FINAL
REPORT

ON THE FEASIBILITY OF MUNICIPAL BROADBAND INTERNET SERVICE FOR THE CITY OF ALBANY, NY

PRESENTED BY

THE ALBANY MUNICIPAL INTERNET BROADBAND COMMISSION

Final Report on the Feasibility of Municipal Broadband Internet Service for the City of Albany, NY

Presented by

The Albany Municipal Internet Commission

Members of the Commission

Craig R. Waltz Jr. – Commission Chair

Jeffrey Quain – Commission Vice-Chair

Fatima Dayonna Bowles – Commission Member

Brian Duffy – Commission Member

Edward Hernandez – Commission Member

Scott Jarzombeck – Commission Member

Caitlin Monjeau – Commission Member

Martin Robinson – Commission Member

Joshua Tocci – Commission Member

Note: The members of the commission would also like to thank Jessica Smith for her work as project manager working with the commission, Luke Gucker for his active participation, insights and logistical assistance, Commission Member Fatima Dayonna Bowles for the design of the final report cover, and Chief Information/Technology Officer Mark Dorry and Commissioner of Administrative Services Rachel McEneny for their input and assistance with obtaining critical research materials, and Council-Member Owusu Anane for his input and assistance as a Common Council Liaison.

I.   <u>Introduction</u>

Since the turn of the century, the internet has more and more become a necessity for commerce and our daily lives. We rely on the internet for financial transactions, record keeping, ordering goods and services, and information retrieval among many other uses. The way we learn, create, retail, and interact with our neighbors has been changed by cell phones, email, and computers.

The digital revolution has placed an emphasis on connectivity and the need for quality, high speed internet service. This reality has been exacerbated by the COVID-19 pandemic and the hybrid/work from home schedules and acceleration of e-commerce. Adoption of home broadband has increased since the turn of the century, but it has not been uniform. While just over of three quarters of Americans have broadband in their home, racial minorities, lower income individuals and those without a high school degree have adopted at lower rates than the national average.

At the state level, New Yorkers have adopted broadband at a higher rate than the national average. However, adoption lags throughout the state in urban and rural areas. Because the FCC identifies areas served if broadband is available (cite), this high adoption rate is not representative of the reality of broadband service and adoption, specifically in urban areas. In fact, this data does not represent the number of households with access to what is considered high speed internet.

In response to these existing inequalities, the Federal government and State of New York have dedicated appropriations to expand coverage and affordability throughout the country and State, respectively.

Over the last two years, the federal government has created a program to provide discounts to households with income at or below 200% of the federal poverty guidelines and meet a list of eligibility requirements. 2021's infrastructure Investment and Jobs Act allocated $42.5 billion for a number of programs to create the Broadband Equity, Access, and Deployment Program, enable middle mile broadband infrastructure, create Digital Equity Act Competitive Grant Programs, and increase broadband affordability.

New York State has also stepped up with additional funding. Governor Kathy Hochul and the State Legislature allocated $300 million through a new program called ConnectALL. This program draws on funding from the Infrastructure Investment and Jobs Act as well as the American Rescue Plan to make $1.4 billion available to New Yorkers to increase access to broadband, increase affordability, and grants for new construction projects to lay fiber optic cables. In order to encourage these construction projects, Governor Hochul also took the step of suspending the PERM 75 permitting program, which imposed a fiber optic fee on fiber installations in the state's right of way.

During this time, local governments throughout the country have stepped up to fill these service gaps. In 2021, the City of Albany created the Municipal Internet Commission, charged with identifying the feasibility of establishing a city-owned internet service. The Commission was charged with identifying ideal service models, cost, and partnerships among other areas to advise the Mayor and Common Council on potential next steps to establishing this service.

Throughout our research, we have identified several options the City of Albany may consider for municipal internet service. Our final report details those findings and options and provides a set of recommendations which we believe will enable the city of Albany to move forward with an incremental approach consistent with other recent city initiatives and provide

the municipal broadband network which achieves digital equity and serves the needs of city residents and businesses. We believe with support from federal, state, city, and community partners, the City of Albany has the opportunity to become a leader in New York State and the Northeast in providing this essential service at an affordable price.

II.   <u>Executive Summary</u>

The members of the City of Albany Municipal Internet Commission are pleased to share this final report of our research and recommendations. This report is intended to provide an overview of the work to fulfill the commission's central charge – to determine the feasibility of creating a municipal broadband network for the city of Albany to achieve the following goals:

•   To improve (and eventually achieve) digital equity for all those who live and work in our community regardless of race, creed, gender, or economic status by providing internet access to all.

•   To encourage innovation, entrepreneurship, and economic development including new job creation through the provision of affordable, reliable, high-speed broadband services.

•   To enable both increased transparency in government operations and improved access to city services through the use of the municipal broadband network.

•   To identify the most reliable and cost-efficient model for the creation of a municipal broadband network for the city of Albany and identify potential funding sources and strategic partnerships to assure the success of the project and its maintenance moving forward.

Basic Configuration Terminology

There are primarily two types of network configurations employed by municipalities with municipal broadband networks:

• "**Hub and Spoke**" – similar to what is commonly found in coffee shops and small businesses. One radio (the"Hub") sends and receives data for several users (the "spokes"). The wireless router has a physical connection to the internet (wired) and the data from multiple users is transmitted through the wire. The disadvantage of this model is that if one of the wireless routers connected to the network goes down, there may not be another present nearby capable of maintaining service to that area of the community.

• "**Mesh Network**" – most municipal wireless networks employ a "mesh" rather than a "hub and spoke" configuration to avoid the shortcomings of that model. It employs a series (mesh) of radio transmitters, and each is capable of communicating with at least two others, essentially creating a cloud of radio signals through the city. Signals travel from router to router through this cloud. This option is also considered to be more cost efficient as it requires fewer wires, it's faster to build, and should one or more nodes fail, others in the mesh can compensate for them until they are repaired.

Recommendations

Summary Recommendation – It is the considered and collective opinion of the commission that it is both feasible and critical for the City of Albany to establish and oversee the creation of a municipal broadband internet network to increase digital equity, provide quality higher speed and consistent service, and encourage market competition to reduce costs to city residents and businesses.

Specific Recommendations

Recommendation 1 – The creation of the Office of Municipal Broadband and position of Albany Municipal Broadband Coordinator within the executive administration of the City of Albany along with appropriate administrative and technical staff to oversee the development and operation of municipal broadband initiatives for the City of Albany.

Recommendation 2 – The establishment of a public-private partnership comprised of representative members from the city administration, private sector, not-for-profit sector organizations, the Albany City School District, Albany Public Library, and community-based non-governmental organizations (NGOs) to contribute skills, expertise, and resources to develop a comprehensive municipal broadband solution that is both cost-effective and advances mutual goals of increased digital equity and affordable internet service city-wide.

Recommendation 3 – Consistent with a Community Accountability Board (CAB) model, the city of Albany should supplement the office of Municipal Broadband with a "Broadband Advisory Committee". Their role would be to monitor the development and operational success of the broadband network service and facilitate two-way communication between members of the community and the city administration regarding progress towards digital equity goals, address concerns from the broadband end-users, and provide guidance and critical input for organizational achievement. Committee members serve voluntarily and appointed by the Mayor and the Albany Common Council.

Recommendation 4 – In the interests of long-term planning for future municipal broadband network development and management, we recommend that the city of Albany request that its New York State level legislative representatives in the Assembly and Senate, create and support

legislation to amend the NYS Authorities law in the upcoming legislative session to permit local governments (Counties, cities, towns, or villages) to establish a Municipal Broadband Authority, without the need for additional state-level enabling legislation at the time of creation. The authority would have the ability to issue bonds, develop and maintain network structures via contractual agreements, develop and maintain the fee structures for such services, and be comprised of members selected by city administration and confirmed by the Albany Common Council for fixed terms as decided at the time of the creation of the authority. This will provide a regulatory framework for future expansion and management of municipal broadband with appropriate oversight from the city administration, while simultaneously managing cost and risks related thereto.

Recommendation 5 – The preferred network configuration given the population density, size, and geographic features of the City of Albany should be a "mesh network" rather than a "hub and spoke" model. This would provide the best opportunities to leverage existing municipal investments in broadband infrastructure and those of potential partner organizations.

Recommendation 6 – The City of Albany should aggressively pursue all grant and funding opportunities identified to minimize the costs of development, management, and operation of the municipal broadband network to city taxpayers and businesses. For this purpose, the addition of a funded grants writer/funding specialist position within the Office of Municipal Broadband is strongly recommended.

III.   Ideal Model for Municipal Internet Service in the City of Albany

The development of building and deploying a broadband communication network is technically complex. There is no single solution. Acting as a Commission, our decisions are dependent upon multiple factors such as the mission, goals, initial capital expenditure and objectives of sponsoring entities. As well as other considerations including capabilities of the existing in-place Albany infrastructure, network security and performance requirements. An "ideal model" network is the design and planning of deciding geographical layout; quantity and what type of equipment stations (nodes) and where this network infrastructure stations should be located in Albany city limits for populated neighborhood areas. Albany broadband should aim to facilitate a broadband network layout to provide inclusive coverage with minimal infrastructure cost.

This is the art of network design. In the early phases of the design process, our goal is to determine the cause or motivation for change. Network planning is one of the most important aspects of Albany's broadband service.

