B

COUNTY ASSET INVENTORY

Figure 14 Ashtabula County Vertical Assets

Owner	Address	Description	Latitude	Longitude
Britton Farms	Hunter RD	Grain Bins	41.582	-80.720
Andover Village	Camplands Blvd	Water Tower	41.635	-80.571
Centerra Co-op	Depot ST	Grain Bins	41.609	-80.570
T.Y.G.B. & J.Y. INC	ST RT 46	Grain Bins	41.517	-80.757
Gruskiewicz	7709 ST RT 193	Silo	41.540	-80.667
Wood	2979 US RT 322	Grain Bins	41.536	-80.678
Spieth	1529 Stanhope	Silo	41.710	-80.615
Hopkins	6805 Countyline	Grain Bins	41.500	-80.576
Comp	3015 Allen Comp	Grain Bins	41.660	-80.676
Stokes		Silo	41.626	-80.781
Gale	2152 Dodgeville RD	Grain Bins	41.591	-80.708
Thompson Bros	3686 State Route 46	Silo	41.650	-80.779
Ashtabula Metropolitan Housing Authority	3703 Lake Avenue	Asset - Other	41.874	-80.788
Ashtabula Metropolitan Housing Authority	3600 Lake Avenue	Asset - Other	41.875	-80.787
		Grain Bins	41.609	-80.571
		Water Tower	41.611	-80.574
	OH-307 Austinberg 44010	Grain Bins	41.769	-80.878
	2794 OH-307, 44010	Tower - Other	41.772	-80.853
	7569 SR 46, Orwell, OH 44076	Tower - Other	41.388	-80.876
		Tower - Other	41.536	-80.770
		Tower - Other	41.536	-80.866
		Water Tower	41.536	-80.866
		Water Tower	41.609	-80.826
	Zito Media Rock Creek Oh	Asset - Other	41.661	-80.860

