

Community Access Plan and Funding Strategy for Broadband

Final Report

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Executive Summary

Monroe County, NY, is located on the shores of Lake Ontario and with its county seat in the City of Rochester. In March 2022, Monroe County retained Magellan, an experienced broadband design, engineering, and consulting firm, to develop an analysis of access considerations as part of its Broadband Feasibility Study. Magellan was selected under a competitive solicitation and had earlier provided consulting services to Monroe County back in 2015/2016 timeframes. Magellan's engagement is focused on identifying impediments to broadband access and developing strategies to improve infrastructure and to develop tactics to increase broadband adoption and to enable improved digital equity for all County residents. Monroe County's Department of Planning and Economic Development are coordinating Magellan's efforts.

Under the leadership of Monroe County Executive Adam Bello, Monroe County also had earlier established the Broadband Task Force, with the goal of providing local input to the County, through the participation of experienced municipal and technology leaders.

As part of the engagement, Magellan performed a market analysis of all services offered by internet service providers (ISP) in the County. Magellan also developed and published two broadband surveys. The first was for constituent services. The survey included an embedded speed test to measure a respondent's actual broadband download and upload speeds, as well as an opinion survey on questions related to the County's role in supporting broadband. The second survey was distributed to key internal department managers and to members of the Broadband Task Force (BBTF). Magellan also conducted stakeholder outreach sessions with BBTF members, with municipal leaders, and with the public.

Over 3,000 communities in the US have invested in fiber networks to support internal government operations and to fulfill greater needs across their areas. In doing so, they have been able to expand this fiber to support connections to County and City facilities, to providing fiber access to schools, and even connecting traffic signals, streetlights, and public safety cameras.

In some cases, municipalities and county governments have expanded their fiber to increase access to high-speed internet services in areas where existing broadband services do not meet one of the four dimensions of internet service, which include speed, reliability, customer service and/or affordability. Economic development has been a major beneficiary of this strategy as the small and medium business sectors are generally the largest contributor to an area's economy yet are challenged to find affordable high-speed internet services. Education, healthcare, transportation, and housing have also benefited from new access to broadband services, enabled by these organizations. And some communities have crafted their own policies to consider internet access a utility, like electric and water. In doing so, these communities have built their broadband networks to reach all citizens and businesses throughout their jurisdictions.

Today's acknowledgement post-COVID, of the importance of connectivity and high-quality Internet services is driving significant investment across the US, and globally. The US Federal government (as

further detailed in this report) in 2020, 2021 and through the next several years will be making historical investments in broadband to ensure every corner of the country is connected, and no one is left behind. In fact, since CARES funding of 2020, hundreds of billions of dollars has been and is being made available to states, counties, cities, tribes, and regions to deploy new infrastructure and services meeting higher thresholds than the FCC's current broadband definition of 25 Mbps download, 3 Mbps upload speeds.

Monroe County commissioned this Community Access Plan to evaluate the broadband gaps and opportunities to enhance broadband services across the County, and to determine Monroe County government's role in accelerating broadband deployments in areas that are unserved or underserved as defined by the US Federal government.

This Community Access Plan is divided into the following sections, consistent with the approved proposal:

1. Section 1 – Identify Populations and Locations with Access Barriers – Includes Market Assessment, FCC Mapping, Community Needs, Survey Results, and enhanced recommendations from Magellan's 2017 Report. (This ties to Deliverable 1, except for SWOT Analysis, which is included as Section 4.)
2. Section 2 – Analyze Public and Private Sector Roles – Includes Business Models, existing fiber and wireless networks, inventory of data collected and created, and potential public-private partnership options. (This ties to Deliverable 2, except for SWOT Analysis, which is included as Section 4.)
3. Section 3 – Federal and New York State Goals and Funding Sources – Includes current and anticipated federal and New York State funding sources, FCC and NYS DPS mapping considerations, and chronology of broadband and grant funding, mapping, and expected schedules. (This ties to Deliverable 3.)
4. Section 4 – Composite Analysis of Monroe County's Strengths, Weaknesses, Opportunities, and Threats/Challenges.
5. Section 5 – Magellan's Recommendations and Monroe County's Next Steps – Includes complete set of recommendations on improving broadband access, on seeking / utilizing / offering grant funds, and on broadband infrastructure expansion on identified underserved areas. Also included is one possible FRF expenditure plan along with a framework for making final decisions.

In addition, there are several Appendices with detailed data to support the Analysis, Report, and Recommendations. Appendices include:

1. Detailed Market Analysis.
2. Network Assessment and Strategy Report Updates.
3. Proposed Fiber Segments.
4. Stakeholder Lists.
5. Digital Inclusion Opportunities.
6. Overview of Business Models.

Monroe County understands the significant opportunity ahead of it given the substantial federal and state funding which will be made available to help finally close the *Digital Divide* in and across the County.

Magellan is pleased to offer this Community Access Plan to Department of Planning and Development, whose leadership and contributions are acknowledged and appreciated. Also acknowledged are County Attorney's Office and Departments of Environmental Services and Infrastructure Services, along with the Broadband Task Force.

Section 1 – Identify Populations and Locations with Access Barriers

SUMMARY - MARKET ASSESSMENT, MAGELLAN FINDINGS, FCC MAPPING RESULTS

(a) Assumptions and Definitions

Technically, broadband refers to a communications circuit that is split into multiple, separate channels. Broadband has come to mean always on, high-speed internet access. As of January 2015, the Federal Communications Commission (FCC) defines “broadband” as a minimum of 25 megabits per second (Mbps) download speed and 3 Mbps upload speed, or “25/3.” In January 2018, the FCC reaffirmed that definition, which they deemed adequate for a single user engaged in telecommuting or student activity. Most broadband services are asymmetrical, with faster download than upload speeds, and providers commonly only advertise download speeds.

Federal and state funding opportunities require the provision of technologies that can provide 100/20 Mbps, with upgrade paths to 100 Mbps symmetrical (meaning that both download and upload speeds are identical at 100 Mbps).

(b) Market Research Overview

Magellan performed a broadband market analysis of Monroe County to determine the current broadband offerings available to residents and businesses. The analysis included identifying what service providers are advertising as being available in the area, and what is available through a random sampling of locations across the County. The goal of this process is to identify what is being advertised versus what is truly provided. In many cases, there is a significant disparity between what is advertised and what is available. As documented in this analysis, it is evident that many advertisements are overstated, misleading and often, unreliable.

An assessment of private-sector telecommunications infrastructure and services in Monroe County provides context for a more targeted and up-to-date assessment. It also informs the County’s strategies given the services that are or are not available in market. Magellan then verified these service offerings by comparing multiple data sources: what the providers’ self-report accessed through BroadbandNow¹, each website of the major providers in the area, and as well as direct service offering inquiry through emails and phone calls.

Companies that nominally sell network services in Monroe County are listed in the table below.

¹ BroadbandNow - BroadbandNow has a comprehensive database of internet service provider information including their coverage, background and up to date service offerings per zip code - <https://broadbandnow.com/>

Table 1 - Major Internet Service Providers in Monroe County

Residential				Business			
Provider	Type of Connection	Reported % County Availability	Service availability of 63 addresses	Provider	Type of Connection	Reported % County Availability	Service availability of 63 addresses
Spectrum	Hybrid Fiber-Coaxial Cable	100%	63/63	Spectrum Business	Hybrid Fiber-Coaxial Cable	100%	50/63
Frontier	DSL, Fiber	94%	47/63	Frontier	Fiber	93%	53/63
HughesNet	Satellite	100%	63/63	Crown Castle ²	Fiber	23%	23/63
Viasat	Satellite	100%	63/63	Lumen/CenturyLink Business	DSL, Fiber	13.8%	47/63
T-Mobile Home Internet	Fixed Wireless	65%	40/63	Greenlight Networks	Fiber	22%	37/63
Ultra-Home Internet	Fixed Wireless	63%	53/63	Verizon Business	Fiber	15.1%	11/63
NYSYS airAccess	Fixed Wireless	53%	30/63	FirstLight	Fiber	10.3%	47/63
Greenlight Networks	Fiber	32.4%	10/63	Kinetic by Windstream	DSL, Cable Fixed Wireless	8.4%	35/63

To confirm each of the advertised service offerings by the providers mentioned in the table above, Magellan dove deeper through targeted research by selecting one residential, and one business address within each zip code within the County to inquire on the services available to them. Specific addresses used may be found in the appendix.

We also analyzed the five dominant providers, including their high- and low-cost plans calculating average costs per megabit per second on subscriptions, summarized in the following table.

² <https://www.crowncastle.com/infrastructure-solutions/?level=14¢er=-77.62191,43.15606>

Table 2 - Summary of Low and High Costs Provider Plans

PROVIDER	PACKAGE	TYPE OF CONNECTION	DOWNLOAD SPEED	MRC	MRC PER MBPS	NOTES
Spectrum	Spectrum Internet	Cable	200 Mbps	\$49.99 for 12 months, then the standard rate will apply	\$0.25	Unlimited Data, plus WI-FI fee
	Internet Gig	Cable	1 Gbps	\$89.99 for 12 months, then the standard rate will apply	\$0.09	Unlimited Data, plus WI-FI fee
Spectrum Business	Spectrum Internet	Cable	200 Mbps	\$64.99 for 12 months, then the standard rate will apply	\$0.32	Unlimited Data , plus WI-FI fee
	Internet Gig	Cable	1 Gbps	\$164.99 for 12 months, then the standard rate will apply	\$0.16	Unlimited Data, no WI-FI fee
Frontier	Option 1 ¹	DSL	12 Mbps	\$49.99 for 24 months, then the standard rate will apply	\$4.17	No Annual Commitment, Wi-Fi router Included, Includes Multi-Device Security.
	Option 4	Fiber	2 Gbps	\$149.99 for 24 months, then the standard rate will apply	\$0.07	No Annual Commitment, Wi-Fi router Included, Includes Multi-Device Security
Frontier For Business	300/300 Mbps	Fiber	300 Mbps	\$44.99 for 24 months, then the standard rate will apply	\$0.15	No Contract Required, No Activation Fee
	Gig Service 940/880 Mbps	Fiber	940 Mbps	\$149.99 for 24 months, then the standard rate will apply	\$0.16	No Contract Required, No Activation Fee
NYSIS aIR ACCESS	Option 1	Fixed Wireless	8 Mbps	\$50	\$10	No data caps; Added installation fee of \$149 and a router for \$69
	Option 2	Fixed Wireless	12 Mbps	\$75	\$6.25	No data caps; Added installation fee of \$149 and a router for \$69
Ultra Home Internet	25 GB	Fixed Wireless	115 Mbps	\$54.99	\$0.48	Data cap of 25 GB per month then download speed goes down to 1 Mbps
	100 GB	Fixed Wireless	115 Mbps	\$144.99	\$1.26	Data cap of 100 GB per month then download speed goes down to 1 Mbps
T-Mobile 5G Home Internet	Option 1	Fixed Wireless	115 Mbps	\$50	\$0.43	No data caps, no annual contracts, no activation fees, easy to set up

(c) Consumer Survey Speed Test Summary

Complementing the market research effort, Magellan analyzed the speed test data that was collected as part of the Monroe County survey. Each survey asked for an address so the point could be geo-located in the mapping system.

The map below shows the speed test data recorded from the Magellan survey. The red and orange dots represent speed test results that are unserved (<25 Mbps download) and, yellow as underserved (25-100 Mbps). The unserved and underserved data points are spread all over the County area. The FCC maps show most of these areas as served.

Figure 1 - Speed Test Results from Survey

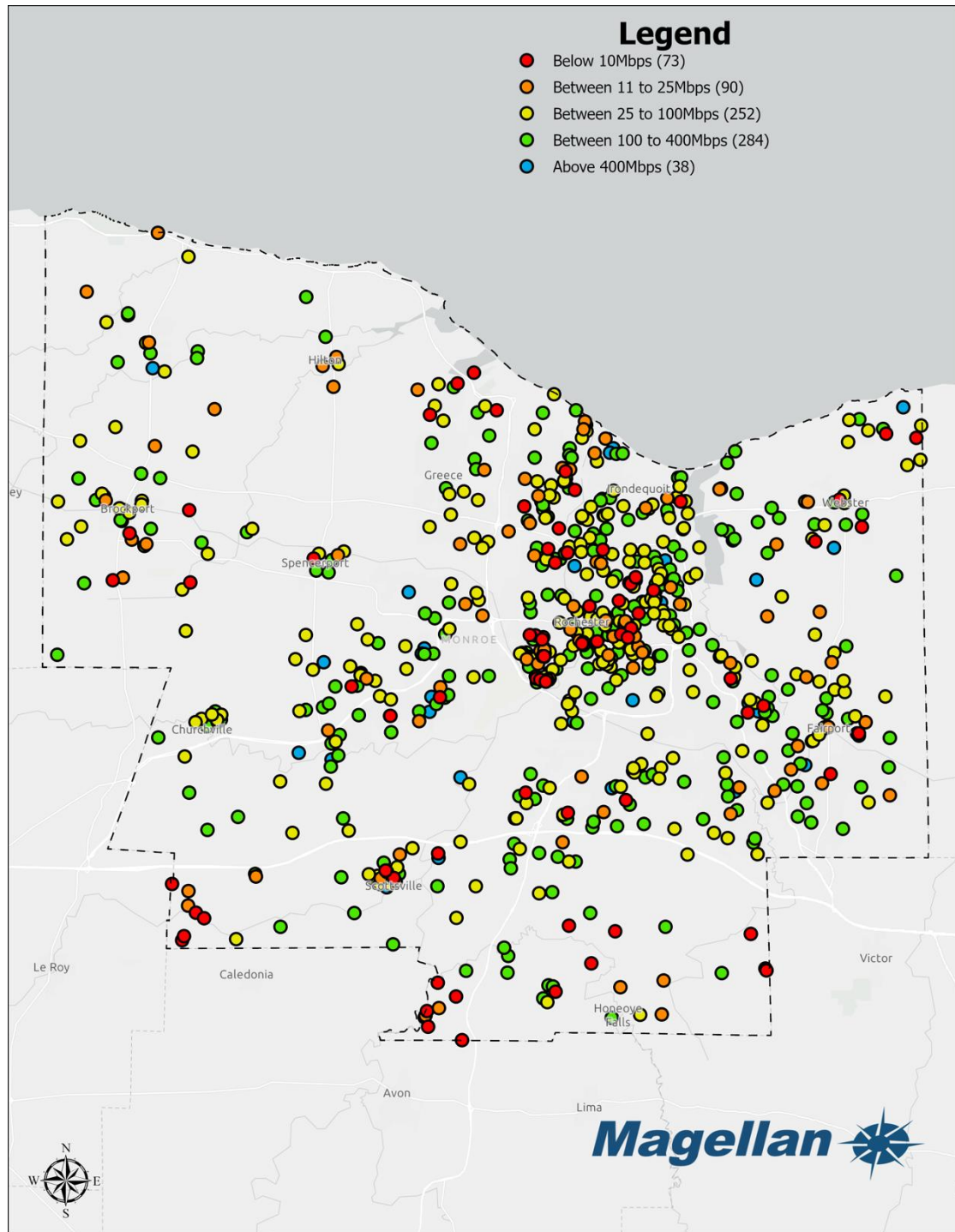


Table 3 - Summary Data of Survey's Speed Test Result

	Download	Number	Pctg
Red	< 10 Mbps	73	9.9%
Orange	10 - 25 Mbps	90	12.2%
Yellow	25 - 100 Mbps	252	34.2%
Green	100 - 400 Mbps	284	38.5%
Blue	> 400 Mbps	38	5.2%
Total		737	100.0%

In addition to parts of the City of Rochester, the low-speed red and orange points are indicative of where affordable service is relatively unavailable and high-speed internet service may be unaffordable.

Based on market research and actual measured survey speed test results, Magellan concludes that there are many pockets in the County where affordable access to broadband does not exist for many households.

(d) FCC Mapping Findings

The FCC's Broadband Data Collection (BDC) Map, the new standard for broadband mapping data, was released to the public on November 18, 2022. The map is based on premise-specific information reported by Internet Service Providers (ISP) with data effective June 30, 2022.

In striking contrast with Magellan's measured conclusions, as of December 1, 2022, the BDC map shows that broadband access is not a significant problem in Monroe County. Almost all of Monroe County is being served by multiple fixed terrestrial providers, either wired or fixed wireless service. (Grant funding opportunities do not classify either mobile wireless or satellite offerings as qualifying broadband.) These providers offer service above 25/3 Mbps, above 100/20 Mbps, and even above 250/25 Mbps. BDC map shows that over 97% of all residential single- and multi-family households have access to these speeds from terrestrial providers such as T-Mobile (over 94% coverage of the County), Charter-Spectrum Communications (over 90% coverage), and Frontier Communications (over 75% coverage). Verizon Communications shows just 10% coverage, with Westelcom, Firstlight Fiber, and Comcast no measurable coverage.

Providers such as Hughes Network, Space Exploration Holding (SpaceX), and Viasat provide satellite services to over 97% of the County.

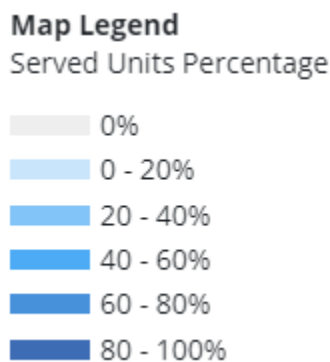
Magellan examined the FCC BCD maps in detail and summarized the small pockets of areas that are not served at 25/3 Mbps. The following image shows coverage in southern Monroe County for terrestrial (neither satellite nor cellular) technologies where access to 25/3 service exists. The FCC maps break coverage areas into hexagons.

Figure 2 - FCC BDC Map in Monroe County



The intensity of the blue hue for each hexagon denotes the percentage of the households in the area with access to 25/3 coverage, according to the following legend.

Figure 3 - FCC BDC Map Legend



In the example above, we see that an area near Henrietta has 63.41% of households with access to 25/3 service. The following table lists the locations and coverage percentages for those hexagons in Monroe County that have less than 100% service coverage.

Table 4 - Areas Lacking 25/3 in Monroe County, per FCC BDC Map

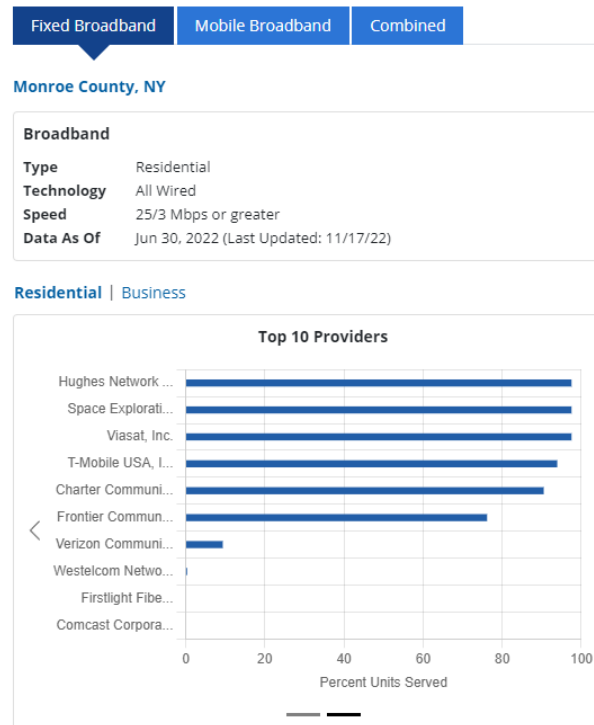
Monroe County - Areas lacking 25/3, per FCC BDC Map (Dec 17, 2022)						
Data as of Jun 30, 2022; last updated Dec 31, 2022						
These figures represent coverage, measured as percent of households, in FCC map hexagons. All other portions of Monroe County are reported as 100% covered.						
Southeast corner	90.38%	88.37%				
Southwest corner (spur)	80.65%	80.00%				
NW of Mendon	98.44%					
Near Wheatland	68.75%	40.00%	55.81%			
Beulah	77.78%	36.17%	88.89%	80.19%		
Near Scottsville	70.00%					
Near Henrietta	63.41%					
West Sweden	93.51%					
Near Adams Basin	66.67%	88.31%	85.71%	83.56%	96.96%	
Near Clackson	95.39%					
North Hamlin	93.79%	88.49%	96.64%	61.90%	96.55%	96.43%

Surprisingly, even areas that are viewed as receiving poor or no service (e.g., Rush) are considered 100% served based on the ISP data as reported by FCC. That suggests that the new FCC Broadband Map may have a bias toward overstating coverage, in contrast with reports of lack of coverage.

The relatively underserved sections correlate with Magellan’s recommended fiber routes.

In the appendices, there are provider-based monthly cost estimates, costs per megabit, and an enumeration of major plan offerings.

Figure 4 - FCC's Fixed Broadband Provider's Residential Coverage Data



Additional summaries of the FCC mapping data showing coverage by provider are also included in Appendix 2. Both speed tiers (25/3, 100/20) are provided.

SURVEY SUMMARY AND DETAILS

Magellan administered a **community survey** for residents and businesses and, a **broadband municipality survey** for internal County leaders across Monroe County. Magellan worked closely with stakeholders across different industries in the County to ensure the survey's reach to as many Monroe citizens as possible given the timeline of the Study.

An online broadband municipality survey link was shared by the County to organizations' leaders and representatives to determine their current and future connectivity needs. Magellan and the County kept this survey open from June 22, 2022 through August 18, 2022.

The results of the survey totaled one hundred (100) survey participants for which 46 were completed and, 54 were partially completed surveys which also had valid data and are found useful for this results summary. The survey enabled the participants to upload documents and images to capture any form of their input.

The participants of this survey were leaders from both public and private organizations in Monroe County, along with municipal leaders and several key Monroe County department heads.

There are common themes of concerns found when the participants were asked what their areas of service's broadband needs are. They are mainly issues around **reliability** and **affordability** which

is worsened by the fact that in most cases only the dominant provider, Charter Communications is available at these locations. GreenLight's reliable and fast broadband services have been a source of hope for many participants, however its area of service is limited and is not available to everyone around the County. For instance, a representative from the Habitats for Humanities mentioned GreenLight's services are not available on one side of Brookfield Road.

ANALYSIS OF COMMUNITY SURVEY RESULTS FOR MONROE COUNTY

The community survey was provided to the public to complete online or in paper form and was available in both English and Spanish. Magellan and the County kept this survey open from June 2, 2022 through August 3, 2022.

The results of the survey totaled in 1,234 residential and business survey participants for which 967 were completed and, 265 were partially completed surveys which also had valid data and are found useful for this results summary. 737 surveys completed a real-time measured speed test.

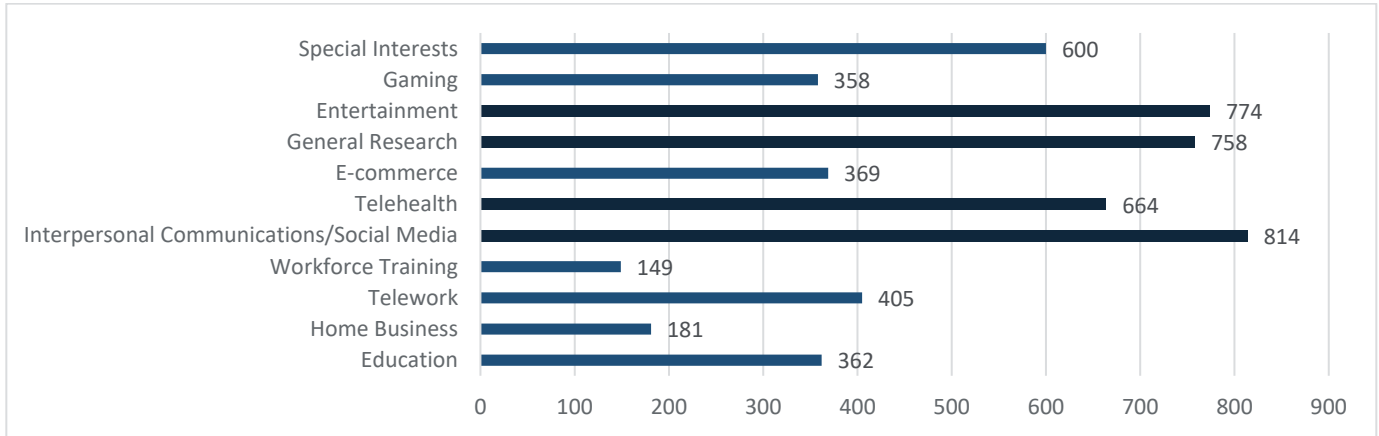
66% of the surveys answered were for residential locations and only 4% account for organizations/businesses, therefore this summary will show more findings from participants representing their households.

Many respondents indicate dissatisfaction with the value for price paid for monthly broadband subscriptions and the lack of affordable choices.

(a) Demographics: Household Characteristics of Residential Survey Respondents

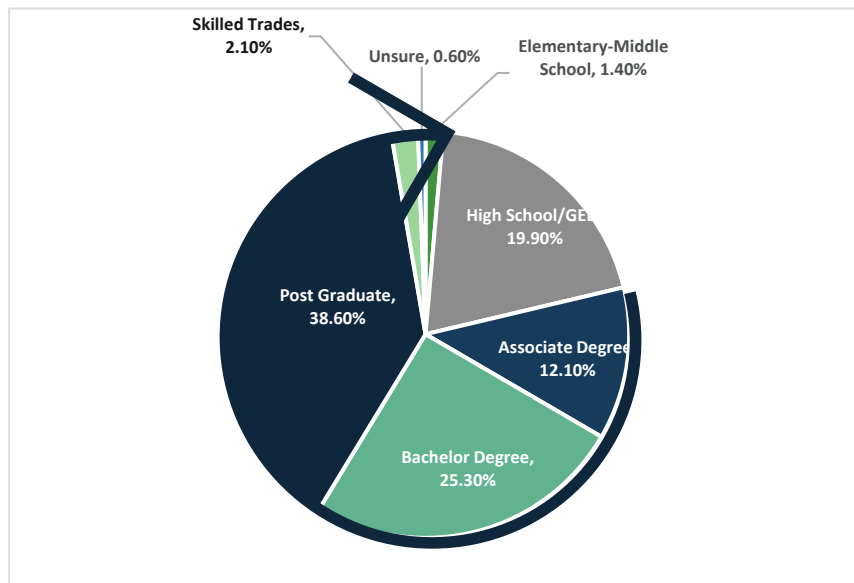
On average, three (3) household members in a residential location use a single connection simultaneously for their day-to-day tasks. For those who have broadband, the figure below represents the percentage of internet usage per category of the residential participants. It shows that most Monroe's residents use their internet to access interpersonal communication applications/social media, entertainment, general research, then telehealth, respectively.

Figure 5 - Residential Internet Use Categories



The chart below illustrates the percentage of the highest attained education in each of the respondents' households. The result shows that over half of the respondents have a person in their households that have attained a higher degree of education.

Figure 6 - Educational Attainment for Households

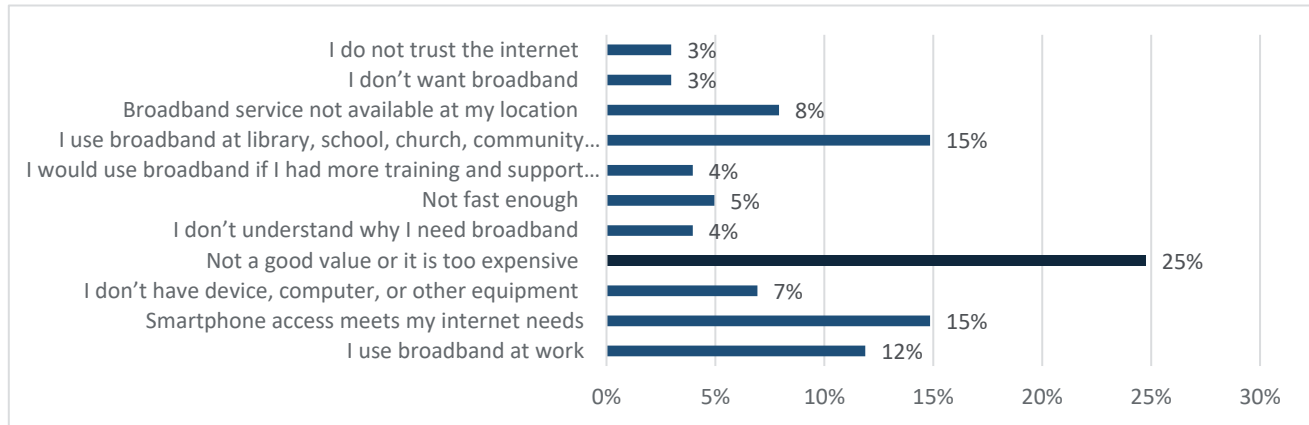


(b) Broadband Availability

88% of the respondents have broadband access, and 12% of those who do not have it in their residential or business location stated that available options are too expensive, followed by the fact

that connectivity needs are being met by their smartphones' network and by the available services offered by their local libraries, schools and other public facilities.