In Albany county's total estimated 310k population, there are still residents who have no options or possibly only one option for receiving broadband service. Subsequently, there are those within the city of Albany's estimated population of 100k who live on one side of the "digital divide". The "digital divide" is a label used to explain a perceived disparity among those Americans who use or have access to telecommunications technologies (e.g., cellular, landline telephones, computers, the Internet) and those who do not. Although numerous offices and businesses now have Internet broadband access, a continuing challenge is offering broadband over "the last mile" to consumers in their homes.

The relation between Internet service providers and customers are referred as the *last mile* by service providers, or from the consumer's perspective, the *first mile*. Throughout the United States, the private sector is predominantly deploying Broadband service and technologies. While the quantities of new broadband consumers continue to increase, studies conducted by the Federal Communications Commission (FCC), the Department of Commerce (DOC), the Department of Agriculture (USDA) and New York State agencies, suggest that the amount of broadband deployment in urban and high-income areas may be outpacing deployment in rural and low-income neighborhood areas. To provide broadband service to every home and every user, access networks will need to be built connecting consumers to broadband service providers: An Albany municipally provided broadband network service could positively affect residents and businesses regardless of their income or geographical location.

>> Section 1: Broadband Network Analysis

Broadband is delivered by an assortment of technologies (e.g. cable, satellite, telephone copper wire, fiber, wireless) that allows consumers the capability to send or receive data at volumes and speeds far greater than slower "dial-up" internet access over traditional telephone lines. In addition to offering speed, broadband access provides a continuous connection (no need to "dial-up") and a dual capability to both receive (download) and transmit (upload) data at high speeds. The faster the data transmission rate, the faster one can download files or visit from website to website. For broadband access services, there is strong competition among several technologies: hybrid fiber coax, wireless, digital subscriber line (DSL) and FTTx (fiber to the x, x standing for home, neighborhood, office, business, curb etc.).

Presently, various competing telecommunications companies are developing, deploying, and marketing specific technologies and services that provide residential broadband access.

Traditionally, the cable television companies known as multiple service offerers (MSOs), have dominated the telecommunication industry in providing broadband services. Albany deserves more accessible options, better highspeed and lower costs. Sophisticated technological advancements, the amazing increase in network capacity, the multiplicity of computer applications, demands to improve the quality and reliability of Internet services underscore the importance of developing and implementing valuable broadband networking solutions. Currently, Albany's options are Charter Communications/Spectrum, Verizon Communications, geostationary satellite solutions from Hughes Network Systems, and low earth orbit satellite solutions from StatLink. There are logical reasons that legacy broadband last-mile technologies like DSL, cable, cellular and satellite are lacking to meet these tasks. For legacy broadband, great care must be taken about segment length, selection of cable type, and other technical specifications.

Today there are various networking configurations in use, individually with unique performance characteristics, advantages and limitations. The Federal Communication Commission requires that broadband services have a minimum speed of 25 Mbps for downloads, and 5 Mbps for uploads. There are two desirable aspects to internet connection: fast transmission rates and seamless, constant connectivity. Fast transmission rates require wide frequency bandwidths, as well as high bandwidth utilization efficiency.

Technology helps to ensure that a coverage as large as possible is reached with a fixed amount of network equipment. Emerging technologies are defined by terms of generations, which implies the evolutionary process. 1G represents analog transmission of voice; 2G represents digital transmission of voice; 2.5G represents digital transmission of voice and narrow bandwidth data;

3G, 4G and5G now represents digital transmission of multimedia for broadband speeds (voice, video, and data).

Fiber Optics – A newer broadband Internet technology is fiber optics. Fiber also offers this new access technology further business and management freedoms from the tyrannies imposed upon by 19th century copper and circuit-switched technology and its regulatory fallacies. Fiber to the home is the ideal choice whenever possible. We recommend and trust fiber can revolutionize Albany. Fiber to the home (FTTH) is a fiber optic transmission delivery form where the fiber spreads from a central office to the boundary of a residential home or business office. Fiber to the home is a configuration that involves installing optical fiber at a central office or location before running fiber optic cables to its destination. After deployment installation, the fiber last mile, seldom need any reengineering for a time. Fiber optic cables use strands of glass to transmit light. To use a fiber-optic cable, equipment must convert an electrical signal into light. The light pulses are converted to electronic signals via optical network terminals and distributed throughout as Internet. These light pulses transport electronic data up to 900 megabits per second. That speed is more than 100 times quicker than traditional coaxial cable, like Spectrum. It's important for the initial optical fiber to be put in a position that will allow it to deliver the benefits of fiber optics to as many people as it possibly can.

Wireless Technologies – In addition to wired broadband services, several wireless technologies have been developed to provide broadband internet access, such as Wi-Fi, cellular, satellite networks and free-space optical communications. Wireless technologies and fifth-generation (5G) wireless networks will be able to provide access through seamless integration of a variety of wireless systems, including wireless personal networks, wireless LANs, wireless access

networks, cellular wide area networks and satellite networks. The status of wireless technologies are due primarily to the mobility, scalability, low cost and ease of deployment.

Wi-Fi (802.11a/b/g/n) operates through wireless access points which establish wireless links among themselves to allow automatic topology discovery and dynamic routing configuration. Multiple access points can be interconnected to form a wireless mesh network (WMN). A wireless mesh network consists of multihop wireless communication links to forward traffic to and from wired internet entry points. The wireless links among access points form a wireless backbone described as a mesh backhaul. Multihop wireless communications in mesh backhaul are used to forward traffic to and from a wired internet entry point and each access point could provide point-to-multipoint access to users known as mesh access or in other words, "the Wi-Fi network".

As a result, a Wi-Fi mesh network can offer broadband access services in a self-configured state allowing fast deployment and easy maintenance. Because of its flexibility and low deployment cost, Wi-Fi has become an useful and economical networking option that is prevalent in both households and the commercial sector, and is a standard feature of electronics.

Wireless LTE, Midband 5G, and mmWave 5G technologies provide broadband class data over wide areas using licensed spectrum. mmWave 5G technology provides gigabit speeds and low latency over a very limited area. Midband 5G and LTE provide up to about 300 Mbps of moderate latency access over wide areas. Midband signal quality and service delivery will vary based on local conditions, including distance from towers and building construction.

Wireless access networks cannot provide a consistency of service equivalent to wired access technologies in factors of data rate and reliability, wireless access offer flexibility and mobility that alternate technologies cannot provide. Wireless access from an implementation standpoint is

faster and cheaper to deliver. Thus, wireless access networks supplement current wired access technologies and will continue to develop in the future.

>>Section 2: Department Organizational Structure Aspects

The effectiveness of an Albany broadband network will depend on the geographical layout of the physical network. The reach and coverage of Albany's fiber-based broadband network is a crucial enterprise decision to be evaluated. After the Albany broadband network is deployed and service is introduced, the network itself must be maintained. It needs to be regularly tested to ensure that a consistent quality of service is sustained. As the Albany customer base increases, the Albany broadband should improve the service, revise its network plan, insert more network nodes and modify the network.

Office of Municipal Broadband – The Office of Municipal Broadband would be responsible for the organizational structure of the network, the division of tasks between the IT management functions, the selection of personnel/contractors to perform these functions and monitoring the performance of the personnel/contractors and the municipal broadband network itself. Acting as a commission, we recommend the creation of a city department or unit committed to the development, implementation and operational monitoring of successful broadband services.

Municipal Broadband Coordinator – We recommend a department head for the proposed Office of Municipal Broadband to lead collaboration, inter-project management and coordination of public and private resources for the collective success of the municipal broadband network. The Municipal Broadband Coordinator would report to the City of Albany Chief Information/Technology Officer.

The proposed "Municipal Broadband Coordinator" position would manage an administrative and technical team to develop a project plan focused on network development, coordination of operations, and adherence to performance goals and standards. As the head of the department, the Municipal Broadband Coordinator would be responsible for strategic planning and the coordination of partnerships, contracts and resources to design, develop, and monitor the operation of the municipal broadband network within the city of Albany. Additional responsibilities would include the establishment of a communication plan that ensures full transparency regarding the development and operation of the network, network performance, and associated costs that is available to the city administration and the community at large; and regular reporting of said network performance.

Suggestive Job Title & Salary Chart

Role Title	Estimated Annual Salary
Municipal Broadband Coordinator	$62,640 - $105,720
Computer Systems Engineers/Architects	$46,540 - $98,740
Budget Analyst	$46,540 - $98,740
Computer Network Support Specialists	$49,630- $78,540

Source: U.S. Bureau of Labor Statistics

>>Section 3: Information Technology Strategy Methodology

The Municipal Broadband Coordinator would select the methodology and techniques that are the most suitable for development of the IT system subject to approval by the Chief Information/Technology Officer and the Mayor. Technical feasibility is concerned with whether the broadband service system can be developed under existing technology or if new technology is needed. For each target within the Office of Municipal Broadband, it is important to identify its due date, current implementation status, planned implementation status and lessons learned. Given that network technology is the physical basis for most of the system's design features, this aspect bears heavily on the overall feasibility.

As part of planning, the Municipal Broadband Coordinator must establish the broadband project objectives, which should include scope, constraints and assumptions. The project scope consists of boundaries such as fiscal or geographical limitations. Constraints are the limitations of the project environment, for example lack of personnel. Assumptions may be based on guarantees of assistance in fulfilling the project as in Albany area community partnerships or funding sources.

Requirements are the foundation of any IT project. Albany Broadband requirements will play a vital role in the systems development and maintenance processes. System requirements consist of hardware requirements, software requirements, and operational requirements. The IT architecture provides the required framework. Requirements are the conditions that must be met for a system product to be acceptable to its customers, users and stakeholders.

