Midcoast Internet:

A Regional Municipal Utility Project

**Supporting the
Towns of Woolwich, Wiscasset, & Dresden**

WWD Fiber Optic Network Scope of Work & Costs

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I. WWD Internet: Concept and Overview

Background

Woolwich, Wiscasset, and Dresden communities have been meeting and working together to determine how to support a fiber optic system that would address the lack of affordable, reliable, and future-proof internet for their citizens. The three communities have partnered in this feasibility study to create the foundational detail for developing a regional or individual town broadband project. The need for this municipally-owned utility and its associated fiber optic network is based on the following:

- The internet service in the region is monopoly controlled, reflected by some of the highest pricing in the nation, with service levels that do not meet customer demands.
- Most of the existing regional infrastructure is outdated DSL and coaxial cable technology, with little to no new investment in network upgrades.
- The incumbent providers are unresponsive to community needs and requests for affordable, fast, symmetrical, and reliable service.
- The cable TV model is outdated and has created a standard of service that is no longer acceptable for modern communications and user expectations.

The mission of the three communities is to provide every home and business in the respective communities with affordable, high-speed, state-of-the-art fiber optic connectivity.

- Community Ownership: Community control and asset ownership for the benefit of its customers
- Affordability: Services provided at a fair price without the need to generate a profit for shareholders
- Reliability: Dependable fiber to the premise service at guaranteed speeds
- State-of-the-Art Technology: Incorporating the newest technology, ideas, and features
- Equal Accessibility: Removing financial and logistical barriers to serve the regional communities better and close the digital divide for every homeowner in the three communities.

The goal of this report

- Create a community-owned regional high-speed internet network by 2024
- Establish the feasibility of an individual town approach that will allow each community to move forward independently if they so choose
- Be a communications document for conveying the rational and fact-based approach to citizens of the three communities

The Network Architecture

This study's cost proposals provide a 100% fiber network capable of reaching every home within the town boundaries of Woolwich, Wiscasset, and Dresden (hereafter described as the WWD Fiber Project) to each premise that requests service. The network architecture planned would be a hybrid Gigabit Passive Optical Network system. In this model, each premise has a dedicated fiber connection back to a strategically placed splitter cabinet. From the cabinet back to the Central Office (CO) equipment, a GPON system would be deployed. GPON systems consolidate multiple services onto a single fiber transport network. This system allows symmetrical upload and download speeds of a minimum of 100/100 Mbps, with up to 10G (10,000 Mbps) symmetrical speeds available to customers. (Mbps stands for megabits per second. The higher the number of Mbps, the faster the internet speed.)

A discussion of delivery technology and fiber optic benefits can be found later in this report.

The Public Utility Model

The growth of municipally-owned broadband networks has exploded over the past five years. Frustration with incumbent prices and service offerings, along with a lack of support from for-profit providers, has led communities throughout the United States to take control of their broadband networks and services. Municipally-owned, non-profit models aim to serve the community as a whole. Without the need to generate a profit for stockholders, these utilities keep prices affordable and dictate the standards/terms of engagement for using their community-owned assets and network services. **Because of the scale of the WWD Fiber Project, even if all three communities work together to form a utility model, it will be near impossible to attract multiple new providers to offer service on a system of this size. Instead, we would encourage the three communities to either partner individually with an Internet Service Provider (ISP) or work together to choose an ISP that fits your collective vision.**

Network Construction: Cost Basis

Network construction cost is priced for each of the communities individually with a free-standing Central Office (CO). The CO is a small building that houses the equipment to deliver internet service to each premise. This study prices the three communities with separate COs to allow individual projects to move forward independently. The construction cost for respective communities is included in Appendices A-C.

Financial Modeling

This study helps ascertain the WWD Fiber Network's viability. It includes 5-year operational models with revenue and expense projections to assist each community in understanding the elements of the project cost and how they relate directly to the revenue generated by subscribers.