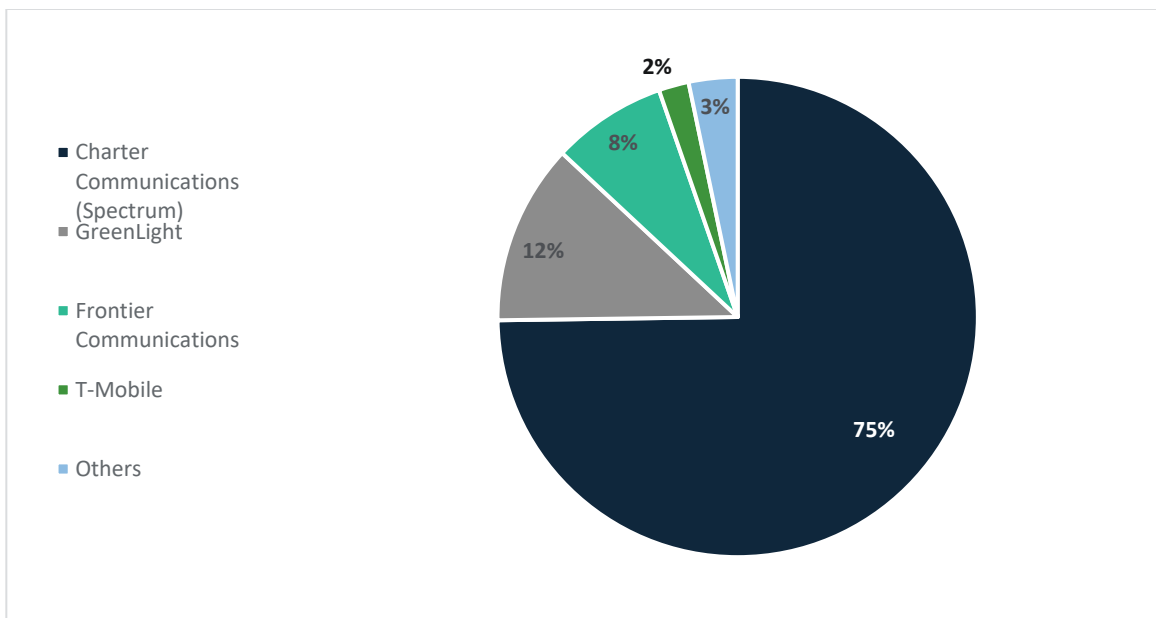
*Figure 7 - Reasons for Not Having Broadband at Location
(Percent Respondents Who Do Not Have Broadband)*



(c) Current Providers

75% of the respondents who have broadband have Spectrum, also now known as Charter Communications which provides hybrid fiber-coaxial cable services, followed by 12% with GreenLight which offers symmetrical broadband speeds though their fiber services.

Figure 8 - Current Providers



(d) Speeds and Prices

The built in speed test in the survey shows the achievable speeds that the citizens around Monroe are currently receiving. The speed test resulted in a median speed of 83.99 Mbps download and 10.55 Mbps upload speeds. The map below shows that although many are categorized as *served* (meets the FCC threshold of 25/3 Mbps), 56% or over half of them are **underserved** (fails to meet the FCC threshold of 100/20 Mbps paying anywhere from \$51 to \$100 for for their broadband service alone as shown in the chart below.

Figure 9 - Mapped Survey Download Speed Data

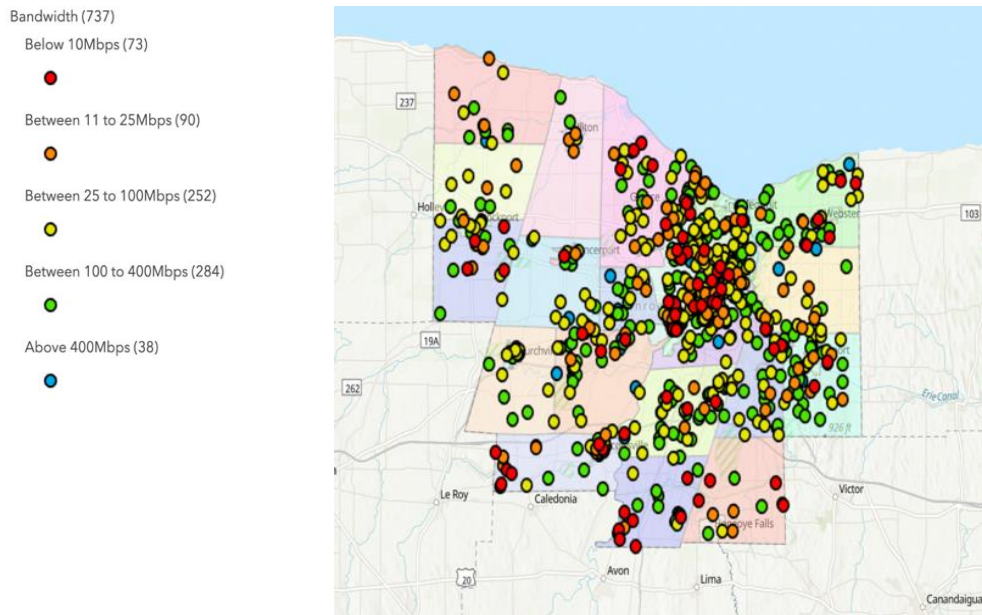
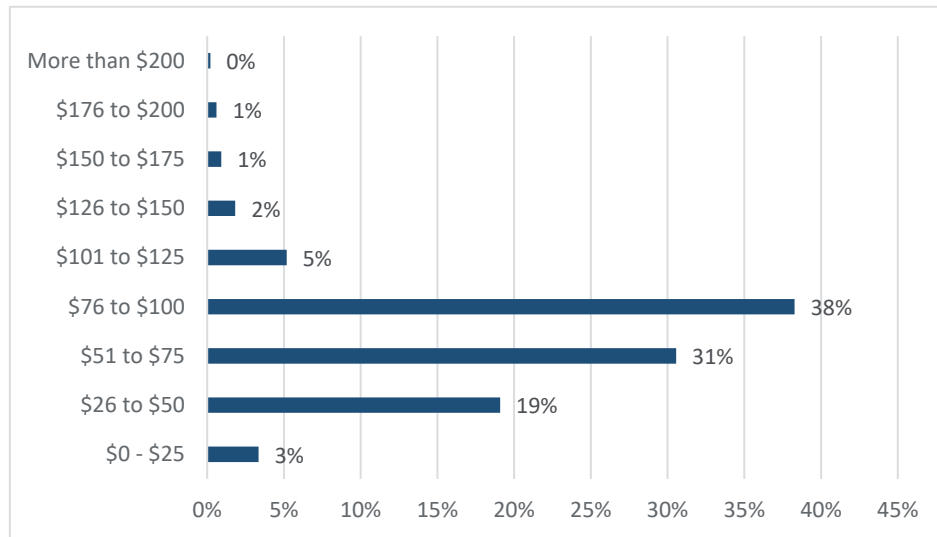
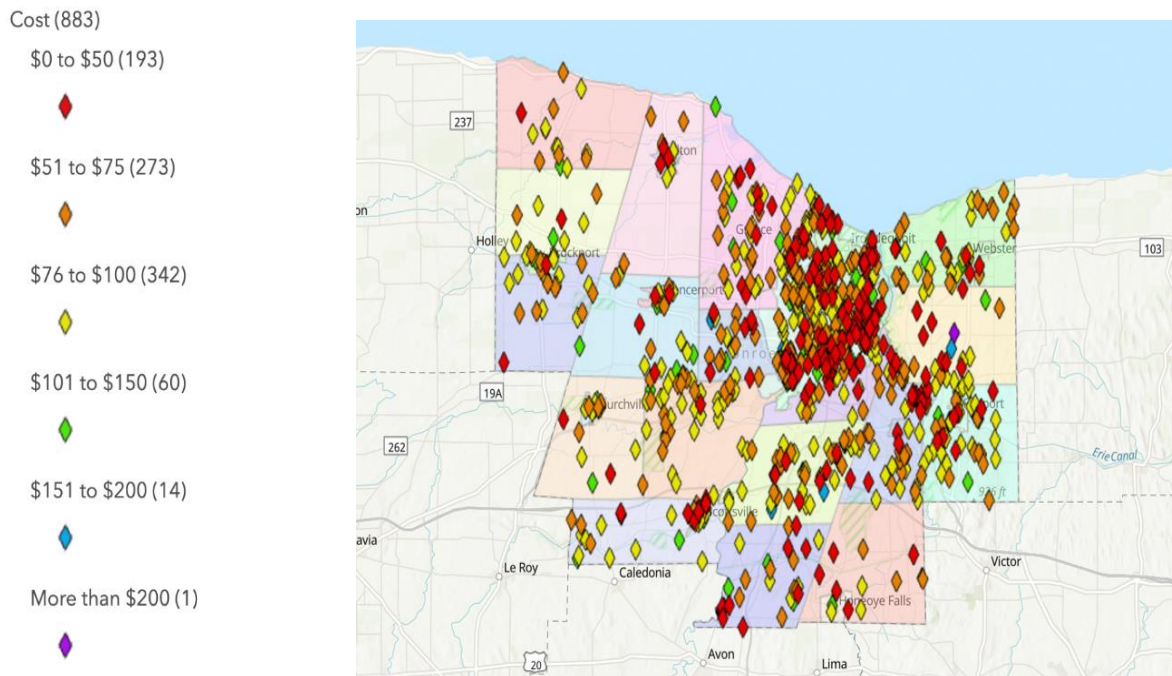


Figure 10 - Monthly Cost of Broadband Service Only



The map below shows that there is a wide range of price options available in most of the areas in the county.

Figure 11 - Mapped Survey Monthly Cost Data



(e) Broadband as a Critical Need

94% of the respondents stated that broadband is essential to them, and 39% of these respondents utilize broadband to make up for any travel barriers that they may have.

61% stated that they have been having an increasing trend of bandwidth needs since the COVID-19 pandemic.

SUMMARY - COMMUNITY NEEDS ASSESSMENT

(a) Public Opinion

As part of the consumer survey, Monroe County sought respondent opinions on key questions related to the role of Monroe County with regard to broadband, as well as how County funds might be best spent to support the expansion of access to broadband. Below is a summary of the public's view on how they think the County can best support them with regards to their connectivity and its required infrastructure.

Of almost 1200 responses, all favorable opinion questions received support of more than 60% of respondents. Two questions received exceptional support. Question 1, asking whether the County should build broadband infrastructure, received almost 70% favorable responses. Question 4, asking whether the County should explore public/private partnerships, received 79% favorable responses. Only question 5, asking whether the broadband market should be left solely to private companies providing access to broadband, was opposed by almost 60% of the respondents.

Clearly, the majority supports a strong measure of County involvement, supporting the expansion of infrastructure and/or pursuing public-private partnerships. And the responses support the position that Monroe County residents feel that the current scenario of private entities deciding the market is not effective. (In the table below, majority support of questions is shaded green while majority opposition is shaded pink.)

Table 5 - Public's Opinion on County's Broadband Infrastructure and Operations

Do you support...	Yes	No	No Opinion
... the County building broadband infrastructure using taxpayer funds?	69.98% [834]	17.6% [210]	12.6% [151]
... the County operating broadband infrastructure using taxpayer funds?	61.8% [737]	22.5% [269]	15.7% [187]
... the County offering public wi-fi using taxpayer funds?	64.4% [767]	22.2% [264]	13.4% [160]
... the County pursuing a public-private partnership to improve access to high-speed internet?	79% [941]	10.7% [128]	10.2% [122]
... only private companies providing access to high-speed internet?	18.8% [221]	59.6% [701]	21.7% [255]

In Section 2, the report enumerates the various roles in which the County may choose to participate in increasing access to broadband internet.

SUMMARY - PREVIOUS MAGELLAN NETWORK ASSESSMENT AND STRATEGY REPORT

In 2017, Magellan performed a Network and Assessment and Strategy Report for Monroe County and the City of Rochester. In this study, Magellan updated the inventory of assets to collect current asset by working with the County GIS group.

The past report determined that the County has extensive fiber-optic infrastructure assets but only one-fifth of them were being used. To maximize their assets and to prepare for the growing bandwidth and connectivity requirements, in that report, Magellan recommended the following steps for the County:

1. Focus on evolving its fiber-optic infrastructure into a revenue-positive platform for delivering public sector network services.

2. Consider establishing an independent public network entity to clarify, expand and formalize their governance of their network assets.
3. Develop the network into a platform for IT service delivery and support by continuously improving facilities and operations with stakeholder input.
4. Expand connections to regional data centers and colocation facilities to increase the functionality and services available.

Magellan now extends this set of recommendations to include support for fixed wireless last mile internet service provision alongside wired terrestrial technologies such as fiber.

There are two key issues relating to the County's available network. One, the County's fiber network allocated for the County government users are not fully in use, while the second, more significant issue is in respect to the County's residential and business' connectivity. While the County government has extensive unused fiber assets, the citizens are lacking access to them, making citizens dependent on private internet service providers (ISP).

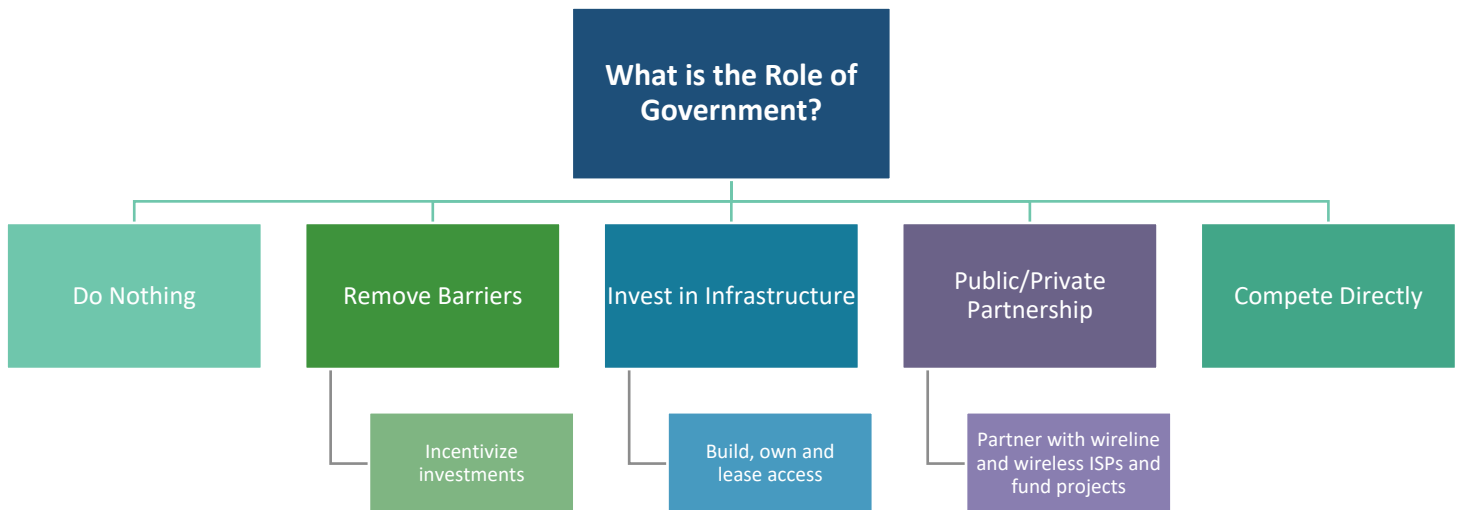
As a portion of the County's fiber was built by and is part of the County's sewer district infrastructure and financed through bonding, Magellan believes that there may be opportunities for leasing fiber to private entities or to internet service providers (ISP) to enhance residential and business internet offerings. While there may be opportunities to extend private, contracted use of this fiber network, Magellan recommends that a detailed analysis of the constraints and limits on these offers would need to be completed before any decisions are made on fiber use, any solicitations are issued, or contracts with private entities are executed.

Section 2 – Analyze Public and Private Sector Roles for Broadband

POSSIBLE BUSINESS MODELS

Communities, such as those in Monroe County, have used differing techniques to expand broadband, from making fiber available to local providers through lease agreements, to developing public-private partnerships. Each community must decide for itself the role it wants to play in driving broadband investment, depending on its unique local issues, available funding, tolerance for risk, capabilities to compete and desire for overall control. About 500 municipal utilities, cities, and cooperatives play a role in expanding broadband directly within their communities today.

Figure 12 - Possible Roles of Government



Monroe County has several options to consider as it determines its role in furthering broadband expansion across the County. That includes doing nothing, removing barriers, investing directly in infrastructure, or structuring a public private partnership (P3 or PPP), or even competing directly with the private sector. New York State law will constrain what local governments can and cannot do as it relates to broadband deployments throughout the State – this will constrain the range of options for the County to consider.

The concept of **Do Nothing** is to accept the fact that residents and businesses in the County will have to live with what they have despite the limitations of services available.

Monroe County can **Remove Barriers** to private sector investment. This is an effective and low-cost strategy to incentivizing further expansion. Some items the County could focus on includes reducing permit fees for fiber and tower construction and simplify permit requirements, incentives to

developers to install conduit in new residential and commercial developments, and by identifying areas of need and demand and sharing that with providers.

Monroe County can make **Direct Investments** in broadband infrastructure (conduit, fiber, towers) and make that infrastructure available to the private sector providers via standard lease agreements to generate revenues from its investments.

The County could pursue a **Public-Private Partnership (PPP or P3)** arrangement with technically and financially viable service providers – both wireline and wireless. The County could develop and structure a grant program targeted to regional providers who would use grant funding to deploy and operate new broadband infrastructure in the areas identified by the County as priorities.

The County could also choose to **Compete Directly** with the area's private sector providers, as a retail ISP, using its funding to build, own and operate its own last-mile networks in the identified areas. This option can also create legal risk to the County as it is likely to draw concerns from the County's incumbent providers.

During the Monroe County Broadband Survey, Magellan captured respondent opinions on which options are most desirable or undesirable. (See Section 1 for Municipal Survey Results for the opinion questions and the poll results.)

EXISTING PUBLIC / PRIVATE HIGH-SPEED BROADBAND SYSTEMS

There are three dominant terrestrial ISPs that provide the fastest speeds in the County, which offer service in excess of 100/20 Mbps. Those three providers are Spectrum/Charter Communications, T-Mobile Communications (both of which offer services to over 90% of the County) and Frontier Communications, which offers services to over 75% of the County.

POTENTIAL FOR PUBLIC / PRIVATE PARTNERSHIPS

Magellan believes that there are opportunities for public-private partnerships. These can be as basic as mutual usage agreements for owned assets, or as complicated as contractual relationships to construct, maintain, and operate fixed wireless and fiber optic networks for the benefits of County residents.

Contracts could take the form of competitively solicited proposals for services or products or may ultimately be in the form of grant solicitations and awards.

As a government entity, Monroe County has significant leverage in negotiating with external providers as they have funds available for use and can expedite right-of-way approvals and permit issuances.

See Recommendations for details.

Section 3 – Federal and New York State Goals and Funding Opportunities

This section details the technical requirements for use of federal funds and then details the federal and New York State funding opportunities that may be available to Monroe County. A complete chronology of federal and NYS funding follows, along with an expected schedule of upcoming commitments and opportunities. Finally, this second summarizes possibilities for public-private partnerships.

TECHNICAL REQUIREMENTS FOR VALID FUNDING USE

Based on statutory specifications in both the American Rescue Plan Act (ARPA, P.L. 117-2) and the Infrastructure Investment and Jobs Act (IIJA / BIL, P.L. 117-58), broadband and fixed wireless technologies are preferred investment opportunities using Fiscal Recovery Funds, federal grants, and state grants and subgrants.

Notices of Funding Opportunity (NOFO) and Funding Opportunity Announcements (FOA) issued by federal granting agencies govern the use of federal funds.

For NYS programs, it is expected that Empire State Development (ESD) subgrant programs using federal funds (ARPA Fiscal Recovery Funds (FRF); Coronavirus Capital Projects Funds (CCPF); Broadband Equity, Access, and Deployment (BEAD) program funds; and Digital Equity Act (DEA) will pass the federal obligations through to subgrant recipients. Grant and subgrant recipients are / will be obligated to timely performance and financial reporting. Federal agencies and NYS ESD will monitor appropriate use of funding. Audits of recipients' financial records will be required.

Technically, there are minimum technical obligations tied to use of funding:

1. There is strong preference to serve unserved households first; that is, those households for which access to even 25/3 Mbps service is unavailable today.
2. Eligible technologies for investment must be capable of supporting last mile service delivery at 100/20 Mbps minimum, easily upgradeable to 100 Mbps symmetrical.
3. Some funding programs like RUS ReConnect require the ability to concurrently deliver these speeds to all households in a service area.
4. Match funding is typically expected varying from a low of 20% of total project costs to as much as 50% of project costs.

Each program may have additional obligations. The grant solicitations will inform all these details and will govern in all cases.

FEDERAL FUNDING OPPORTUNITIES

Existing Federal Broadband Funding

The American Rescue Plan Act (ARPA, P.L. 117-2) created new programs and allocated \$360 billion in funds that can be used for broadband.

(a) ARPA State and Local Fiscal Recovery Fund (FRF)

ARPA created the State and Local Fiscal Recovery Fund (FRF), allocating \$350 billion to state, local, and tribal governments across the country to support their response to, and recovery from, the COVID-19 public health emergency. Funding allocations were determined by the U.S. Treasury, reserving the following amounts:

Recipient Class	Amount (\$ billion)	Comments
States and D.C.	\$195.3	Treasury-defined allocations.
Counties	\$65.1	Treasury-defined allocations.
Metropolitan Cities	\$45.6	Treasury-defined allocations.
Tribal Governments	\$20.0	Allocations to each federally registered tribe.
Territories	\$4.5	Treasury-defined allocations.
Non-Entitlement Units of Local Governments	\$19.5	Distributed through the states to small cities, towns, and other municipalities with populations under 50,000. Allocations are determined by each State.
TOTAL	\$350.0	

The funding and programs are administered by the U.S. Treasury. As of June 2022, all funds have been delivered to the recipients. FRF funds must be committed for expenditure by December 31, 2024 and expended by December 31, 2026.

Among the eligible uses of FRF are three eligible classes of infrastructure projects, for broadband, for water, and for sewer projects. The Treasury's Final Rule, effective April 1, 2022, significantly broadens eligible broadband infrastructure investments to address challenges with broadband deployment, access, affordability, and reliability.

Within the broadband space, there are three eligible uses of FRF funds: when used for middle-mile projects, when used for last-mile projects, and when used as match for later broadband grant programs. By reserving some FRF funds for allocation as match for later, anticipated grant programs, using FRF funds would reduce the need for any municipal, city, state, or tribal entity to deplete either its capital or operating budgets for grant matching.

For tribal entities, FRF allocated \$20 billion to Tribal governments, directing that, first, \$1 billion is to be allocated equally among eligible Tribal governments and second, that \$19 billion is to be allocated

to Tribal governments in a manner determined by the Treasury. The Treasury calculated that the allocations of the \$19 billion were determined by two factors, self-certified by the tribes themselves. Those two factors were the pro rata tribal census enrollment data and pro rata tribal employment data. The original basis for these census enrollment counts were based upon information originally submitted by the tribes to the Bureau of Indian Affairs, while the employment data was collected as part of CARES Act.

Keep in mind two points:

1. Local governments (counties, cities, towns) and tribal entities can also apply to their states for a portion of statewide Fiscal Recovery Funds (FRF). Contact your state capital to determine if any FRF funds remain uncommitted.
2. If County has not yet committed or reserved all FRF allocated to your jurisdiction, please consider keeping some unallocated in reserve for use as matching funds on future broadband infrastructure deployment project grants. Those grants could be direct from federal government or through states (e.g., future BEAD subgrants).

(b) ARPA Coronavirus Capital Projects Fund

ARPA also created the Coronavirus Capital Projects Fund (CCPF) with funding of \$10 billion, to address many challenges revealed by the COVID-19 pandemic, especially in rural America, tribal communities, and low- and moderate-income communities. These funds will help to ensure that all communities have access to high-quality modern infrastructure, including broadband. Allocations were made directly to States and to Tribal entities.

The grant enrollment deadline has passed for states and territories. However, the deadline for submitting a Grant Plan framework with at least one Program Plan is September 24, 2022. After that, state recipients may submit additional Program Plans on a rolling basis throughout the following 365-day period, ending on September 24, 2023. The U.S. Treasury will approve each program plan separately, providing access to funds for the program as approved.

Recipient Class	Amount (\$)	Comments	Deadline for Project Submission
States (and DC, PR)	\$9.8 billion	Allocations.	September 24, 2022
Territories	\$100 million	Fixed allocation of \$14,285,714.29 to seven territories.	September 24, 2022
Tribal Governments	\$100 million	\$167,504 for each federally registered tribe.	N/A
TOTAL	\$10.0 billion		

Eligible uses for CCPF funds are:

1. **Broadband Infrastructure Projects:** the construction and deployment of broadband infrastructure designed to deliver service that reliably meets or exceeds symmetrical speeds of 100 Mbps so that communities have future-proof infrastructure to serve their long-term needs.
2. **Digital Connectivity Technology Projects:** the purchase or installation of devices and equipment, such as laptops, tablets, desktop personal computers, and public Wi-Fi equipment, to facilitate broadband internet access for communities where affordability is a barrier to broadband adoption and use.
3. **Multi-Purpose Community Facility Projects:** the construction or improvement of buildings designed to jointly and directly enable work, education, and health monitoring located in communities with critical need for the project.

(c) Future Federal Broadband Funding

The Infrastructure Investment and Jobs Act (IIJA, P.L. 117-58) made an unprecedented amount of funding available to plan for and deploy broadband infrastructure. Over \$47 billion in funding has been allocated to the U.S. Department of Commerce's National Telecommunications and Information Administration (NTIA) and the U.S. Department of Agriculture's Rural Utilities Service (RUS), dedicated to broadband deployment.

In addition, IIJA allocated to NTIA another \$2.75 billion nationwide to improving digital equity and digital inclusion initiatives. Finally, IIJA allocated to Federal Communications Commission (FCC) \$14.2 billion to establish the Affordable Connectivity Program (ACP) to subsidize household broadband costs, with the objective of making broadband more affordable to households.

(d) Broadband Infrastructure Deployment Funding

In May 2022, NTIA published a funding announcement for the Broadband Equity, Access, and Deployment Program (BEAD), offering \$42.45 billion in funding. Funding will be available during the first half of 2023. The NOFO provides an unprecedented opportunity for states to build out last-mile networks for telecom and electric utilities, cooperatives, independent telecom providers, and local and tribal governments. Grant funding opportunities from the states using their funds will be available starting as early as first half of 2023. NTIA is currently developing funding allocations among the states, based on counts of unserved and underserved households, and other objective data. All States have committed to participate in the BEAD program.

When the initial statewide mapping and planning phases are completed and a five-year Statewide Plan has been developed, the Plan will be submitted to NTIA. Once NTIA formally approves the

State's plan, BEAD funds will be released to the State. At that point, the State will offer competitive grant programs to eligible entities.

RUS will also shortly issue the fifth Funding Opportunity Announcement (FOA) for the Rural eConnectivity (ReConnect) Broadband Loan and Grant program. The FOA will offer almost \$1 billion, and funds will be awarded most likely in first quarter 2023, well before BEAD funds are awarded to the states. Portions of these funds earmarked for Tribal entities.

(e) Digital Equity and Digital Inclusion Funding

NTIA also published Notice of Funding Opportunity (NOFO) for the Digital Equity Act (DEA), offering \$2.75 billion for states to improve and fund digital equity and digital inclusion initiatives. NTIA is currently developing funding allocations among the states, based on needs. All States have committed to participate in the DEA program.