Albany Broadband Network Design & Planning

During this stage, our primary objective is to study as much about the proposed broadband network needs to identify and uncover the problem or opportunity that occurs. A network

topology, which is the physical layout of the components of the network - can conceptualize this information. As a result, we'll want to understand electro-mechanical applications and technical processes that the proposed broadband network should be supporting. Our broadband network assessment strategy may consist of several fundamental phases: preliminary investigation, analysis, preliminary design, detailed design, implementation, and documentation.
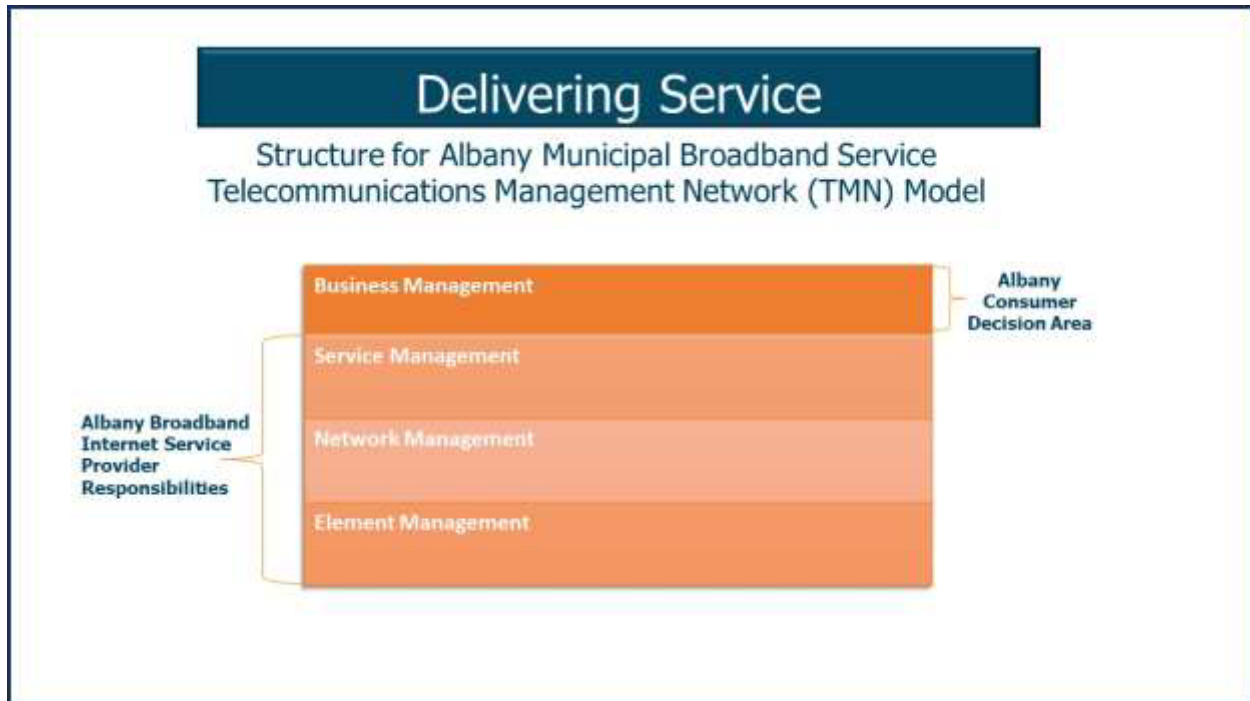
The planning phase

- Involves collecting thorough statistics and noting initial suggestions about the broadband network design. This plan consists of performing research about the needs of potential Albany residential and business customers, which produces documents outlining service gaps, risk analysis and competitive practices.

The architecture phase

- Entails capturing the results of the planning phase and pairing them with our broadband servicing goals. The architecture is a sophisticated conceptual design. At the end of the architecture phase, an Albany land topology, physical design and operating prototype should be documented.

The design phase

- Renders the architecture reality. It identifies precise details necessary to execute the new broadband network design. Providing information necessary to create the broadband network, in the arrangement of a detailed topology, physical design, operations design and maintenance plan.

Related Ideal Model Designs Issues

#1 Issue – ACCESS RIGHTS FOR BROADBAND DEPLOYMENT

Recent technology often requires new changes of property rights and careful evaluation of how public rights-of-way and rights to use of the commons is understood and distributed.

Utility Poles: Utility poles typically serve multiple purposes, of which the most important are electricity supply and telecommunications. Certain utility poles also provide street lighting. Wires are strung between utility poles, with a lot of poles being needed to carry wires between destinations, such as a power station and direct to a home or business. These premises are usually served by only one series of utility poles carrying both power and telecommunications wires.

Towers: Wireless technologies for broadband delivery normally need to attach to towers from which they can shoot a signal over a large territory. Depending on the wavelength used, wireless signals may need a "line of sight" (an intervening space occupied by nothing but air) to the

receiver, generally cannot penetrate hills and may be impeded by interference such as thick foliage or buildings. A transmitter on a tower or tall building can rise above clutter and reach a wide territory.

#2 Issue - NETWORK DESIGN, ARCHITECTURE AND TOPOLOGY

- FTTx or traditional coaxial
- Cellular or Fixed Wireless

Fixed wireless network topologies fall into four broad categories.

- Point-to-point (PTP) networks
- Consecutive point and mesh networks
- Point-to-multipoint (PMP) networks
- NLOS point-to-multipoint networks

#3 Issue – STRENGTHING EXISITNG PROVIDERS

- **AlbanyNet**

Today, the state of the art with respect to broadband service delivery delivers a variety of connectivity options with different cost, performance, and operational considerations. Each solution type comes with unique performance characteristics, operational advantages and disadvantages, and different capital and operational cost structures.

Options for end user connectivity are:

- **Fiber to the Home (FTTH)**, which are passive optical networks used to deliver high speed network access in residential and commercial settings. Regionally, Verizon offers FIOS as a solution in this space. FTTH is the gold standard for internet access.

- **Advantages**:
  - Highest Performance
  - Highest Reliability
  - City or partner entities have the ability to implement independently of larger commercial telco.
- **Disadvantages**:
  - Requires Significant capital expense, including pole access, permitting for fixed equipment, etc.
  - Slow implementation speed – property owners must provide access to homes and modifications are required.
- **Cable and Hybrid Cable Networks**, which are broadband networks currently delivered by Spectrum in the city of Albany. Cable networks can provide service levels that exceed FCC broadband standards but perform lower than FTTH solutions.
  - **Advantages**:
    - Acceptable to High levels of performance, depending on service tier.
    - Reliable service delivery. Reliability may vary based on age and health of local infrastructure.
    - Solution is already largely implemented.
  - **Disadvantages**:
    - Subscriber Cost
    - Pockets of poor availability
- **5G Cellular Broadband**, which are commercial cellular data networks delivered by AT&T, T-Mobile, Verizon and MVNO networks that utilize carrier infrastructure. 5G

cellular networks can provide service levels which meet or exceed FCC broadband standards, but performance and reliability will vary locally due to signal strength, building construction and other factors.

- o **Advantages**:
  - Acceptable to High levels of performance, depending on physical location.
  - Reliable service delivery – All carriers are making significant investments in 5G implementation, site hardening.
  - Implementation of 5G Cellular is fast and straightforward. No building modifications are required, and government or partner entities can distribute or provide navigators to assist residents.
  - City or partner investments with a partner cellular carrier can overcome some local connectivity challenges.
  - City or partner entities can deploy private 5G in scenarios where carrier are unable or unwilling to do so.
- o **Disadvantages**:
  - The highest levels of performance, equivalent to Hybrid Cable Networks, rely on millimeter-wave cellular. This technology has limited range, and has only been partially deployed by Verizon in this area, and has not been activated as of early 2023.
  - Mid-band 5G service, while exceeding FCC broadband standard, is a lower performing option as compared to wired connectivity.
- **LEO Satellite Broadband**, is a service offered today exclusively by Starlink. Starlink utilizes constellations of satellites that are about 350 miles above the earth to deliver low-

latency, high speed connectivity in selected regions of the earth where users have unobstructed views of the sky. Albany is in the Starlink service area.

- o **Advantages**:
    - High levels of performance.
    - Reliability similar to cellular broadband.
    - Fast implementation
- o **Disadvantages**:
    - High cost of fixed equipment
    - High cost of ongoing service.

>>Section 4: Public-Private Partnership and Community Stakeholder Entity

The Office of Municipal Broadband would operate as a city department which interacts with external competitive commercial environment and marketplace. Upholding customer satisfaction and achieving digital equity for Albany's residents and businesses is the measure of strategic success.

Public-Private Partnership -- The Municipal Broadband coordinator in consultation with the Mayor, Common Council, and Broadband Advisory Committee would establish a public-private partnership with representatives from various sectors (public, private, not-for-profit, NGOs)

Role/Responsibilities: to share and leverage their expertise and resources to manage costs and risks associated with the planning, development, implementation, and operation of a municipal broadband network for the City of Albany. The Municipal Broadband Coordinator, selected by the Mayor and confirmed by the Albany Common Council would serve as the Chair of the

partnership committee. As noted by the World Economic Forum (WEF), such public-private partnerships are a commonly used means, particularly in "Smart City" development projects to both encourage community buy-in and secure access to critical technical expertise and resources.

