Report:

Dutchess County Broadband Strategic Plan

Prepared for:

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NYSTEC
YOUR INDEPENDENT TECHNOLOGY ADVISOR

Working Draft

This draft document represents a work in progress for the broadband access survey and gap analysis project. It is provided exclusively for the purpose of review. During the project, this document will be updated, replaced, or made obsolete by future versions or replacement documents and should, therefore, not be viewed as either final or nearly final.

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REVISION HISTORY			
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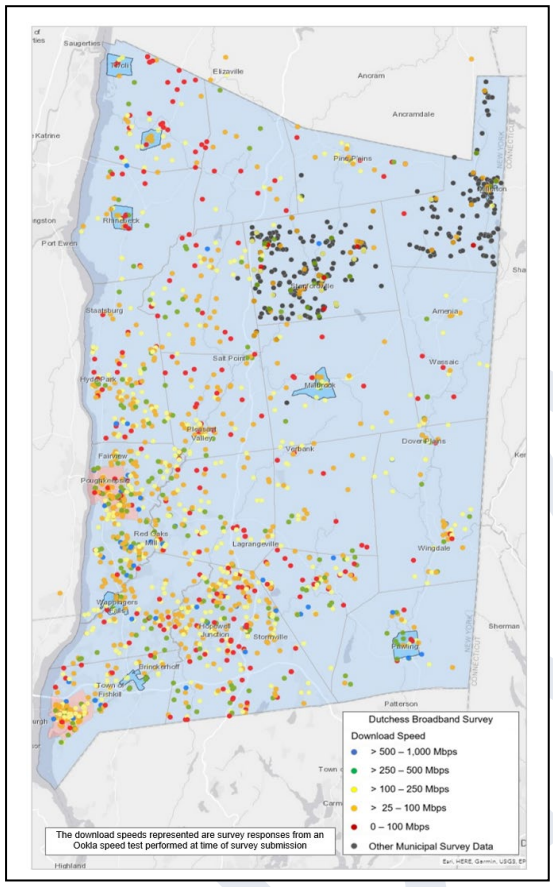
1.0		NYSTEC	Initial Draft

List of Figures

2 Executive Overview

Dutchess County, New York, has undertaken a multiyear planning approach focused on understanding the existing broadband environment while looking for opportunities to expand broadband throughout the county.

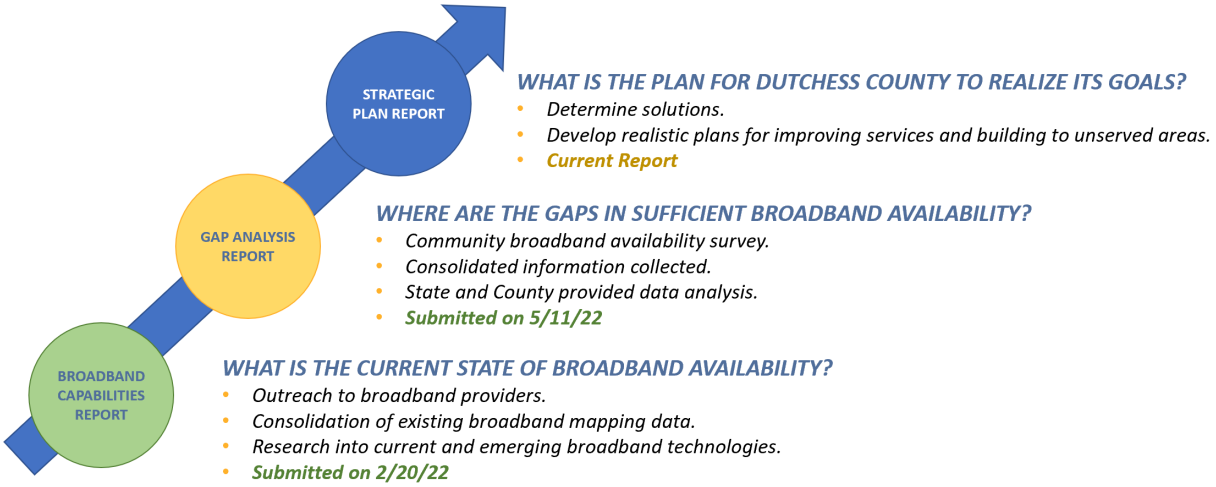


As part of this approach, the Dutchess County Broadband Strategic Plan was developed. The purpose of the plan was to identify potential strategies for broadband deployment improvements by understanding the communities of interest (unserved/underserved or opportunities for improving existing service). Dutchess County's vision is to become a model intelligent community that encourages high-speed broadband services to serve businesses, schools, government, healthcare facilities, and the public at large.

NYSTEC was engaged by the Dutchess County Broadband Commission to provide strategies to address the underserved and/or unserved areas within the county. As part of this engagement, NYSTEC was tasked to deliver this strategic plan, which establishes a direction for assisting with closing broadband gaps.

NYSTEC worked with the Dutchess County Working Group on two primary tasks as inputs into the strategic plan. The first was determining the as-is state of broadband within Dutchess County, which involved collecting as-is broadband data from both public and private entities. That information was collected via survey responses.. The associated data from that survey was consolidated in a geographic information system (GIS) mapping layer that will be provided to the county. The second task was conducting countywide broadband questionnaires/surveys of residents, government, nonprofits, and businesses. It is important to note that other municipal surveys were conducted by individual entities and that the information they shared was collected and included in the data sets.

FIGURE 1, DUTCHESS COUNTY STRATEGIC PLAN ROADMAP



The result of this project was to gain a comprehensive picture of the broadband deficiencies in Dutchess County and the associated strategies, were identified, regarding how to best address those issues. The deliverables associated with those tasks were the broadband capabilities report and the gap analysis report. While a summary of those reports is provided in sections 1.1 and 1.2, more detailed information regarding their contents can be found in Appendix A and B, respectively.

Note: For the purposes of this report, the terms broadband and high-speed internet are interchangeable. This report is intended to be the last of three reports.

2.1 Broadband Capabilities Report Summary

Beginning in the summer of 2021, state and county data was collected to determine what providers were offering broadband in the county, what services/broadband speeds they were currently providing, and what their future plans were for broadband expansion/enhancement.

Below is a summary of the findings of the Broadband Capabilities Report *(for additional detail please see Appendix A)*:

- NYS data sets from 2018 indicated that more than 93% of Dutchess County residents are considered served (this was using the previous 100Mbps download/10Mbps upload [100/10] "served" criteria and used the one-served, all-served methodology, which is based on speeds available at a census block level). *The data in Figure 2 below reflects the updated information that was released June 7, 2022, which shows 96% of Dutchess County residents considered served.*

- While there are, at minimum, 12 broadband providers in the area, there are three that provide service to the largest share of residents (Altice/Optimum, Charter, and Verizon serve more than 85% of the residents, based on the countywide broadband survey), and there are a few areas where there are multiple providers providing broadband service above 100/20 (new FCC broadband speed definitions, see Section 2 for details).
- When conducting the interviews, many of the providers did not have a plan for expansion and indicated that they only address expansion and/or network enhancements on a case-by-case basis, as it applied to their business model.
- Emerging technologies were explored as an alternative to wired service, as there continues to be a growth in the speeds these new technologies can provide (e.g., 4G, LTE, fixed wireless, satellite).
- With the announcement of the ConnectALL NY and National Telecommunications and Information Administration (NTIA) internet-for-all programs, providers look to expand or update their services.

2.2 Gap Analysis Report Summary

After the initial broadband provider interviews took place and were documented in the broadband providers capabilities report, NYSTEC, in conjunction with Dutchess County, developed a survey that was shared with the community. That survey was conducted between December 2021 and March 2022, and the questions were directed at the community at large, with additional questions for business, nonprofits, and government entities. This survey could be taken online (in English and Spanish) or on paper for those without internet service.