When the initial statewide planning phases are completed and a five-year Statewide Plan has been developed, the Plan will be submitted to NTIA. Once NTIA formally approves the State's plan, DEA funds will be released to the State. At that point, the State may offer competitive grant programs to eligible entities.

(f) Affordable Broadband Program (ACP) and Broadband Subscription Subsidies

FCC also recently established the Affordable Connectivity Program (ACP), with initial funding of \$14.2 billion. ACP offers monthly subsidies for broadband subscriptions to households receiving assistance from select programs. Subject to submitting supporting information to internet service providers registered with the FCC (or to the FCC directly), households can receive a \$30 monthly subsidy. Tribal households can receive \$75 monthly subsidy. The program is currently active.

NEW YORK STATE FUNDING OPPORTUNITIES

In New York State, Empire State Development (ESD) is managing the Connect ALL program and is administering and managing the Department of Commerce's National Telecommunications and Information Administration's (NTIA's) BEAD and DEA programs.

ESD is working closely with Department of Public Service (DPS), which supports premise-based mapping efforts in support of 911 emergency services. DPS has expanded its scope to support broadband mapping efforts, working with counties, with the New York State Association of Counties (NYSAC), and with Regional Planning Groups, such as the Genesee Finger Lakes Regional Planning Council, to which Monroe County belongs.

1. ConnectALL is currently funded for these amounts for programs for which specifications and grant opportunities are being designed:
 - a. \$300 million – from NYS budget appropriation for ConnectALL grant program.
 - b. \$345 million – from NYS allocation of Treasury’s Coronavirus Capital Project Fund (CCPF), authorized by the American Rescue Plan Act (ARPA). Broadband infrastructure investment is one of several valid uses (along with digital equity programs).
 - i. Digital Connectivity Technology Projects: the purchase or installation of devices and equipment, such as laptops, tablets, desktop personal computers, and public Wi-Fi equipment, to facilitate broadband internet access for communities where affordability is a barrier to broadband adoption and use.
 - ii. Multi-Purpose Community Facility Projects: the construction or improvement of buildings designed to jointly and directly enable work, education, and health monitoring located in communities with critical need for the project.
 - iii. Broadband Infrastructure Projects: the construction and deployment of broadband infrastructure designed to deliver service that reliably meets or exceeds symmetrical speeds of 100 Mbps so that communities have future-proof infrastructure to serve their long-term needs.
 - c. \$400 - \$800 million – from NYS allocation of NTIA’s Broadband Equity, Access, and Deployment (BEAD) program, authorized by the Infrastructure Investment and Jobs Act (IIJA), which is also known as the Bipartisan Infrastructure Law (BIL). (These amounts are a range estimated by NYS. Final allocation decisions will be made by NTIA and announced by June 30, 2023.) On December 12, 2022, NYS received the \$5 million BEAD planning fund allotment.
 - d. \$80 - \$100 million – from NYS allocation of NTIA’s Digital Equity Act (DEA) program, authorized by the Infrastructure Investment and Jobs Act (IIJA), which is also known as the Bipartisan Infrastructure Law (BIL). (These amounts are a range estimated by NYS. Final allocation decisions will be made by NTIA later.) On December 12, 2022, NYS received the \$2.18 million DEA planning fund allotment.
2. NYS’s “Working to Implement Reliable and Equitable Deployment of Broadband Act” (WIRED Broadband Act) Capital Investment Plans for Broadband include:
 - a. Local Connectivity Planning Grant Program – Grants to municipalities and non-profits to identify local broadband challenges, devise community-based solutions, and perform engineering or other work to prepare for capital investments.
 - b. 21st Century Municipal Infrastructure Investment Program – Grants to municipalities to construct fiber/conduit to expand 21st Century open, accessible public infrastructure that drives innovation and increases affordability, competition, and consumer choice.
 - c. Rural Broadband Grant Program – Matching grants to extend broadband to unserved and underserved areas of the state.
 - d. Innovation Grant Program - Competitive grants to entities across the state to plan and construct creative, innovative, and new technology solutions to meet local connectivity

needs. This could fund innovative pilots to connect affordable housing residents, increase cellular coverage in rural areas, launch non-profit internet service providers, and more.

- e. Digital Equity Grant Program - to promote equitable access to broadband for all New Yorkers and support effective implementation of the State Digital Equity Plan.

As of January 19, 2023, ESD had not yet offered subgrant solicitations for any of these programs.

CHRONOLOGY OF FUNDING, MAPPING – TO DATE, FUTURE

This section presents in tabular form all the various timelines for funding programs and for mapping, for both federal and NYS entities. Finally, as an aid to Monroe County in planning expenditures and making investment decisions, Magellan provides a roadmap for expected future dates.

(a) Federal and State Historical Funding Chronology

The first chronological table summarizes key dates in legislation, federal and state funding programs through January 13, 2023.

New York State Broadband Chronology Federal and New York State Funding	
Date	Action
11-Mar-2021	<p>President Biden enacts into law the American Rescue Plan Act of 2021 ("ARPA", P.L. 117-2) establishing and authorizing funding for the programs below.</p> <p><u>State and Local Fiscal Recovery Fund (SLFRF)</u> - allocates \$350 billion to state, local, and tribal governments to support their response to and recovery from the COVID-19 public health emergency. Strict deadlines are set for commitment of funding (Dec 31, 2024) and expenditures of funding (Dec 31, 2026), along with periodic reporting obligations; however, governments have wide discretion on how to expend funds.</p> <p><u>Coronavirus Capital Projects Fund (CCPF)</u> - allocates \$10 billion for payments to eligible governments to carry out critical capital projects that directly enable work, education, and health monitoring, including remote options, in response to the public health emergency.</p>
15-Nov-2021	<p>President Biden enacts into law the Infrastructure Investment and Jobs Act ("IIJA", P.L. 117-58) establishing and authorizing funding for the programs below. (The law also known as Bipartisan Investment Law, or BIL).</p> <p><u>Commerce's NTIA Broadband Equity, Access, and Deployment (BEAD) Program</u> - \$42.45 billion, to be allocated directly to states and territories. Five-year plans must be developed by states and submitted to NTIA for approval prior to release of funding. \$5 million grant planning funding will be made to each state.</p> <ul style="list-style-type: none"> - BEAD definitions: household is "unserved" if it lacks access to any 25/3 Mbps fixed service providers. Household is "underserved" if it lacks access to any 100/20 Mbps fixed service providers. - Access to mobile wireless and satellite service providers do not affect unserved / underserved status. - Using federal funding requires commitment to provide 100/20 Mbps. <p><u>Commerce's NTIA Digital Equity Act (DEA) Program</u> - \$2.75 billion. First portion will be \$1.5 allocated directly to states and territories for planning and digital equity subgrant capacity initiatives. Remaining \$1.25 billion will be a later competitive grant offering. Five-year plans must be developed by states and submitted to NTIA for approval prior to release of funding; \$60 million will be allocated to states to support development of their five-year planning programs.</p> <p><u>Commerce's NTIA Middle Mile Grant (MMG) Program</u> - \$1.0 billion, to be competitively bid to eligible entities.</p> <p><u>FCC Affordable Connectivity Program (ACP)</u> - \$14.2 billion for \$30 monthly broadband subscription subsidies for households in need (\$75 monthly for tribal households).</p>
5-Jan-2022	<p>New York State's Governor Hochul creates ConnectALL program, establishing NYS Broadband Office (in Empire State Development, ESD), and:</p> <ul style="list-style-type: none"> - Created Broadband Assessment Program, including mapping, which will be administered by Department of Public Service (DPS). - Allocated \$300 million from NYS Budget for broadband capital programs. - Allocated entire \$345 million in NYS CCPF funding for three separate broadband capital programs: Digital Connectivity Technology Projects; Multi-Purpose Facility Projects; and Broadband Infrastructure Projects. - Created a Digital Equity Program.

New York State Broadband Chronology Federal and New York State Funding	
Date	Action
8-Apr-2022	<p>New York State enacts WIRED Broadband Act.</p> <p>Department of Commerce's National Telecommunications and Information Administration (NTIA) issues Notices of Funding Opportunities (NOFO) for Broadband Equity, Access, and Deployment (BEAD) and Digital Equity Act (DEA) grant programs. Both programs had been authorized and funded by IIJA.</p>
13-May-2022	<p>Deadline for states and territories to submit their NTIA BEAD and DEA grant applications and letters of intent. All states and territories, including New York State, timely submit.</p>
15-Jul-2022	<p>Deadline for states to submit Capital Projects Funding Request to Treasury. All states, including New York, timely apply.</p>
24-Sep-2022	<p>Deadline for NTIA Middle Mile Grant (MMG) grant applications.</p>
30-Sep-2022	<p>NTIA announces initial planning grant awards have been made to New York State for BEAD Planning (\$5 million) and DEA Planning (\$2,178,646). Planning funds may be used for statewide broadband mapping (DPS) and development of five-year plan for BEAD and one-year plan for DEA.</p>
12-Dec-2022	<p>As of this date, ESD has published no subgrant opportunities for any of:</p> <ul style="list-style-type: none"> - Coronavirus Capital Projects Fund (CCPF) projects; - Other project funding sources.
16-Dec-2022	

(b) FCC and NYS Mapping Chronology

The next table summarizes key dates in legislation, federal and New York State mapping efforts through January 19, 2023.

New York State Broadband Chronology	
FCC Mapping, NYS Mapping, and BEAD Allocation	
Date	Action
23-Mar-2020	President Trump enacts into law the Broadband Deployment Accuracy and Technological Availability Act ("Broadband DATA Act", P.L. 116-130), requiring the Federal Communications Commission (FCC) to change and improve the way broadband data is collected, verified, and reported.)
15-Jun-2022	FCC announces that Internet Service Providers (ISP) must report initial premise-specific broadband offerings to new Broadband Data Collection (BDC) map. The initial report is due September 1, 2022 based on offering data as of June 30, 2022. Semi-annual reporting will be required by all ISP denoting data as of June 30 and December 31 of each year. (This BDC reporting obligation is in addition to quarterly FCC 477 ISP reporting obligations.
1-Sep-2022	Initial ISP data collection deadline for FCC Broadband Map (BDC). Once reviewed and challenges adjudicated, this map will be the basis for statewide allocations of NTIA's \$42.45 billion BEAD program.
2-Sep-2022	FCC announces that FCC BDC map, including locations and ISP offerings, will be available to public in November for reviews and challenges.
c Oct 2022	New York State adds approximately 31K location records to FCC map that had been previously overlooked or mis-characterized.
10-Nov-2022	FCC and NTIA jointly announces timeline for map challenges, FCC adjudications, and publication of NTIA statewide BEAD allocations. - FCC will permit local governments and individual households to submit availability challenges at specific locations (Nov 18, 2022 - Jan 13, 2023) with challenge adjudications resolved by early June 2023. - NTIA will utilize the revised FCC map data to calculate statewide BEAD allocations which will be announced by June 30, 2023.
14-Nov-2022	NYS ESD confirms that it will not submit challenges on behalf of counties or municipalities. Challenges must either be submitted by the Counties or regional planning groups (e.g. Genesee Finger Lakes Regional Planning Council, GFLRPC, of which Monroe County is a member), or directly by the specific household.
18-Nov-2022	FCC Broadband Map (BDC) published. Availability / access challenge window opens, and is expected to close on January 13, 2023. - FCC clarifies that fixed speed test data (such as those collected by Monroe County broadband surveys) are not a valid basis for challenges. Only excessive installation times or excessive one-time installation costs are valid at specific locations.
9-Dec-2022	NYS DPS announces that, upon execution of appropriate data sharing agreement, counties will be able to share the ISP service level broadband data that has been collected by NYS DPS.
15-Dec-2022	NYS Broadband Office, supported by NYSAC, ESD and DPS, conduct webinar to educate counties and local municipalities to perform their own outreach and challenge processes to FCC maps.

(c) Expected Forward Schedule

The final table summarizes expected dates for key points related to funding and mapping efforts. These are forecast based on statutory guidance, federal Notices of Funding Opportunities (NOFO) and Funding Offering Announcements (FOA), and regulatory guidance issued by Federal Communications Commission (FCC), U.S. Treasury (Treasury), and Department of Commerce (NTIA). This forecast is effective January 13, 2023.

New York State Broadband Chronology	
Forecast / Expected Dates	
Date	Action
19-Dec-2022	As of this date, ESD has published no subgrant opportunities for any of: - Coronavirus Capital Projects Fund (CCPF) projects; - Other project funding sources.
13-Jan-2023	Deadline to submit challenges to FCC BDC map data.
27-Jan-2023	Deadline to submit additional data to NYS DPS Broadband Map. This map is expected to evolve in parallel to FCC BDC map.
Spring 2023	NYS DPS will use additional data submitted to PSC as input for modifications to the next release of FCC Broadband Map.
15-Jul-2023	(Expected) NYS must complete its one-year DEA plan and submit to NTIA (due one year from DEA grant letter of intent).
12-Sep-2023	(Expected) NYS must complete its five-year BEAD plan and submit an initial proposal to NTIA (270 days from receipt of BEAD Planning Funds, c 12/12/22).
31-Dec-2023	Initial NYS BEAD proposal to be submitted to NTIA (180 days from BEAD allocation announcement).
c Feb 2024	(Estimated at 60 days; expected) NTIA accepts initial NYS BEAD proposal. 20% of BEAD funds released to NYS.
c Feb 2025	(Expected) Final NYS BEAD proposal to be submitted to NTIA (365 days from acceptance of initial BEAD proposal).
c Apr 2025	(Estimated at 60 days; expected) NTIA accepts final NYS BEAD proposal. Remaining 80% of BEAD funds released to NYS.

POTENTIAL FOR PUBLIC / PRIVATE PARTNERSHIPS

In Recommendations (Section 5), Magellan also specifies how Monroe County can leverage their ARPA FRF funds through grant programs to create incentives for private ISPs to improve service and enhance broadband access to households.

Any entity that commits resources or, especially, contributes to expanding broadband infrastructure (fiber or fixed wireless), or enables access (through affordability and other subsidy plans) can be considered a partner.

Contractually, a true public/private partnership will require a binding agreement that would be approved by Office of County Executive and/or the County Council.

Private provider entities that agree to expand broadband infrastructure whether as part of a grant agreement or as part of an infrastructure deployment agreement can be considered public/private partners.

The County should explore formal partnership agreements with commercial providers that expand broadband infrastructure. The County can offer expedited permits, access to rights-of-way, and other benefits in return.

Section 4 – SWOT Analysis

Magellan provides this consolidated analysis of Monroe County’s Strengths, Weaknesses, Opportunities, and Threats / Challenges (SWOT) in the context of improving broadband access in the County. In the following sections, there is descriptive text and commentary on each SWOT item.

SUMMARY SWOT TABLE

	Summary Statement
Strengths	Monroe County’s Municipal Fiber Network
	Executive Commitment
	Treasury FRF Funding Commitment
	Broadband Task Force
	Hunt Fiber Study (in Process)
	Communications re Subsidy Programs
	Monroe County Broadband Survey
	Monroe County Survey
	Municipal Leader Survey
	Awareness of Various Broadband Models for County
	Significant Control Over Permitting, Rights-of-Way, Other Assets
Weaknesses	Limits on use of current municipal fiber network.
	Convergence of FCC broadband map with NYS DPS broadband.
	Broadband Service Affordability
	Affordability in HUD LMI Areas
Opportunities	Broadband deployment grant program that can be offered by County
	Grant applications for CCPF projects
	Grant applications for BEAD projects
	Leasing dark fiber from commercial providers
	Create additional subsidy programs
	Open access to existing fiber network
	Establish multi-purpose facilities
Threats / Challenges	Overstated coverage in FCC broadband ap
	FCC challenge process for unserved households

	FRF obligation and expenditure deadlines
	Commercial ISP seeking funding

STRENGTHS

Strength	Explanation
Monroe County's Municipal Fiber Network	Implemented to support Department of Environmental Services (DES) operations. This network is utilized for County purposes only
Executive Commitment	Support of County Executive; commitment and active engagement of Planning and Development Department and Legal Department
Treasury FRF Funding Commitment	Anticipated \$20 million in FRF funds reserved / dedicated to broadband.
Broadband Task Force	County Executive creation of Broadband Task Force. Active engagement of Municipal Leaders, elected officials
Hunt Fiber Study (in Process)	Department of Environmental Service contracted work with Hunt, approved June 2022
Communications re Subsidy Programs	County's awareness of FCC's Affordability Connectivity Program (ACP), coupled with previous communications
Monroe County Broadband Survey	Over 1200 resident surveys were collected, including responses to opinion questions to inform Executive policy decisions
Monroe County Survey	Community interest is high regarding broadband, with over 1,200 responses (967 complete, 265 partial)
Municipal Leader Survey	Municipal leaders, members of Broadband Tasks Force, and Monroe County departments provided 100 responses (46 complete, 54 partial)
Awareness of Various Broadband Models for County	Magellan's set of options for possible policy
Significant Control Over Permitting, Rights-of-Way, Other Assets	Monroe County can offer expedited permit approvals access to right-of-way and other assets (utility poles, etc.) Ability to influence local municipalities in County

WEAKNESSES

Weakness	Explanation
Limits on use of current municipal fiber network.	Funding sources impose constraints on how municipal fiber might be utilized via leasing / access agreements to private providers.

	Additional legal review on limits imposed by original funding source is required
Convergence of FCC broadband map with NYS DPS broadband.	FCC map will be basis for NTIA's statewide BEAD allocations. Will NYS DPS map be basis for statewide subgrants? Lack of information
Broadband Service Affordability	County can advocate for lower pricing from broadband providers but has little direct control over pricing
Affordability in HUD LMI Areas	While services may be offered by providers, lack of disposable income adversely impacts household adoption. There are finite limits to subsidy funding by Monroe County

OPPORTUNITIES

Opportunity	Explanation
Broadband deployment grant program that can be offered by County.	<p>Create Monroe County grant program seeking commercial proposals to provide fixed wireless and/or fiber solutions for last mile in underserved areas.</p> <ul style="list-style-type: none"> - Ask providers to commit proportion of project funding leverages use of FRF funds. <p>Consider other requests as well:</p> <ul style="list-style-type: none"> - 30% or 50% of project costs funded by provider grant applicants - Requiring offer of subsidies (ACP, Monroe County) to County subscribers - Requiring provision of devices to subscribing households - Requiring commitment of affordable monthly pricing plan
Grant applications for CCPF projects.	Can use FRF funds to apply for ESD CCPF subgrant programs
Grant applications for BEAD projects.	Can use FRF funds to apply for ESD BEAD subgrant programs
Leasing dark fiber from commercial providers.	Rather than constructing new fiber, consider leasing excess current fiber from providers, private entities. and/or universities and colleges
Create additional subsidy programs.	Use FRF funding to augment FCC ACP subsidies, reducing out-of-pocket costs
Open Access to Existing Fiber Network	Create additional revenue streams to County, possibly in exchange for reduced pricing to consumers
Establish multi-purpose facilities	Support young adult access in (new) public community centers

THREATS / CHALLENGES

Threat / Challenge	Explanation
Overstated coverage in FCC broadband map	Overstated coverage in FCC maps can result in under-allocations of BEAD funding to NYS
FCC challenge process for unserved households	Identifying unserved households is labor- and resource-intensive, with relatively low likelihood of success (survey speed tests are not valid basis for challenge)
FRF obligation and expenditure deadlines.	Obligation and expenditure deadlines for FRF funds (Dec 2024, Dec 2026, respectively) might be difficult to meet if County waits for BEAD subgrants offered by ESD
Commercial ISP seeking funding	Commercial ISP may apply directly to federal agencies, ESD, expanding their own physical plant; there is no obligation to provide affordable service

Section 5 – Magellan Recommendations, Next Steps for Monroe County

This section lists the Magellan recommendations in the following areas:

1. Improving Internet Access
2. Grant Planning
3. Broadband Infrastructure Expansion and Utilization
4. Possible Fiber Expansion of County's Fiber Network to Underserved Areas
5. Broadband Task Force Support and Advocacy

The section then includes one recommended allocation of a \$20 million ARPA FRF commitment to broadband, with explanations for each line item, and a framework for modifying to suit Monroe County needs.

Finally, the report closes with recommended next steps for Monroe County.

IMPROVING INTERNET ACCESS RECOMMENDATIONS

Magellan makes the following recommendations for improving affordable access within Monroe County.

1. Continued ACP Outreach to ISPs – Monroe County should encourage ISPs to support the FCC's Affordable Connectivity Program (ACP), which offers recurring \$30 monthly subsidies for broadband subscriptions.
2. Continued ACP Outreach to Municipalities – Monroe County had earlier distributed details on the FCC's ACP program to all municipalities and members of the Broadband Task Force. Monroe County should continue to encourage municipalities to utilize the ACP program.
3. Procure Devices to Support Broadband Access – Monroe County could utilize federal funding to acquire devices to access the internet for distribution to households in need at no or nominal costs.
4. Developing Monroe County Broadband Subsidy Program – Develop subsidy program to complement FCC's Affordable Connectivity Program (ACP). Perhaps \$20 monthly for up to two years.
5. Monroe County Grant Program (MCGP) – Create a grant program to offer FRF funding for private entities to deploy new broadband infrastructure, either fixed wireless or fiber.
6. Additional requirements MCGP – Consider requiring applicants to commit to:
 - a. Providing 30% to 50% of total project cost committed by applicant, leveraging County FRF funds by up to 100%.
 - b. Offering ACP subsidies to any subscribers using newly deployed infrastructure.
 - c. Acquiring devices and providing to subscribers at no out-of-pocket cost.

- d. Providing Affordable Monthly Subscription Plan – one suggestion could be \$50 for 100/20 Mbps service. Coupled with \$30 ACP subsidy, which could reduce monthly out-of-pocket to \$20.
7. FCC Broadband Map Availability Challenges – The FCC Map Availability Challenge window closed on January 13, 2023, on schedule. Challengers and incumbent service providers that rebut challenges will negotiate final disposition. If no agreement is reached, the FCC will decide.
8. FCC Broadband Map Fabric Challenges – The County continues to have a role in tracking new locations that are created through economic development actions. As a government entity, the County can continue to submit new locations to the FCC Broadband maps. This process will be ongoing.
 - a. FCC is requiring that ISPs report service offerings, by location, on a semi-annual basis.
9. NYS BDC Fabric Challenge Data – Ask NYS PSC to share the approximately 31K additions and modifications to the FCC fabric. Examine areas where additional fixed wireless and/or fiber could benefit underserved areas.

GRANT PLANNING RECOMMENDATIONS

Magellan makes the following recommendations regarding possible grant programs. Magellan believes there are benefits in applying for grant programs and in offering grant programs to qualified applicants.

Monroe County Fiscal Recovery Funds (FRF) – Magellan understands that Monroe County is reserving up to \$20 million in FRF to utilize for deployment of expanded broadband infrastructure, including fiber. Monroe County and Magellan are both aware of the strict deadlines for FRF expenditures: By statute, strict deadlines have been set for commitment of funding (Dec 31, 2024) and expenditures of funding (Dec 31, 2026), along with periodic reporting obligations. Failure to meet these deadlines risks possible return of awarded funds back to U.S. Treasury.

U.S. Treasury FRF Final Rule supports the utilization of FRF funds for: last-mile broadband projects; match for broadband projects; other broadband projects. Capital investment projects must commit a minimum of 100 Mbps service to unserved and underserved households.

Monroe County should consider using its FRF funds for some or all the following initiatives:

1. Establish Broadband Infrastructure Grants Program – Monroe County could establish a grants program for infrastructure projects (Monroe County Grants Program, or MCGP), utilizing some of its Fiscal Recovery Funds (FRF) to expand broadband infrastructure within the County to unserved households. The County could solicit grant applications from incumbent and start-up service providers in particular areas of need. The County would ask the grant applicant respondents to contribute their own capital as matching (say, 30% or 50%), significantly expanding the returns on FRF investment contributions.

2. Reserve FRF to Support Subgrant Application Preparation – Utilize FRF funds for later subgrant applications to ESD when CCPF and BEAD subgrant programs are established by NYS in County.
3. Reserve FRF funds as matching contributions for CCPF and BEAD subgrant programs. Treasury FRF Final rule permits eligible use code 5.20 for matching. (Specific Funding Opportunity Announcements (FOA) notices of subgrant programs may or may not permit use of these funds. The FOAs govern.)
4. Apply Directly to Later Federal Broadband Funding Programs –
 - a. USDA’s ReConnect Program offers loan, grant, and loan/grant combinations to rural areas that lack sufficient broadband. As Monroe County is not consider rural (more than 100 miles from a population area of 50,000 or more, the specific areas that could apply would have to be very circumscribed, with a resulting population density of no more than six (6) people per square mile.
5. Devices to Support Broadband Access – Monroe County could utilize federal funding to acquire devices to access the internet for distribution to households in need at no or nominal costs.
6. Establish Public Computer Centers – for youth programs, for digital skills training.
7. Digital Equity Act – Monitor ESD website to apply for DEA subgrant applications offered later by ESD.
 - a. In 2024-2025, prepare to submit competitive Digital Equity grant application directly to NTIA.
8. NYS BDC Fabric Challenge Data – Ask NYS PSC to share the approximately 31K additions and modifications for inclusion in the Monroe County GIS infrastructure.

Monroe County should keep foremost in mind that both federal government and New York State grant programs operate under strict guidelines, including proper use of funds and specific deadlines.

In deciding how to spend any broadband funding, the County should always be exploring opportunities to leverage their funding by asking other entities to contribute complementary funding for the greater good of improved broadband access.

BROADBAND INFRASTRUCTURE EXPANSION AND UTILITIZATION RECOMMENDATIONS

Monroe County should consider the following steps to improve the utilization of the existing County fiber network.

1. Seek solicitations from private providers to deploy new, or extend use of, fixed wireless and fiber to underserved areas in Monroe County.
2. Examine the feasibility of increasing the utilization of the County-wide fiber network. Today, Monroe County’s fiber network is used exclusively for County municipal purposes. Perhaps

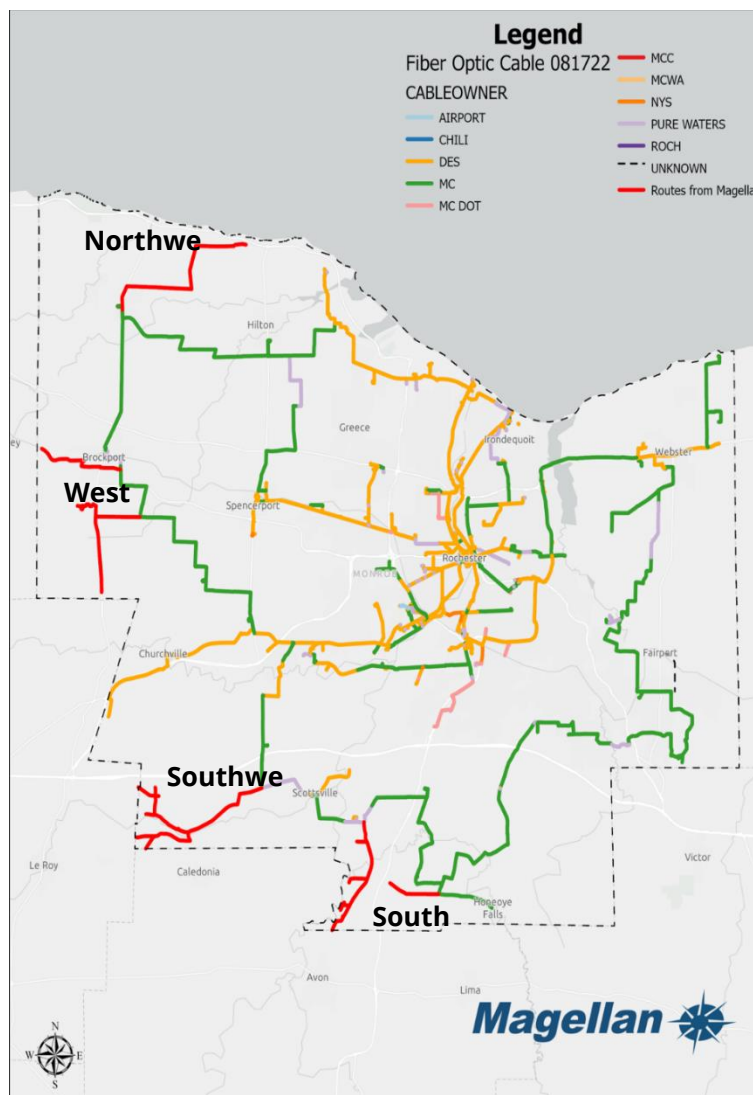
use could be extended to permit limited and managed leasing of access to unused portions of the network to providers. The providers could be persuaded or required to offer municipal broadband service to underserved areas of the County.