Community Stakeholder Entity – Acting as a commission, we also recommend supplementing the office of Municipal Broadband with formation of its own "Broadband Advisory Committee" to provide guidance and critical input for organizational achievement. Committee members serve voluntarily and appointed by the Mayor and the Albany Common Council. Broadband Advisory Committee members would be drawn from stakeholders who have a vested interest in Albany's municipally provided broadband network service.

Following a Community Accountability Board (CAB) model, their role would be to monitor the development and operational success of the broadband network service and facilitate two-way communication between members of the community and the city administration regarding progress towards digital equity goals. The committee represents a formalized process to engage and address concerns from the broadband end-users.

Composition: The composition of the Broadband Advisory Committee may include local, state, and federal legislators or their representatives, public, private sector, and not-for-profit organizations, and local residents/individuals. Additionally, former Municipal Internet Commission members can offer insight and produce informed recommendations.

Responsibilities/Role: Potential responsibilities for Broadband Advisory Committee include providing an open public forum to share data, brainstorm and deliver feedback to the appropriate governing authorities and other partners on how to efficiently deploy consistent and maintainable broadband and planning to allow broadband infrastructure accessibility and affordability for all.

Conclusion

The internet has become so far-reaching that such issues as regulation, access and related policies have become key factors in the economy and societal living. Further than ever before, communications and information technologies enter every aspect of our lives: home, workplace/employment, education and physical health. Albany municipally operated broadband access can enable a number of valuable applications to individual users and to the overall community. Functions such as public safety, e-commerce, telecommuting, telemedicine, distance learning and countless others. Emerging web-based applications constantly power the explosive growth of the internet.

As a commission, our research warrants sufficient consideration relative to the hardware, software and architecture infrastructure aspects of the broadband network design. Modeling network coverage areas and traffic requires that the geographic location of network nodes be determined along with the magnitude and the statistics of the traffic originating from and

destined for each traffic source. Deploying telecommunication resources has always been by cables stretched between utility poles, however, deployment can be aerial or underground. As bandwidth demands for multimedia applications increase continuously, consumers require broadband and flexible access with higher bandwidth and a lower cost. Albany Municipal broadband, which has yet to be developed, has potential to transform lives and deliver services to everyone it can reach.

References

[ANSI/TIA/EIA] American National Standards Institute, Telecomm. Industry Assoc., and Electrical Industries Assoc., Standard 568B.3.

[ANSI] American National Standards Institute and National Electric Contractors Association, Standard NEIS-301, 1998.

[Barany] D. Barany, B. Murphy, and R. Draper, Various Powering Methods for FTTX Architectures, undated.

Federal Communications Commission FCC 17-166 before the federal ... (n.d.). Retrieved March 1, 2022, from https://docs.fcc.gov/public/attachments/FCC-17-166A1.pdf

FCC fixed broadband deployment. FCC Fixed Broadband Deployment. (n.d.). Retrieved March 1, 2022, from https://broadbandmap.fcc.gov/#/

U.S. Census Bureau quickfacts: Albany County, New York. (n.d.).
https://www.census.gov/quickfacts/fact/table/albanycountynewyork/PST045222

IV. FINANCIAL CONSIDERATIONS

It is an obligation of the Commission on Municipal Internet Service to "review all available options that would minimize the financial cost of creating such infrastructure." This section explores the possible sources of financing that could be used to build and develop municipal internet in Albany, and discusses various considerations the city's decision-makers should review in terms of operating such a service.

Grant Funding Sources

The City of Albany should pursue and obtain eligible funding. A significant component is the creation of grant funding expanded by recently passed legislation. In this instance, a grant is funding provided by a government agency to another government entity that enables it to perform specified ventures for the common good, without having to resort to financing or placing a burden on the overall city budget. The prospective channels are:

Federal Funding - *The Broadband Equity, Access & Deployment Program (BEAD)*

"All states will receive a minimum of $100 million as part of the Broadband Equity Access and Deployment Program (BEAD). The remaining BEAD dollars are allocated based on formulas detailed in the Infrastructure Investment and Jobs Act (IIJA). States will also receive money from the State Digital Equity Capacity Grant Program based on formulas detailed in the IIJA. Notably, states must apply for both of these programs in order to receive funds."[1]

---

[1] National Telecommunications and Information Administration. (n.d.). *Grants*. National Telecommunications and Information Administration. Retrieved May 22, 2022, from https://www.ntia.doc.gov/category/grants

State Funding - *ConnectALL Initiative*

"To support local efforts to expand broadband, the ConnectALL initiative will establish three grant programs to provide funding to local municipalities and other entities to plan, engineer, and construct accessible broadband infrastructure. The State will coordinate with municipalities in every corner of New York to ensure funding is directed where it's most needed and that every community has the support and resources to effectively participate. The grant programs are focused on three primary efforts: Local Connectivity Planning and 21st Century Municipal Infrastructure: This program takes a pioneering approach by providing grants to municipalities, nonprofits and other entities to construct open and accessible public broadband infrastructure."[2]

Grant Funding Procurement

Any grant proposal submitted on behalf of the municipal internet service should include a narrative description of the work that an Albany Municipal Internet Service plans to undertake to fulfill both its own and grant administrator goals. The proposal includes, at minimum, a description of the problem to be addressed, a detailed plan for addressing the problem, what it will cost, and what results the grant administrator can expect from the proposed project. After the proposal is accepted by the grant administrator and a grant award is made, the grant proposal forms the basis for a legally binding contract between grant administrator and grant recipient. By signing the contract, the City of Albany as a grantee agrees to perform mutually agreed-on plans of work and to report its progress toward fulfilling the terms of the grant and achieving the goals set forth in its grant proposal. A critical, but often neglected part of planning a project is sustainability. Is it critical,

---

[2] New York State. (2022, January 5). *Governor Hochul announces new $1 billion 'ConnectALL' initiative to bring affordable broadband to millions of New Yorkers*. Governor Kathy Hochul. Retrieved March 20, 2022, from https://www.governor.ny.gov/news/governor-hochul-announces-new-1-billion-connectall-initiative-bring-affordable-broadband

the city of Albany incorporates into the project the means that it will keep the Municipal Internet Service project going after the grant is exhausted.

Grant Funding Budget Audit

Since the Albany Municipal Internet Service capital requirements are based on budgets, the need for precise budget forecasting and aggressive ongoing management of the budget is critical. Poor execution and noncompletion of technology projects are a material waste of corporate resources - vast majority of technology projects have missed deadlines and overrun budgets, as publicized in the news media. IT project failure can be at best a hindrance and, at times, fatal to a company. In every case, working on the right projects ineffectively or working on the wrong projects is a drain on precious grant funding resources. Recognition of these shortcomings enables the proposed Albany Municipal Internet Service to analyze scenarios and ask questions, which either validate the need for the IT expenditure or uncover other alternatives.

Financing Options

While grants and other forms of funding from the Federal and State government are crucial to funding a large project such as this one, they may not cover the entire cost and can be competitive to secure. The city of Albany has several options it can undertake to raise funds itself to either close funding gaps or to fully pay for the project without assistance. These examples provide a general overview of each funding type and real-life examples from other cities and municipalities across the country that have used them to help establish their internet service.

Revenue Bonds

The city of Albany can issue bonds to fund the initial setup and establishment of the broadband service. Bonds are then paid back with the revenues from the service. Revenue bonds are typically

issued to private investors and then, once the service is established and running, the municipality can begin to pay back those bonds with revenues. The bonds typically are issued with an interest rate and are usually repaid over many years. This is one of the most common forms of fundraising and can potentially generate a lot of capital for a project quickly. Bonds are considered a safe form of investment and can be useful to large investment firms or even regular citizens who are looking for a low-risk investment.

This is a popular financial strategy used to fund part of or all a municipal internet project. Examples of municipalities using revenue bonds can be found all over the country, including Lafayette, Louisiana, Cedar Falls, Iowa, and Chattanooga, Tennessee.[3]

Loans

Another option for the city is to take out a loan and use the revenues from the service to pay it back over time. Loans can be taken out from a bank or a federal agency. Certain Federal agencies, such as the United States Department of Agriculture, have specific loan programs that are designed to increase broadband access. The ReConnect Loan and Grant Program from the USDA provides 100% loans that will cover the entire cost of a project, as long as the project meets certain requirements. These loan programs also typically have low, fixed interest rates. For example, the USDA loan has an interest rate of 2%. Federal loan programs seem to have diminished over the past few years, but with the new recently passed IIJA, more loan programs along with other funding opportunities could become available again.