Prior to the countywide surveys, there were other municipal surveys (Stanford, NorthEast-Millerton) conducted, as those communities were looking to understand the broadband landscape in their respective geographies. The results from those surveys were also incorporated into the gap analysis.

Key findings from the surveys include:

- ~10% of respondents claimed to not have access to high-speed internet.
- ~35% of respondents claimed that their high-speed internet was inadequate.
- Based on the comments provided, many of the respondents that had broadband service indicated that their service was unreliable, had slow or inadequate speeds, and that the lack of competition was likely partially to blame for service issues and high costs.

While it is not possible to confirm that that the survey results are directly aligned with the whole community, the identified gaps and recommended strategies address the broader high-speed internet issues that impact *all residents within Dutchess County.*

Based on the information collected from the broadband provider capabilities report and community surveys, the gaps identified were clear. The analysis indicated that there were three overarching gaps that would form the basis for the strategic plan:

- **Unserved/Underserved Broadband Service**: There are areas throughout the county that have no access to broadband. This is often in rural areas, where providers believe there is not a sufficient return on investment to support the build costs.
- **Inadequate Broadband Service:** Many more respondents claimed to have *inadequate* service than claimed to have *no* service. Improving existing service is important to ensuring that the community has access to broadband to meet their current and future needs.
- **Educational Opportunities:** There are often changing provider footprints, service plans, emerging technology, and funding sources available that can enhance broadband capabilities and options – without clear communication, the public would have no idea that those opportunities exist.

For additional detail regarding the survey findings and gap analysis, see Appendix B, which contains the full report.

Sections 2 and 3 of this report provide potential strategies and available opportunities to address the noted broadband gaps.

3 Key Strategies for Identified Gaps

With the acknowledgement of the importance of broadband being recognized and solidified into initiatives for broadband expansion at the national and state levels, and in alignment with the timing of this report, there has been a national push to further explore the current funding sources and program details that can potentially assist with the expansion of broadband in Dutchess County.

The details of the funding sources available at the time of this report can be found in Appendix E. As program details and funding deadlines change, that document will need to be updated accordingly. As with other aspects of the strategies identified in this report, regular updates and tracking progress (including third-party follow ups) will be required to ensure that the county is aware of and actively monitoring and assisting stakeholders from all aspects of these broadband projects.

It is recommended that the county have a team committed to seeing the vision of broadband for all through to completion. To successfully accomplish this, reporting on the following will be required:

- **Federal Communications Commission (FCC) Map Update Oversight/Awareness** (including reported broadband speeds).

- **Continued Funding Updates/Program Changes** (See appendix A for funding sources available at the time of this report) – The overarching federal programs are detailed below, but specific project criteria and timelines change, and programs can be cancelled or added at any time.
- **Provider Network Upgrades/Expansion; with Proposed Schedules** – This could be deployment of new physical infrastructure and/or technology upgrades that allow for high-speed broadband access.

The information below prior to Section 2.2 provides additional details regarding the recommended strategies for expanding and enhancing broadband and for educating the community and other stakeholders of the current and future state.

FCC Maps

The FCC is in the process of updating their broadband maps with the Broadband Data Collection (BDC) program. From their website:

> "The need for accurate data pinpointing where broadband service is available, and where it is not available, has never been greater. Service providers and governments use broadband maps to make decisions about where service is needed and how to fund the expansion of broadband services.
>
> **The FCC is in the process of updating its current broadband maps with more detailed and precise information on the availability of fixed and mobile broadband services.** The Broadband Data Collection (BDC) program will give the FCC, industry, state, local and Tribal government entities, and consumers the tools they need to improve the accuracy of existing maps."

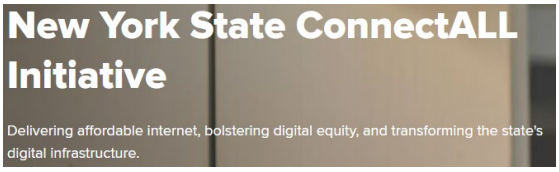
These maps will provide a more comprehensive picture of the state of broadband, down to the individual location; it will be continually updated by providers and other stakeholders and is expected to be available to the public sometime after September 2022, when the provider broadband collection filings are due to the FCC *(see Appendix C – Dutchess County Broadband Roadmap for more information).*

Federal/State Funding Programs

Below is an overview of current federal and state broadband initiatives. The government, from the federal level down to individual municipalities, is committed to providing broadband service to everyone.

Why High-Speed Internet Access Matters

America runs on high-speed internet. It powers our economy and supports education. It fosters better public health. It connects loved ones and strengthens social ties. It helps citizens connect with their democracy and one another. But not everyone is connected. Too many Americans are cut off from the opportunities that high-speed internet makes possible. That's why we're working to bring high-speed internet to all Americans.



Making Broadband for All a Reality

As part of her 2022 State of the State address, Governor Hochul announced the $1+ billion ConnectALL initiative — the largest ever investment in New York's 21st century infrastructure. This initiative will deliver affordable internet access to millions of New Yorkers, bolster digital equity, and transform the state's digital infrastructure through new investments.

Read more about ConnectALL.

Provider Network Upgrades/Expansion

Broadband providers are regularly making changes to their business models and how to best serve the community with their business interests in mind. Constant communication with providers is the best way to ensure that you have an accurate understanding of their current network and future plans, as you look for opportunities to partner with providers who are enhancing broadband throughout the county.

The remainder of Section 2 details some examples of active and planned projects—to offer some insight into current trends in the industry that are being deployed.

2.1 Unserved/Underserved

There are areas within the county that have no access to broadband. This is often in rural areas, which are difficult to reach, or where providers believe there is not a sufficient return on investment to support the build costs.

A large focus of the ConnectALL NY and NTIA internet for all programs will be providing broadband to the unserved/underserved.

These are the most recent federally recognized unserved/underserved criteria:

- Unserved locations (no access to 25/3 Mbps).
- Underserved locations (no access to 100/20 Mbps).

Most publicly available funds generally apply to areas that are considered unserved or underserved. Until recently, this was dependent on the "one-served, all-served" methodology, which considers a complete census block's service to be that of the highest available speed offered within that census block.

With the updated FCC data maps presenting a more granular picture of the broadband availability, there will be an increase in the accuracy of this information and the ability to identify unserved areas.

The areas with limited service or no service at all are typically in more rural areas, where there is a low density of homes or buildings. The number of homes per mile often dictates whether a provider will build to a certain area.

There are several ways to provide broadband service to unserved and underserved areas, with the most common being the installation of new wired broadband infrastructure to homes. As technology continues to improve, there is emerging broadband technology that is becoming comparable to wired broadband.

New wireline broadband builds, whether fiber or cable, are usually installed on utility poles or underground, with upgrades also available—in some cases—with only equipment upgrades. Appendix D presents examples of wireline build pros and cons, as well as estimated costs per mile and associated timeframes.

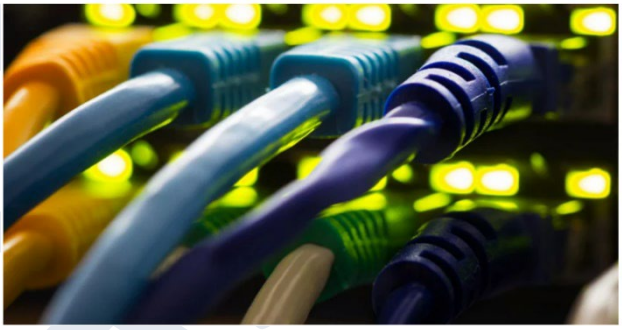
Updates to the FCC maps will show measurable results by the updated speeds that are reported and the identification of projects that are planned for unserved/underserved areas.

3.1.2 Installation of New Wired Broadband Infrastructure to Homes

Installation of new wired broadband infrastructure to homes is one of the most reliable ways to provide residents with high-speed broadband. This could be fiber optic or other cabling capable of delivering broadband service. In many cases, this may require third-party funding, and there is a much better chance of securing funding if the area is considered unserved or underserved.