All three communities are committed to building and owning the network infrastructure without raising local taxes or mil rates. To meet that goal, WWD Fiber needs to take an aggressive approach to reduce the cost of construction and associated debt service through a hybrid financial package (a capital stack) that will primarily come from state grants offered through the Maine Connectivity Authority. Each 5-year proforma will highlight the required take rates needed to ensure that the revenue generated covers the cost of borrowing. These models can be dynamic—Axiom will work with each community to optimize the model for each community's unique needs.

Data Analysis

Axiom will be utilizing the state VETRO mapping platform to give each community an understanding of what current levels of internet service have been reported. This information is one of the tools that the state uses to assess grant applicants. Because coaxial cable is so prevalent in the region, most communities qualify for funding as "underserved" - areas having service of 100/20Mbps or less. Any homes served by fiber will be considered "served," homes that can receive 100/100Mbps or greater.

The Strategic Path

Construction costs, ongoing operational expenses, revenue modeling, and the opportunities to maximize grant funding and minimize debt service represent the elements required of a WWD Fiber strategic plan. Analysis of these elements and the rapidly evolving market conditions will inform decisions and the strategic path forward to complete this report by the end of the year and support MCA grant opportunities in the first quarter of 2023.

II. Technology Options

This section intends to help community leaders and members understand fiber optics' benefits. It explains fiber superiority over other technologies, including DSL and coaxial cable, which are currently used to provide internet service throughout the Midcoast and Maine. It contrasts the benefits of fiber optic over other emerging technologies, including 5G and Low Earth Orbiting (LEO) satellites.

Fiber Optic Technology

Internet and communication systems installing fiber optics are designed, engineered, and built for decades of future use. Broadband committees, regional municipalities, and state agencies are often asked about the differences between the available network technologies and why fiber technology is a more desirable network solution.

- Fiber supports the increasing demands of 21st-century technology and provides associated economic opportunities.

- Fiber advances communities through its high-speed symmetrical connectivity

- Fiber, over the long run, is a less expensive technology, yet it represents a valued asset when community-owned and operated by a regional municipal utility

- Fiber represents a tested and reliable long-term investment in a community's future
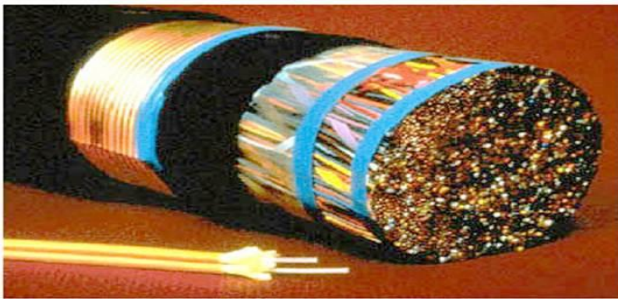
The optical fiber cable in the foreground has the equivalent capacity of the copper cable in the background.

Just one visual example will underscore the capabilities of a fiber connection versus a legacy copper network connection. With today's technology, one fiber -- the thickness of a human hair -- can carry more data than 4,000 top-speed DSL lines.

Contrasting DSL and Coaxial Cable

Homes that are served by copper, either through DSL from the phone company or with coaxial cable from the cable TV company, have significant limitations in service because of how each technology works.

DSL

In the case of DSL, the driving technology is outdated, and the old copper lines (sometimes called "twisted pair" because they are made of pairs of copper twisted around one another) are susceptible to corrosion that severely impacts the reliability of a subscriber connection. Furthermore, the distance DSL can push a signal is limited to 3 miles. Those homes furthest from the telco equipment face connections that often cannot reach even an inadequate 3Mbps download speed.