---

[3] Institute for Local Self-Reliance. (2014, January). *How municipal networks are financed*. Institute for Local Self-Reliance. Retrieved June 20, 2022, from https://ilsr.org/wp-content/uploads/2014/01/financing-munis-fact-sheet.pdf

Internal Loan

Another loan option for the city is to use an internal loan. Instead of taking out a loan from a bank, an Internal Loan allows one department to take out a loan from another department within the same municipal government. The advantage of this type of loan is that it can be taken out at a much lower interest rate than a loan from a bank would be taken out for.[4]

One notable example of an internal loan can be found in the development of Chattanooga Tennessee's municipal internet services, one of the most successful in the country. The Electric Power Board (EPB), which is in charge of Chattanooga's municipal internet service, also has an energy division that supplies internet to homes in the city. To finance some of the initial project, the Electric Division supplied a $50 million loan to the Fiber Optic Division. The purpose of this loan was "to finance the costs of adapting the broadband network to provide telecommunications services to its customers". The Fiber Optic Division established a repayment schedule to repay this loan and as of December 2012, was on track to repay the loan ahead of schedule. While only a portion of the project was funded utilizing an internal loan, it provided a seamless and low costs loan to accomplish a crucial part of the process.[5]

Avoided Cost

Another helpful tool cities have used is an avoided cost. An avoided cost comes into play for networks that are built incrementally over time. As the municipality installs and establishes the infrastructure for the broadband system, the city can redirect existing funds used to lease connections from providers to build and operate its network. For example, adding one section of a

---

[4] Institute for Local Self-Reliance. (2014, January). *How municipal networks are financed*. Institute for Local Self-Reliance. Retrieved June 20, 2022, from https://ilsr.org/wp-content/uploads/2014/01/financing-munis-fact-sheet.pdf
[5] McCarthy, K. (2012, December 14). *Chattanooga high speed broadband initiative*. Office of Legislative Research. Retrieved March 20, 2022, from https://www.cga.ct.gov/2012/rpt/2012-r-0515.htm

city or all municipally owned buildings into a municipal internet service can generate savings that can be used to further establish the network.[6]

The City of Santa Monica in California was able to use avoided cost to help save hundreds of thousands of dollars and redirect that funding towards establishing and improving their municipal internet service. The city began laying the groundwork in 1998 for their service and initially connected municipal buildings, the local school district, and the local college into a community-owned internet service. The city saw savings of around $400,000 in the first year of establishing this network and was able to reinvest those savings into helping further establish the city-owned internet service to the rest of the city.[7]

Tax Increment Funding

Tax Increment Funding (TIF) is another strategy the city could use to fund the project. While TIF funding has historically been used for more traditional projects such as land acquisition or construction, it could be useful to keep in mind as a funding option for the city. The idea behind TIF is to pay for a project or investment upfront that is expected to increase tax values or increase the tax base, and then use those increases to pay back initial costs. TIF financing has two different methods the city could use; Bond Financing and "Pay As You Go."

In TIF Bond Financing, bonds that are issued are guaranteed to be paid back with increased tax collection that is generated from the investment. In this case, bonds would be issued to fund the implementation and set up of the municipal internet system. Once the system was set up, increased

---

[6] Institute for Local Self-Reliance. (2014, January). *How municipal networks are financed*. Institute for Local Self-Reliance. Retrieved June 20, 2022, from https://ilsr.org/wp-content/uploads/2014/01/financing-munis-fact-sheet.pdf

[7] Gonzalez, L. (2021, February 24). *Santa Monica city net: An incremental approach to building a fiber optic network*. Institute for Local Self-Reliance. Retrieved March 20, 2022, from https://ilsr.org/santa-monica-city-net/

tax collections from increased property values, new businesses establishing in the city, or from other benefits would be utilized to pay back those bonds.[8]

The second option for TF financing, "Pay As You Go," entails partnering with a private developer or contractor. With a private contractor doing the work of setting up the municipal internet system, the city would be able to incrementally pay for the services as additional tax revenue is collected by the city. Both of these options include a risk to the city and in the case of "Pay As You Go," to the developer as well. However, this method of funding does allow for a potentially faster starting time for the project.

Operating Considerations

Accessibility and Pricing

The Commission was formed in part due to the recognition that internet service, which is increasingly vital to function in an increasingly digitized world, remains unaffordable to many Albany consumers. During the height of the pandemic, there were reports of students in Albany having to sit in fast-food restaurants and other public places with Wi-Fi because their homes were not connected to the Internet. This type of situation is unacceptable, and one of the Commission's goals in researching the development and implementation of a municipal internet service is to ensure that this type of situation does not repeat itself.

When the Commission met with the Kevin O'Connor, the Director of Economic Development for Albany County and former Chief Executive Officer of FirstLight Fiber (formerly Tech Valley Communications) suggested that if the city were to develop a municipal internet service, that it be

---

[8] World Bank. (2015). *Tax Increment Financing (TIF)*. Tax Increment Financing (TIF) | Urban Regeneration. Retrieved March 20, 2022, from https://urban-regeneration.worldbank.org/node/17

provided at no-cost to consumers. The rationale he provided was that listing a price to access the service would serve as a barrier to potential consumers, and that it would force the city to set up an infrastructure to collect payments that would in of itself be costly to maintain.[9]

While it would be ideal to provide free access to the internet to all consumers within city-limits, it may not be feasible to do this while trying to ensure the service remains financially self-sufficient in the long-run. Especially as the equipment needed to support such a service will likely need to be upgraded and maintained on a regular basis and at a substantial cost. Therefore, a pricing structure should be considered when the service expands beyond a proof-of-concept experiment to a more city-wide service.

When the system is developed enough to support a pricing structure, the Commission suggests creating at least three-tiers of service:

1. A tier that would be of no-cost to consumers that would provide enough service for general web-browsing, sending emails/downloading attachments, and to facilitate reliable streaming/videoconferencing (in recognition of the fact that many schools and employers utilize services like Zoom or WebEx to facilitate classroom learning or work-related meetings).
2. A tier with low-cost high-speed service targeting consumers looking for faster internet speeds, or those who are looking to avoid having internet service bundled with television service.

---

[9] O'Connor, K. (2022, October 19). Meeting of the Albany Municipal Internet Commission [Zoom].

3. A tier that is targeted toward businesses or other high-bandwidth consumers (like those who participate in eSports), that would provide the most robust service at gigabit level speeds.

The latter two tiers could be used to support the cost of proving the no-cost tier. Additionally, revenue sources to financially support the no-cost tier could come from the sale of advertisements to consumers of that service or utilizing the Affordable Connectivity Program subsidy offered to low-income households.

The Commission recommends that pricing of the municipal internet service remain under the oversight of the City of Albany to best ensure affordability.

Operating Structure of Municipal Internet Service

If such a service is initially created to serve a limited area of the city – such as a neighborhood with low-broadband connectivity, it may be prudent to include municipal internet under an existing city department to be led by a director or coordinator. A possible starting structure for this municipal internet service could be the following:

1) **Director of Municipal Internet/Municipal Internet Coordinator** – oversees operation of municipal internet service, direct point of contact with contractors, engage with the public and city officials on matters pertaining to function and operation of the service.

2) **Grant Writer(s)** – research and applies for grants to fund the development and operation of municipal internet service.

3) **Technical advisor** – to assist director and other staff with the technical aspects of the service, trouble shoot any repairs (if service is fully contracted out to an outside internet service provider, this position may not be necessary).

4) **Attorney** – to assist with any legal or legislative matters concerning the development of such a service, assist the director and other city officials with any contract negotiations with service providers, compose and review requests-for-proposals or requests-for-quotes to ensure they abide by all applicable regulations and laws, ideally should have an understanding of telecommunications and utility regulations and laws.

5) **Administrative aides** to assist with billing or customer issues. (If service fully contracted out, this may not be necessary).

Should the service expand to become a city-wide service or greater, the city administration and the Common Council could permit the municipal internet service to become its own department led by a commissioner with a complementary public authority to support the financing of the service akin to how the City of Albany Water Department and the Municipal Water Finance Authority jointly operate to provide water service throughout the city and the ensure that the service has the financial ability to sustain itself.

Potential Salaries of Municipal Internet Service Staff

To provide an idea of the initial costs of staffing a municipal internet service, the Commission decided to use the City of Albany's adopted 2023 budget as a baseline. The Commission believes that if the city initially develops such a service, it would be akin the creation of a specialized department such as that of Sustainability and Community Services. However, it could evolve into a full department headed by a commissioner, like the Water Department.

Commissioners in the City of Albany are compensated based on a pay scale grade of W. 14, which has an annual salary range of $111,600 to $167,400.

For recently created positions designed to address specific issues, but housed in a larger department – such as the Director of Community Services falling under the purview of the Planning and Community Development – these were the annual salary pay scales:

- Director of Sustainability – W.10 (annual salary between $76,200 to $114,300)

- Director of Community Services – W.10 (annual salary between $76,200 to $114,300)

The annual salaries of supporting staff for Commissioners and Directors unrepresented by a union ranged from a pay scale of W.1 and a salary grade of W.7 ($32,300 to $85,800).[10]

If a governing body is established, the Commission believes the costs of operating it would be similar to the cost of other governing bodies that oversee other city departments and offices.

This information is provided as a guide to be considered. The Commission recognizes that ultimately, all positions and respective salaries would need to be determined by the Mayor and the Common Council.

Waiving the Residency Requirement

Given the specialized skills and knowledge required to head a municipal internet service, the Mayor and the Common Council may need to consider the possibility of waiving the residency requirement for certain positions – in particular those positions charged with developing and administering the service. Most cities that have established municipal internet services are out of the state, meaning that most of the pool of experienced and qualified individuals may not be current residents of Albany. The existing residency requirement in the City of Albany may hinder efforts

---

[10] City of Albany. (2023, January 26). 2023 Adopted City Budget. Albany, NY.

to recruit the best candidate for this position, especially considering that both the public and private sector face difficulties in filling positions in the current economic climate.

Cost Considerations of Developing a Fiber-to-the-Home Service

Municipal internet services that provide fiber-to-the-home (FTTH) service, like in Chattanooga, can be more easily developed and operated by the municipality because they already operate public power utilities. These existing power supply networks are already owned and operated by the respective municipalities with established right-of-way access to be able to connect directly to consumers' homes, businesses, and other buildings throughout their municipality. The City of Albany's power services are run by a private utility, which means any FTTH municipal internet service would require the City of Albany to develop its own fiber infrastructure and negotiate right-of-way agreements with existing private utilities.