Many broadband providers work within their business models and generally do not build out areas that are already served, as take rates tend to be low (based on demand [already served] or capacity [rural - minimal homes per mile]).

Appendix B shows some estimated build costs—based on density—to give an idea of how this could affect providers' desire to build out or expand broadband to a given area. It also presents some traditional broadband deployment methods, along with rough order of magnitude costs and time frames for deployment.

Example Project of New Wired Broadband to Homes
"Much of the funding for such a project could come from the New York State ConnectALL initiative. ConnectALL is a plan to use $1 billion in public and private investments to expand broadband access across the state. *To support local efforts to expand broadband, the initiative will establish three grant programs to provide funding to local municipalities and other entities to plan, engineer, and construct accessible broadband infrastructure.* *Mr. McAdoo said it would cost from $10 million to $12 million to construct a network to serve every residence in Canton.* ***If a municipal network is not pursued,** there should still be a plan to get access to the unserved residences, he said.* ***The best way to achieve that would be to ask for requests for proposals from Spectrum, Verizon, SLIC and TDS to provide the service."*** Source NETWORK **Canton, N.Y., to Consider Municipal Broadband Network** Following a presentation of a new broadband study, officials recommended holding a meeting about taking a two-pronged approach to improve access to high-speed Internet, including discussion of a municipal network. May 26, 2022 • Thomas Graser, Watertown Daily Times   

3.1.3 Determination of New and Emerging Broadband Technology Comparable to Wired Broadband

There are areas it may not be possible to build wireline broadband, or the cost and/or time to reach those areas make it too difficult to complete. If wired builds are not feasible in those areas, other new and emerging technologies may provide service to those who may have previously seemed unreachable.

With continual advances in technology, there are more and more options to provide service to unserved/underserved residents. From fixed wireless to satellite, broadband deployment speeds continue to improve, offering solutions for connectivity where it would not have been possible in the past.

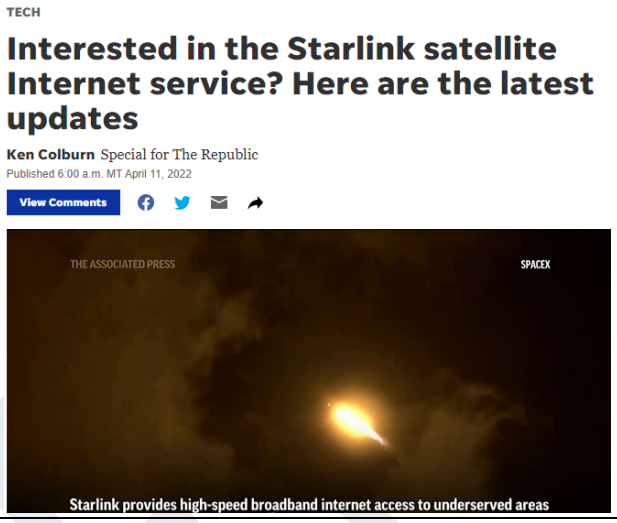
Example Project of Comparable Broadband Technology

"Since they started making the service publicly available in October 2020, the number of low-orbit satellites in the network has more than tripled to over 2,000 which has improved coverage and performance.

The long-term first phase goal is to have nearly 12,000 satellites in the network to provide coverage for the entire planet.

The ground-based satellite dish has gone from a round concave design to a flat rectangular dish that is lighter and thinner. The associated Wi-Fi router has also seen a slight upgrade with an additional MU-MIMO antenna (3x3 vs 2x2) for more simultaneous connections on the local network."

Source Link
Availability Map


TECH

Interested in the Starlink satellite Internet service? Here are the latest updates

Ken Colburn Special for The Republic
Published 6:00 a.m. MT April 11, 2022

View Comments

3.2 Inadequate Broadband Service

Based on the countywide survey results, there were many more respondents who claimed to have inadequate service than claimed to have no service at all. Improving existing service is important to ensuring that the community has access to broadband to meet their current and future needs.

Potential ways to improve service in those areas include existing providers making improvements, new providers overbuilding, and new and emerging technologies (NET) offering comparable service. Many would find the latter two options preferable, as they would bring competition to those already served areas, although there can often be challenges presented with those options – most notably, many grant funds apply only to unserved/underserved areas.

Sections 2.2.1 through 2.2.3 explore NET in more in depth and provide real-world examples and potential solutions. While it could be difficult to gauge how successful changes to this issue can be quantified, there are several ways to ensure that the community is getting the service it needs.

- **Documented Provider Enhancements:** Communication with key stakeholders (service providers, municipal contacts, etc.) regarding changes that service providers are implementing, and working with the community to confirm changes are experienced on their end.
- **Community Feedback:**
  - Follow-up community survey—although these are voluntary surveys and results are not scientific.
  - Active portal or other method for the community to notify the county of issues they are experiencing *(see section 2.4.3 "Broadband Communication Plan").*

3.2.1 Current Provider Upgrades

Many providers continually upgrade service for business and community benefits. How this is accomplished is often tied closely to their business models.

Since there are a few key providers in many areas of Dutchess County, incentivizing existing providers to improve service would benefit the community.

Many cable providers use Data Over Cable Service Interface Specification (DOCSIS), which is a standard for cable transmission of Internet Protocol (IP) data services. As DOCSIS technology improves, greater speeds become available. Cable providers use this technology to provide greater speeds when it is not feasible to expand fiber into their coverage areas. Other cable providers may decide to use their attachment space on utility poles for fiber-optic upgrades. Those upgrades can be a combination of equipment upgrades and fiber deployments.

Legacy telephone companies also upgrade their networks regularly, and some of the older copper digital subscriber line (DSL) networks have been migrated to new fiber infrastructure for enhanced service.

Example Project of Current Provider Upgrades
"In an article from Fierce telecom, Altice USA's CEO *Dexter Goei discusses the company's plan to deploy symmetrical 2-gig service. This will begin in 2022 with further expansion into 2023.* *Altice has been looking to shore up its business in areas where it competes with Fios, outlining plans to prioritize fiber deployments in Verizon territories as it works to cover a total of 6.5 million locations with the technology by the end of 2025. The 2-gig service will be priced at $120 per month while the 5-gig offer will run $180 per month."* Source Link   

Discussion with Optimum Business highlighted their efforts to deploy fiber-optic services to prospective clients. They first look at expansion in fiber optic deployment, and if it benefits Optimum based on their business model, that will in turn create service availability to any underserved or unserved areas along their service route. Also noted was an alignment between the capabilities of their business offering with their consumer offerings of service levels. Participation in the Affordable Connectivity Program (ACP) within existing footprints allows for assistance with providing broadband service to residents who are not able to afford it. Altice's (Optimum) existing network capabilities far exceed the unserved/underserved minimums.

3.2.2 New Broadband Infrastructure to Homes by Additional Providers

New broadband infrastructure deployment into areas where there are already additional providers is a logical way to improve competition. While there is a significant community benefit in this, there is often not a business case to do it. Adding competition will likely require third-party funding, which can be a challenge if the area is considered "served."

While areas considered to be "served" are less likely to be allocated government grant funds due to broadband service already being available in the area, there are private funding sources that are willing to build out those areas if they meet a set criterion for their business model. These private builds are often in more dense residential areas, where the conditions are right for these buildouts.

Example Project of New Broadband Infrastructure in "Served" Area	
*"Greenlight's fiber network will deliver data speeds as high as 2 Gbps, with a base speed of 500 Mbps upload and download for $50 a month. **Greenlight's Internet service is five times faster and 25 percent less expensive than the incumbent cable provider**, with no contracts, taxes, or hidden fees. Fiber internet provides the best possible online experience for gaming or streaming high-quality video and supports simultaneous high-speed connections across multiple devices.* *"Greenlight Networks will be expanding their services in the Town of Clifton Park in 2022, offering an additional option for high-speed fiber to the home, said Supervisor Barrett. "The new internet service will provide Clifton Park residents with a new option for a service many people use every day."* Source Link	**Greenlight Networks to Bring its Gigabit FTTH Service to Clifton Park, NY** November 2, 2021 By BBC Wires 

3.2.3 Determination of Emerging Broadband Technology Comparable to Wired Broadband

Similar to Section 2.2.3, where new and emerging broadband is explored for unserved/underserved areas, NET is often a more viable alternative to the legacy providers when people want competition. There is often little to no governmental funding for areas that are already served, leaving those residents with just one broadband provider. Using emerging technology can be a more cost-effective way to drive competition.