Coaxial Cable

In the case of coaxial cable (coax), used by TV cable providers, capacity is also an issue, but for different reasons. Coaxial cable is not as scalable as a fiber-optic system—for every step up in speed, equipment needs to be upgraded both at the home and the cable plant. Furthermore, cable systems were designed primarily to push data down to the customer (e.g., delivering television to the home), an appreciably different model than the emerging data needs for telecommuting and interactive video, which require high bandwidth in both directions (referred to as symmetrical download and upload speeds). Finally, of significant concern, the cable is a shared system. The signal strength any individual user receives depends on how much bandwidth is drawn by other users connected to that cable line. Cable companies commonly oversaturate their subscriber networks, leading to inconsistent speeds for the end user. Additionally, the distance that a user is from the node or box where the coax is connected will also dictate the speed a user receives. Consequently, this explains why some users at relatively short distances from others receive very different speeds regardless of the number of users on the system at any given time.

Competing Wireless Technology

There are two types of wireless options, fixed and satellite. While none of these technologies can deliver the speeds and reliability available with fiber optics, they play a role in today's technology options. It is crucial to identify the specific uses where they may be valuable and to understand the limitations of each fully.

Fixed Wireless

Wireless service is not as reliable as fiber optic and can be susceptible to weather conditions and the movement of outdoor equipment due to wind. Most wireless systems require a direct line of sight; obstructions (e.g., trees, water, granite) interfere with and can disrupt wireless signals and service. Reliability concerns and reliance on line-of-sight make wireless installations best suited to dense urban areas or specific rural locations where the physical environment makes other solutions unachievable or not financially viable. In the case of the Midcoast region, wireless connectivity is serving some homes. Given its limitations in speed, geography, and lack of dependability, a wireless system that can support ever-increasing bandwidth demands would be a lower-tier consideration or a specialty last-mile application.

5G

Touted as the next great technology, 5G is increasingly a consideration in major urban markets where the density of buildings makes fiber optic installation expensive and complicated. But 5G is many years away from being implemented in rural Maine. Experts note that 5G mobile wireless connections will be "extraordinarily useful add-ons to fiber," but they "depend on fiber being installed everywhere." Experts predict that to bring 5G to fruition, 20 times the number of fiber-backed cell towers and cell installations will be needed than exist today, every 15,000 feet deep into neighborhoods and towns.

In summary, 5G systems rely on a robust fiber infrastructure system to power the system. Therefore, the emergence of 5G will one day supplement the region's fiber infrastructure—it will not replace it. Fiber and wireless should be viewed as complementary—not competing technologies.

Traditional Satellite

Hughes and ViaSat are examples of two satellite internet providers available in the US. This technology is expensive, slow, suffers from lag and inclement weather interruptions, and comes with tiny data caps. Residents often augment their satellite connections with mobile hotspots to ensure they are always connected, but at a tremendous expense – sometimes as much as several hundred dollars a month.

LEO Satellites

StarLink is a type of satellite technology called LEO or "Low Earth Orbital," - where the satellite sits closer to the Earth than traditional geosynchronous satellites like Hughes or ViaSat. In theory, this proximity allows LEOs to provide faster and more robust service. While trials suggest StarLink provides speedier service, upwards of 100/20 in specific communities, this pales compared to the promised gigabit speeds. Still, Starlink appears to be capable of speeds that have been unattainable with traditional satellite internet and to regions where no wired or fiber connection exists.

Obstacles to LEO implementation in Maine include LEO service requiring a clear view of the sky to stay connected. Any object obstructing the line of sight between your home and the satellite, such as a tree branch, pole, or roof, will cause service interruptions. Customers find that a permanent mount in an elevated location, like a roof, pole, or wall, provides the best installation and service. LEO, in today's market with current technology, is suited for vast open areas where connectivity is unreliable or completely unavailable.

Summary

- Fiber is the network standard and best consumer and community choice due to its reliability at consistently high speeds, long-lasting duration, and resiliency.

- A fiber network will assist in social equity and inclusion by helping to close the digital divide through universal access and affordable service options.

- Fiber allows for symmetrical upload and download speeds, allowing all users to share files and communicate seamlessly.

- 5G and low earth orbit satellites are years away from effective rural deployment and will meet a different reliability and capacity than fiber currently has. It is essential to remember that those technologies remain dependent on a robust fiber optic infrastructure.