3. Examine the feasibility of utilizing fixed wireless technologies to provide broadband speeds as an additional option in relatively dense areas, such as the City of Rochester. This will be less expensive than fiber-to-the-premises for each household.
4. Establish Broadband Infrastructure Grants Program – See Grant Planning Recommendations, above.

POSSIBLE EXPANSION OF COUNTY’S NETWORK TO UNDERSERVED AREAS

Based on service coverage, supported by analysis of existing Monroe County fiber network, and reinforced by survey results, Magellan recommends that Monroe consider including the following segments in the Hunt EAS report. These fiber segments would permit the offering of improved service in areas the FCC map suggests have incomplete coverage.

Figure 13 - Monroe County's Fiber Network



The following table summarizes the distances for each of the four segment areas:

Table 6 - Summary of Distances of the Four Segment Areas

Location	Linear Feet	Mileage
Southwest	78,270	14.82
South	59,951	11.35
West	89,530	16.96
Northwest	52,469	9.94
Totals	280,220	53.07

BROADBAND TASK FORCE AND COMMUNITY SUPPORT

Magellan provides an over-arching recommendation that focuses on engagement, outreach, and advocacy by members of the Monroe County Broadband Task Force (BBTF). Each of the members was asked to participate because of:

1. Their role as a municipal leader;
2. The organization or agency with whom they regularly work can contribute to economic development opportunities in the County;
3. The organization or agency with whom they regularly work can contribute to improved educational opportunities in the County; or
4. They, or their organization or agency to which they belong, serve constituencies within the County that could benefit from improved access to affordable broadband.

Consequently, BBTF members can support the County's efforts and, more specifically, the expansion of broadband access in the County by:

1. Raising and/or contributing complementary funds to leverage the County's contributions;
2. Providing access to devices for use in their areas;
3. Working with other community leaders to provide access to facilities for technical infrastructure or public access centers;
4. Encouraging private entities to provide access to facilities to support fixed wireless infrastructure and antennas;
 - a. (This is not a pro bono requirement; the facility could negotiate fair rates with the County.)
5. Continuing outreach and public notice efforts on ACP and any broadband subscriber subsidy programs to encourage affordability;
6. Hosting fund-raising programs with local area businesses, schools, and community organizations; and
7. Recruiting youth to offer volunteer or entry-level roles in supporting training and technical skill programs.

In addition, towns, villages, local school and library systems, local healthcare organizations, and local businesses can contribute resources to the effort. These resources could be cash or other financial contributions, in-kind service contributions, recruitment of youth as labor force (both as a training opportunity and providing local hands-on support directly in the community).

The County could coordinate an outreach effort, utilizing the access and outreach that the BBTF members have in their community to create an effective multiplier effect on the County's financial resources and will to improve broadband.

ONE POSSIBLE ARPA FRF SPENDING PLAN TO IMPROVE ACCESS

Planning for investing Monroe County's Fiscal Recovery Funds is a significant undertaking. Monroe County has been planning for several months and based on current plans is expected to reserve \$20 million for broadband expenditures. Spending decisions are complicated due to the FRF statutory deadlines, of which the County is aware: Dec 31, 2024 for all funds to be obligated and Dec 31, 2026 for expenditures; failure to meet these deadlines risks having to return some funds to U.S. Treasury.

Given newly revealed schedule for NTIA BEAD allocation announcements to New York State not to be made until June 30, 2023, and BEAD funds not to be made available to ESD until early 2024, the risks of failing to make timely FRF expenditures are not trivial.

How might Monroe County invest those FRF funds?

Magellan offers the following as one possible scenario for investing the \$20 million. This is a viable, reasonable allocation of funding. However, determinations of final amounts for the spending plan will be Monroe County's decision. All these programs need not be funded.

Similarly, there may be other programs that could be funded, augmenting, or replacing items on the plan.

Table 7 - Possible Fiscal Recovery Fund (FRF) Broadband Spending Plan

Possible Fiscal Recovery Fund (FRF) Broadband Spending Plan

Direct additional County Investment in new Fiber and Fixed Wireless	\$4,000,000
Monroe County Grant Programs	\$10,000,000
Device Acquisition Program	\$750,000
Monroe County Broadband Subsidy	\$750,000
BEAD / CCPF Grant Reserve (matching)	\$3,000,000
Reserve for Grant Applications	\$300,000
Committed per Above Plan	\$18,800,000
Planned FRF Reserve	\$20,000,000
Available / Uncommitted	\$1,200,000

1. Direct Additional Investment in Fiber and Fixed Wireless – Consider reserving \$4,000,000 FRF for additional fiber extensions and/or fixed wireless towers/antennae in underserved areas.
2. Monroe County Grant Programs (MCGP) – Utilize \$10,000,000 FRF in grant programs. These offered broadband infrastructure grants would be competitively bid for by internet service providers. Scoring rubrics would be weighted heavily toward providing service to unserved and underserved areas in the County, implementing or extending fixed wireless service or additional fiber to provide 100/20 Mbps (minimum). Requiring grant contributions of 30%-50% of total project costs by awardees could permit investments of up to \$24 million.
 - a. Additional stipulations can be overlaid on the grant program rubric. These could include requirements; to offer affordably priced monthly service; to offer FCC Affordable Connectivity Program (ACP) or other subsidies; to offer or provide devices to subscribers; etc.
3. Device Acquisition Program – Monroe County could solicit bulk device acquisitions, developing a program with eligibility criteria to provide devices to County residents that need them. There would need to be considerations on licensing, on support, on asset tracking, and on County indemnification by the recipient. In this example, Monroe County reserves \$750,000. In this example, 1,500 devices could be acquired for \$500 per device; including software licenses.
 - a. Competitive solicitation or piggybacking on previously competed contract would be helpful.
4. Monroe County Broadband Subsidy – Complementing the FCC’s ACP program, Monroe County could develop a monthly subsidy program with its own eligibility, registration, and payment terms. Subsidies could be provided as with the FCC ACP program: as a credit to the consumer and paid directly to the provider to keep its accounts whole. In this example, Monroe County reserves \$750,000.
 - a. Alternatively, the Monroe County subsidy could be in the form of a voucher that can be redeemed with the consumer’s provider of choice.
 - b. This could be a \$30 monthly subsidy for 25,000 subscriber-months, which could cover 2,000 two-year subsidy subscriptions for eligible households.
 - c. Other variations exist.
5. Reserve for CCPF / BEAD Match Contributions – Based on ESD subgrant programs utilizing CCPF and/or BEAD funds, there may be requirements for matching. If ESD subgrant solicitation permits use of FRF as matching funds, Monroe County could reserve \$3,000,000 in grant matching.
6. Reserve for Costs of Grant Application Preparation – Monroe County will have internal costs and may have external costs for grant application preparation services. In this example, \$300,000 is reserved for these costs.
7. Available / Uncommitted – Magellan leaves some portion of the \$20 million allocation uncommitted to stimulate the discussion on where FRF funds should be invested.

Of course, Monroe County Executive Team must make the final decision, with appropriate discernment and approval. Coupled with fund-raising and other support by BBTF members, the \$20 million might be increased by a factor of 25%, or 50%, or even more.

Magellan could support that decision process.

NEXT STEPS FOR MONROE COUNTY

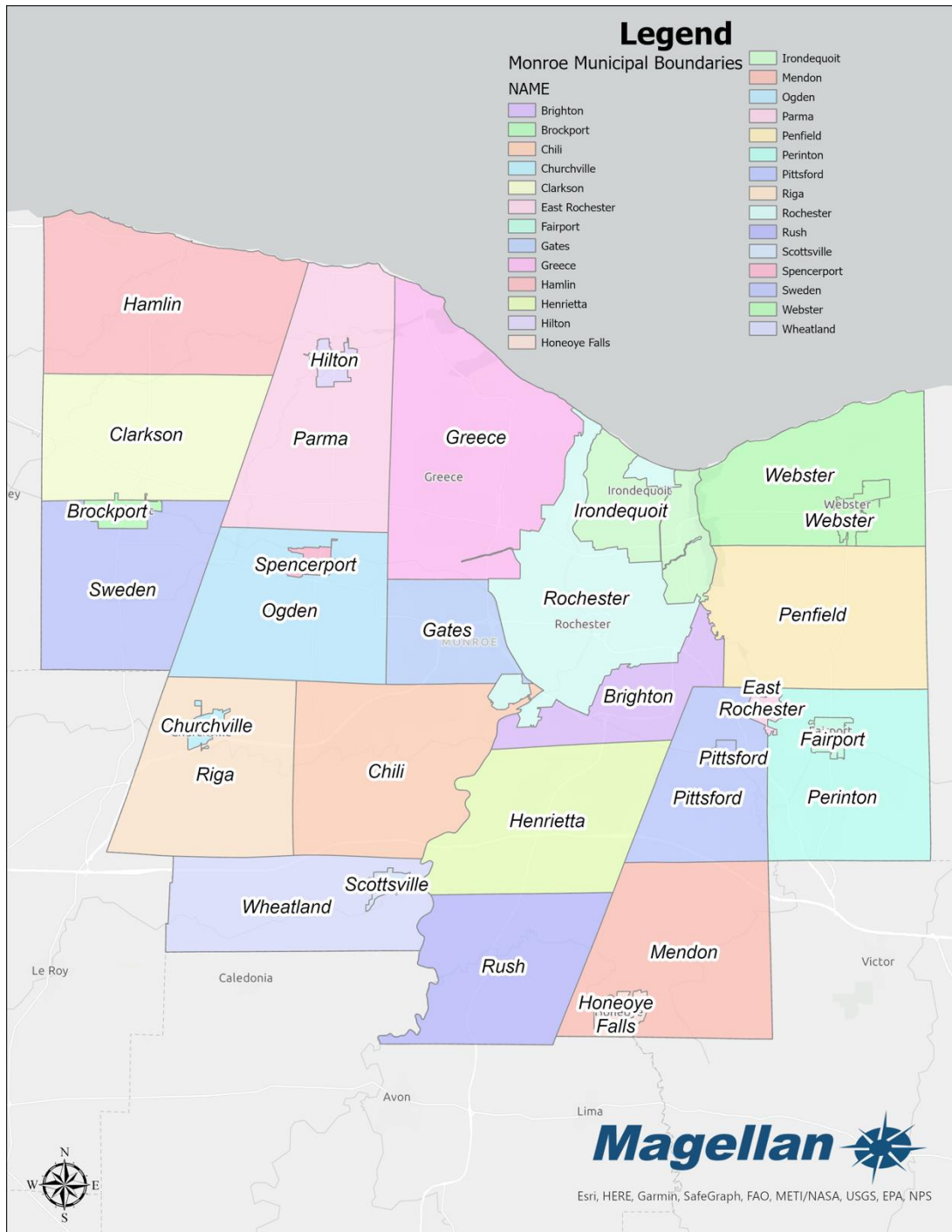
Magellan recommends the following next steps for Monroe County:

1. Review this report, findings, and recommendations internally. Department of Planning and Development and Purchasing and Legal Departments should review.
 - a. Final review should be with Office of County Executive.
2. Review approved report with Broadband Task Force (BBTF).
 - a. Prepare summary presentation and deliver to BBTF for feedback.
3. Determine which recommendations should proceed.
 - a. County Executive and Broadband Task Force.
4. Finalize ARPA Fiscal Recover Fund (FRF) allocation to broadband.
5. Develop solicitations for services, as necessary.
6. Magellan will provide all GIS layers to County.

Appendix 1: Monroe County's Base Maps and Telecommunications Environment

POLITICAL MAP

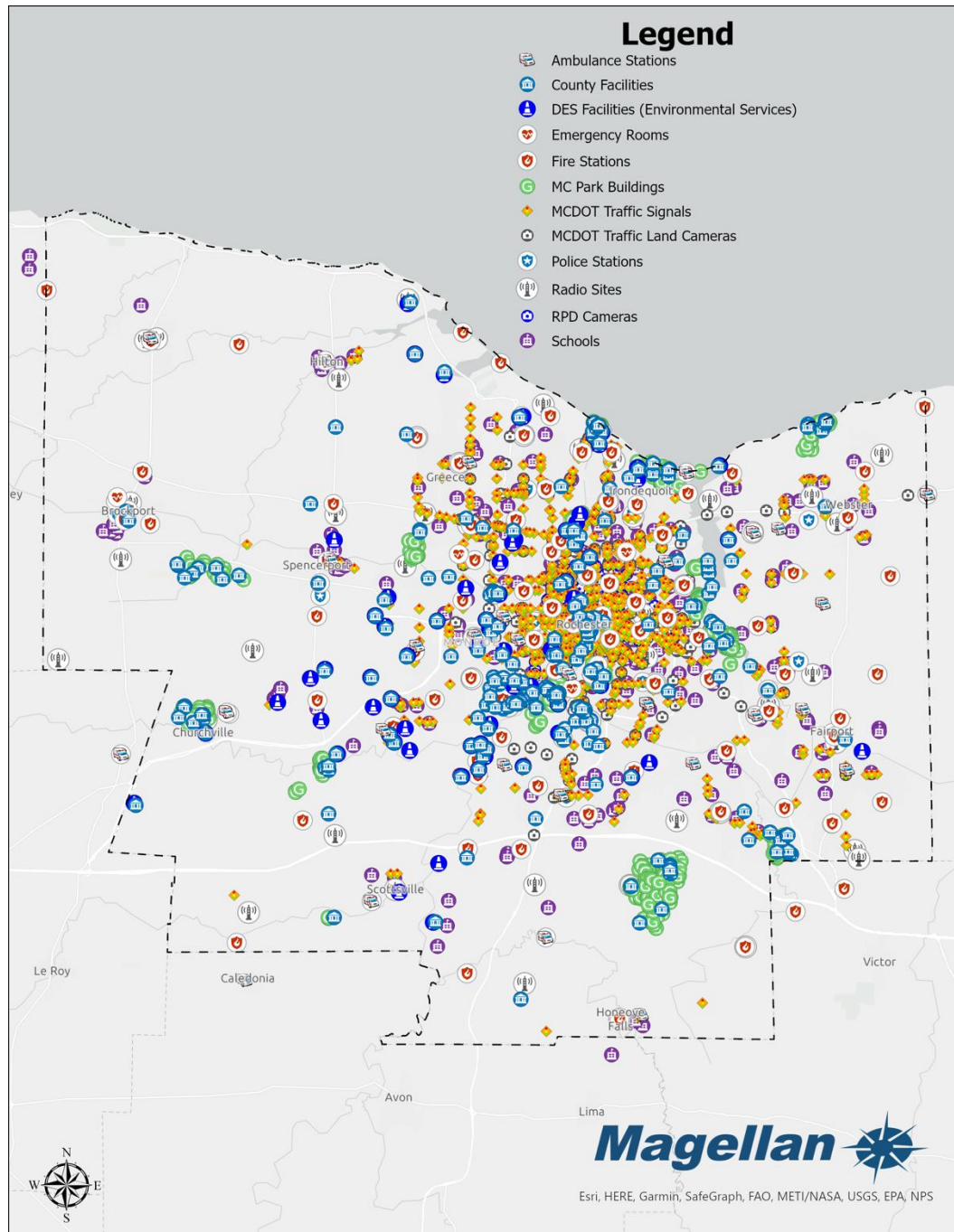
Figure 14 - Political Map of Monroe County and Municipalities



COUNTY POINT OF INTEREST MAP

County sites and facilities, city facilities, libraries, schools (both K-12 and higher ed) and public safety sites are all candidates to be connected to a County wide fiber-optic network. As indicated below, there are many public facilities and locations throughout the County, fortunately however, Monroe County has connected the bulk of these sites over the years using the County's existing fiber network. The map of County sites and other points of interest are depicted below to provide a frame of reference in the County.

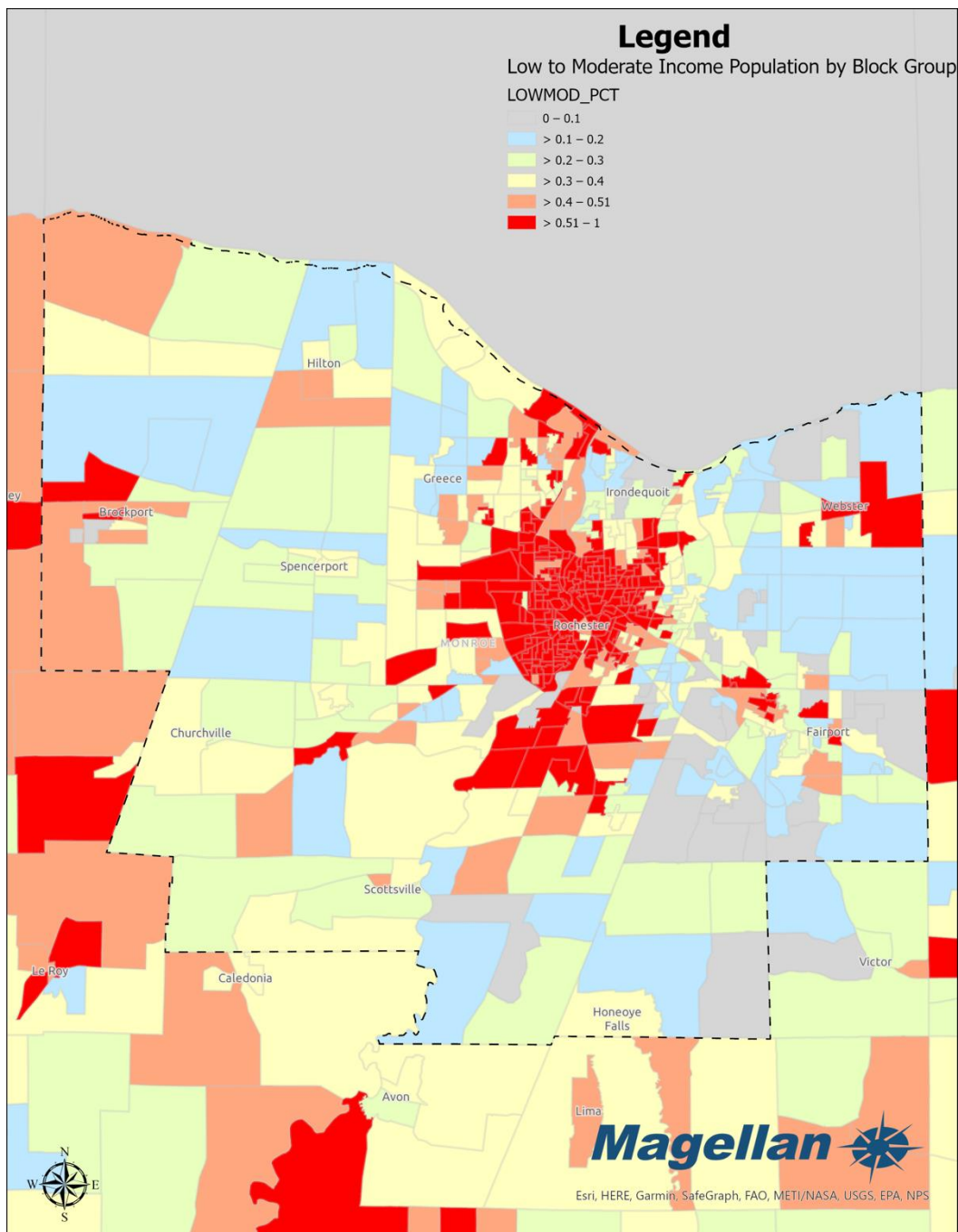
Figure 15 - County Point of Interest Map



HUD / LOW INCOME ELIGIBLE AREAS

US Department of Housing and Urban Development (HUD) data is utilized to determine areas that may be eligible for support based upon Low and Moderate Income (LMI) statistics. HUD-eligible areas can qualify for CDBG funding to support telecom infrastructure projects and are generally likely to include significant low-income and at-risk populations. The map below indicates the entire range of Low/Mod statistics. For an area to be eligible, we generally focus on areas with greater than the 51% Low/Mod indicator.

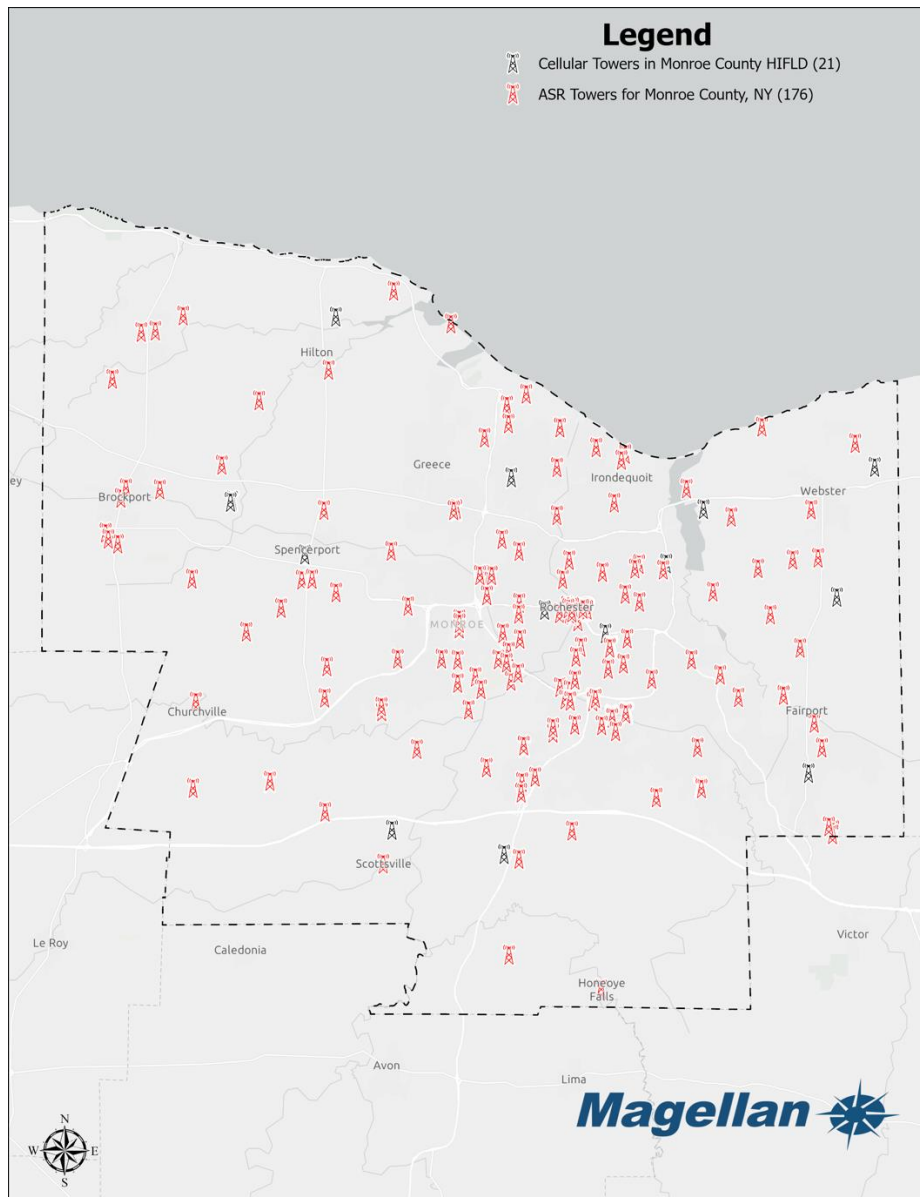
Figure 16 - HUD/Low Income Eligible Areas Map by LMI Statistics



TOWERS IN MONROE COUNTY³

The map below depicts tower data collected from Homeland Infrastructure Foundation-Level Data (HIFLD) and Antenna Structure Registration (ASR) for Monroe County. According to the Federal Communications Commission (FCC), "Primary antennas for transmitting wireless telephone service, including cellular and Personal Communications Service (PCS), are usually located outdoors on towers, water tanks and other elevated structures like rooftops and sides of buildings. The combination of antenna towers and associated electronic equipment is referred to as a 'cellular or PCS cell site' or 'base station.' Cellular or PCS cell site towers are typically 50-200 feet high.

Figure 17 - Monroe County Towers Map

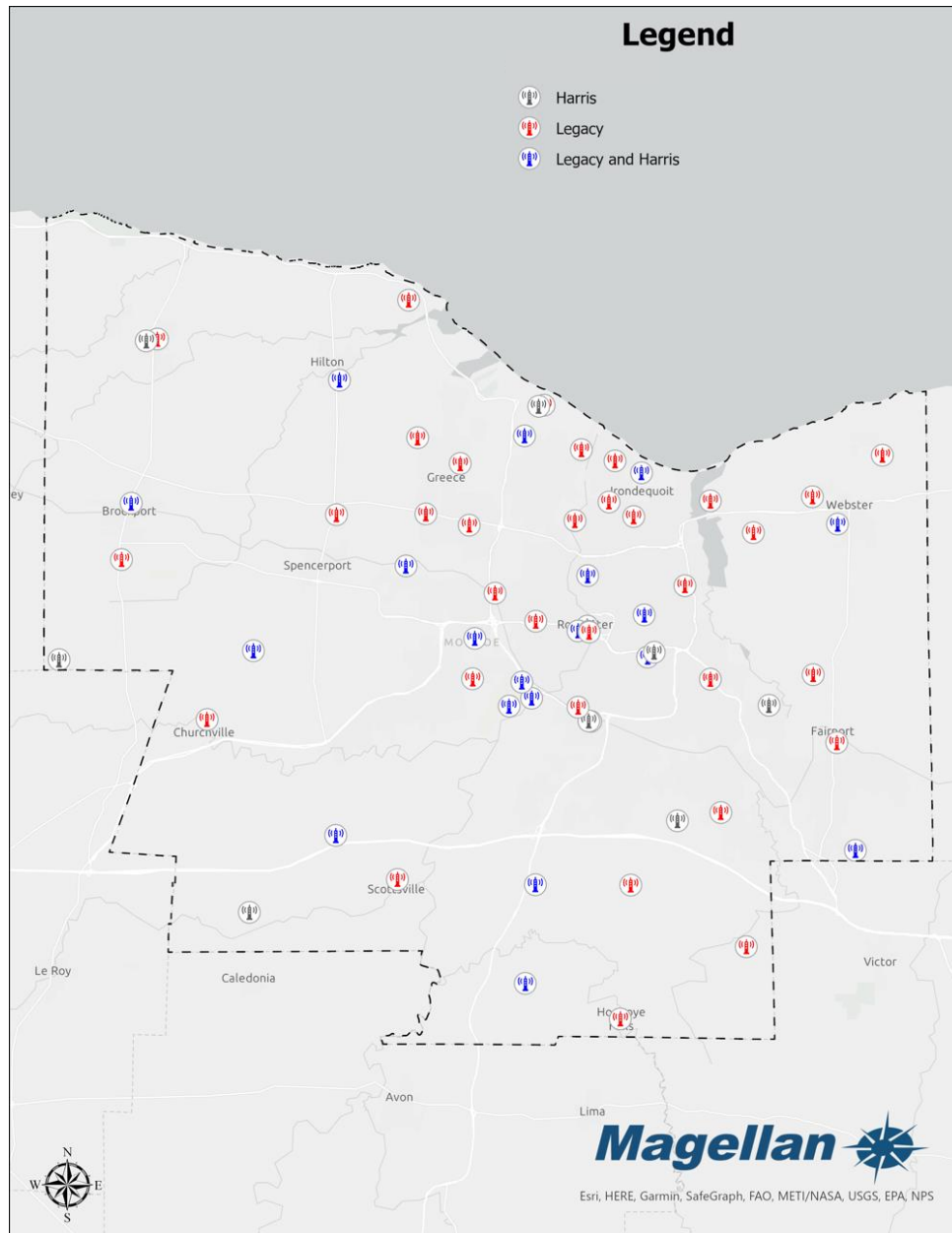


³HIFLD-<https://hifld-geoplatform.opendata.arcgis.com/maps/0835ba2ed38f494196c14af8407454fb>,
ASF-<https://wireless2.fcc.gov/UISApp/AsrSearch/asrRegistrationSearch.jsp>

RADIO SYSTEMS IN MONROE COUNTY

The County has provided Radio Systems data. In 2010, the County contracted *Harris* - Monroe County's public safety trunk radio system, to migrate from its legacy systems with a goal to aggregate Monroe County's public safety and safety agencies in one digital communication system⁴.