3.3 Educational Opportunities / Communications Planning

Although there are several existing opportunities for residents and businesses to access multiple providers and broadband services at reduced rates, there is a significant lack of public awareness for

those programs. It is crucial to create and maintain a public communications schedule to inform and educate the public on Those programs. This can include social media posts, newspaper articles, educational seminars, and more.

There are often changing provider footprints, service plans, emerging technology, and funding sources available that can enhance broadband capabilities and options – without clear communication, this information can often be missed. As an example, and as detailed in section 3.3.1 Broadband Adoption, there is a federal Affordable Connectivity Program where a credit can be applied to low-income residents who meet the criteria – how does the county assist with making sure everyone aware of this program to be able to apply?

A detailed communications plan shared with all relevant stakeholders is vital to improving broadband availability, maintaining public awareness, and keeping citizens engaged. *(see Section 2.4.3).*

3.3.1 Use of Mapping Data

Mapping data has proven to be a useful tool while analyzing different situations. It provides a platform that is familiar to the user and allows for geographical discussion around needs in a certain area. Mapping can provide route information for serving remote areas. Adding topographical information can allow for proper planning and the estimation of resources required. With locational information, you can direct resources to a single point and provide multiple points for common discussion.

Using a broad scope of resources, we were able to create graphical picture of the provider and existing network deployments within Dutchess County. By overlaying the responses from the broadband gap survey participants, and the Broadband data provided by other Municipalities, we believe that the mapping effort created a very detailed, Dutchess County-focused picture of the broadband needs of the county as a whole.

FCC Map Details

Using information provided in the broadband capabilities and gap analysis report and the strategic plan could provide deeper insight into the broadband landscape and plans. From the NTIA BEAD FAQ:

> The broadband data maps refer to the maps created by the FCC that will be used by NTIA in determining the allocation of funding for each eligible entity in the Broadband Equity, Access, and Deployment (BEAD) Program. Those maps will identify the availability of broadband service at the individual location level, as opposed to previous maps produced by the FCC that provided data at the less granular census-block level. Entities may refer to the FCC's Second Report and Order on Establishing the Digital Opportunity Data Collection for further detail on the FCC maps.

> In preparation for the FCC broadband data map release and subsequent challenge process, an eligible entity may improve their data collection and analysis efforts by identifying existing pertinent data sources (e.g., NTIA's Indicators of Broadband Need map, the American Community Survey [ACS], National Broadband Availability Map), collecting relevant data and information on both infrastructure availability/access and adoption/use, and developing/updating a comprehensive broadband map at the location level. Refer to the FCC's Third Report and Order (FCC 21-20) for further detail on the FCC challenge process.[1]

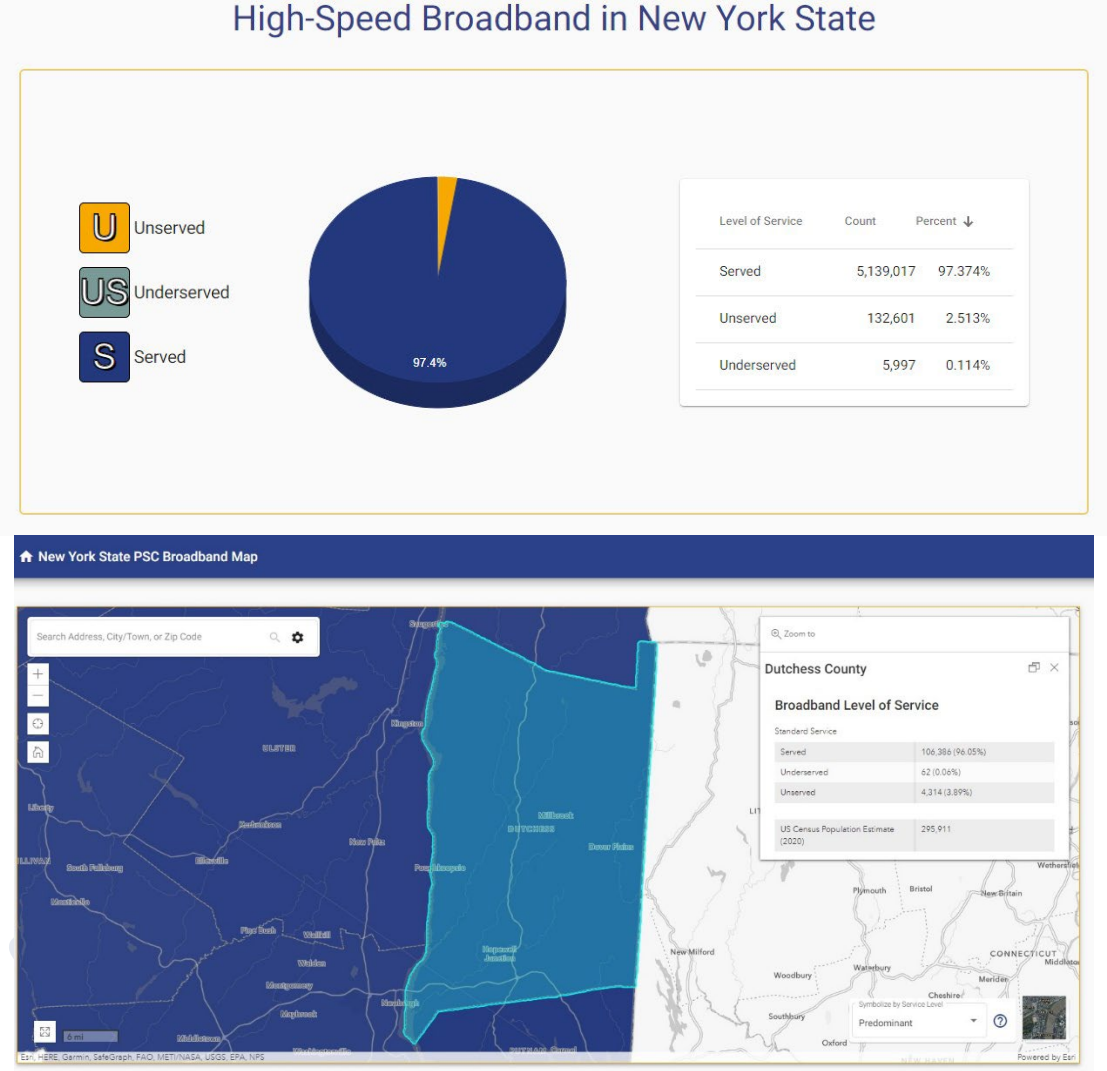
The NYS Public Service Commission Broadband Map

The NYS Public Service Commission (PSC) broadband map seems to present a statewide view of the perceived gaps in broadband service delivery. Local GIS mapping offers a more comprehensive picture of specific county needs by focusing on Dutchess County-specific surveys, whereas the statewide maps offer a generic picture of the broadband landscape at the state level. Revisions of the acceptable rates of service have changed in the past year from "one served, all served," where if one household in a given area has access to 25down/3up connection, that area was identified as "served." The new mapping effort employs an underserved (<100/20)/unserved (<25/3) model on the individual household level. With contributor-provided input, this should align the statewide view with the more specific gaps in broadband services, as locally focused surveys and feedback will most certainly be more in tune with the local representation of need.