The cost of developing a FTTH municipal internet service to cover the City of Albany was determined by the original City of Albany broadband study to be $44 million. A response to the Commission's preliminary report by written by Mark Dorry, the City of Albany's Chief Information Technology Officer issued on August 11, 2022 noted that it would not be unreasonable for the cost to be closer to $50 million.[11] The Commission also met with Kevin O'Connor, the Director of Economic Development for Albany County and former Chief Executive Officer of FirstLight Fiber (formerly Tech Valley Communications), on October 19, 2022 who cited his experience in developing fiber-optic internet networks and estimated the cost of developing a city-wide network in Albany to be between $50-70 million.[12] Factoring in recent fluctuations in

---

[11] Dorry, M. (2022, August 11). *City of Albany Office of Information Technology.* Response to Municipal Internet Commission's Preliminary Report.
[12] O'Connor, K. (2022, October 19). Meeting of the Albany Municipal Internet Commission [Zoom].

construction costs, if the City of Albany were to pursue a FTTH approach to municipal internet city-wide, local decision-makers may need to consider the possibility of the total development cost being or exceeding $100 million.

Cost Considerations of Developing a Wireless Broadband Service

Although FTTH internet service is considered the gold-standard, wireless broadband service may be a more cost-effective approach to providing quality broadband throughout the city. The City of Albany has a history with this type of service. The Albany FreeNet, established in 2006, provided wireless internet access in certain locations of the City of Albany. When meeting with the Commission, O'Connor noted this service is still available, however, the equipment that broadcasts the wireless broadband signals are out of date resulting in a poor quality of service – especially as the technology used to access this service (cell phones, laptop, tablets) have evolved substantially.

Today's wireless broadband equipment can provide much faster and reliable internet speeds and can better handle the multiple devices people use to access the internet. Newer developments like 5G technology, which cellular service providers are starting to introduce to many areas throughout the country, have the potential to provide gigabit level internet-speeds. However, with technology constantly evolving, it is likely that this equipment will need to be replaced every five-to-ten years in order to ensure the service remains functionable for the public. The cost of wireless internet equipment varies, but according to an FCC report it can range from the tens of thousands of dollars per unit for standard Wi-Fi service, akin the that used on college campuses or public libraries to hundreds of thousands of dollars per unit for state-of-the-art 5G equipment.[13]

---

[13] Federal Communications Commission. (2021, September 30). *Federal Communications Commission*. Secure and Trusted Communications Networks Reimbursement Program: Final Catalog of Eligible Expenses and Estimated Costs. https://docs.fcc.gov/public/attachments/DA-21-947A4.pdf

One idea that was discussed at the October 19, 2022 Municipal Internet Commission meeting was replacing the existing equipment used for the Albany FreeNet with newer equipment and expanding the coverage of the service by using city-owned buildings as locations to place new antennas and other wireless equipment. The commission was informed that such a system with 75 antennas spread citywide was estimated to cost $9-10 million to install based on a 2018 estimate.[14]

In a letter dated August 11, 2022 from the City of Albany's Chief Information Technology Officer, it was noted the City of Albany, led by its Director of Sustainability, is collaborating with the New York Power Authority (NYPA) on a proof-of-concept project that will replace several street-lights in the South End with Wi-Fi enabled streetlights that will provide no-cost public Wi-Fi to consumers.[15] When discussed further with the Chief Technology Officer, it was noted that this effort was largely funded by NYPA which would be providing the equipment to be used and allow the city to gain some experience with managing a municipal internet service without the burden of financing this concept independently.[16]

The Role of the City in Operating Municipal Internet

A key factor that will determine the long-term cost of developing and operating a municipal internet service in Albany is the specific role the city will play. In municipalities that already operate power utilities, like in Chattanooga, the skilled employees needed to maintain and manage the infrastructure for a municipal internet are already in place. For Albany, this will be a difficult challenge because the city does not operate a power utility and thus does not have the skilled employees on hand needed to immediately develop and operate an internet service. Therefore, the

---

[14] O'Connor, K. (2022, October 19). Meeting of the Albany Municipal Internet Commission [Zoom].
[15] Dorry, M. (2022, August 11). *City of Albany Office of Information Technology.* Response to Municipal Internet Commission's Preliminary Report.
[16] Dorry, M. (2022, September 21). Meeting of the Albany Municipal Internet Commission [Zoom].

city will need to partner with a private sector entity with the necessary experience in developing and operating internet service. Once the infrastructure is in place to support this service, Albany will need to decide how much of a role the city administration will play in its operation.

City Fully Operates Municipal Internet

One option the City of Albany could take is to fully operate the municipal internet service itself, similar to the way it maintains and operates water service in the city. This approach would be the most difficult and costly because it would require the city to build up a specialized staff capable of maintaining the service including a technical staff to maintain/build out internet service infrastructure, an administrative staff to handle customer issues, legal staff to address any legal issues (for example negotiating access agreement, establishing rights-of-way with other existing utilities, etc.). While a benefit to this approach would be that the city would be fully responsible for the quality of the service, a drawback would be that the city and its taxpayers would be fully exposed to any financial risks that may be associated with the development and operation such a system. However, this risk can be mitigated somewhat with the creation of an authority whose finances would be outside of the city's general fund.

Contracting Out Internet Service

Another option would be for the city to contract the operation of a municipal internet service to a private sector entity who has experience with operating this type of utility. The City of Albany has some experience with this as it collaborated with what was then Tech Valley Communications on the initial development of the Albany FreeNet in 2006. Fast forward to now, there some internet providers – particularly those that provide cellular service – that are interested in expanding their

customer base. Especially as 5G technology is increasingly made available and providers are rushing to develop the infrastructure to support it.[17]

Many of these private entities have the experienced staffing in place, and the institutional knowledge to support such an operation. If the city chose to adopt this approach, it may not need to absorb the costs of building up a staff from ground up, and depending on whatever agreement is made, may not need to worry about being exposed to the cost of maintaining and operating equipment as well as only having a very limited role in addressing customer issues. This would allow the city to focus its existing workforce on providing existing city services and not have to absorb additional cost of effectively building a new utility service for consumers.

However, the risk to contracting this service out would be that the quality and growth of the service would be limited to the capacity and capabilities of the vendor. If the city were to move into a different direction with the internet service, its ability to do so would be dependent on the scope of the agreement with their vendor or vendors.

If the City of Albany decided to adopt this approach, the Commission strongly recommends that the city does not agree to any exclusivity arrangements. This is to ensure that one vendor does not establish a monopoly on internet service provision. The commission believes that facilitating competition in internet service provision will provide the best outcomes for potential consumers of the service.

---

[17] Anders, D. (2022, September 8). *T-Mobile expands 5G home internet to another 9 million households*. CNET. https://www.cnet.com/home/internet/t-mobile-expands-5g-home-internet-coverage-to-9-million-more-homes

Hybrid Public-Private Model

The City of Albany could also take a hybrid approach to internet service provision – managing certain portions of the service, while contracting out the remaining portions. Although this approach may have more direct costs to the city or any authority that is developed than fully contracting out, it would allow give the city a more hands on approach to operating the municipal internet service without taking on all the risk. This approach could allow the city to operate a portion of the service based on its existing capabilities – such as managing prices, addressing local regulations, and providing oversight for instance while leaving other operational aspects the city might not have the capacity to handle to the vendor like infrastructure maintenance, billing, and handling customer service issues.

Financial Recommendation in Developing and Operating Municipal Internet in Albany

The Commission recommends that the City of Albany issue a "Request for Interest" to internet service providers and telecommunications companies to determine the interest and how these private sector entities may be interested in working with the city in providing internet service. The responses provided can be used to determine the approach the city could take to develop its municipal internet service. This recommendation is in line with what was recommended by the city's Chief Information Technology Officer.

References

Anders, D. (2022, September 8). *T-Mobile expands 5G home internet to another 9 million households*. CNET. https://www.cnet.com/home/internet/t-mobile-expands-5g-home-internet-coverage-to-9-million-more-homes

City of Albany. (2023, January 26). 2023 Adopted City Budget. Albany, NY.

Dorry, M. (2022, August 11). *City of Albany Office of Information Technology.* Response to Municipal Internet Commission's Preliminary Report.

Dorry, M. (2022, September 21). Meeting of the Albany Municipal Internet Commission [Zoom].

Federal Communications Commission. (2021, September 30). *Federal Communications Commission*. Secure and Trusted Communications Networks Reimbursement Program: Final Catalog of Eligible Expenses and Estimated Costs. https://docs.fcc.gov/public/attachments/DA-21-947A4.pdf

Gonzalez, L. (2021, February 24). *Santa Monica city net: An incremental approach to building a fiber optic network*. Institute for Local Self-Reliance. Retrieved March 20, 2022, from https://ilsr.org/santa-monica-city-net/

Institute for Local Self-Reliance. (2014, January). *How municipal networks are financed*. Institute for Local Self-Reliance. Retrieved June 20, 2022, from https://ilsr.org/wp-content/uploads/2014/01/financing-munis-fact-sheet.pdf

McCarthy, K. (2012, December 14). *Chattanooga high speed broadband initiative*. Office of

    Legislative Research. Retrieved March 20, 2022, from

    https://www.cga.ct.gov/2012/rpt/2012-r-0515.htm

National Telecommunications and Information Administration. (n.d.). *Grants*. National

    Telecommunications and Information Administration. Retrieved May 22, 2022, from

    https://www.ntia.doc.gov/category/grants

New York State. (2022, January 5). *Governor Hochul announces new $1 billion 'ConnectALL'*

    initiative to bring affordable broadband to millions of New Yorkers. Governor Kathy

    Hochul. Retrieved March 20, 2022, from https://www.governor.ny.gov/news/governor-

    hochul-announces-new-1-billion-connectall-initiative-bring-affordable-broadband

O'Connor, K. (2022, October 19). Meeting of the Albany Municipal Internet Commission

    [Zoom].