Figure 15 Ashtabula County Government Parcels

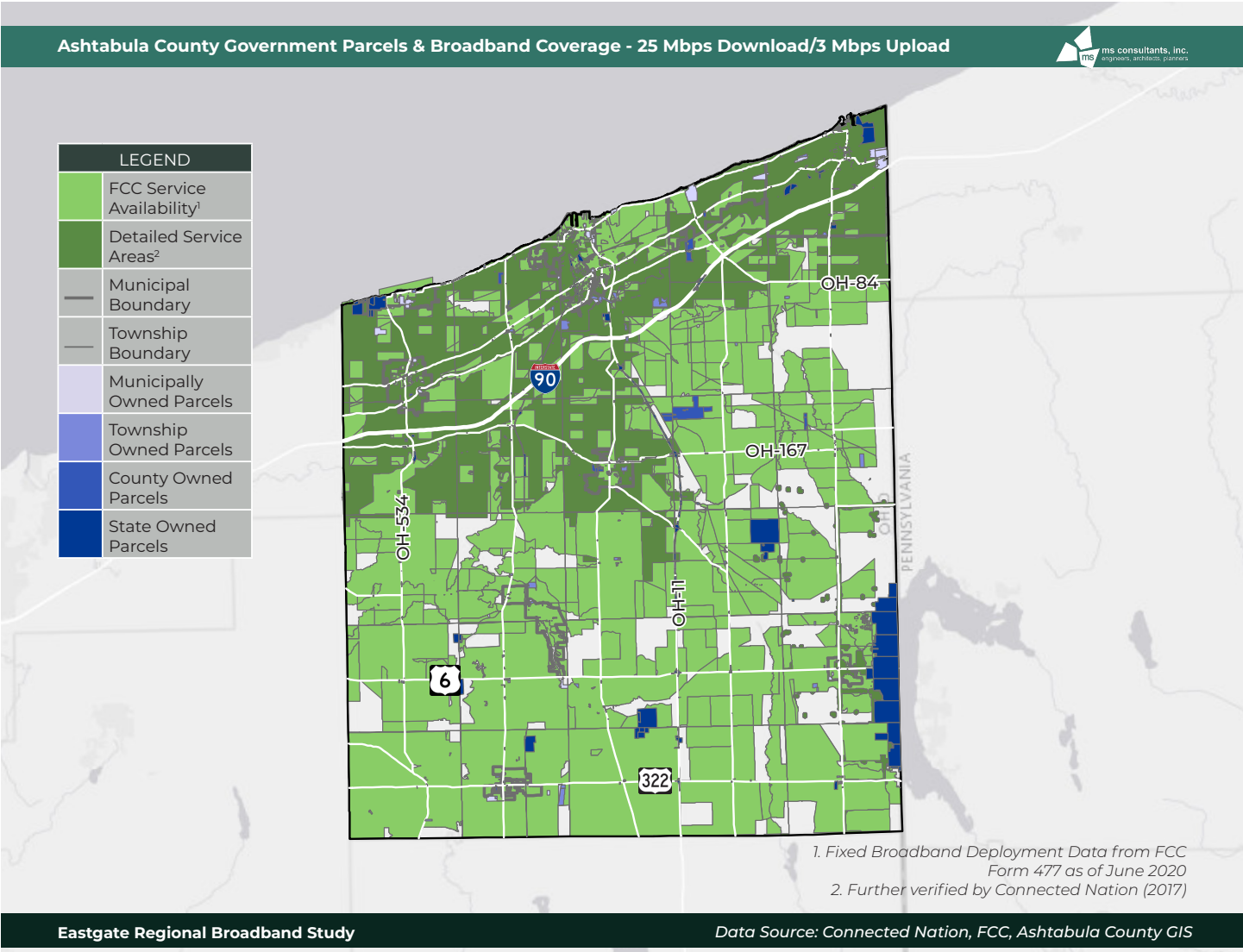


Figure 16 Mahoning County Vertical Assets

Owner	Address	Description	Latitude	Longitude
Kirk Road Radio Tower	4881 Kirk Rd.	Kirk Road Radio Tower	41.069	-80.746
Water Tower	6640 S RACCOON RD	Sanitary Engineer Water Tower	41.023	-80.738
District 4 Radio Tower	18605 W. Middletown Rd	District 4 Radio Tower	40.954	-80.698
Eastside Radio Tower	2996 McCartney Road	Eastside Radio Tower	41.091	-80.588
Evans Lake Radio Tower	9500 Springfield Road	Evans Lake Radio Tower	40.980	-80.608
Evans Lake Radio Tower	Springfield Road	Evans Lake Radio Tower	40.937	-80.612
Controls	4880 KIRK RD	Kirk Road Radio Tower	41.070	-80.748
Radio Tower	4880 KIRK RD	Kirk Road Radio Tower	41.070	-80.748
WNEO Radio Tower	13870 Salem-Alliance	WNEO Radio Tower	40.901	-80.946
PROPERTY IN THE OPEN	4880 KIRK RD	Kirk Road Radio Tower	41.070	-80.748
PROPERTY IN THE OPEN	6640 S RACCOON RD	Sanitary Engineer Water Tower	41.023	-80.738
Boardman Township Tower/Dispatch	8299 Market St.	Boardman Twp Tower	41.016	-80.663