Figure 2 offers two snapshots of the NYS Broadband assessment effort updated June 7, 2022. It shows an overview of the data collected for discussion and is based on the familiar Street and Address Maintenance (SAM) data. It points to a specific address independent of type of property. It does not define whether the specific point is a single- or multiple-unit dwelling, or if it is a business. As this is a Statewide look, it may not be the best representation of the individual county/city/town/village/hamlet level detail that would be necessary to focus on a specific area of need for services. You can explore the data in detail on the PSC broadband map.[2]

[1] https://broadbandusa.ntia.gov/sites/default/files/2022-06/BEAD-FAQs.pdf
[2] https://mapmybroadband.dps.ny.gov/explore

FIGURE 2, HIGH SPEED BROADBAND IN NEW YORK STATE



3.3.2 Community Education

Community education ensures that stakeholders are engaged and updated and maximizes collaboration while providing a platform for ongoing communication. With changes already happening within the county and other broadband improvements being planned, it will be increasingly valuable to share the successes and challenges within the community of Dutchess County. The county already has a robust social media presence in the community and using and expanding on that with additional resources and tools would add value.

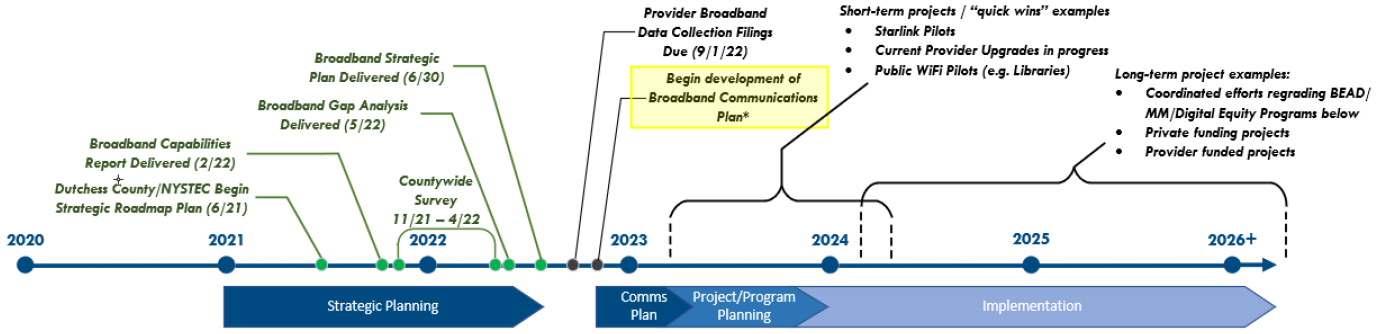
Using local school districts as a source of engagement and distribution of materials to families is a built-in source for driving communication. Dutchess County public schools, which educate 46,000 students and employ more than 3,000 educators, can distribute information through backpack packets for students to give to their families.[3]

As traditional communications vehicles like newspapers, television, radio, and the county newsletter/website and social media sites share a common demographic of users who are restricted by access to broadband, it is recommended that Dutchess County use those tools to communicate service plan changes, coverage areas, and public initiatives tied to broadband availability and expansion.

3.3.3 Broadband Communication Plan

As you can see from the roadmap timeline below, foundational groundwork has been completed by Dutchess County in assessing the current state environment, identifying gaps, and leveraging strategic planning for the future. One of the most vital components of the strategic plan is the development of a communications plan.

FIGURE 3, BROADBAND ROADMAP TIMELINE



Communication plan strategy should be established with a focus on:

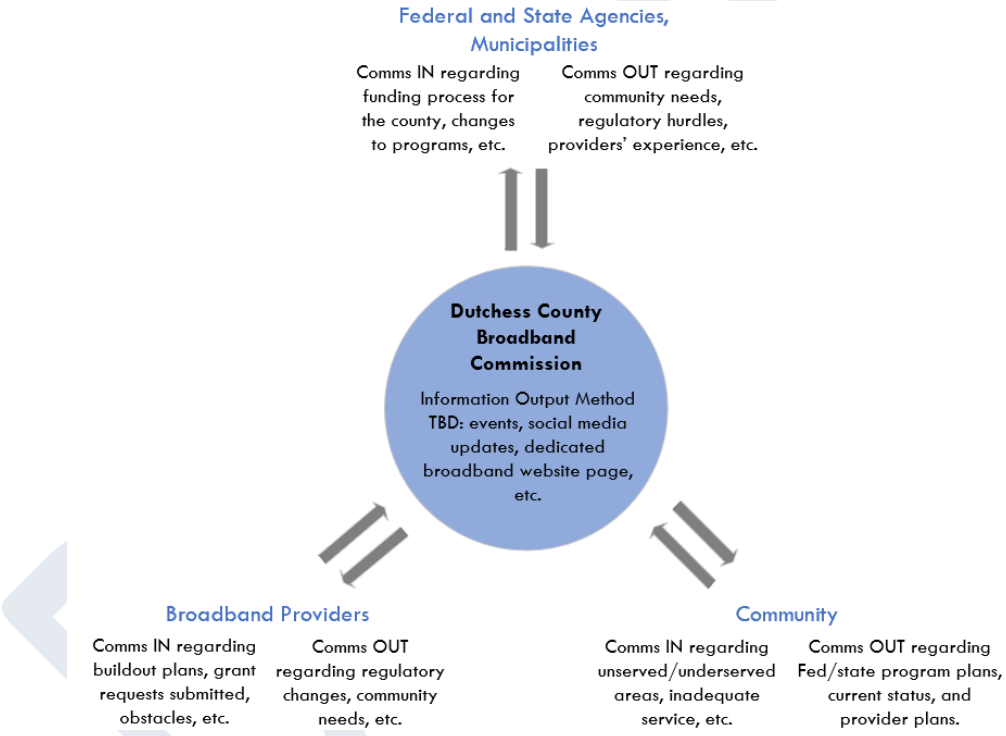
- Establishing goals.
- Defining key audiences.
- Identifying key messages.
- Creating a tactical outreach plan.
- Specifying a timeline for moving forward.

[3] Dutchess County NY Schools

It is recommended that the Dutchess County Broadband Commission remain engaged in the ongoing programs and the proposed and conceptual work, as well as assist with overcoming any hurdles. This will require working with providers, consultants, grant writers, other government entities, etc., to assist with plan development and acquiring funds, to oversee buildouts, and to be a communication beacon for all stakeholders.

The development of a communications plan will be necessary to properly see this vision through. Figure 4 illustrates the typical communications flows and stakeholders that will be required.

FIGURE 4, TYPICAL COMMUNICATIONS FLOWS/STAKEHOLDERS



The following initial steps should be taken when setting up the communications plan:

- **Goals** — Establish broadband use cases and program goals,
- **Key Audiences** — Identify community-based broadband champions.
- **Key Messages** – Develop messaging to ensure consistency.
- **Tactical Outreach Plan** – Focus on tactical goals that are specific, measurable, attainable, relevant, and time-bound (SMART).
  - Identify applicable state and federal funding sources.
  - Collaborate with service providers for service updates and community education.

- **Specify Timeline** – As depicted in the timeline graphic above, create a timeline with associated milestones, to ensure that objectives are achieved.

4 Other Opportunities

When addressing broadband availability, creative approaches may help solve specific use cases. As there are unique challenges, a multifaceted strategy is recommended to achieve the best results. A plan considered "one size fits all" will not result in any demonstrable success.

4.1 Infrastructure

4.1.1 Existing County Infrastructure

The Dutchess County Department of Emergency Response Services has shared that they are adding radio sites throughout the county. Those sites may provide opportunities to use wireless/radio frequency (RF) broadband point-to-point, or potentially point-to-multipoint solutions.

Leveraging those county resources for specific use cases may be possible; however, further design reviews would be needed to assess the feasibility of using the available assets (towers/sites, infrastructure, backhaul, hardware/software, license, etc.). Thoughtful traffic engineering and cybersecurity design review could help determine if this county infrastructure would be sufficient to support applicable broadband use cases. If Dutchess County chooses to leverage the equipment currently considered for procurement and the current budget environment, there may be potential cost savings associated with adding capacity in the short term.