Figure 18 - Monroe County Radio Map



⁴ <https://www.govtech.com/em/disaster/new-yorks-monroe-county-radio.html>

FIBER ROUTES IN MONROE COUNTY

Magellan reviewed and accessed both publicly available sources, as well as subscription-based services to identify the fiber routes within the County. Some telecom providers simply do not share their route data. Major fiber providers are listed below. Lumen (formerly CenturyLink) provides business and residential services. Hudson Fiber, Level 3 (which is now part of CenturyLink/Lumen), Sprint (Cogent Communications), Telia Carrier (now known as Arelion), and Windstream provide custom business connections. Spectrum does not contribute to their fiber routes to these data sources, but records indicate business and residential services widely available across Monroe County.

Figure 19 - Monroe County's Long-Haul Fiber Routes by Provider

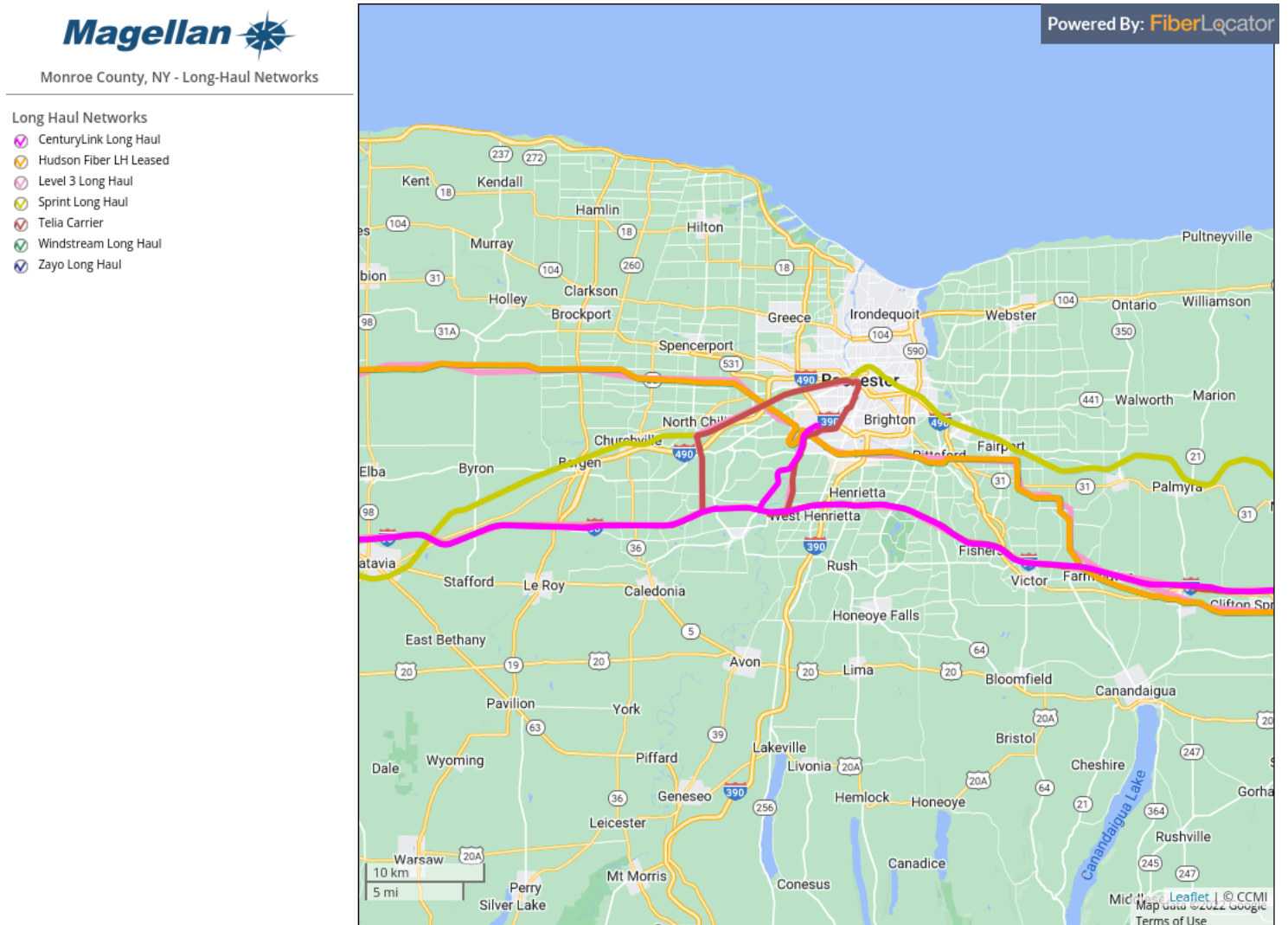

























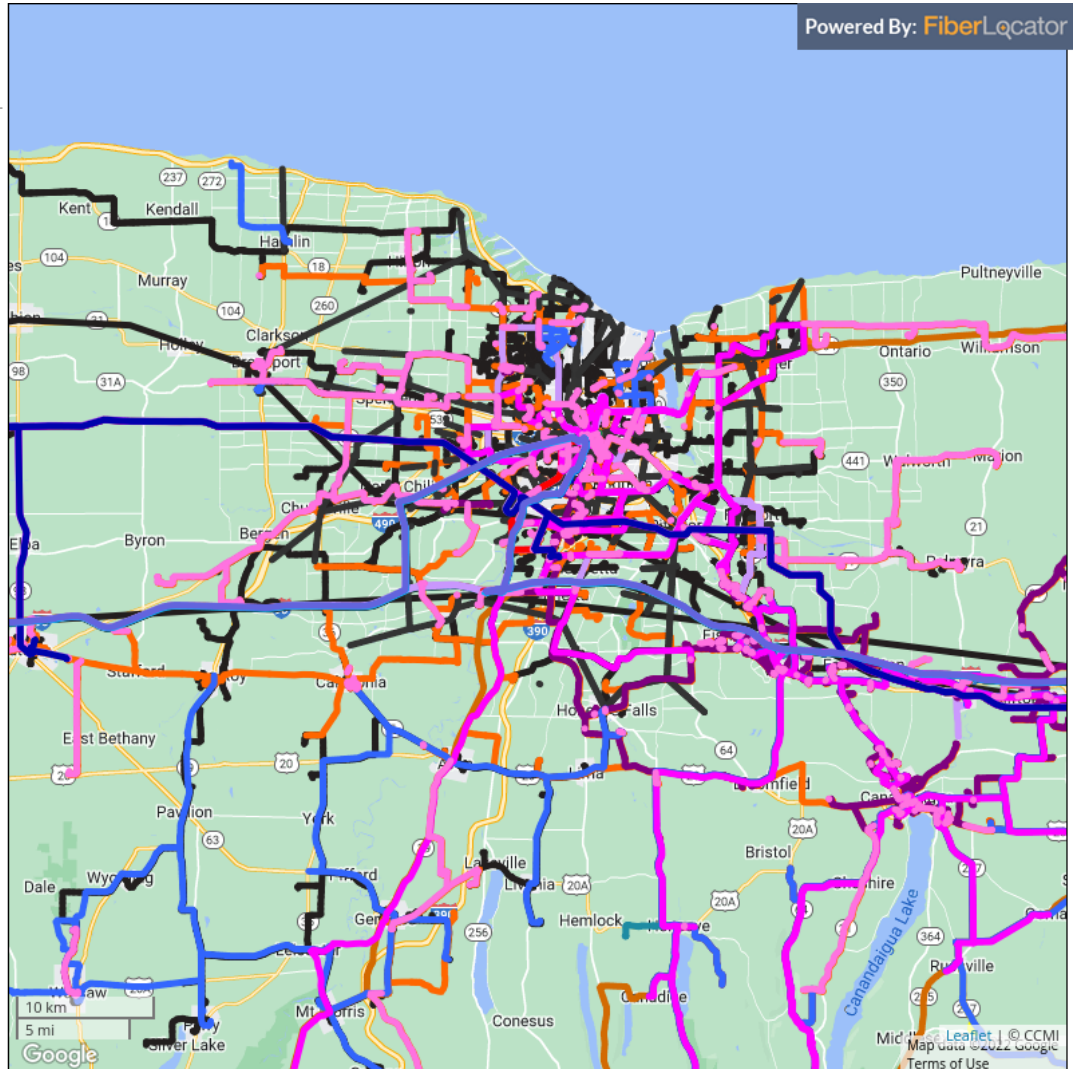
Figure 20 - Monroe County's Metro Fiber Routes by Provider



Monroe County, NY - Metro Networks

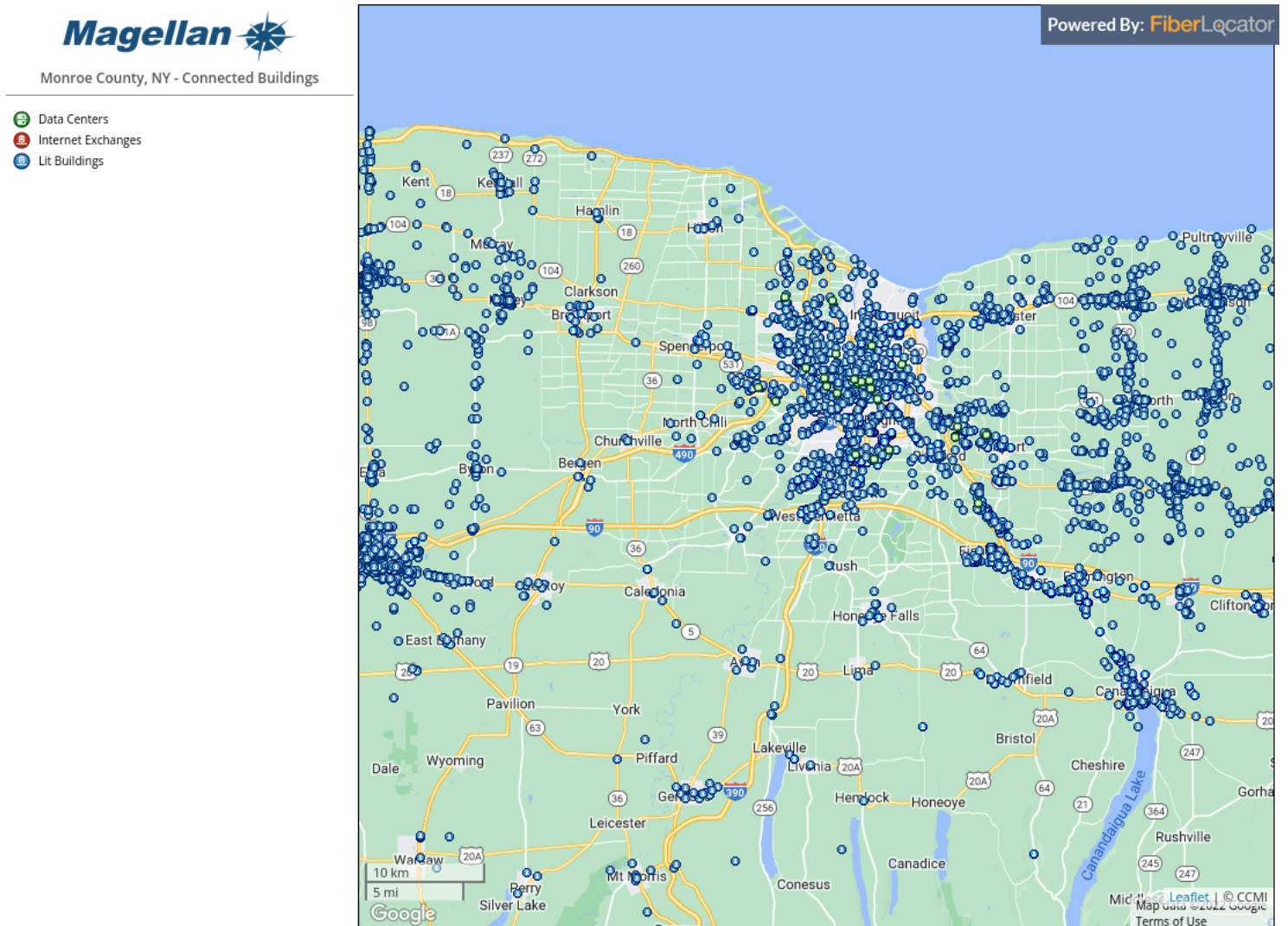
Metro Networks

-  Atlantic Broadband
-  Atlantic Broadband Leased
-  Access Ontario
-  Access Ontario - Under Construction
-  County - Monroe County, NY
-  Crown Castle
-  DANC
-  Empire Access
-  ExteNet Systems
-  Finger Lakes Technologies
-  FirstLight
-  FirstLight - Leased
-  FirstLight - Planned
-  Hudson Fiber
-  Independent Optical Network (ION)
-  Level3 Metro
-  Northland Communications
-  Southern Tier Network
-  Uniti Fiber
-  Windstream
-  Windstream - Dark
-  Zayo Metro
-  Zito Business



The map below shows “lit,” connected buildings, data centers and internet exchanges around Monroe County. Lit buildings and data centers are mainly concentrated at the center and south of Rochester, then they have significantly low numbers for the areas just outside of it.

Figure 21 - Fiber Connected Buildings and Data Centers in Monroe County



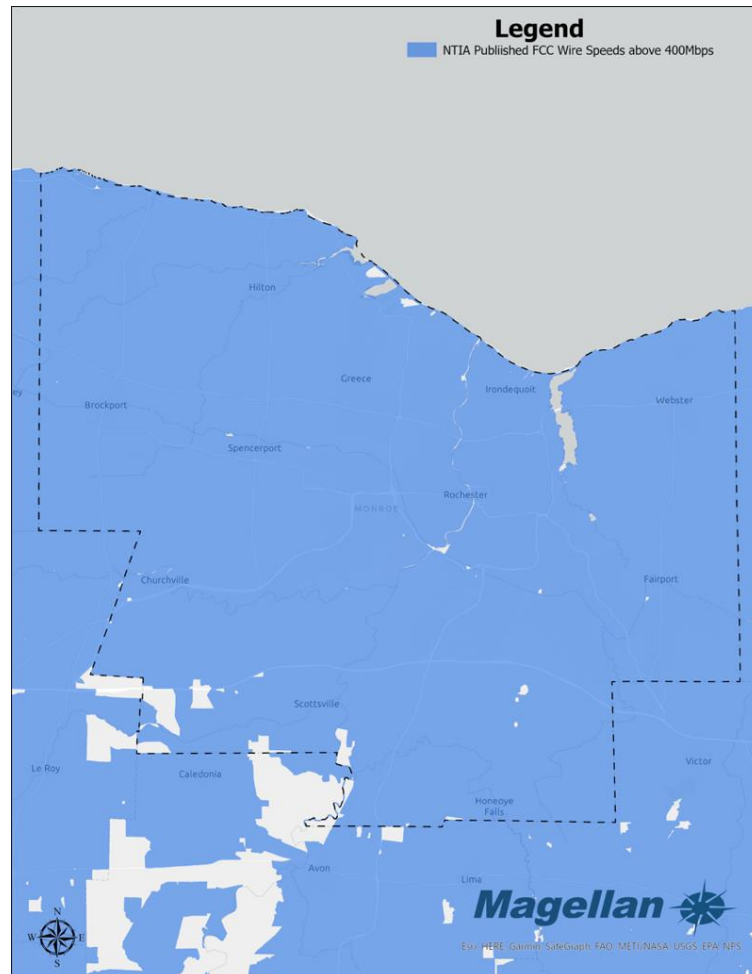
SERVED, UNDERSERVED AND UNSERVED (NTIA 2021 DATA MAP)

Areas identified below have been rated using the FCC Form 477 and NTIA data map sets. Service providers including incumbent telephone and cable companies are required to file a 477 report quarterly with the FCC to identify where their service is available and at what speed using the current FCC definitions:

- Unservd** Lacks access to at least 25 Mbps DOWN/3 Mbps UP
- Underserved** Lacks access to at least 100 Mbps DOWN/20 Mbps UP
- Served** At or above 100 Mbps DOWN/20 Mbps UP

Historically, the Form 477 data have been problematic due to the nature of the reporting, which is self-reported by providers. The providers generally report their best speeds in any given area, not their average, and if a single customer is reported as being served in an area (census block), then it is deemed that the entire area is served. The latest 477 data is from 2020.

Figure 22 - NTIA's 2021 Data Map by Maximum Download Speed in Mbps



CELLULAR COVERAGE

Magellan used cellular data sources from the FCC 477 maps and OOKLA recorded performance data to assess the coverage and speed of the three largest networks in Monroe County. FCC 477 maps are shown below for AT&T Verizon, and T-Mobile. The FCC 477 maps for cellular are a recent addition to the FCC performance database. They are self-reported by the cellular carriers and are based on a predictive map using a standard propagation tool. The solid colors indicate at least 5 Mbps/1 Mbps speed levels. This is the result of a propagation simulation; no real test data is provided. All carriers indicate blanket coverage except for the western part of the county, around Brockport at the Town of Sweden. Verizon reports the most coverage, AT&T and T-Mobile show more areas not covered. The fourth map is the OOKLA mobile speed test map which captures actual customer speed test results. It shows that all areas have speed test takers with speeds below 10 Mbps and 25 Mbps.

Figure 23 - FCC's 477 Map of Cellular Coverage Reported by AT&T

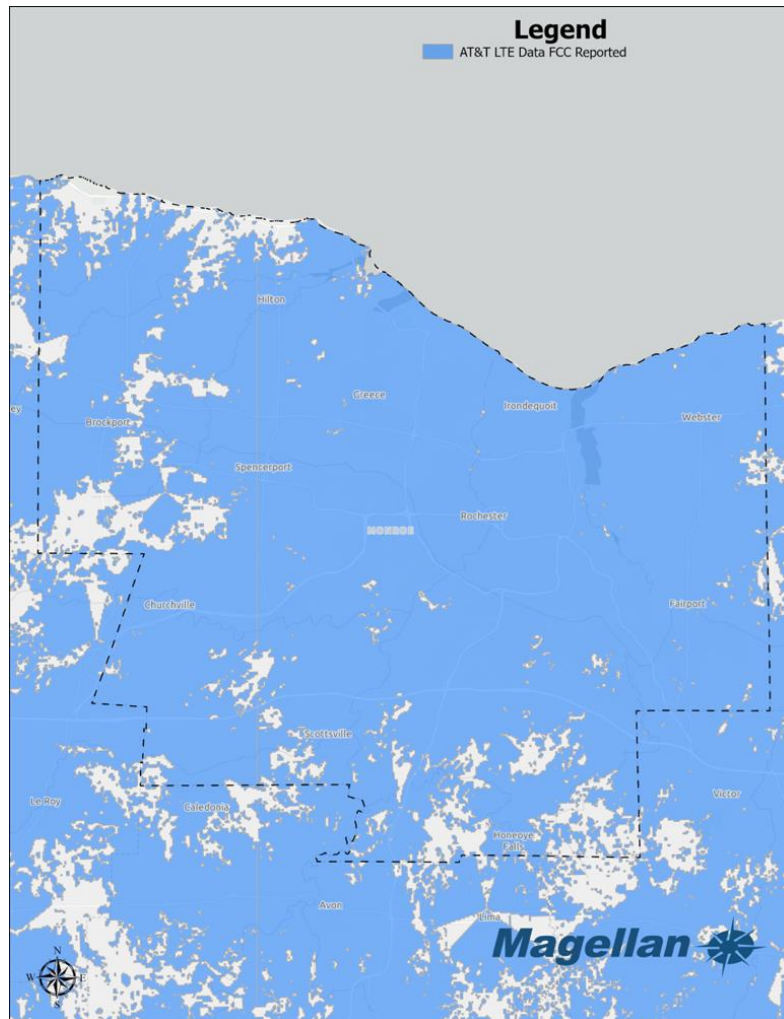
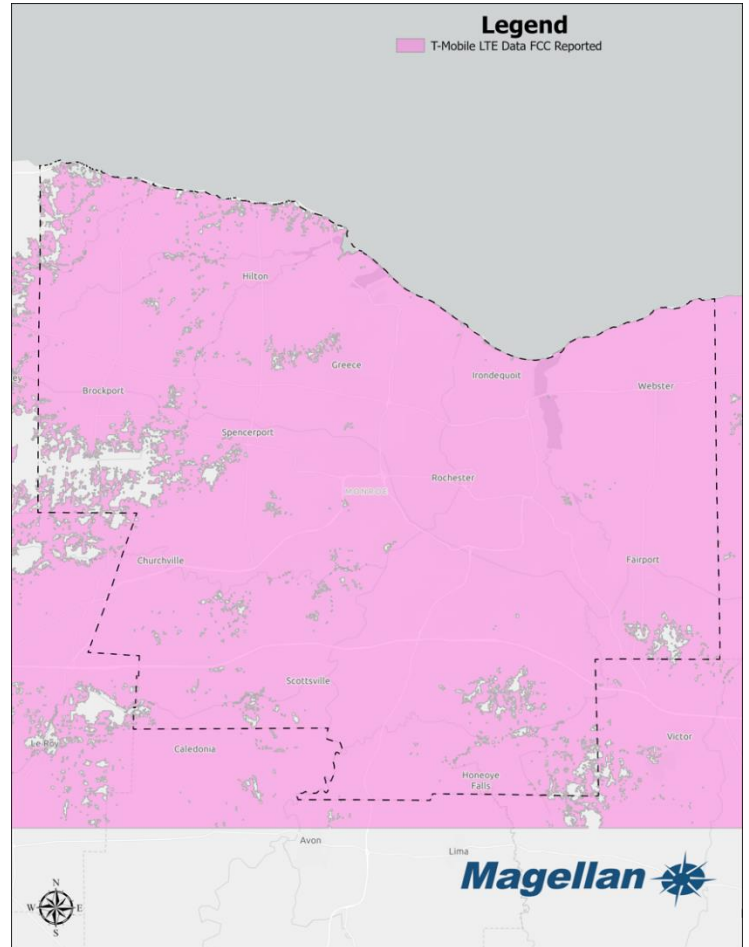
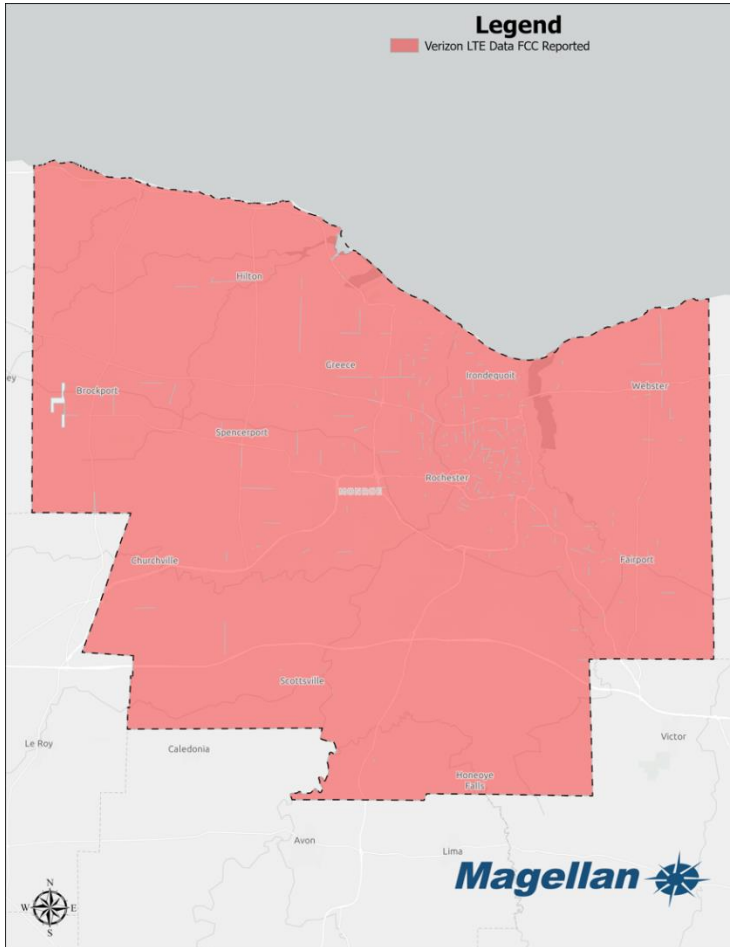


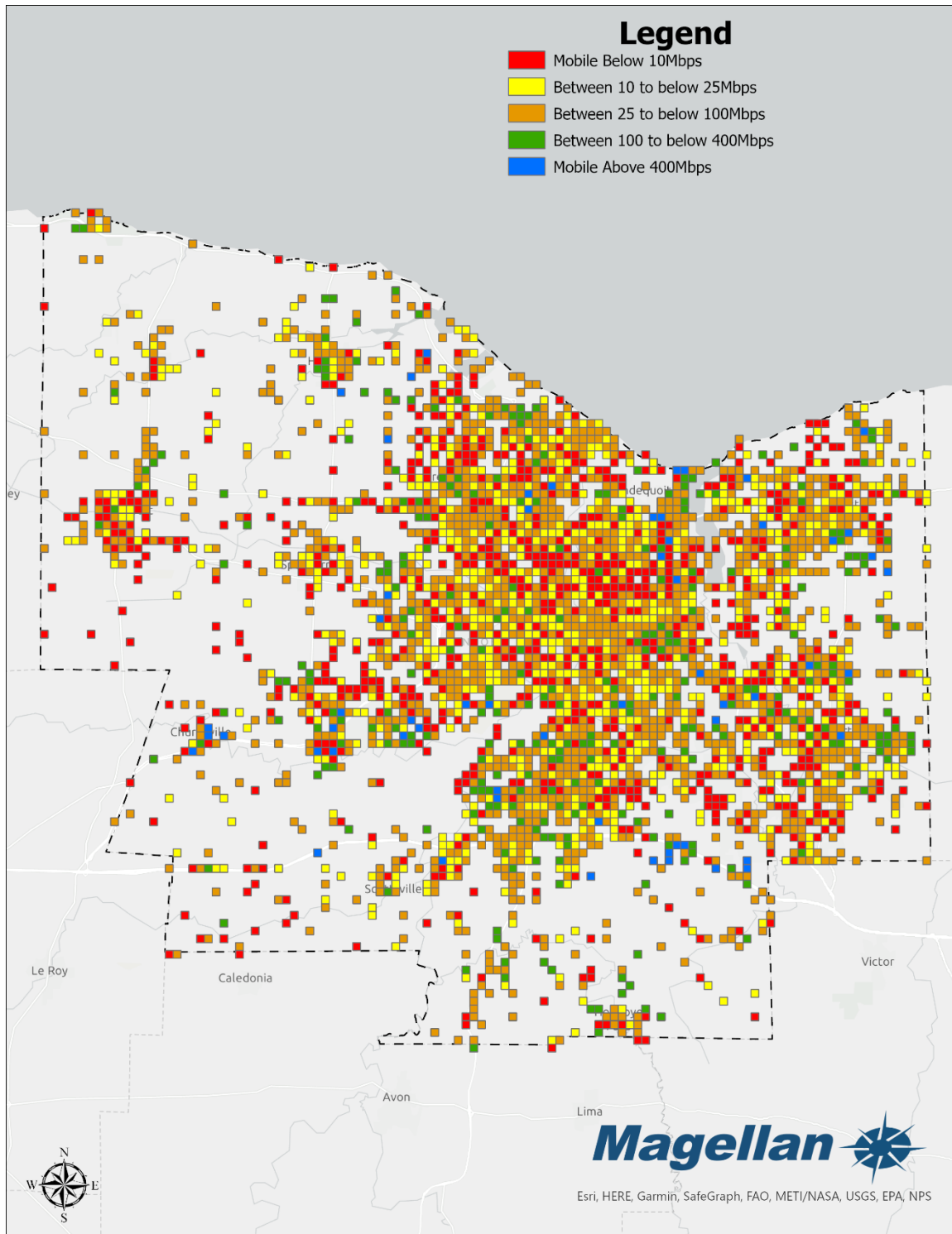
Figure 24 - FCC's 477 Map of Cellular Coverage Reported by Verizon

Figure 25 - FCC's 477 Map of Cellular Coverage Reported by T-Mobile



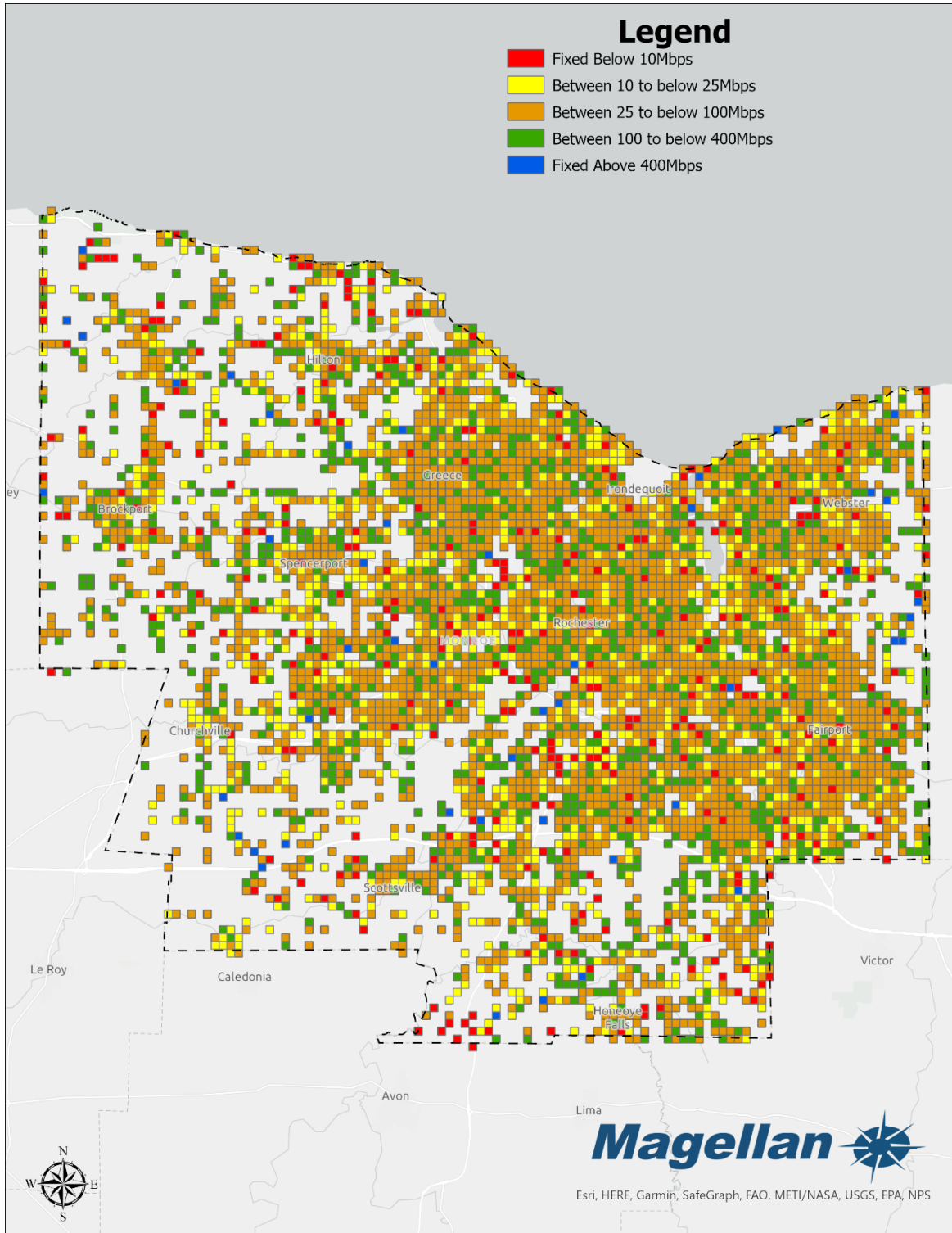
The map below is Ookla recorded mobile speed test data. The red and yellow blocks are unserved. The orange blocks are underserved. Many parts of the County are covered with these points.