Figure 17 Mahoning County Government Parcels

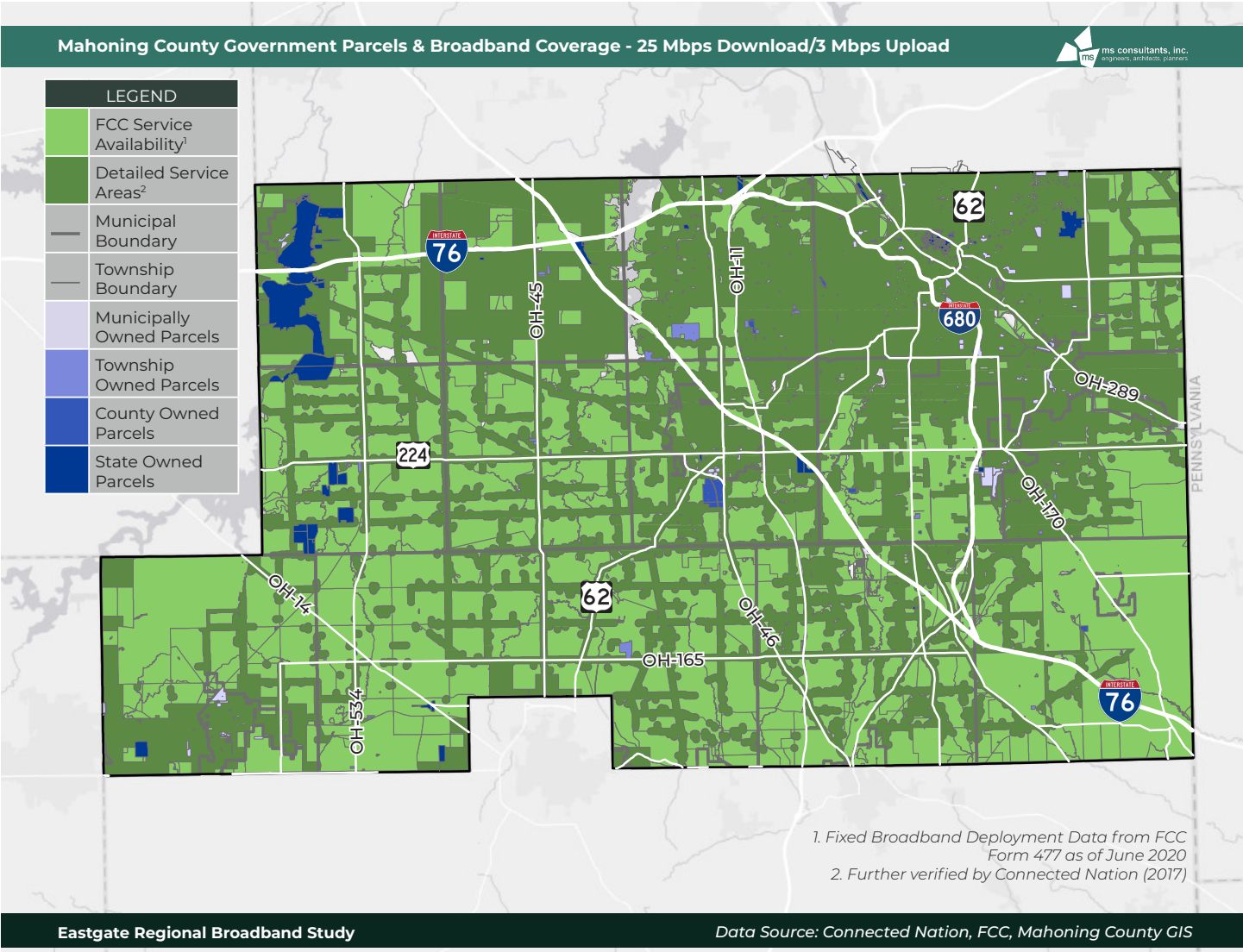


Figure 18 Trumbull County Vertical Assets

Address	Description	Latitude	Longitude
650 N. River Road NW, Warren, Ohio 44483	Other-unknown	41.249	-80.876
3680 Warren Meadville Rd, Cortland, Ohio 44410	Other-unknown	41.318	-80.733
2449 SR 5, Courtland, OH 44410	Tower	41.283	-80.767
2100 Greenville Rd NW, Bristolville OH 44402	Other-unknown	41.388	-80.876
2210 Elm Rd. NE Cortland, OH 44410	Water Tower	41.292	-80.761
3996 Youngstown Conneaut Rd, Burghill OH 44404	Other-unknown	41.329	-80.566
7555 Youngstown Conneaut Rd, Kinsman OH 44428	Wind Turbines	41.424	-80.586
8643 St Rt 7. Kinsman OH 44428	Silo	41.456	-80.579
2818 SR 7, Fowler OH 44418	Radio Tower	41.297	-80.566
4270 Grand Army of the Republic Highway, Andover OH 44003	Water Tower	41.635	-80.571
7164 Youngstown Conneaut Rd, Kinsman OH 44428	Radio Tower	41.414	-80.577
3016 US Rt 6, Andover OH 44003	Radio Tower	41.605	-80.676
at SR7 and 88 intersection near Vernon Center	Radio Tower	41.386	-80.568
251 4th St, West Farmington Oh 44491	Tower	41.393	-80.975
6259 Mahoning Ave NW Warren OH 44481	Water Tower	41.323	-80.857

Figure 19 Trumbull County Government Parcels