4.1.2 Cellular/Wireless

One technology area highlighted as having the potential to solve rural broadband challenges is the Citizens Band Radio Service (CBRS) cellular spectrum. The FCC completed a process to establish rules for the use of this bandwidth in 2017, and under those rules, wireless carriers could potentially deploy mobile networks without having to acquire licenses. This changed the business model that service providers use when looking to provide services. Appendix F provides an example case study on how CBRS technology works and how providers are using it to help solve some broadband challenges, especially in rural areas.

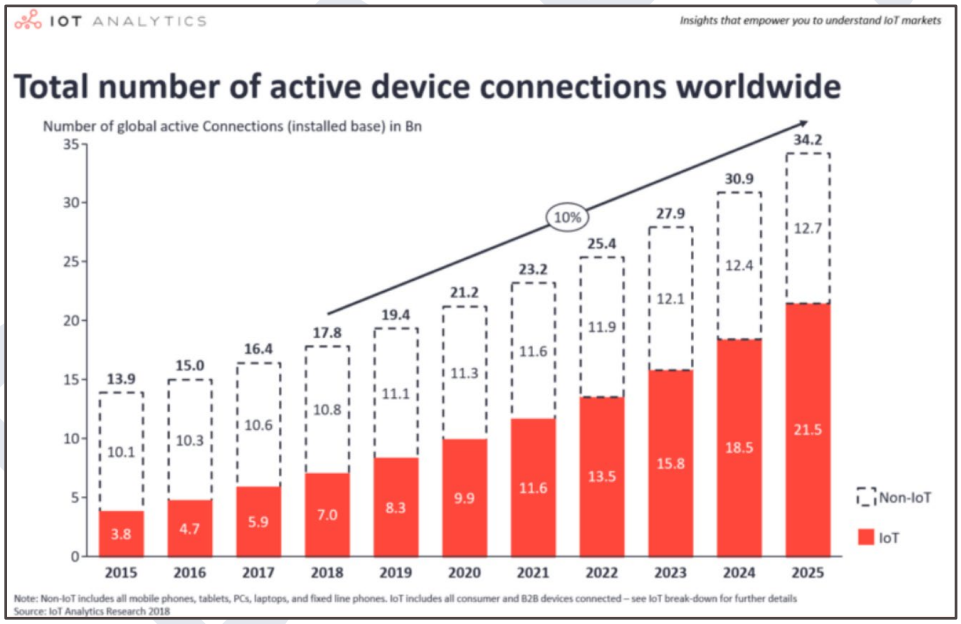
4.1.3 Internet of Things (IoT)

There is a digital transformation underway, and the need for bandwidth in this space will continue to grow as more devices are connected to the internet. This is relevant to the broadband strategic plan, as it is important to understand the current and future needs of broadband for your community. A key component of understanding broadband availability needs should focus on not only the community at large, but also residential usage as well.

Taking IoT projects into consideration and planning for new ones will be important for future proofing broadband networks. From the cellular/wireless connections of sensors, to the internet backbone connectivity that supports the IoT environment, strategic planning—as it relates to broadband connectivity associated to the anticipated growth in IoT—is paramount.

Figure 5 depicts the total number of IoT active devices and provides insight into the growth projections.

FIGURE 5, TOTAL ACTIVE DEVICE CONNECTIONS WORLDWIDE



Strategic planning—as it pertains to IoT—should focus on ways that IoT will transform the future, such as:

- **Public Safety** – Gun shot detection, video surveillance, and situational awareness.
- **Transportation** – Sensors that collect data to optimize traffic and parking.
- **Health Care** – Telemedicine, telehealth, and smart buildings.
- **Smart Cities** – Smart lighting, utilities management, and environmental well-being.

Additional areas to consider include reviewing what other municipalities are focused on. The following link provides a view into the Smart City Roadmap that NYSTEC assisted the City of Saratoga with.

Smart City Roadmap 1.0 | Saratoga Springs, NY (saratoga-springs.org)

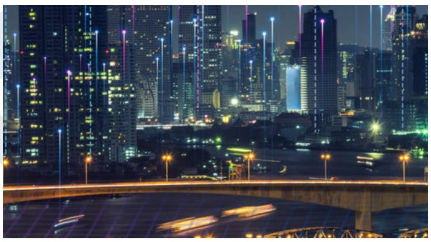
Example IoT Project

"To assist with city management and planning, a growing number of local governments may eventually turn to digital twins — virtual models that replicate the performance of real-world systems, structures and processes.

Digital twins take the concept of a computer simulation to the next level by incorporating information about how an existing item is functioning, collected via Internet of Things (IoT) sensors, to provide a more in-depth, accurate projection.

While digital twin platforms are still an emerging technology, they have a number of potential applications in municipal environments.

A digital twin could help city leaders quickly address an unfolding sewer system issue, for example, by allowing them to obtain a more detailed, three-dimensional view of what was happening — and what effect any proposed solutions would have. The technology could also be used to examine how a new element, such as an expanded public transit line, would interact with other city systems.



DATA ANALYTICS

Digital Twins Help Cities Study Operations of Infrastructure Systems

Some municipalities are preparing to use the modeling platform to assess their approach to operations.

Source Link

4.2 Available Funding

4.2.1 Procurement Methods

Procurements for broadband projects, especially when state or federal funds are being used, will likely have to follow specific guidelines. There are also municipal and other jurisdictional entities that may have certain requirements that will need to be followed. Ensuring that all jurisdictional requirements are adhered to is important to a successful project and will assist with fostering competition and innovation, encouraging more strategic approaches, and promoting broader social, environmental, cultural, and economic outcomes.

Two of the more typical procurement methods of using public funds for broadband are the request for bid (RFB)/request for quote (RFQ) and reverse auction. The latter of which was used for the FCC's Connect America Phase 2, as well as for other programs in the region. While these are the two most common procurement methods, other opportunities are available—such as sole source Procurements.

> *"The FCC's Connect America Phase II reverse auction gives competitive providers a shot at getting USF support to build broadband networks in unserved rural areas where incumbent providers have chosen not to build. The process is complicated – at best*."
>
> The Connect America Fund Reverse Auction (bbcmag.com)

Based on the community's need and other circumstances, there can be exemptions to the procurement rules, so understanding all aspects of the procurement rules, the terms of the funding sources, and the specific circumstances that apply is crucial to broadband procurement opportunities.

4.2.2 Private Equity Funding

Private equity funding can be used to complement government funding sources, or to fund in full. Depending on the funding source and on the size of the private equity company, there may not be an opportunity to combine government and private equity funds. Rural broadband private equity funds, when the sole funding source, often comes with benefits and disadvantages. The benefits being potentially faster funding than grant sources, more comprehensive and strategic planning (as opposed to just targeting unserved/underserved), and telecom industry expertise. The disadvantages focus on what the funding source will get in return for their contribution and/or what other stakeholders will give up (network ownership, right-of-way use, etc.).

Example Private Equity Project
"Construction on a $42 million, privately funded infrastructure project meant to bring fiber optic internet access to all homes and businesses in East Hartford is underway, public officials announced Tuesday morning. *The East Hartford FiberCity project will provide the town's 19,046 households, 4,649 businesses and institutions with high-speed, affordable internet service, they said.* *Fiber optic infrastructure developer SiFi Networks is installing the state's first open access network, meaning its cables will be shared by multiple internet service providers to offer the best speeds at competitive prices. Speeds of up to 1,000 megabytes per second will be offered initially, increasing to 10 gigabytes per second over time."* Source Link May 17, 2022 **East Hartford launches $42M fiber optic infrastructure project** 

4.2.3 Public-Private Partnerships

Public-private partnerships (P3) is a common way to disperse broadband funding and can come in many forms. Many federal and state broadband grants require a match, and while some allow this to be

another government entity, there are times when the private stakeholders have to add a percentage match to show that they have some "skin in the game."