Figure 26 - Ookla's Mobile Speed Test Map by Download Speeds in Mbps



The map below is Ookla recorded fixed network speed test data. The red and yellow blocks are unserved. The orange blocks are underserved. Many parts of the County are covered with these blocks.

Figure 27 - Ookla's Fixed Speed Test Map by Download Speeds in Mbps



Appendix 2: Detailed Market Analysis

The goal of this project is to close the gap between the publicly available data and what needs to be addressed to provide the County's residents, businesses, and anchor institutions more affordable, reliable high-speed broadband options especially for the identified areas and groups of concern detailed in this report. Therefore, Magellan has gathered, verified, and analyzed various data sources on Monroe County's level of connectivity by performing a comprehensive market research, survey and stakeholder analysis reported in the sections below.

COMPREHENSIVE MARKET ANALYSIS AND KEY FINDINGS:

- The coverage availability reported by the Internet Service Providers (ISPs) are overstated. For instance, one of the providers detailed in the section below, claim to have a 100% service coverage availability in the County but is found to be unavailable for ten (10) business addresses sourced from different zip codes.
- Spectrum's Hybrid Fiber-Coaxial (HFC) cable services provide the fastest speeds among all the options available to the County. HFC cable, although it is better than most of the other types of connection, is still not as cost efficient or as reliable as fiber.
- Most advertised fiber solutions for County residents are unavailable. For example, Frontier's fiber service is only available to one of 63 residential addresses that were researched (see Frontier's table of offerings in Table 4).
- Calculating a monthly *cost per Mbps* of service, residents are paying anywhere from a low of **\$0.07** (Frontier's 2Gbps Fiber plan, which is only available to one out of 63 residential addresses in the County) to **\$6.25** (NYSYS airAccess' Fixed Wireless 12 Mbps plan) for services. Businesses in the County are paying anywhere from **\$0.06** (Lumen's 1 Gbps Fiber plan) to **\$1.40** (Green Light's 1 Gbps Fiber plan) for services.

*In essence, if someone is paying \$50 for a service that provided a speed test of 50 Mbps download, that resident is paying \$1 per megabit per month. In communities providing fiber-optic broadband services, where residents are paying approximately \$80 for 1 Gbps download (1,000 Mbps), they are paying \$0.08 per megabit. It is clear to see that fiber service offerings offer the best unit cost to customers when measuring cost per Mbps. Further, a fiber service offering is the only service capable

- of providing symmetrical services where download and upload speed are identical, i.e., 1,000 megabit per second symmetrical (1 gigabit, or 1 Gbps).
- Broadband connection is considered an essential service by 94% of Monroe's survey respondents.
 - There is an increased demand for bandwidth for 61% of the respondents since the COVID-19 pandemic.
 - 69% of the survey respondents are currently paying over \$51 for for their broadband service alone, and in contrast only 21% are paying below \$50 per month for their services.
 - The median speeds among Monroe's citizens are **83.99** Mbps download and **10.55** Mbps upload speeds, with over 50% of the survey respondents being underserved. This data is based on the survey's speed test. These median speeds achieved in the County are way below the median speeds achievable in New York state which are reported as **179.32** Mbps download and **35.83** Mbps upload speeds.
 - Seventy-five percent (75%) of the County's citizens have Spectrum/Charter Communications as their current broadband service provider.
 - Most respondents who do not have broadband responded that the service prices are **too expensive**, or they are taking advantage of the **alternatives that are available to them** such as access through their cellular service and through the schools, libraries and from other public facilities.
 - The majority of respondents support the idea of the **County having a level of participation in shaping or influencing the County's broadband infrastructure**. In contrast, over 50% of the respondents are **against the idea of allowing only private companies the ability to provide access to high-speed broadband services to them**.
 - The municipality survey's result shows consistency with the issues expressed by the residents and businesses around the County. **Reliability** and **Affordability** issues are the top connectivity concerns of organizations in the County. The dominant provider among them is Spectrum/Charter Communications. Many of them are currently subscribed to multiple service providers in case of slowdowns or connection outages.
 - Also based on the municipality survey, the expected infrastructure developments around the County in the coming months and years are focused on *Industrial, Retail, Rezoning, Smart City*, then *Residential*, respectively. These are all expected to increase the citizens' demand for reliable and accessible broadband services.

METHODOLOGY

This comprehensive report contains different data sources gathered from the following sources:

- Ookla's Speed Test Data⁵
- FCC's Fixed Broadband Deployment Map⁶
- **Market Research** – BroadbandNow.com⁷, Providers Service Availability Webpages, Magellan's Direct Service Offering Inquiries
- **Stakeholder Outreach** – Magellan-organized
- **Community Survey** - Magellan-organized

The data provided by each of the sources mentioned above are then compared through a comparative matrix to identify gaps and to address the needs and issues accordingly.

MARKET RESEARCH OVERVIEW

Magellan performed a broadband market analysis of Monroe County to determine the current broadband offerings available to residents and businesses. The analysis included identifying what service providers are advertising as being available in the area, and what is available through a random sampling of locations across the County. The goal of this process is to identify what is being advertised versus what is actually provided. In many cases, there is a significant disparity between what is advertised and what is available. As documented in this analysis, it is evident that many advertisements are overstated, misleading and often, unreliable.

ASSUMPTIONS AND DEFINITIONS

Technically, broadband refers to a communications circuit that is split into multiple, separate channels. Broadband has come to mean always on, high-speed internet access. As of January 2015, the Federal Communications Commission (FCC) defines "broadband" as a minimum of 25 megabits per second (Mbps) download speed and 3 Mbps upload speed, or "25/3." In January 2018, the FCC reaffirmed that definition, which they deemed adequate for a single user engaged in telecommuting or student activity. Most broadband services are asymmetrical, with faster download than upload speeds, and providers commonly only advertise download speeds.

⁵ <https://www.speedtest.net/global-index/united-states>

⁶ <https://go.usa.gov/xuHQ2>

⁷ BroadbandNow has a comprehensive database of internet service provider information including their coverage, background and up to date service offerings per zip code - <https://broadbandnow.com/>

BROADBAND ENVIRONMENT IN MONROE COUNTY

(a) Ookla Speed Test Data - U.S. Baseline Coverage

OOKLA, a global leader in Internet testing, data and analysis, reports fixed, and mobile Internet speeds based on user speed tests performed using the Speedtest.net website. Reported by OOKLA, as of May 2022, the median nationwide USA **fixed broadband** download speed is 151.46 Mbps, and median upload speed is 21.03 Mbps. At a global level, the U.S. ranked eighth in the world for median fixed Internet speed. Verizon is the major provider in the state of New York, according to Ookla's speed test data.

The State of New York ranked second in the USA, with a median download speed of 179.32 Mbps and upload speed of 25.83 Mbps. This data is specific to the whole state but indicative of speeds achievable in Monroe County. Comparatively, the state of New Jersey has the highest reported median download speed of 195.20 Mbps down and 36.32 Mbps up, having Verizon as the state's fastest provider.

For mobile or cellular connections, the country's median download speed is 61.12 Mbps, and median upload speed is 8.60 Mbps. At a global level, the U.S. ranked 23rd in the world for median mobile Internet speed. The top three providers for mobile Internet in the United States are T-Mobile, Verizon Wireless and AT&T. The State of New York ranked fifth in the USA, with a median download speed of 80.25 Mbps and upload speed of 14.23 Mbps, with T-Mobile as the fastest broadband speed provider.⁶ Speeds indicated are the maximum achievable speeds in the area and may depend on numerous factors, including distance from cell site, number of subscribers in the cell, and weather. Also, cellular data services may come with monthly data caps that may slow down the service, charge more for additional data, or cease service entirely.

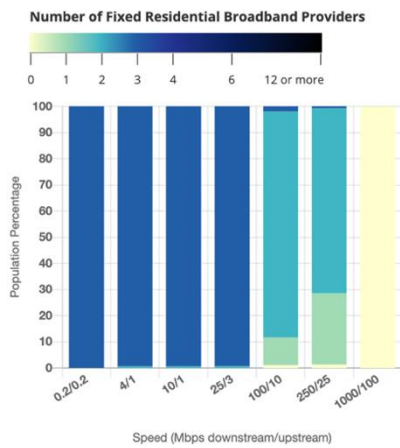
(b) FCC Form 477 Mapping Data

The FCC's most recent fixed broadband availability map⁷, as of December 2020, shown in the figures below, are based on self-reported data by the Internet Service Providers (ISP) in the area. Although it is comprehensive, the FCC data has historically been **problematic** and **overstated** in many ways due to the historical reporting requirements based on service availability within a census tract, as the data is self-reported by carriers. According to the reporting guidelines, if only a few households are served in a census tract, the entire tract can be reported as **served**. This issue

has been recently identified at the FCC level, and there are initiatives underway to change the way this data is reported to reflect actual conditions more accurately.

On the spectrum denoted in the figure below, the darker shading (black) in the right most side represents 12 or more ISPs, and the lighter it gets to the left (yellow), the table indicates that there are fewer no providers for that class of service available in those areas within Monroe County.

Figure 28 - FCC's Number of Fixed Residential Broadband Providers by Speeds



those areas within Monroe County.

Figure 29 - Number of Providers Providing 25/3

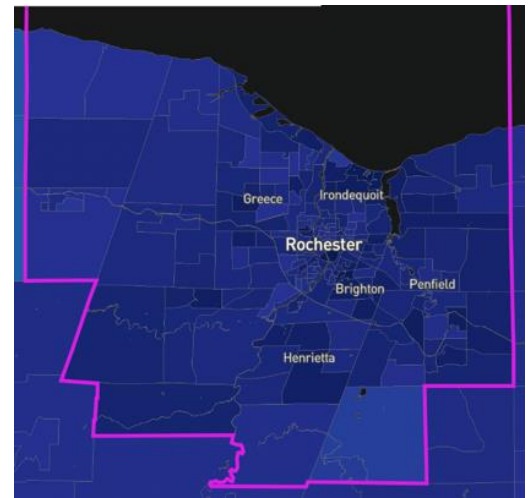
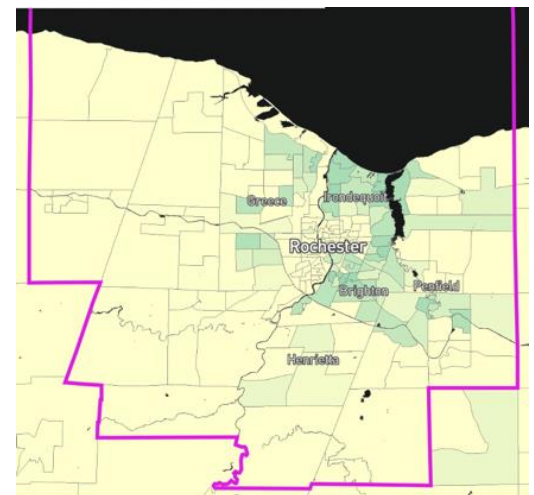
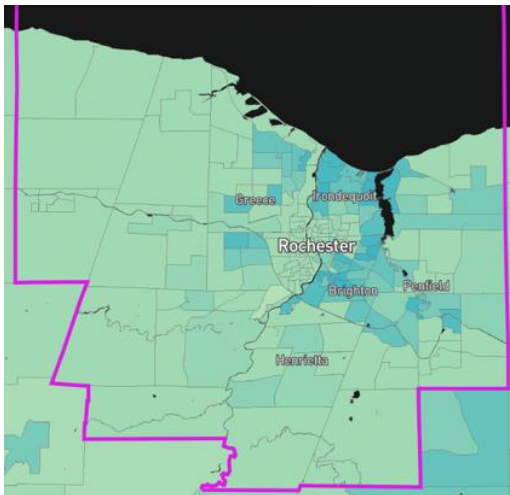


Figure 30 - Number of Providers Providing 100/10



As shown in the figure above, there are more *Figure 31 - Number of Provider Providing 1000/100* than 3 ISPs⁸ around the entire County that are offering 25/3 Mbps speed services. While Figure 18 shows that there is less choice (fewer ISP options) that offer 100/10 Mbps download speeds. More specifically, based on this map 77% of the County is being served at 100/10 Mbps download speed by only a single provider. Finally, gigabit service, or a speed of 1000/100 Mbps, is scarce in the County; the map in Figure 19 shows that 79% of the County have no providers offering this speed, and only one provider is offering this speed to 22% of the County.

Zooming in closer to these maps through FCC’s interactive map, it can be observed that there are many communities that are underserved and, when served, some citizens of the County are still unable to access them possibly due to high pricing set by the dominant providers in their area.

(c) Market Research

An assessment of private-sector telecommunications infrastructure and services in Monroe County provides context for a more targeted and up-to-date assessment. It also informs the County’s strategies given the services that are or are not available in market. Magellan then verified these service offerings by comparing multiple data sources: what the providers’ self-report accessed through BroadbandNow⁹, each website of the major providers in the area, and as well as direct service offering inquiry through emails and phone calls.

Companies that nominally sell network services in Monroe County are listed in the table below.

Table 8 - Major Internet Service Providers in Monroe County

RESIDENTIAL				BUSINESS			
Provider	Type of Connection	Reported % County Availability	Service availability of 63 addresses	Provider	Type of Connection	Reported % County Availability	Service availability of 63 addresses
Spectrum	Hybrid Fiber-Coaxial Cable	100%	63/63	Spectrum Business	Hybrid Fiber-Coaxial Cable	100%	50/63

⁹ BroadbandNow - BroadbandNow has a comprehensive database of internet service provider information including their coverage, background and up to date service offerings per zip code - <https://broadbandnow.com/>

Frontier	DSL, Fiber	94%	47/63	Frontier	Fiber	93%	53/63
HughesNet	Satellite	100%	63/63	Crown Castle ¹⁰	Fiber	23%	23/63
Viasat	Satellite	100%	63/63	Lumen/ CenturyLink Business	DSL, Fiber	13.8%	47/63
T-Mobile Home Internet	Fixed Wireless	65%	40/63	Greenlight Networks	Fiber	22%	37/63
Ultra-Home Internet	Fixed Wireless	63%	53/63	Verizon Business	Fiber	15.1%	11/63
NYSYS airAccess	Fixed Wireless	53%	30/63	FirstLight	Fiber	10.3%	47/63
Greenlight Networks	Fiber	32.4%	10/63	Kinetic by Windstream	DSL, Cable Fixed Wireless	8.4%	35/63

To confirm each of the advertised service offerings by the providers mentioned in the table above, Magellan dove deeper through targeted research by selecting one residential, and one business address within each zip code within the County to inquire on the services available to them. Specific addresses used may be found in the appendix.

In the section below, advertised, and actual price and speeds are compared per provider. It is important to note that advertised prices by these providers are often only *introductory prices*, which means after 3-24 months of service subscription the monthly rates offered will increase.



Spectrum is an Internet service segment offered by its parent company, Charter Communications. What sets Spectrum apart from other cable providers are its features including contract-free plans, unlimited data on all plans and no equipment rental fee. However, the caveat to their services is the varying speed throughout the day depending on the number of users connected to the network and the varying plan offerings per location. In short, although it is available and affordable to most of its county customers, its service reliability may be an area of major concern. The service offerings are shown in the table below.

BroadbandNow's data and as reported by Spectrum shows that their average coverage availability in Monroe County 99.5%, targeted research shows that Spectrum is available to all 63 residential locations. Their average coverage

¹⁰ <https://www.crowncastle.com/infrastructure-solutions/?level=14¢er=-77.62191,43.15606>

availability for businesses is 99.7% and is specifically offering their services to 50 of 63 business locations.

Table 9 - Spectrum's Published Residential Internet Service Offerings in Monroe County¹¹

Package	Type of Connection	Download Speed ¹²	MRC ¹³	MRC per Mbps ¹⁴	Notes
Spectrum Internet	Cable	200 Mbps	\$49.99 for 12 months, then the standard rate will apply	\$0.25	Unlimited Data, plus WI-FI fee
Internet Ultra	Cable	400 Mbps	\$69.99 for 12 months, then the standard rate will apply	\$0.17	Unlimited Data, plus WI-FI fee
Internet Gig	Cable	1 Gbps	\$89.99 for 12 months, then the standard rate will apply	\$0.09	Unlimited Data, plus WI-FI fee

Table 10 - Spectrum's Published Business Internet Service Offerings in Monroe County

Package	Type of Connection	Download Speed ¹²	MRC ¹³	MRC per Mbps ¹⁴	Notes
Spectrum Internet	Cable	200 Mbps	\$64.99 for 12 months, then the standard rate will apply	\$0.32	Unlimited Data, plus WI-FI fee
Internet Ultra	Cable	600 Mbps	\$114.99 for 12 months, then the standard rate will apply	\$0.19	Unlimited Data, plus WI-FI fee
Internet Gig	Cable	1 Gbps	\$164.99 for 12 months, then the standard rate will apply	\$0.16	Unlimited Data, no WI-FI fee



Frontier Communications has been offering their digital subscriber line (DSL) internet services over copper wires to provide internet to homes and businesses across the United States since 2008. In 2014, they have acquired additional

¹¹ <https://www.spectrum.com/internet-service/new-york/rochester>

¹² Speeds are in megabits per second (Mbps) download over megabits per second upload. Cited in this section are those advertised by providers and should be considered maximum possible speeds. Actual speeds are likely to be lower.

¹³ MRC is "monthly recurring cost."

¹⁴ This metric is the MRC divided by the download speed in Mbps

fiber networks from Verizon and is now offering up to 2,000 Mbps of download speed services, marketed as *Frontier Fiber*¹⁵.

Based on the market research performed by Magellan, Frontier only offers DSL service to Monroe County's residents with a maximum download speed of 12 Mbps. Most businesses on the other hand have access to all of Frontier's Fiber service offerings except for those areas where Frontier reported to have low coverage availabilities; examples are in the Village of Holley – 14470, Village of Macedon, 14502, and more.

BroadbandNow's data and as reported by Frontier shows that their average coverage availability in Monroe County is 94%, and the per residential address offerings - targeted research shows that Frontier is available to 47 of 63 residential locations. Their average coverage availability for businesses is 93% and is specifically offering their services to 53 of 63 business locations.

All plans shown in the table below are expected to increase their monthly rates after 23-36 months of subscription.

*Table 11 - Frontier's Published Residential Internet Service Offerings in Monroe County*¹⁶

<i>Package</i>	<i>Type of Connection</i>	<i>Download Speed</i> ¹⁴	<i>MRC</i> ¹⁵	<i>MRC per Mbps</i> ¹⁶	<i>Notes</i>
<i>Option 1</i> ¹⁷	DSL	12 Mbps	\$49.99 for 24 months, then the standard rate will apply	\$4.17	No Annual Commitment, Wi-Fi router Included, Includes Multi-Device Security.
<i>Option 2</i>	Fiber	500 Mbps	\$49.99 for 12 months, then the standard rate will apply	\$0.10	One-Year Agreement, Wi-Fi router Included, Includes Multi-Device Security
<i>Option 3</i>	Fiber	940 Mbps	\$89.99 for 36 months, then the standard rate will apply	\$0.10	One-Year Agreement, Wi-Fi router Included, Includes Multi-Device Security

¹⁵ <https://broadbandnow.com/Frontier-Communications>

¹⁶ <https://go.frontier.com/fiber/internet>

¹⁷ <https://internet.frontier.com/cart/plan-package/>

Package	Type of Connection	Download Speed ¹⁴	MRC ¹⁵	MRC per Mbps ¹⁶	Notes
Option 4	Fiber	2 Gbps	\$149.99 for 24 months, then the standard rate will apply	\$0.07	No Annual Commitment, Wi-Fi router Included, Includes Multi-Device Security

Table 12 - Frontier's Published Business Internet Service Offerings in Monroe County¹⁸

Package	Type of Connection	Download Speed ^a	MRC ^c	MRC per Mbps ^c	Notes
300/300 Mbps	Fiber	300 Mbps	\$44.99 for 24 months, then the standard rate will apply	\$0.15	No Contract Required, No Activation Fee
700/700 Mbps	Fiber	700 Mbps	\$89.99 for 24 months, then the standard rate will apply	\$0.13	No Contract Required, No Activation Fee
Gig Service 940/880 Mbps	Fiber	940 Mbps	\$149.99 for 24 months, then the standard rate will apply	\$0.16	No Contract Required, No Activation Fee



NYSYS airAccess offers Fixed Wireless service offerings only to the state of New York. It serves approximately 842,000 residents and businesses in the state¹⁹. Based on Magellan's direct online inquiry with NYSYS' sales agent, they are currently offering two service options for Monroe's residents with maximum speeds ranging from 8-12 Mbps (shown in table below). NYSYS does not provide significant business service offerings in Monroe County.

BroadbandNow's data as reported by NYSYS shows that their average coverage availability in Monroe County is 53.4% and the per residential address offerings - targeted research shows that NYSYS is available to 30 of 63 residential locations checked.

¹⁸ <https://go.frontier.com/business/fiber-internet>

¹⁹ <https://broadbandnow.com/NYSYS-Wireless>

Table 13 - NYSYS Residential Monthly Subscription Rate per Download Speed in Mbps²⁰

Package	Type of Connection	Download Speed ¹⁴	MRC ¹⁵	MRC per Mbp ¹⁶	Notes
Option 1	Fixed Wireless	8 Mbps	\$50	\$10	No data caps; Added installation fee of \$149 and a router for \$69
Option 2	Fixed Wireless	12 Mbps	\$75	\$6.25	No data caps; Added installation fee of \$149 and a router for \$69



Ultra Home Internet offers 5G and LTE home service internet through T-Mobile's network reaching approximately 300 million residents and businesses across 8,000 cities in the country. Ultra's customers enjoy the contract-free plans, quick and easy installation, and wide availability especially in rural and less populated suburbs²¹. Their website advertises services with a price range of \$59.99-\$139.89 and download speeds from 25-115 Mbps, depending on the location as shown on the table below.

BroadbandNow's data and as reported by Ultra Home Internet shows that their average coverage availability in Monroe County is 63% and the per residential address offerings - targeted research shows that Ultra Home Internet is available to 53 of 63 residential locations checked.

Table 14 - Ultra Residential Monthly Subscription Rate per Download Speed in Mbps²²

Package	Type of Connection	Download Speed ¹⁴	MRC ¹⁵	MRC per Mbps ¹⁶	Notes
25 GB	Fixed Wireless	115 Mbps	\$54.99	\$0.48	Data cap of 25 GB per month then download speed goes down to 1 Mbps
50 GB	Fixed Wireless	115 Mbps	\$79.99	\$0.70	Data cap of 50 GB per month then download speed goes down to 1 Mbps
75 GB	Fixed Wireless	115 Mbps	\$119.99	\$1.04	Data cap of 75 GB per month then download speed goes down to 1 Mbps
100 GB	Fixed Wireless	115 Mbps	\$144.99	\$1.26	Data cap of 100 GB per month then download speed goes down to 1 Mbps

²⁰ <http://www.nysysairaccess.com/airaccess/>

²¹ <https://broadbandnow.com/ultra-home-internet>

²² <https://homeinternet.ultramobile.com/plans>



T-Mobile 5G Home Internet is a wireless gateway solution that is available in many underserved areas around the country. This expands the range of options for many satellite-connected users in the market. Their plan does not require contracts, nor have data caps. However, reliability may be an issue when there is congestion in the network.

BroadbandNow's data and as reported by T-Mobile Home Internet shows that their average coverage availability in Monroe County is 65% and the per residential address offerings - targeted research shows that T-Mobile Home Internet is available to 40 of 63 residential locations checked.

Table 15 - T-Mobile 5G Home Internet's Monthly Subscription Rate per Download Speed in Mbps²³

Package	Type of Connection	Download Speed ^a	MRC ^a	MRC per Mbp ^a	Notes
Option 1	Fixed Wireless	115 Mbps	\$50	\$0.43	No data caps, no annual contracts, no activation fees, easy to set up



Greenlight Networks is a broadband internet provider offering fiber and fixed wireless services to approximately 162,000 residential and business customers around 123 zip codes in the State of New York²⁴. Their website advertises services with price ranges of \$50-\$200 for residential and \$150-\$2,000 for businesses and download speeds from 500-2,000 Mbps. The residential and business packages in the table below are both set of offerings with symmetrical speeds for consistency and MRC per Mbps comparison. Greenlight has nonsymmetrical speed offerings for businesses for more affordable prices²⁵³⁰

BroadbandNow's data and as reported by Greenlight shows that their average coverage availability in Monroe County 32%, but the per residential address offerings - targeted research shows that Greenlight is available to 10 of 63 residential locations checked. Their average coverage availability for businesses is 22%.