World Bank. (2015). *Tax Increment Financing (TIF)*. Tax Increment Financing (TIF) | Urban

    Regeneration. Retrieved March 20, 2022, from https://urban-

    regeneration.worldbank.org/node/17

V. Identification of Potential Strategic Partnerships in implementing Municipal Broadband in Albany

In order for the City of Albany's municipal broadband to succeed, the Commission believes it is critical that the city leverages its relationships to engage partners in government, educational institutions, community groups and businesses. The municipal broadband will require funding from the federal and state government and collaboration from Albany County and City of Albany departments.

Educational institutions, community groups, and businesses will be important partners for the city to collaborate with on educational opportunities, resource sharing, and program rollout.

Collaboration with the Private Sector

In addition to utilizing the potential partnerships above, the commission believes that the city should consider undertaking a public private partnership to assist with the municipal broadband program. The benefits of a public private partnership can assist the city with various components of the Municipal Broadband.

The Commission feels that a public private partnership would be especially advantageous from a fiscal standpoint. The Commission recognizes the city has limited financial resources due to a number of factors and that the build out and operation of the municipal broadband will be a massive financial commitment. A public-private partnership could be a cost saving option should municipal broadband move forward.

A public private partnership can benefit the city in the following areas:

- Build out – by partnering with a private company, the city could save substantially on the capital expenditure required to build out the broadband system throughout the city.

- Operation – by partnering with a private company, the city can save on operational costs while still maintaining oversight of the system.

- Efficiency – A public private partnership may allow certain operational efficiencies that would otherwise not be possible.

- Innovation – A partnership with a private company may allow the city to access new technology and systems that would otherwise not be available to the public sector for some time.

If the city should choose to move forward with a collaborative model such as a public private partnership, the city should engage companies with experience in broadband build out and implementation, program management, and innovation.

Public Partnerships

Legislative Delegations

The success of the municipal broadband program will require significant financial support. The federal government recently passed the Bipartisan Infrastructure and Jobs Act, which included funding for broadband expansion. The city should engage Senate Majority Leader Chuck Schumer, Senator Kirsten Gillibrand, and Representative Paul Tonko to identify future funding opportunities.

State Level

New York State has made broadband expansion a priority for economic development and equity for several years. In 2022, the state created the ConnectALL initiative, allocating $1 billion to bring affordable broadband to New Yorkers across the state. The city should engage Governor Kathy Hochul, State Senator Neil Breslin, and Assemblymember Patricia Fahy about accessing this funding and to include additional funding in the FY24-25 state budget.

County Level

Albany County recently launched a program to bring affordable broadband throughout the county. The city should engage the county and coordinate efforts to maximize shared goals of bringing broadband to all residents in the city and county.

Educational Institutions

The City of Albany is fortunate to be home to several educational institutions from primary to post graduate. These institutions can serve as partners for research, implementation, public awareness, and as anchors for the municipal broadband program. These intuitions include, but are not limited to:

- Albany Public Library Systems

- Albany City School District

- University at Albany

- University at Albany Center for Technology in Government

- College of St. Rose

- Maria College

- Albany Law School

- Albany Pharmacy School

- Sage College

Local Community Groups and NGOs

The city is fortunate to have a strong fabric of active and informed community groups and NGOs who provide services to city residents. They should engage these community groups and NGOs to assist with community outreach, and act as anchors for the municipal broadband program.

Specifically, the city should engage and work closely with the members of the Capital Region Digital Equity Coalition including:

- Albany Can Code

- Capital Region BOCES

- United Way of the Greater Capital Region

- Connect Center for Youth

Additionally, at a listening session of the Capital Region Digital Equity Coalition in March 2023, community members and stakeholders identified the following community services and programs working to improve internet access. The city should look to collaborate with and support the following:

- Capital District Women's Employment & Resource Center (WERC)

- FCC's Federal Affordable Connectivity Program (ACP)

- SUNY Attain with Albany Housing

- Lending Library with CanCode

- Senior Planet

- ATTAIN Lab

Local Businesses

Local businesses will be critical to ensure the municipal broadband program is a success. The city should engage this critical resource to provide their expertise and inquire about financial support and/or a collaborative relationship as outlined in this section if applicable. A successful municipal broadband program will act as a catalyst for attracting, retraining, and training the workforce.

VI. Review of Comparable Broadband Projects/Initiatives

As noted in our preliminary report, one of the challenges encountered by the benchmarking subcommittee was that the majority of community/municipal broadband initiatives underway were for communities substantially smaller than the city of Albany, making them less than ideal choices for a basis of comparison. For example, two communities in Maine who have undertaken successful municipal broadband initiatives consistent with a municipally controlled but privately contracted for service provision approach are typical of the communities identified and are noted below.

<u>Georgetown, Maine</u>

Georgetown is a coastal community in Maine with a population of 1,058 (as of the 2020 census) which has undertaken to build a multi-million-dollar, full fiber to the premises (FTTP) municipal broadband network. Inspired to do so by a lack of reliable service provided by their incumbent internet service provider (ISP) and the connectivity issues brought on by the COVID-19 pandemic, the town broadband committee enlisted outside assistance to finance the construction.

Georgetown opted to pursue an FTTP network despite the high-cost relative to other solutions. The initial cost was identified as $3,712,043.00, but the community devised a funding strategy that made the project feasible. Through partnering with a different ISP, Axiom, and a mix of grants and community funding, and a grant from Connect Maine of $858,365.00 they were able to cover the costs. It is expected that the project construction will begin in Summer 2022.

Roque Bluffs, Maine

The town of Roque Bluffs has a population of approximately 300 people and made the decision to pursue a community-driven broadband project. The town was already partially served by an internet service provider (ISP) and the project was complicated by the rural nature and low population density of the community. Through the active engagement of the community and the aid of the Island Institute, the broadband committee was able to devise an optimal solution for their community and resolve their connectivity issues. The community received a grant from the USDA for $893,170 to build out a fiber network for 166 homes, 22 farms, and 16 businesses.

Suitable Communities for Comparison

In our final report the commission has chosen to focus on three communities which are suitable comparisons for the city of Albany based on population size, density, and basic demographics. They are as follows: Chattanooga, Tennessee, Chicopee, Massachusetts (though not a match on population size), and Longmont Colorado.

Chattanooga, Tennessee

Chattanooga was one of the first U.S. cities to pursue the creation of a city-wide municipal broadband network. A city with a population nearly twice that of the City of Albany (171,000 as of the last census), they began creation of their fiber networks in 2009. According to an independent study completed by Dr. Bento Lobo of the University of Tennessee, over the past 12 years, the broadband utility (EPB Fiber) **has returned nearly $2.7 billion** on an original investment of $220 million to build, expand, and maintain the network. This also includes the creation of over 9,000 new jobs during the same period.[1]

Demographics: While the population of Chattanooga is double that of Albany, other features of both make them a suitable comparison for potential returns on investment in municipal broadband. Both are:

1)   Centers of government activity.

2)   Have a large number of private and public universities both within and adjacent to the cities.

3)   Are centers for technology development and innovation

4)   Have a large aging and growing minority population.

Network Management: The network is overseen by a five-person Board of Directors and a professional team of in-house managers who also share responsibility for the management of the SmartGrid power grid controlled by the Electric Power Board (EPB) as well. Their structure is that of a fully-functional municipal authority with a President/CEO and a nine-person E-suite of vice-presidents covering everything from network management, commercial sales, customer service, and strategic operations. Given the expanded scope of responsibilities of the management team of Chattanooga's municipal network, it was decided that a detailed review of salary structure would not be of value for the purposes of this report and its recommendations.

Network: The network was installed and established by the Electric Power Board (EPB), a Chattanooga public utility corporation. Construction was financed by a combination of loans and grants totaling approximately $220 million over a 10-year period. The Fiber Network is a "**Full Service**" Network as opposed to a "**Dark Fiber**" network used in other municipalities and employs "mesh networking" (relaying radio signals throughout the whole city via a series of access points or radio transmitters, each of which is connected to at least two other transmitters)

as opposed to the "hub and spoke" hard-wired models which are more costly and less reliable in cities.

Mesh networks provide reliable user connections and are also faster to build and less expensive to run than the hub and spoke configurations. Internet connections can also be secured through the addition of a wireless router to an existing wired connection – a convenient method for internet access provision in small, centralized areas (for example public housing, apartment complexes/towers).

Program Options: EPB offers both residential and commercial service plans to individuals and local businesses.

Rates/Service packages

Currently there are three levels of service offered:

·   300MBPS – for both download and upload. Current Rate is $57.99/Month

·   "Gig" Package – 1000 MBPS for both download and upload. Current Rate is $67.99/month

·   10 Gig Package – 10,000 MBPS for both download and upload. Current Rate is $299.99/month

Additional Items of Note: The city of Chattanooga also combined their efforts to provide municipal broadband with the creation a "smart" power-grid for the city which allowed them to leverage the framework created for the power grid to support the broadband infrastructure as well.