Key Characteristics of Public-Private Partnerships (P3)

There is no single definition of a P3. The U.S. Government Accountability Office defines a public-private partnership as:

> "A contractual arrangement that is formed between public and private-sector partners. These arrangements typically involve a government agency contracting with a private partner to renovate, construct, operate, maintain, and/or manage a facility or system, in whole or in part, that provides a public service. Under these arrangements, the agency may retain ownership of the public facility or system, but the private party generally invests its own capital to design and develop the properties. Typically, each partner shares in income resulting from the partnership. Such a venture, although a contractual arrangement, differs from typical service contracting in that the private-sector partner usually makes a substantial cash, at-risk, equity investment in the project, and the public sector gains access to new revenue or service delivery capacity without having to pay the private-sector partner."[4]

While the ConnectAll NY and NITA internet for all programs require a match, that match may be combination of both federal and state funds, depending on the program.)

4.3 Legislation

4.3.1 Broadband Adoption

Another substantial issue, aside from access to broadband, is the cost. There are new programs available at the federal and state levels that can alleviate the cost burden on the consumer and ensure there are fewer barriers to enter the broadband community.

While the broadband access survey did not ask the income of respondents or if broadband was too expensive/unaffordable, the additional comments provided indicated that for approximately 20% of respondents, the cost was too high. The data was revisited based on that feedback, and out of the ~20% (196 of total 932 comments), fewer than 10 respondents indicated that they could not afford broadband.

4 Public-Private Partnership (P3) Basics | Associated General Contractors of America (agc.org)

The ConnectALL NY program's initiatives and the FCC's Affordable Connectivity Program are intended to relieve some of this cost burden, with public awareness and ease-of-use being items that the strategic plan with focus on.

The Federal Affordable Connectivity Program

The Infrastructure Act, passed in 2021, provides $14.2 billion to modify and extend the Emergency Broadband Benefit Program (EBB Program) to a longer-term broadband affordability program called the Affordable Connectivity Program (ACP). The ACP will help ensure that households can afford broadband through discounted rates.

The benefit provides a discount of up to $30 per month toward internet service for eligible households and up to $75 per month for households on qualifying tribal lands. Although eligible households can also receive a one-time discount of up to $100 to purchase a laptop or desktop computer, no providers in Dutchess County are participating in that portion of the program.

The ACP is limited to one monthly service discount and one device discount per household.

Who Is Eligible for the Affordable Connectivity Program?

A household is eligible for the ACP if the household income is at or below 200% of the Federal Poverty Guidelines or if a member of the household meets at least one of the following:

- Received a federal Pell Grant during the current award year.
- Meets the eligibility criteria for a participating provider's existing low-income internet program.
- Participates in one of the following assistance programs:
  - The National School Lunch Program or the School Breakfast Program, including through the USDA Community Eligibility Provision.
  - Supplemental Nutrition Assistance Program (SNAP).
  - Medicaid.
  - Federal Public Housing assistance.
  - Supplemental Security Income (SSI).
  - Women, Infants, and Children (WIC).
  - Veterans Pension or Survivor Benefits.
  - Lifeline.
- Participates in one of the following assistance programs and lives on qualifying tribal lands:
  - Bureau of Indian Affairs General Assistance.
  - Tribal Temporary Assistance for Needy Families (TANF).
  - Food Distribution Program on Indian Reservations (FDPIR).

- Tribal Head Start (income based).

Dutchess County Internet Service Providers Participating in the ACP:

- Altice/Optimum/Cablevision.
- Comcast.
- Consolidated Communications.
- Earthlink.
- Frontier Communications.
- Hughes Network Systems.
- Mid-Hudson Data Corp (Wireless).
- Spectrum.
- Verizon.

Dutchess County Providers NOT Participating in the ACP:

- Dishnet.

There are other opportunities to provide residents with free or low-cost internet access. Below is an example of one such opportunity.

Example Project of Free Internet Access (Pilot)
"I use the internet not only to pay bills, research, entertainment, movies, talking to family all over the world through video -- everything -- the internet has become so essential," says Elyer Soto. It sounds similar to the lives of many people, including students, as the internet advances through the nooks and crannies of everyday life. But there's a deep digital divide, driving limited access to underserved communities in some parts of Yonkers. That's why the pilot program is there to help bridge that gap, allowing hundreds of Yonkers families to access the internet at no cost. The Westchester County Association is spearheading this pilot project, with a $450,000 grant from a nonprofit called U.S. Ignite. Source Link **Pilot program offers free access to the internet in Yonkers** Dec 14, 2021, 10:56pm • *Updated on Dec 20, 2021* By: **News 12 Staff**    Yonkers residents are getting free access to the internet through a pilot program known as "Y-Zone."

4.3.2 NYS Legislation

Although the New York legislative session is over for the year, there are two NYS bills aimed at regulating the broadband industry.

S5117, sponsored by Senator Sean Ryan (D-60, Buffalo) and **A7412**, sponsored by Assemblyperson Nily Rozic (D-25, Queens), would amend the New York Broadband Resiliency, Public Safety and Quality Act to authorize the PSC to exercise oversight, promulgate rules and regulations, and conduct evaluations for broadband and Voice over Internet Protocol (VoIP) in New York State. Essentially, these bills will allow the PSC to **regulate broadband—similar to utilities like water and electricity**.

Both bills are in committee in the Senate and assembly. With the legislative session concluded for the summer, no movement will be made on the bill until the NYS legislature reconvenes. At this time, it is unclear if the bill will pass or what kind of impact it will have on broadband availability in Dutchess County.

5 Summary / Next Steps

With more than $65 billion dollars being allocated to broadband to ensure that all Americans have access to affordable, reliable high-speed internet, coupled with the investment from the private sector, there will undoubtably be significant opportunities for broadband improvement throughout Dutchess County.

With ongoing and proposed projects, we are already seeing the early signs of this transformational undertaking.

The most critical strategy that Dutchess must deploy is leveraging the county broadband commission and supporting staff to track current and proposed projects and to look for broadband solutions to solve immediate needs, while focusing on a long-term vision. Identifying synergies among stakeholders throughout the community has the potential to drive down or share costs and is another effective way to fill potential broadband gaps. All the strategies identified in section 2 will require, in some part, county engagement.

Once the communications plan is established, it will be important to use the plan to:

- Identify strategies that will need to be tracked for progress, to ensure objectives are met.
- Determine the improvements that are planned and identify gaps that remain after planned improvements.
- Work with state and federal partners and service providers to find solutions for remaining unserved/underserved areas.

- Seek to identify opportunities to increase competition, via new technologies, business models that allow for deploying to served areas, and/or funding sources that allow for funding in served areas.

Ensuring access to high-speed internet is essential in Dutchess County. The benefits associated with high-speed internet access cannot be understated, whether the focus is on bridging the digital divide, improving access to telehealth/telemedicine, distance learning, or smart cities/communities, broadband is the fuel for the engine of economic growth.

Solving broadband challenges in Dutchess County will require a multifaceted approach and an ongoing commitment/focus on acquiring funding/grants, establishing and engaging community champions, and developing achievable broadband program goals.

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DUTCHESS COUNTY BROADBAND STRATEGIC PLAN PROCESS

COUNTYWIDE COMMUNITY SURVEY

- COUNTYWIDE SURVEY RAN FROM NOV '21 TO APRIL '22
- MORE THAN 1,700 REPONSES
- FEEDBACK FROM RESPONDENTS GEOTAGGED

BROADBAND PROVIDER CABABILITIES

- INTERVIEWED MORE THAN 12 BROADBAND PROVIDERS
- CURRENT AND FUTURE SERVICE OFFERINGS
- CURRENT DUTCHESS ASSESTS REVIEWED

Frontier COMMUNICATIONS
MID-HUDSON MID-HUDSON CABLEVISION INC.
Charter Spectrum
altice
optimum.
comcast
verizon

DUTCHESS COUNTY LIBRARIES, AND MORE...