Table 16 - Greenlight's Residential Monthly Subscription Rate per Download Speed in Mbps²⁴

²³ <https://www.t-mobile.com/news/offers/t-mobile-launches-5g-home-internet-in-metro-by-t-mobile-stores>

²⁴ <https://www.greenlightnetworks.com/residential-2/>

Package	Type of Connection	Download Speed ⁴	MRC ⁵	MRC per Mbps ⁶	Notes
<i>Amazingly Fast</i>	Fiber	500 Mbps	\$50	\$0.10	With one-time standard installation fee of \$100
<i>Buckle Up!</i>	Fiber	750 Mbps	\$75	\$0.10	With one-time standard installation fee of \$100
<i>The Big Gig</i>	Fiber	1000 Mbps	\$100	\$0.10	With one-time standard installation fee of \$100
<i>Binge!</i>	Fiber	2000 Mbps	\$200	\$0.10	With one-time standard installation fee of \$100

Table 17 - Greenlight's Business Monthly Subscription Rate per Download Speed in Mbps²⁵

Package	Type of Connection	Download Speed ⁴	MRC ⁵	MRC per Mbps ⁶	Notes
<i>Amazingly Fast</i>	Fiber	500 Mbps	\$300	\$0.60	With one-time standard installation fee of \$300 and Static IPs for \$10/mo
<i>Buckle Up!</i>	Fiber	750 Mbps	\$900	\$1.20	With one-time standard installation fee of \$300 and Static IPs for \$10/mo
<i>The Big Gig</i>	Fiber	1000 Mbps	\$1400	\$1.40	With one-time standard installation fee of \$300 and Static IPs for \$10/mo
<i>Binge!</i>	Fiber	2000 Mbps	\$2000	\$1.00	With one-time standard installation fee of \$300 and Static IPs for \$10/mo

LUMEN[®]



CenturyLink, now rebranded as Lumen, is available in 37 states in the US²⁶, and is continuously expanding its residential fiber service within and out of the country. Lumen is known for being a major DSL and fiber provider that takes advantage of fiber to the loop landline networks

allowing for affordable high-speed internet. Their service coverage is known to reach rural and suburban areas of the country. Lumen's key benefits it offers to customers are contract-free plans and unlimited data plans. On the other hand, they still have limited fiber availability in the county, no bundle discounts, and plans. In addition, despite being available in many locations, offerings may vary in price and speeds. In Monroe County, they mainly serve business customers.

BroadbandNow's data and as reported by Lumen shows that they have an average of 14% coverage availability in Monroe County. Most of these business locations around the county do not have access to Lumen's Fiber service product.

²⁵ <https://www.greenlightnetworks.com/business>

²⁶ <https://broadbandmap.fcc.gov/#/provider-detail?version=dec2020&direction=d&hoconums=130228>

Table 18 - Lumen’s Small Business Monthly Subscription Rate per Download Speed in Mbps²⁷

Package	Type of Connection	Download Speed*	MRC ⁶	MRC per Mbps ⁶	Notes
Small Business Internet	DSL	100 Mbps	\$50	\$0.50	Unlimited Data, No Annual Contract
Fiber Internet	Fiber	940 Mbps	\$65	\$0.06	Unlimited Data, No Annual Contract



Crown Castle Fiber offers service across 41 states and is known for its high-speed internet offerings for businesses and large organizations. It is also the largest provider of shared communications infrastructures connecting networks to key peering points and data centers to provide a reliable and scalable broadband solution. They also offer fixed wireless for areas that are hard to reach and have diverse connections.

BroadbandNow’s data and as reported by Crown Castle shows that their average coverage availability in Monroe County is 49.7%, and the per business address offerings - targeted research shows that Crown Castle is available to 23 of 63 residential locations checked.



Viasat, formerly known as Exede, is a major satellite communications provider in Monroe County. Although satellite services are not the first internet option for many, it provides accessible connectivity in many rural areas. Their plans, as shown in the table below, offer unlimited internet or no data caps unlike many other internet providers, but the speed may slow down after using 40-150 GB of data depending on the plan chosen. All plans are expected to increase their monthly rates after three months of subscription.

BroadbandNow’s data and as reported by Viasat shows that their average coverage availability in Monroe County is 100% and the per residential address offerings - targeted research shows that Viasat is available to all 63 residential locations checked.

²⁷ <https://www.centurylink.com/small-business/business-internet/>

Table 19 - Viasat's Published Residential Internet Service Offerings in Monroe County²⁸

Package	Type of Connection	Download Speed ¹⁴	MRC ¹⁵	MRC per Mbps ¹⁶	Notes
Unlimited Bronze 12	Satellite	12 Mbps	\$49.99 for 3 months	\$4.16	40 GB High Speed-Data
Unlimited Silver 25	Satellite	25 Mbps	\$69.99 for 3 months	\$2.80	60 GB High Speed-Data
Unlimited Gold 50	Satellite	50 Mbps	\$99.99 for 3 months	\$2.00	100 GB High Speed-Data
Unlimited Platinum 100	Satellite	100 Mbps	\$149.99 for 3 months	\$1.50	150 GB High Speed-Data

HughesNet. HughesNet offers similar plans as Viasat in Monroe County market, but with lower speeds and includes data caps. All HughesNet plans are 25 Mbps download speed with different data caps. The plans range from 15 GB data cap for \$44.99 after promo discount to 75 GB data cap for \$139.99 per month. Prices for each of the plans are all for 2-year contracts. All plans are expected to increase their monthly rates after six months of subscription. Typically, new satellite customers are burdened with the installation costs however, HughesNet offers a leasing option of their equipment.

BroadbandNow's data and as reported by HughesNet shows that their average coverage availability in Monroe County is 100% and the per residential address offerings - targeted research shows that HughesNet is available to 63 of 63 residential locations checked.

Table 20 - HughesNet's Residential Monthly Subscription Rate per Download Speed in Mbps²⁹

Package	Type of Connection	Download Speed ¹⁴	MRC ¹⁵	MRC per Mbps ¹⁶	Notes
15GB	Satellite	25 Mbps	\$44.99 for 6 months	\$1.80	15 GB High Speed-Data; 24-month commitment required
30GB	Satellite	25 Mbps	\$54.99 for 6 months	\$2.19	30 GB High Speed-Data; 24-month commitment required
45GB	Satellite	25 Mbps	\$89.99 for 6 months	\$3.60	45 GB High Speed-Data; 24-month commitment required
75GB	Satellite	25 Mbps	\$139.99 for 6 months	\$5.60	75 GB High Speed-Data; 24-month commitment required

²⁸ Service offerings are accessed here: <https://buy.viasat.com/en-US/r/pln>

²⁹ <https://internet.hughesnet.com/order-online/product-selection/>

Other residential providers available in parts of Monroe County with very low coverage availability in the region that were not discussed in detail are - Community Broadband Network (CBN), EarthLink, Empire Access, and Verizon. Providers for businesses included CBN, Empire Access, GTT, FirstLight, Kinetic by Windstream and Verizon Business.

STAKEHOLDER OUTREACH OVERVIEW

Fast, economical, reliable internet access is essential for participation in today's digital economy. Monroe County's Broadband Study is aimed to understand the true connectivity gaps and needs across Monroe's communities that limit the ability of businesses and residents in the region to thrive. Magellan engaged stakeholder representatives from different entities and discussed their connectivity needs and issues. We sought out representatives of stakeholders in government, Monroe County Broadband Task Force members, and other influential sectors in the County. Each of the discussions was led by Magellan with an agenda that started with an introduction to Monroe County's broadband project, information on the standard baseline residential connectivity speeds as defined by the FCC³⁰, questions on Monroe County residents' connectivity with regards to their accessibility, reliability, and affordability of broadband services, and finally a map depicting areas of potential interest around the county was shown for stakeholders' validation.

This section summarizes the reports made during discussions Magellan had with key stakeholders in Monroe County.

- Public Service Commission reports that over 80% of the county has access to broadband services at download speeds of 100 Mbps or greater.
- While new fiber installation may be the best option, it can be expensive.
- Affordability remains a concern for many households in the county. Magellan recommends outreach efforts to ISPs to advertise the FCC's Affordable Connectivity Program (ACP).
- Digital literacy and skills training remains a priority.
- Monroe County, with Magellan support, has reached out to New York State's Empire State Development (ESD), and;
- Monroe County, with Magellan support, has reached out to New York State's Public Services Commission (PSC) to determine current state of mapping of unserved and underserved households.

³⁰ Federal Communications Commission – an independent government agency that regulates communications by radio, television, wire, satellite, and cable across the United States.

STAKEHOLDER OUTREACH KEY FINDINGS

The stakeholders that Magellan has engaged with represent a wide cross section of leadership within Monroe County. This section will highlight the top connectivity issues impacting the County, as identified by the Stakeholder Survey and interviews conducted by the Magellan team.

- Many feel that broadband is almost a utility service. While broadband is increasingly a necessity and essential, it falls short of being a utility as New York State Public Service Commission (PSC) does not regulate broadband pricing.
- Lack of availability has been reported as an issue, even though ISP report services are reported as offered by the FCC. This is explained by the inherent bias toward overstating coverage during the Form 477 quarterly processes.
- Outages are frustrating, as when any essential service is disrupted.

(a) Public Opinion

As part of the consumer survey, Monroe County sought opinions on key questions related to the role of Monroe County with regard to broadband, as well as how County funds might be best spent to support the expansion of access to broadband. Below is the public’s view on how they think the County can best support them with regards to their connectivity and its required infrastructure. The majority supports the County in pursuing a public-private partnership. In contrast over half of the respondents are against the idea of only private companies providing access to high-speed internet.

Table 21 - Public's Opinion on County's Broadband Infrastructure and Operations

Do you support...	Yes	No	No Opinion
... the County <u>building</u> broadband infrastructure using taxpayer funds?	69.98% [834]	17.6% [210]	12.6% [151]

... the County <u>operating</u> broadband infrastructure using taxpayer funds?	61.8% [737]	22.5% [269]	15.7% [187]
... the County <u>offering</u> public wi-fi using taxpayer funds?	64.4% [767]	22.2% [264]	13.4% [160]
... the County pursuing a public-private partnership to improve access to high-speed internet?	79% [941]	10.7% [128]	10.2% [122]
... only private companies providing access to high-speed internet?	18.8% [221]	59.6% [701]	21.7% [255]

(b) Open-Ended Comments from Respondents

- Theme 1: Affordability
 - “My husband runs a business out of our home and with all the children's school work faster and more reliable internet would be a plus. The cost keeps increasing but the reliability does not!”
 - “The cost of Spectrum is ridiculous and was just told that my equipment is outdated and I received this equipment 6 mo. ago. I do many zoom meetings and is a must.”
 - “We had to upgrade the speed of our internet through Spectrum to obtain the speed that was needed for a work computer. The cost to get to that speed was pretty costly, a good internet at more economic rate would be awesome. I use the internet for banking, social media, therapy organization and access to program to transcribe books into braille. So it is pretty important in our household.”
 - “Price and reliability definitely price the cost is killing me killing us it was fine for the first 12 months and now it's just out of hand horrible and I'm trapped into it if it were up to me I would cancel it and try to start all over but the loved ones are so dependent on it I don't dare cut them off so I suffer and silence with the price and the cost it really turns my stomach but it's what we do for love sacrifice.”
 - “I am on fixed income as a senior. The cost is prohibitive. I would like to have more internet offerings. Spectrum does not have any competition where I live.”
 - “A lower-cost would be better given that I am on a fixed income and rates keep increasing.”

- “Our neighborhood has been trying to get Greenlight for years now. All I need is the internet, and Spectrum is too expensive.”
- “Better broadband at a reasonable price would mean a great deal to me. My payments to Spectrum are extremely high. The internet is an integral part of my life allowing me to live a high quality life. I'm sure there are many citizens that feel this way. It seems like there is no price regulation in the industry, and the cost factor makes it difficult for citizens in Monroe County. Unfortunately being in a recession, people are paying more for life necessities. Hopefully government can assist in this process of making broadband accessible to all at a reasonable cost.”
- “Yes, I am using the ACP which helps somewhat with the price, would appreciate even lower cost. Am also using for volunteer work with League of Women Voters, think a public/private partnership is a good idea.”
- Theme 2: Speed/Reliability
 - “A more reliable and better access to broadband means we would be able to access information more quickly than we are able to, it would enhance the quality of our streaming service. It would definitely cut down on the time spent with customer service trying to trouble shoot the system every time it fails or slows down which is more often than I'm able to tolerate at this point. High cost low quality service.”
 - “The problem in our household is only 3 connections can take place at one time. If we are using the home computer, anyone else has to log off Wi-Fi so the home computer and printer can work from our Sprint/t mobile hot spot. The speed is always slower, but we are able to watch, for example, netflix, if no one is on the Wi-Fi. I am not able to afford Spectrum or another large company- we have antenna TV. no extras bought!”
 - “Reliable high speed broadband is essential to being able to support our clients. We serve Deaf Refugees, Immigrants, and asylum seeker. We are heavily dependent on video communications. This means we must have high speed internet.”
 - “My Internet speed is super slow.”
 - “Surprised to find that I get less internet speed than what I am paying for. All in all the service is acceptable.”
 - “Better reliability and speed would make running our business more reliable. Being able to stream lessons for school.”
 - “I use it to do historical research which means downloading maps and historical documents. Better download speed would be helpful. Also, I am

a member of the USCGAux. I take care of the Flotilla web site, so upload speed would be important but mine is terribly slow.”

- Theme 3: Accessibility

- “Decrease monthly expense. Better and affordable access to low-cost or free internet access. Currently, in our zip code, we cannot access Green Light, the most affordable. However, suburban areas with higher incomes are able to access this lower cost service. Definitely an equity issue for this zip code.”
- “Spectrum is the only viable option in our apartment. Unfortunately the speeds don't match their claims and the price keeps going up every year.”
- “Greenlight is in my area but not my Road. When my daughter started working from home she needed to make Zoom calls etc., therefore i had to upgrade the package with Spectrum. I'm paying almost \$100 a month. Green light with better speed only costs \$50.
- More options. Spectrum has a local monopoly, Frontier DLS is a joke and Green light has limited coverage. The prices and speed vs the rest of the world are laughable. <https://www.newamerica.org/oti/reports/cost-connectivity-2020/global-findings>”
- “More competition would drive down cost overall. Better access for the disadvantaged would help the community overall, as well as enhancing economic development in general.”
- “More options than greenlight and spectrum Price and speed very important it cost little to nothing to deliver.”
- “It would be nice if Spectrum had some competition. There pricing is out of control. I have the lowest internet speed offered because I can not afford (fixed income) the regular internet speed. Choices need to made, internet is important, just like food, gas and electric.”
- “My speed is not even classified as broadband per FCC. 25Mbps down and 3Mbps up. For what I'm paying monthly, it is a ripoff, my speed should be faster. It is barely adequate now. I only have one provider at this location with no competition. Frontier is not a viable competitor to Spectrum. I have no choice but Spectrum or no internet at all. How about a municipal provider at this location. Do something for us within my lifetime.”
- “More options for providers - currently Spectrum is the only broadband provider with reasonable speeds. Frontier's DSL can only get 4Mbps to my house.”

ANALYSIS OF MUNICIPALITY SURVEY RESULTS FOR MONROE COUNTY

An online broadband municipality survey link was shared by the County to organizations' leaders and representatives to determine their current and future connectivity needs. Magellan and the County kept this survey open from June 22, 2022 through August 18, 2022.

The results of the survey totaled one hundred (100) survey participants for which 46 were completed and, 54 were partially completed surveys which also had valid data and are found useful for this results summary. The survey enabled the participants to upload documents and images to capture any form of their input.

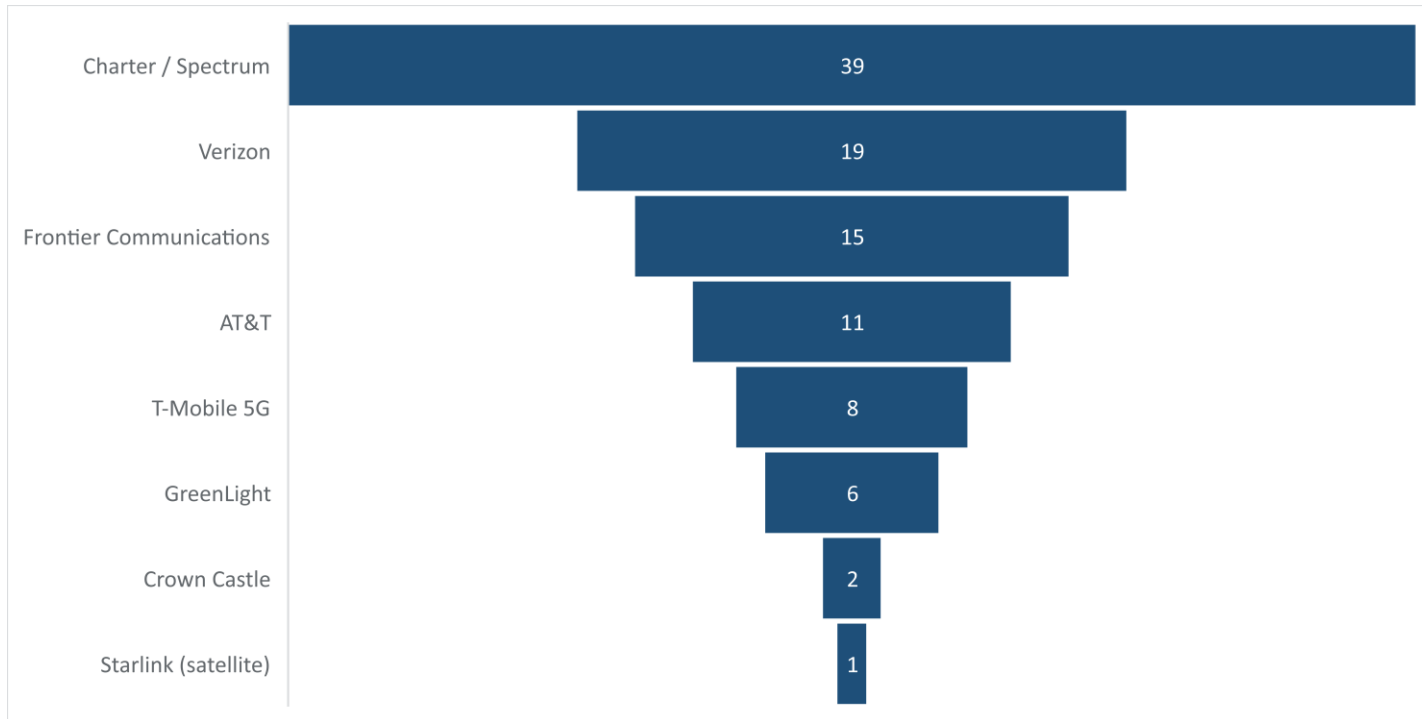
(a) Participants of the Broadband Municipality Survey

The participants of this survey were mostly leaders from both public and private organizations in Monroe County.

(b) Providers

The figure below illustrates a ranking of providers from having the most subscribers to the least. Charter Communications, (Spectrum) unsurprisingly also dominates the organizational market in the County. It is also found that most of these organizations are concurrently subscribed to services from multiple providers. For example, a representative from Goodwill of The Finger Lakes uses several services from AT&T, Charter Communications, Frontier Communications, GreenLight, and T-Mobile. One of the major reasons could be the lack of reliable service options in their locations. For example, one of the survey participants expressed that it is critical for the Emergency Management department of the County to have a redundant network in their main office and a back-up for their mobile vehicles network in case their primary network is down.

Figure 32 - Municipality Survey Participants' Providers



(c) Needs

There are common themes of concerns found when the participants were asked what their areas of service's broadband needs are. They are mainly issues around **reliability** and **affordability** which is worsened by the fact that in most cases only the dominant provider, Charter Communications is available at these locations. GreenLight's reliable and fast broadband services have been a source of hope for many participants, however its area of service is limited and is not available to everyone around the County. For instance, a representative from the Habitats for Humanities mentioned GreenLight's services are not available on one side of Brookfield Road.

Below is a summary of locations that participants described to have broadband reliability, affordability and in some cases accessibility needs.

Table 22 - Municipality Survey's List of Areas and People of Concern

<i>Location</i>	<i>Organization</i>	<i>Areas/People of Concern</i>
Stafford	Village Of Scottsville	Affordability and lack of competition

Rochester	Village Of Scottsville	Inner city Rochester NY Zip Codes 14608 14611 14613
New Martinsville	Monroe County Health Department	Older adults
Rochester	Monroe County Commissions	Reliability and Accessibility Issue - Lack of mobile network coverage in poll sites
Rochester	Monroe County Parks	Reliability issues of connection in a large number of parks facilities/lodges. "It is important as many businesses like to host meetings in our lodges."
Brockport	Town of Hamlin	Parts of N, Hamlin, Chase, Moscow
Rochester	Ibero	Consistent drop of connection. Poor service quality and price options
Brockport	BCSD	Hamlin in Lake Ontario
Batavia	Union Presbyterian Church, Wheatland	Accessibility Issue - only able to access Spectrum or Frontier in the Village of Scottsville. Poor service quality and price options
Rochester	Monroe County Planning & Development	Limiting Accessibility Issue- "The Department of Planning and Development is on Monroe County's fiber network. When we are plugged into our docking stations, the internet works pretty well with few outages. Our wi-fi is not as strong when our laptops are off of their docking stations. We do not make the wi-fi password available to public visitors because of concerns about weakening the signal."
Ithaca	Cornell Farmworker Program	Limiting Accessibility Issue - "The absence of broadband is a significant challenge for farmworkers residing in the county...for maintaining communication with service providers in the areas of health, education and legal support"
Rochester	REOC	"The Rochester EOC has a population of students that require these services to do their course work. Currently, many students are using smart phones, and or public Wi-Fi at businesses to access the Internet." Approximately 90 percent of enrolled students live within the City of Rochester."
Albany	Human Services	Accessibility and Digital Literacy Issues - Inner loop Downtown thru the Crescent. I.e Joseph Avenue, Clinton Avenue, St. Paul Street, Hudson Avenue, Portland Avenue, Good man Street, and parts of Culver Rd. from Atlantic Avenue north for all toward Rte. 104 east and west for East side of Rochester. Southeast including South Avenue, South Clinton, Mt. Hope, and surrounding areas thru to Elmwood Avenue. On the Southwest side of Rochester, Ford Street, Reynolds Street, Jefferson Ave, Genesee Street, Genesee Park Blvd., and further to Gates Border heading west. Northwest going further to include Lyell Avenue and surrounding locations including Lake Avenue to 104 East and West. "These areas have issues associated with poverty and lack of education or knowledge to use broadband."

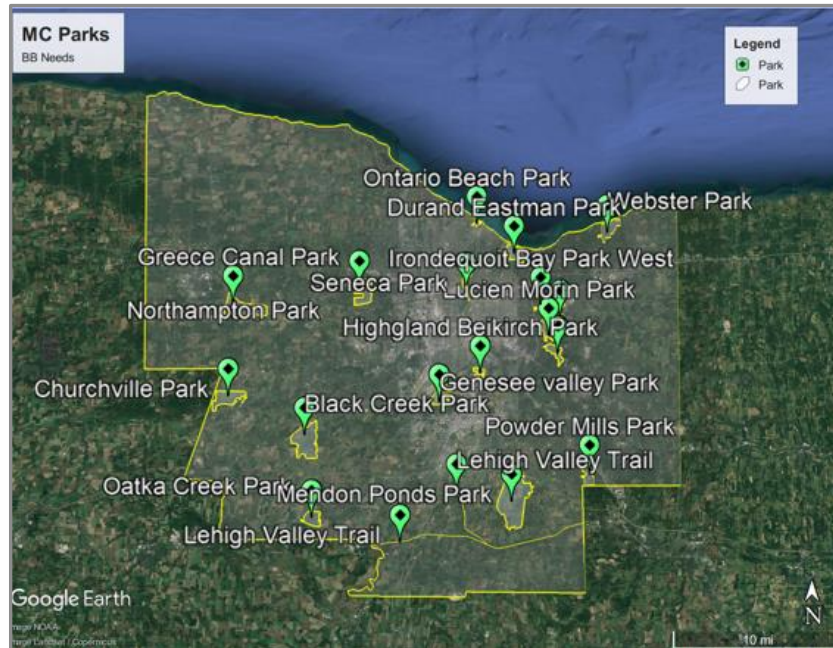
Pittsford	County Of Monroe	Reliability Issue - Redundant broadband at Emergency Operations Ctr and mobile vehicles if primary is down.
Rochester	Goodwill Of the Finger Lakes	Accessibility Issue in area
Hilton	Monroe County Probation-Community Corrections	Reliability Issue - "Internet access is lacking on the 4th floor of City Place Offices near windows and adjacent the alley... We are also lacking service when doing "after-hours" on call work and not connected to WI-FI"
Bridgeport	Ibero American Action League	Reliability Issue - IBERO buildings , "tends to go in and out" 218 Clifford Avenue "...has spotty Wi-Fi"
Rochester	Flower City Habitat for Humanity	Accessibility Issue - Brookfield Road "one side is not eligible for Greenlight"
Rochester	Monroe County District Attorney's Office	Reliability Issue - Watts Building at 47 South Fitzhugh Street "The Wi-Fi is very weak. Cell phones and laptops that are not connected to docking stations are challenging to use. Coverage is spotty and inconsistent, at best."
Rochester	Monroe County	Accessibility, Reliability, Affordability and Digital Literacy Issues - Beechwood "Greenlight does not service this neighborhood. And if it did, the cost would be too high for many households. Frontier has sent flyers that fiber is available, but inquiries turn up the fact it's not. A friend got T-Mobile home internet, and it was too slow to do streaming. So, we are stuck with Charter. Most people don't know about broadband benefits."
Rochester	Town Of Pittsford / The Children's Agenda	Accessibility, Reliability, Affordability and Digital Literacy Issues for Seniors and Children - Town of Pittsford "To my knowledge, our town is fully covered with broadband service. However, a single provider dominates it. There is high interest by residents in getting Greenlight service, but they have been slow to cover our town...There are surprisingly widespread problems with phone service...there are significant dead spots in town. We think it should be regulated as a public utility with pricing and service requirements and consumer protections because it is no longer a luxury, but a necessity for functioning as an equal member of society."

One of the survey participants who has shared a map of their service locations (shown in the figure below) in need of better broadband service is a representative from Monroe County's Parks. Below is a summarized list of their needs in the department:

- State-of-the-art gigabit service providing adequate and reliable service, including support of a modern electronic badge access control system
- Available guest Wi-Fi for all their tourists, guests and residents visiting the parks.
- Secured Wi-Fi access points for all park personnel no matter what county park they travel to across the county

- Fully connected PCs at all their labor centers for supervisory staff to facilitate communications with the Parks Administration building to send and receive pertinent rental information in a timely fashion
- They would like security cameras at all their parks in areas of concern that cannot be monitored by staff frequently. Current modem connections do not allow for security camera set-ups at this time.

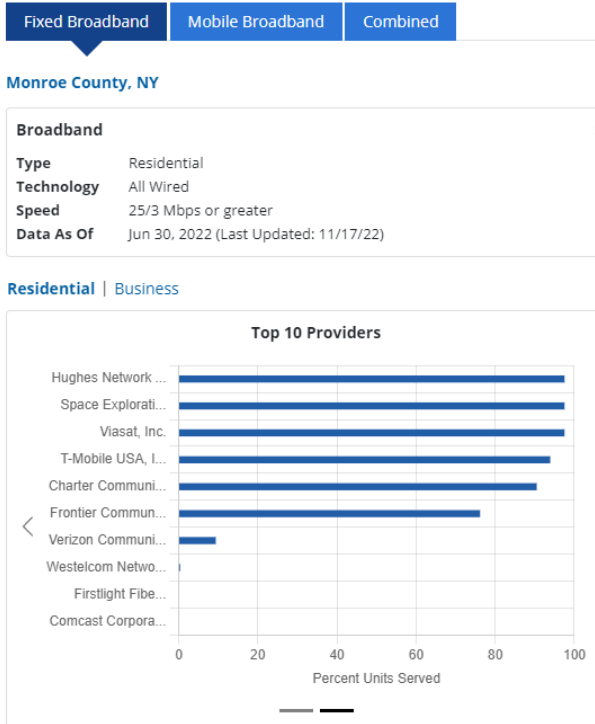
Figure 33 - Map of Monroe County Parks



(d) Future Plans That Will Drive an Increased Bandwidth Demand and Use in the County

91 of 100 survey respondents are expected to build industrial developments, 85 are to have major commercial and retail developments, 6 are planning on rezoning, 6 are on “Smart City” infrastructure development, and 7 are to develop a mix of smaller infrastructure developments such as single and multifamily residential homes. All of these will only increase the demand for a reliable, affordable, and accessible broadband service in the County. If broadband issues identified earlier in this report in the County are not addressed, it may impede these developments which in turn may affect the County’s economy as a whole and the residents’ quality of life in the long-term.