EPB made a conscious decision not to offer their services at a lower rate than competing internet providers in order to promote economic peace, instead focusing on providing higher-quality services and speeds at the same rates.

Here is a link to the report of the study conducted by Dr. Bento Lobo of the University of Tennessee at Chattanooga which provides a detailed analysis of the costs and economic benefits derived from the creation of municipal broadband in the city of Chattanooga:

Ten Years of Fiber Optic and SmartGrid Infrastructure in Hamilton County, Tennessee

Works Cited

Electric Power Board (EPB). Electric Power Board Website

Lobo, Bento. 2020. *Ten Years of Fiber Optic and Smart Grid Infrastructure in Hamilton County, Tennessee*, University of Tennessee at Chattanooga.

Subramanian, Samanth. "The Best Broadband in the U.S. isn't in New York or San Fransisco. It's in Chattanooga.", Quartz, April 15, 2021.

Chicopee, MA

Population: 55,560 (2020 Census). Albany, NY is 98,860 (2020 Census).

Although the population difference between Chicopee, MA and Albany, NY at first glance seems to paint these cities as being in different spheres, diving deeper shows they have many similarities in terms of their influence in their respective regions.

Demographics: Both are older Northeastern cities with former industrial bases and have transformed themselves in the 20th century; Albany to a focus in state government and education

and Chicopee to manufacturing and as a military center, as it the largest Air Force Reserve base in the United States. Both cities are also important population centers to their respective states; Chicopee is the 2nd largest city in Western MA (behind Springfield, MA) and Albany is the center of New York State's Capital Region and the largest population center in Eastern New York State north of New York City.

Like Albany is doing now, Chicopee commissioned a committee to determine the feasibility of a municipal internet service starting in 2012. The study was concluded in 2018 and determined that this would be a worthwhile option for the citizens of Chicopee.

Network Management: Chicopee's municipal internet service is relatively new, with the service being established in 2019 and construction beginning in 2020. Chicopee Electric Light (CEL) is overseen by a three-person Municipal Light Board. The board features two commissioner positions and a clerk position, all of which are voting members.

Day-to-day operations of CEL and Crossroads Fiber is managed by a General Manager. According to the minutes from the board's May 31st, 2023 meeting, a new candidate recently signed a five-year contract that will see them come on as the Assistant General Manager until January 2024 when they will take over as the General Manager at a salary of $195,000 per year.

The duties of the General Manager includes oversight of all aspects of the operations of CEL's utilities and broadband development. Crossroads Fiber is currently undertaking capital projects to install fiber throughout the city and reach more homes and businesses. The General Manager is also a member of multiple city boards and planning committees.

Network: Chicopee has chosen to have the municipal internet service be run by Chicopee Electric and Light (CEL), which " was established as a municipal utility in 1896 by community

leaders who wished to free the community from the grip of a private utility company", much in the same vein as what we are attempting to accomplish today for internet. They spun off a separate entity under CEL to run and manage the internet portion, known as Crossroads Fiber (www.crossroadsfiber.net).

They have taken an approach of building out their network using Fiber Internet, and doing so in stages, working neighborhood by neighborhood based on demand. Initially available only to business customers, they have expanded to residential opportunities after the first year. As of the end of 2020, capacity was projected to be at 5500 households, with a goal of full buildout to all available households by the end of 2027.

Rates/Service packages: Current pricing and service tiers vary between consumer and business accounts. Business plans are available at two distinct tiers, Crossroads Business Standard and Crossroads Enterprise.

Crossroads Business Standard provides business customers with 'best effort' bandwidth and availability, with plans ranging from $99.95 for 250 Mbps up to $249.95 for 1Gbps tier. Crossroads Enterprise provides dedicated services with tiers ranging from $395.95 for 100 Mbps upto $1895.95 for a 1 Gbps plan. Contract options are either 1 or 2 years. 1 year contracts are charged an install fee of $99.95, while 2 year contracts waive the installation fees.

Residential tiers are $59.95 for 250 Mbps or a 1 Gbps plan for $69.95 monthly. Residential plans are not charged an installation fee. Speeds on residential plans are listed as 'best effort' and 'up-to' the speeds listed per tier, but not guaranteed.

Again, Chicopee may have a smaller overall population than Albany, but it looks to be an example for how to effectively and efficiently build out a municipal internet network that can

benefit its citizens and quite a varying array of businesses, and that can scale over time to continue to meet those needs.

 Sources:

: [ABOUT | Chicopee Electric (celd.com)](https://www.celd.com)

https://www.celd.com/2023-agenda-minutes

https://www.celd.com/

https://www.crossroadsfiber.net/

https://www.thereminder.com/localnews/chicopee/chicopee-electric-light-expanding-municipal-intern/

https://medium.com/@JoelforChicopee/its-time-to-stop-preventing-progress-in-chicopee-it-s-time-for-municipal-internet-74b8f4328177

https://muninetworks.org/communitymap

<u>Longmont, Colorado</u>

Another community that could serve as an excellent comparison community and model for Albany's municipal internet service is Longmont, Colorado. Longmont is very similar in size to Albany.

<u>Demographics:</u> As of the 2020 Decennial Census, the City of Albany has a population of 99,224 and 48,031 households and Longmont has a population of 98,885 and 41,680 households. Being so close in both overall population and households makes Longmont an ideal comparison community, with lessons to be learned on cost, service tiers, types of networks, and more.

Network Management: When it was initially established in 2014, NextLight was overseen by the Longmont Power & Communications general manager. However, as of 2019 when the original General Manager retired, the duties of the position were split into two new positions. A director of electric utility and director of NextLight internet services positions were created to handle both enterprises separately. Having a director focused solely on NextLight's internet services will allow them to better enhance their services for customers.

The **Director of Broadband Services** reports directly to the Deputy City Manager and is responsible for the daily operation for NextLight's broadband services. According to the most recently available city budget data, the broadband division of NextLight features a mixture of full-time and part-time employees. The titles of these positions range from GIS Analyst, Utility Rate Analyst, Neighborhood Resource Coordinator, and more. Between the full and part-time positions, there are 9.18 full-time equivalent (FTE) positions in the broadband division. The available budget data does not breakdown individual salaries, but wages for the broadband division in 2022 totaled approximately $1.05 million. Considering the high level of the Director of Broadband Services position and the managerial responsibility, the position's salary is likely in the range $115,000 - $130,000.

Network: Longmont has a citywide gigabit fiber network which is much faster and more reliable than a traditional cable internet system. The city's municipal service is frequently rated amongst the fastest internet services in the nation, being ranked highly every year since 2018. Longmont's municipal internet service was installed and established by the Longmont Power and Communications (LPC) and is managed by NextLight. LPC is a public power organization that has worked to provide affordable electricity and other services to residents of Longmont for over

100 years. LPC was established to manage the municipal internet service in 2014. NextLight also provides landline phone service to residents who want it.

Rates and Service Packages: NextLight provides both residential and commercial service to residents and businesses.

For residential customers, there are three plans available. The first and most expensive plan is the internet and phone plan. This plan provides 1000 mbps and includes landline phone service. This plan costs $94.95 a month. The next plan, the 1 Gig Internet plan, also offers 1000 mbps internet speeds but does not include the landline phone. This plan costs $69.95 a month. The last plan offers 100 mbps internet speeds for smaller households or households with fewer devices. This plan costs $39.95 a month. All three plans have no data caps and no lock-in contracts.

 NextLight's business options are mainly geared towards small businesses but can accommodate businesses who need a faster internet speed. Similar to the residential options, businesses have three plans to choose from. NextLight offers plans that provide 25, 50, and 100 mbps download speed. These plans come at a monthly price of $59.95, $119.95, and $199.95 respectively. These speeds cover the needs of most small businesses, whether they have just one or two computers or are frequently on video calls and downloading large files. Custom options are available if a business requires a faster download speed.

Sources:

[Longmont Names Dodd to Lead NextLight Internet Service | News and Updates | City of Longmont, Colorado (longmontcolorado.gov)](#)

[2022 Budget Documents | City of Longmont, Colorado (longmontcolorado.gov)](#)

VII. Conclusion

As we noted in our preliminary report, there has been a steadily increasing demand, and need, from the public for high-speed internet access.

The experiences of the city administration, residents, and businesses during the shift to remote delivery of services during the COVID-19 pandemic drove home the stark reality of internet service as a critical infrastructure. Even more importantly, the importance of providing affordable broadband internet access and the gaps in digital equity within our community which negatively impact the most vulnerable sectors of our population. We applaud the commitment of the City of Albany's administration and elected officials to implement municipal broadband improvements to address those gaps and achieve digital equity within our community, a need which is both clear and immediate.

Given the considerable efforts at both the Federal and State level to make funding available for municipal broadband initiatives, the commission believes that such an investment of time and resources by the city of Albany is both structurally and fiscally feasible and necessary.

In this final report, the commission has refined their preliminary findings and recommendations on potential models and proposals so that the Mayor and Common Council to recommend an incremental process which would create a mechanism to establish municipal broadband in the City of Albany, manage the costs and associated risks of doing so through the provision of internet service and re-establishment of a competitive market for doing so; and achieve digital equity within our community.

We believe that the return on investment for the provision of such services will improve the local economy through reduction of service costs associated with business development, increase

educational achievement through the provision of critical services to all students, and improve the delivery of city services to our seniors and other vulnerable populations. That success, or close to it, would be life-changing for our community and further confirm the position of the City of Albany as a national leader in innovation.