BROADBAND PROVIDER CABABILITIES REPORT

MILLERTON/NORTH EAST AND STANFORD SURVEYS

CONSOLIDATED MAPPING DATA (GIS)

- PROVIDER SERVICE AREAS
- REPORTED SERVICE SPEEDS
- FIBER DATA, CELL TOWERS, AND OTHER RELATED DATA

CONSOLIDATED SURVEY/OUTREACH RESULTS

DIGESTABLE COMMUNITY AND PROVIDER FEEDBACK

- COST/SPEED/SATISFACTION WITH SERVICE
- ADDITIONAL COMMENTS CATEGORIES TO FURTHER IDENTIFY ISSUES

GAP ANALYSIS REPORT

KEY GAPS IDENTIFIED:

UNSERVED/UNDERSERVED BROADBAND SERVICE

GAP DESCRIPTION

- APPROX. 10% OF SURVEY RESPONDENTS
- APPROX. 4% OF COMMUNITY BASED ON FCC ONE-SERVED ALL-SERVED METHODOLOGY*

RECOMMENDATIONS

- INSTALLATION OF NEW WIRED BROADBAND
- DETEMINE EMERGING BROADBAND TECH COMPARABLE TO WIRED SERVICE

INADEQUATE BROADBAND SERVICE

GAP DESCRIPTION

- APPROX. 35% OF SURVEY RESPONDENTS HAD SPEEDS THAT WERE CONSIDERED SERVED, BUT IT DID NOT MEET THEIR NEEDS

RECOMMENDATIONS

- CURRENT PROVIDER UPGRADES
- NEW BROADBAND TO HOMES BY NEW PROVIDERS
- DETERMINE EMERGING BROADBAND TECH COMPARABLE TO WIRED SERVICE

EDUCATIONAL OPPORTUNITIES

GAP DESCRIPTION

- IMPROVEMENTS TO COMMUNITY KNOWLEGE OF BROADBAND ENVIRONMENT: PROVIDER SERVICE AREAS/ PLANS, EMERGING TECH, AND FUNDING SOURCES ARE ALWAYS CHANGING

RECOMMENDATIONS

- USE MAPPING AND SURVEY DATA TO BETTER UNDERSTAND CURRENT BROADBAND LANDSCAPE AND FUTURE PLANS
- EDUCATE COMMUNITY ON AVAILABILTY, DETERMINE TOOLS TO SHARE INFORMATION
- DEVELOP COMMUNICATIONS PLAN AND WORK WITH ALL STAKEHOLDERS TO SEE VISION THROUGH

SEE PAGE 2 FOR STATEGIC PLAN REPORT SUMMARY

DUTCHESS COUNTY BROADBAND STRATEGIC PLAN REPORT

RECOMMENDATIONS FOR PRIMARY GAPS IDENTIFIED

UNSERVED/UNDERSERVED BROADBAND SERVICE

INSTALLATION OF NEW WIRED BROADBAND INFRASTRUCTURE TO HOMES

IDENTIFY AND USE FUNDING SOURCES AS APPLICABLE

FEDERAL PROGRAMS

- BEAD PROGRAM
- MIDDLE MILE PROGRAM

STATE PROGRAMS

- ConnectALL RURAL BROADBAND
- LOCAL CONNECTIVITY PLANNING AND 21ST CENTURY MUNICIPAL INFRASTRUCTURE

PRIVATE EQUITY / PPP BROADBAND OPPORTUNITIES

NEW FEDERAL UNSERVED / UNDERSERVED DEFINITIONS

- ***25/3 UNSERVED***
- ***100/20 UNDERSERVED***

EDUCATIONAL OPPORTUNITIES

USE BROADBAND MAPS

COUNTY COLLECTED GIS DATA

- BROADBAND SURVEY RESULTS
- COUNTY INFRASTRUCTURE, PROVIDER SERVICE AREAS, THIRD PARTY TOWER LOCATIONS, PUBLIC WI-FI, AND MORE…

NEW FCC DATA MAP

- BY PREMSIE, NOT CENSUS BLOCK
- CHALLENGE RULE IF AVAILABLE SPEEDS ARE NOT WHAT IS LISTED

NYS PSC BROADBAND MAP

- BY PREMISE, NOT CENSUS BLOCK

COMMUNITY EDUCATION

NEWSLETTER / ONLINE POSTINGS REGARDING SERVICE PLAN CHANGES, NEW COVERAGE AREAS, ETC.

DEVELOP PORTAL FOR THE UNSERVED / UNDERSERVED

BROADBAND COMMUNICATIONS PLAN

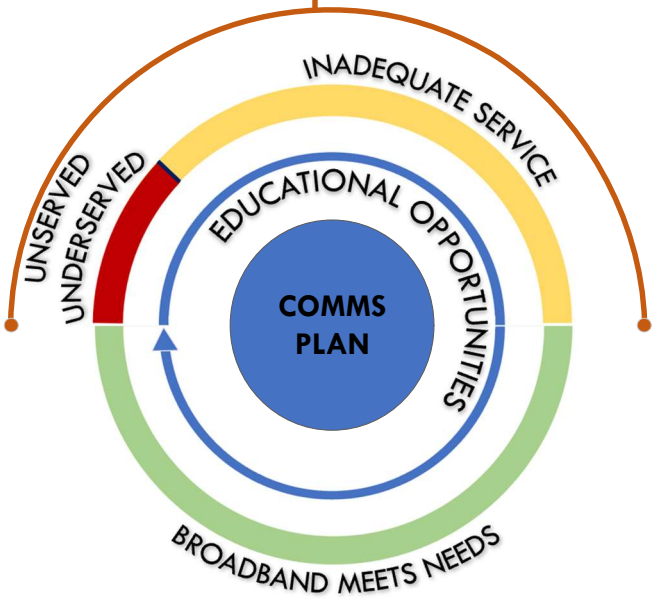
DETERMINE BROADBAND TECHNOLOGY COMPARABLE TO WIRED BROADBAND SERVICE

NEW AND EMERGING TECHNOLOGY

- E.G. IMPROVED SATELITTE SERVICE (E.G., STARLINK)

CONNECTIVITY FOR REMOTE AREAS AND/OR MORE COST-EFFECTIVE SOLUTONS

- E.G., FIXED WIRELESS PILOTS
- PUBLIC AVAILABILITY TO WI-FI



INADEQUATE BROADBAND SERVICE

CURRENT PROVIDER UPGRADES TO SERVICES

SEEK REGULATORY CHANGES TO EASE DEPLOYMENT ABILITY + INCREASE COMPETITION

DETERMINE PROVIDER UPGRADE PLANS AND WHETHER "SERVED" AREAS ARE INCLUDED

NEW BROADBAND INFRASTRUCTURE TO HOMES BY ADDITIONAL PROVIDERS

DETERMINE FUNDING AVAILABILITY OPTIONS OR OTHER PARTNERSHISP INTERSTED IN BROADBAND DEPLOYMENT IN SERVED AREAS

OTHER CONSIDERATIONS

FUNDING MECHANISMS

- RFP/RFQ
- REVERSE AUCTION
- PRIVATE EQUITY FUNDING
- PUBLIC/RIVIATE PARTNERSHIPS

INTERNET OF THINGS / SMART CITY IMPLICATIONS

LEGISLATIVE PROPOSALS THAT ARE IN THE WORKS

COUNTY / MUNICIPAL OWNED ASSESTS THAT CAN BE LEVERAGED

BROADBAND ADOPTION

- WHAT IS BEING DONE TO ENSURE THAT EVERYONE WHO WANTS ACCESS TO BROADBAND HAS ACCESS

FCC AFFORDABLE CONNECTIVITY PROGRAM EXTENDED: $30/MONTH FOR BROADBAND AND $100 FOR HARDWARE BASED ON QUALIFYING INCOME + HH SIZE