(e) FCC Broadband Maps – 25/3 Mbps Service



(f) FCC Broadband Maps – 100/20 Mbps Service

Fixed Broadband | Mobile Broadband | Combined

Monroe County, NY

Broadband

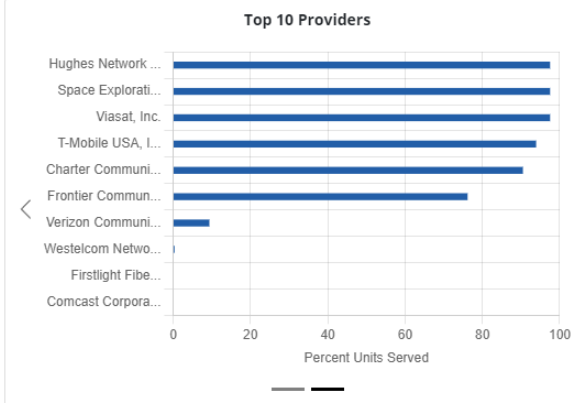
Type Residential

Technology All Wired

Speed 100/20 Mbps or greater

Data As Of Jun 30, 2022 (Last Updated: 11/17/22)

Residential | Business



Fixed Broadband | Mobile Broadband | Combined

Monroe County, NY

Broadband

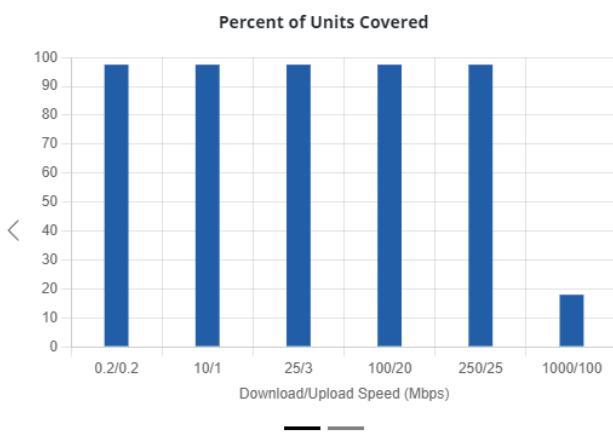
Type Residential

Technology All Wired

Speed 100/20 Mbps or greater

Data As Of Jun 30, 2022 (Last Updated: 11/17/22)

Residential | Business



Appendix 3: Network Assessment and Strategy Report Updates

Magellan performed a Network and Assessment and Strategy Report for Monroe County and the City of Rochester in 2017. Magellan updated the inventory of assets in this study by working with the County.

The past report determined that the County has extensive fiber-optic infrastructure assets but only one-fifth of them were being used. To maximize their assets and to prepare for the growing bandwidth and connectivity requirements, in that report, Magellan recommended the following steps for the County:

- Focus on evolving its fiber-optic infrastructure into a revenue-positive platform for delivering public sector network services.
- Consider establishing an independent public network entity to clarify, expand and formalize their governance of their network assets.
- Develop the network into a platform for IT service delivery and support by continuously improving facilities and operations with stakeholder input.
- Expand connections to regional data centers and colocation facilities to increase the functionality and services available.

Magellan now extends this set of recommendations to include support for fixed wireless last mile internet service provision alongside wired terrestrial technologies.

According to the County's Information System's Director, the County currently has fifty-seven (57) government buildings in remote sites, and only four (4) of them are connected to the County's fiber network. Many areas critical to the county's economic growth such as the City of Rochester's downtown and civic center are still using their old legacy networks or the area lacks sufficient fiber, thus slowing down their plans to migrate to cloud based software for easier collaboration among County and cities departments.

There are two key issues relating to the County's available network. One, the County's fiber network allocated for the County government users are not fully in use, while the second, more significant issue is on the County's residential and business' connectivity. While the County government have an extensive unused fiber network, the citizens are lacking access to them, making citizens dependent on private internet service providers (ISP).

There are three dominant ISP that provide the fastest speeds in the County, that exceed 100/20 Mbps. Those three providers are Spectrum/Charter Communications, T-Mobile Communications (both of which offer services to over 90% of the County) and Frontier Communications, which offers services to over 75% of the County.

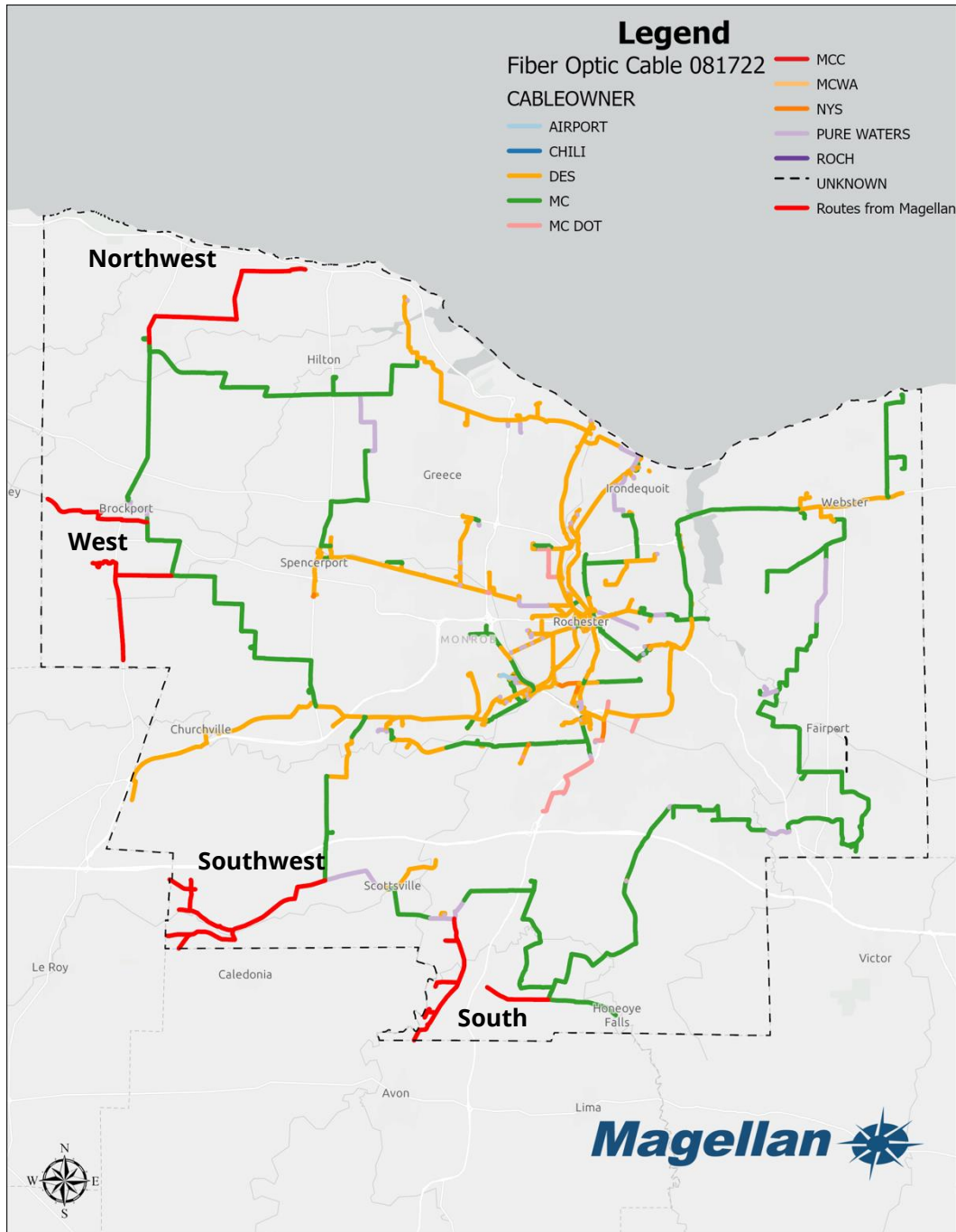
The current median speed achieved in the County based on Magellan’s survey is 83.99 Mbps download, and 10.55 Mbps upload speeds and for contrast, New York state’s median speeds are 179.32 download and 35.83 Mbps upload. Not only are the speeds the problem but the available services’ reliability. Based on the survey and community outreach, many County stakeholders have back up providers just to make sure they have something to work with when their main service does not work well, or at all. Due of the lack in competition, affordability and reliability are two overarching issues that put burden on many County citizens, and through the survey they have expressed their need for the County to have a higher level of participation on the County’s broadband infrastructure. To move forward, the County first needs to recognize today’s gaps on its digital infrastructure, and how it is impacting effective decision making in the context of scaling existing and future initiatives. Some gaps identified are as follows:

- There is a lack of accurate data available on who are served, unserved and underserved. The survey’s data collected as part of this Study are limited to those who have responded, and many citizens were not able to participate may be left behind.
- The County do not have a complete or a sufficient information on the providers’ (ISPs) existing service areas due to provider’s privacy concerns.
- The County may not be able to extend the use of its fiber to internet service providers (ISP) to lease due to the County’s legal limitations. (Magellan recommends that Monroe County examine the limits of use on its existing fiber.)

Figure 29 below and the supporting table (Appendix 3) is Magellan proposed extensions to Monroe County’s fiber network; the proposed fiber extensions are denoted in red.. The map and supporting table could be incorporated into other fiber-based County initiatives.

As a portion of the County’s fiber was built by and is part of the County’s sewer district infrastructure and financed through bonding, Magellan believes that there may be opportunities for leasing fiber to private entities or to internet service providers (ISP) to enhance residential and business internet offerings. While there may be opportunities to extend private, contracted use of this fiber network, Magellan recommends that a detailed analysis of the constraints and limits on these offers would need to be completed before any decisions are made on fiber use, any solicitations are issued, or contracts with private entities are executed.

Figure 34 - Fiber Routes (Existing and Magellan Proposed)



Appendix 4: Proposed Fiber Segment

<i>Area</i>	<i>Feet</i>	<i>Miles</i>	<i>Segment Location</i>
Southwest	14369	3	Flint Hill Rd
Southwest	3986	1	Lime Rock Rd
Southwest	11275	2	Oatka Rd
Southwest	3399	1	George St
Southwest	1860	0	Main St
Southwest	3534	1	Riga Mumford Rd
Southwest	7034	1	N Rd
Southwest	5921	1	Beulah Rd
Southwest	17247	3	Scottsville Mumford Rd
Southwest	2343	0	Wheatland Center Rd
Southwest	7302	1	N Rd
South	6354	1	Golah Rd
South	2319	0	Stull Rd
South	2106	0	Meadowood Estates
South	2255	0	East River Rd 2 of 2
South	262	0	Honeoye Falls 6 Rd
South	2798	1	Old East River Rd
South	16239	3	Honeoye Falls Five Points Rd
South	24369	5	East River Rd 1 of 2
South	3249	1	Perry Hills Rd
West	4969	1	Holley St
West	19513	4	West Canal Rd
West	6632	1	South Ave
West	16780	3	Autumn Ridge Dr
West	3487	1	New Campus Dr
West	207	0	Main St
West	2142	0	Commencement Dr
West	18507	4	State Route 19
West	14395	3	Colby St

Northwest	16486	3	North Hamlin Rd
Northwest	9485	2	Walker Lake Ontario Rd
Northwest	21030	4	Brick Schoolhouse Rd
Northwest	5468	1	State Route 19
West	207	0	Main St
West	2691	1	Adams St

Appendix 5: Stakeholders List

<i>Meeting Group</i>	<i>Person</i>
Municipal Leaders & CE Bello	Linda Gibson
Municipal Leaders & CE Bello	Tom Flaherty
Municipal Leaders & CE Bello	David Dunning
Municipal Leaders & CE Bello	Jacqueline Sullivan
Municipal Leaders & CE Bello	Ciaran Hanna
Municipal Leaders & CE Bello	Martin D'Ambrose
Municipal Leaders & CE Bello	John Moffitt
Municipal Leaders & CE Bello	Cosmo Giunta
Municipal Leaders & CE Bello	Maggie Ridge
Municipal Leaders & CE Bello	Erica Linden
Municipal Leaders & CE Bello	Annie Crane
Municipal Leaders & CE Bello	John Hartman
County DHS and Public Safety and Security	Denise Read
County DHS and Public Safety and Security	Perry Wheeler
County DHS and Public Safety and Security	Holly Roth
County Environmental Services	Michael Garland
County Environmental Services	Sean Murphy
County Environmental Services	Bill Putt
Municipal Leaders - Town of Sweden	Annie Crane
Municipal Leaders - Town of Greece	William Reilich
Municipal Leaders - Village of Fairport	Julie Domaratz
Municipal Leaders - Town of Webster	Tom Flaherty
Municipal Leaders - Town of Rush	Jeanne Morelli
Municipal Leaders - Village of Spencerport	Gary Penders
Municipal Leaders - Town of Henrietta	Stephen Schultz
County Information Services	Jennifer Kusse
County Information Services	Ken Forney
County Information Services	Jay Enderlin
County Information Services	Aaron Friedman
County Information Services	Daniel Krebs
Monroe County Literacy Rochester	Joshua Stapf
Broadband Task Force	Stephanie Townsend

Broadband Task Force	Rachel Barnhart
Broadband Task Force	Mary Lupien
Broadband Task Force	Howard Maffucci
Broadband Task Force	Lovely Warren
Broadband Task Force	Lesli Myers-Small
Broadband Task Force	Robert Poltrino
Broadband Task Force	Hanifab Dulwahid
Broadband Task Force	Richard Wright
Broadband Task Force	Brittany Wells
Broadband Task Force	Glen Van Derwater
Broadband Task Force	Marc Cohen
Broadband Task Force	Allison Clark
Broadband Task Force	B J Scanlon
Broadband Task Force	Steven Newcomb
Broadband Task Force	Brie Harrison
Broadband Task Force	Adam Traub
Broadband Task Force	Brenda LaCrosse
Broadband Task Force	Oliver Miller
Broadband Task Force	Sabrina LaMar
Broadband Task Force	Steve Brew
Broadband Task Force	Jackie Smith
Broadband Task Force	Simeon Banister
Broadband Task Force	Robert Duffy
Broadband Task Force	Anthony Plonczynski-Figueroa
Broadband Task Force	Stephanie Townsend
Broadband Task Force	Rich Sutherland

Appendix 6: Digital Inclusion

The critical nature of broadband was made evident during the pandemic. Instantly, people were forced to work, learn, and play at home. Those lacking in broadband internet were impacted in their ability to work-at-home and for their children to participate in remote learning. The pandemic also accelerated tele-medicine which is becoming a standard method to deliver basic health care. Thus, residents that lack broadband, lack the ability to participate effectively in modern societies and economies.

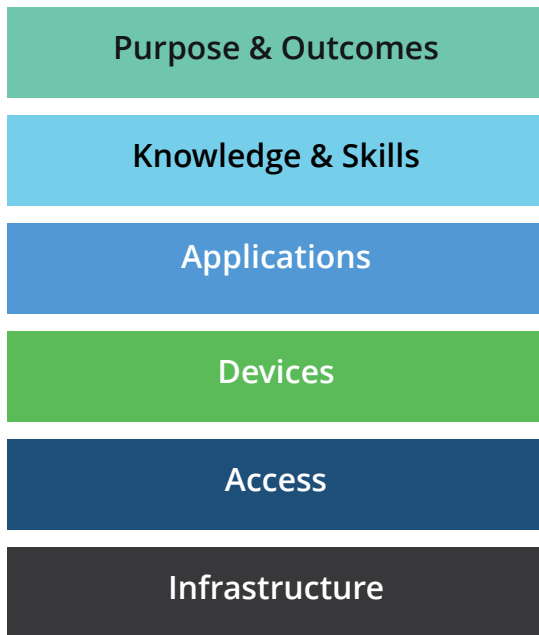
Those residents lacking broadband access are not limited by availability broadband internet access throughout Monroe County. It could be from fixed network providers such as Spectrum or Frontier, a wireless provider such as the 4G/5G providers, a variety of Wireless Internet Service Providers (WISP) offering Fixed-Wireless Access, or even from several satellite providers. The *availability* of internet access is not limiting most residents in participating in the modern economy. However, there are substantial segments of the population, including low income, immigrants, farmers, and senior citizens, that lack broadband internet access where they live.

The primary reasons these segments lack broadband are economics and digital literacy, as confirmed by some stakeholders interviewed in this Study. Economics impact broadband in two ways. First, is the cost of the devices such as laptops, PCs, or tablets. Second, are the monthly recurring fees. Digital literacy includes the ability to use devices to access the internet for any purposes. This impacts senior citizens and immigrants from less digitalized areas.

It is virtually impossible for a private provider to close the digital divide without public governmental interference because of the level and inaccuracy of data that is publicly available to track the unserved and underserved communities, and ultimately due to the cost of building network infrastructures in these areas.

Digital inclusion does not end with individuals. Ultimately, it involves transformation of businesses and other organizations. Technology can make them more efficient, flexible, productive, and, therefore, more sustainable. Generally, this involves increasing knowledge, skills, and pay by substituting technology for labor. It requires a whole suite, or “stack,” of technology components, illustrated in the figure below.

Figure 35 - The Tech Stack



Each component, or layer, of the tech provides key functions for the layers above and below. For example, network access requires infrastructure and devices require access. Functionality is constrained from the bottom up so should be driven from the top down: The type of infrastructure should be determined by the type of access required, not vice-versa. Ideally, purpose and intended outcomes should be clearly defined before other components of the tech stack. Components at the top of the stack are limited by lower layers. The knowledge and skills required are often determined by the available applications, which are in turn determined by the available devices, etc.

There are two keys for achieving digital inclusion. The first is to define the current, default stack and the ideal, planned stack. These should be touchstones to guide digital development efforts as well as rubrics for assessing it. The second key is to capitalize on resources to create a sustainable source of support for digital inclusion. Technology is getting cheaper and easier, but it is not free or self-evident. Digital development requires money and time. Generally, the lower layers of the stack require relatively more financial capital while the upper levels require more human capital.

Technology companies want to invest in digitally inclusive places with solid, complete technology stacks. This means communities must invest in their tech stacks. Private companies must invest in their tech stacks. Government agencies must invest in their tech stacks. An initial infusion of capital can be critical as a catalyst to kick start this process.

Monroe leads other communities in linking network investment to larger outcomes. The basic bottom line benefits of digital inclusion for the County are reducing social costs from crime, disease, poverty, unemployment, etc. The top line benefits relate to basic municipal functions—why counties and cities exist: improved quality of place, increased economic activity, incomes, and tax base, and more effective operations. Beyond this, the County should realize many indirect benefits as local industries, institutions, residents, and visitors use the network.

Appendix 7: Overview of Business Models

The general requirements throughout Monroe County, particularly for business and industry, are for much greater throughput: network access should be symmetrical 1 Gbps services with a path to 10 Gbps services. Private industry and public institutions require multiple providers and redundant network routes in the area for greater reliability. The general requirements in more rural parts of the County are more fundamental: Simple access.

Services based on coaxial cables and twisted pair wires simply cannot economically meet these requirements. Indeed, these general requirements translate into more specific infrastructure requirements. Monroe County needs to focus on expanded fiber backhaul and towers where they lack, as well as key last-mile distribution technologies to provide retail Internet services.

Broadband Technology for Monroe County

The right choice for broadband technology is imperative for Monroe County's deployment of infrastructure in areas of the County.

Fiber-optic technology is the gold standard, it maintains life for 20+ years and is the infrastructure that enables all other technologies including advances in wireless, satellite, and 5G. To develop a long-term broadband infrastructure plan, the County must make investment in fiber optic projects where it can.

BROADBAND BUSINESS MODEL OPTIONS

A business model describes how a product or service is developed, operated, and supported. Traditional broadband business models involve enterprises established specifically to provide communications services. The earliest such enterprises were startups that leased telephone lines to provide service. Today, most services are provided by either traditional cable television or telephone companies that added internet access as an optional service via the companies' own infrastructure.

Many local governments and other public enterprises provide broadband or similar services, most only to internal departments and other public agencies. Many also provide free public Wi-Fi access at public facilities. Some provide for-fee services to businesses and residences, competing head-to-head with for-profit providers. Others partner with private companies. There are a range of policies and programs local governments, and other institutions can implement to foster broadband

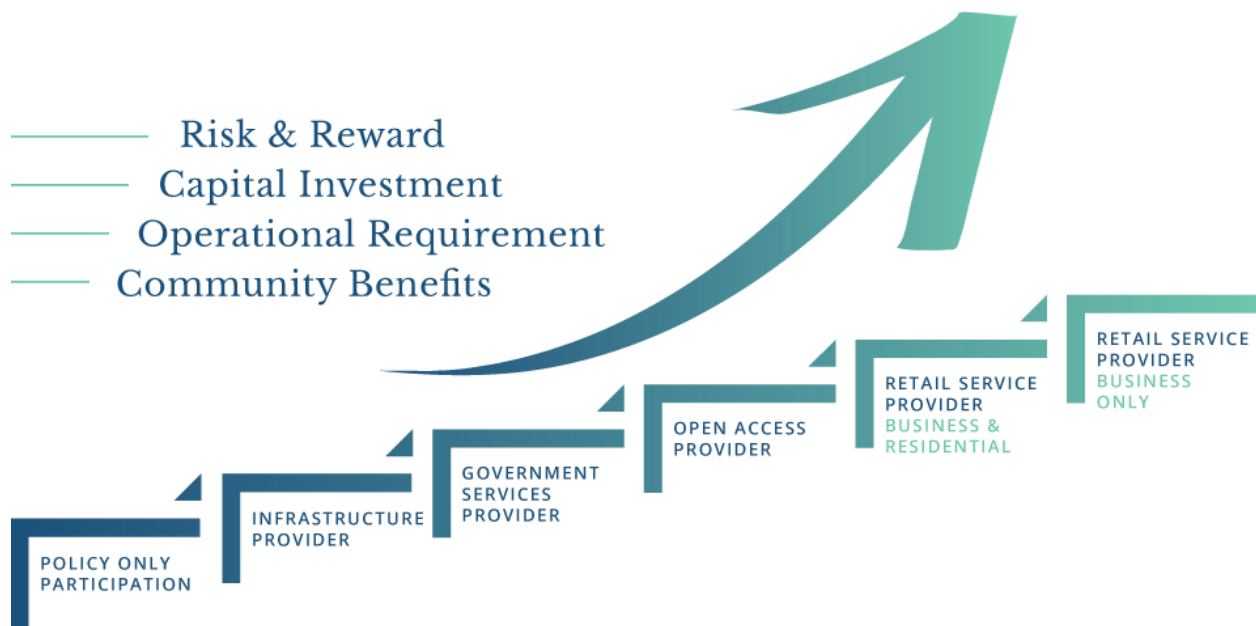
development. Which to implement depends on the factors depicted in Figure 31 and is entirely dependent on the local leadership’s view on what Government’s Role is in incentivizing and even directly driving broadband investments.

Figure 36 - Inputs to Selecting the Right Broadband Approach



The greatest return on any investment in network assets comes from using them for broadband services. The best, most feasible, and viable business model is one that aligns with the vision of the community, its leadership, and government operations. Becoming a fully functioning provider comes with significant challenges. Monroe County leaders will need to make decisions about the level of benefits they hope to achieve and level of investment they are willing to make.

Figure 37 - Risk and Reward Continuum of Broadband Business Models



The business models fall on a continuum, illustrated in the figure above, that ranges from low-risk options, low investment options to higher risk, and high-risk investment options. As a local government evaluates the various business model options along the continuum, it will encounter greater degrees of risk and reward; risk, in terms of financial, operational, and regulatory risk; reward, in terms of community benefits, revenue generation, and overall potential for profit. Moving “up” the continuum also implies greater local government participation in the delivery of

broadband services. The table below provides a high-level comparison of the business model options.

Table 23 - Comparison of Public Broadband Options

CONSIDERATION S	Passive Government Models				Active Government Models		
	<u>Policy-</u>	<u>Infrastructure- Only</u>	<u>Partnerships (P3)</u>	<u>Public-Only</u>	<u>Wholesale Open Access</u>	<u>Business-Only</u>	<u>Full Retail</u>
Services	None	Dark Fiber Only	None	All/Any	Transport	Internet	Internet
Customers	None	Broadband Providers	None	Public Agencies	Broadband Providers	Businesses	Businesses & Residents
Funding	Low	Moderate	Low to High	Moderate	Moderate	Moderate	Moderate
Compete with Providers	No	No	No	No	No	Yes	Yes
Operational Requirements	Low	Low	Low	Low	Moderate	Moderate	Moderate
Regulatory Requirements	Low	Low	Low	Low	Moderate	High	High
Revenue Generation	Low	Low	Low to High	Low	Moderate	High	High
Operational Costs	Low	Low	Low	Low	Moderate	Moderate	Moderate
Financial Risk	Low	Low	Low	Low	Moderate	Moderate	Moderate
Execution Risk	Low	Low	Moderate	Low	Moderate	Moderate	High

(a) Policy-Only

This is the most passive model and includes permitting, right of way access, construction fees, and franchises that regulate the cost of constructing and maintaining broadband infrastructure within its authority. This option is not considered a true business model but does significantly affect the local broadband environment and is therefore included as one option.

(b) Infrastructure-Only

Municipalities lease and/or sell physical infrastructure, such as conduit, dark fiber, poles, tower space, and property to broadband service providers that need access within the community. These providers are often challenged with the capital costs required to construct this infrastructure, particularly in high-cost urbanized environments. The utility infrastructure provides a cost-effective alternative to providers constructing the infrastructure themselves.

(c) Partnerships

A broadband public-private or public-public partnership (P3) is a negotiated contract between a public entity (i.e., Monroe County) and private or public entity to fulfill certain obligations to expand broadband services in each area. P3s leverage public broadband assets, such as fiber, conduit, poles, facilities with private broadband provider assets, and expertise to increase the availability and access to broadband services. Partnerships can also be formed through the development of grant programs or joint partnerships in applying for funding.

(d) Public-Only

These organizations are generally limited to the community anchors that fall within their jurisdiction, including local governments, school districts, higher educational organizations, public safety organizations, utilities, and occasionally healthcare providers. Many of these anchors require connectivity and often, the municipal network provides higher capacity at lower costs than these organizations can obtain commercially. This is generally the model that Monroe County employs today for its current backbone network.

(e) Open Access / Wholesale

Municipalities that adopt open-access generally own a substantial fiber-optic network in their communities but do not provide services to consumers. Open access allows these municipalities to “light” the fiber and equip the network with the electronics necessary to establish a “transport service” or “circuit” to service providers interconnecting with the local network. The concept of open access is designed to enable competition among service providers across an open network that is owned by the municipality. The municipality is essentially a “wholesale” provider that retains neutrality and non-discriminatory practices with the providers who operate on the network.

(f) Business-Only

Municipalities that provide end users services to business customers are considered retail service providers. Most commonly, municipalities provide voice and Internet services to local businesses. In many cases, a municipality may have built a fiber network for the purposes of connecting the city’s primary sites that has been expanded to connect local businesses, in effort to support local economic development needs for recruitment and retention of businesses in the city. As previously stated, there are challenges in the State of New York that can make providing business-only retail services challenging.

(g) Full Retail

Municipalities that provide end user services to businesses and residential customers are considered retail service providers. Most commonly, municipalities provide services to their businesses and residents through a municipally owned public utility or enterprise fund of the city. As a retail service provider that serves businesses and residents, the municipality is responsible for a considerable number of operational functions, including management of its retail offerings, network operations, billing, provisioning, network construction, installation, general operations, and maintenance. As previously stated, there are challenges in the State of New York that can make providing full retail services challenging.