- Fiber is the only technology with unlimited bandwidth capacity, making it a future-proof investment.

III. Benefits of Fiber

Consumer Benefits of Fiber

Speed and Capacity

Experts say fiber optic is the only technology with enough bandwidth to support projected consumer demands over the next decade. The average home has multiple connected devices now, and the number of such devices is expected to grow. According to Deloitte, the average home has 25 internet-connected devices, up from 11 in 2019. Deloitte defined connected devices as laptops, tablets, and smartphones; video streaming devices and smart TVs; wireless headphones and earbuds; gaming consoles and smart home devices; and fitness trackers and connected exercise machines. But the list continues to grow with home appliances, GPS trackers for devices, pets, and more.

Future-Proof

Because of fiber's capabilities, new technological innovations are being invented daily to utilize its superior ability to transport tremendous amounts of data at fast speeds. The ways we use the internet at home and in our businesses that seem commonplace now were, in many cases, not even conceived of five years ago. Moving forward, technologies such as 3D holographic 4K television and 8K immersive gaming will be everyday items in Maine and households worldwide. The fiber system we are designing will be able to handle the estimated gigabit-per-second needs of such equipment.

One Delivery System

A fiber solution provides customers with the capacity to receive telephone, video, audio, television, and almost any type of digital transmission using a seamless FTTP connection. This trend will continue as consumers have an increasing array of à la carte choices for communication, data, and streaming options. Subscribers will realize that receiving bundled services through a streaming fiber connection can enhance choice and save money.

Reliability

An internet connection is a necessity, not a luxury. In surveys across Maine, the #1 complaint about internet service is reliability. When connectivity is interrupted or slowed down unexpectedly or inexplicably, consumers are furious that they cannot accomplish basic online tasks, leading to a significant loss of productivity and time. Fiber provides the most reliable connection for internet services. As discussed above, fiber's reliability is far superior to all other technologies.

Community Benefits of Fiber

Closing the Digital Divide

A driving force behind most community-driven and community-owned networks is the ability to address equity and inclusion. In the WWD communities, many people are without access/connectivity and without knowledge of how to utilize and benefit from the technologies associated with a broadband connection.

Job Creation

Fiber networks create jobs by supporting existing businesses and attracting new ones. Having the requisite broadband availability opens up the opportunity to develop new lines of business for Mainers, e.g., customer service representatives for significant corporations, tech support, and all bi-directional communication and service industries that will place Maine workers on a par with job opportunities in more densely populated portions of the country.

Business Attraction

Business attraction means providing the connectivity and IT backbone for businesses that quickly move large amounts of data--architects, designers, media companies, banks, online retail businesses, medical specialists, and other heavy users. With high-speed broadband access, companies and professional offices can relocate to the Midcoast area—a trend that we are seeing across the nation resulting from the pandemic and demographic trends already underway.

Telemedicine

The medical field and how patients and providers interact are undergoing seismic change. One of those changes is how patients are treated, monitored, and increasingly given tools to manage health care from their homes. A fiber connection has a symmetrical download and upload capacity, which facilitates our elders aging in place, relieving an increasingly burdened healthcare system and ensuring medical access to remote Maine areas even during winter months when roads are less passable.

Telecommuting/Entrepreneurship

As remote work has changed from a luxury to a necessity, having a consistent and robust connection is crucial, especially when uploading from home to the internet. The technology of fiber makes it ideally suited for telecommuting. Virtual meetings, cloud-sharing documents, scheduling, and other applications are seamless with a fiber connection. While telecommuting is important to temporary and seasonal residents, remote work has become necessary for many of our permanent residents in Maine.

As a result of demographic shifts in the US, and hastened by the Covid-19 pandemic, we are seeing entrepreneurs relocate to Maine full-time, as well as full-time staff workers, management teams, and executives of corporations, associations, and other entities. Fiber optic connectivity makes this remote work possible, further contributing to economic growth and opportunity for Maine.

High-speed connectivity plays a significant role in attracting and retaining Maine's "next generation" in an increasingly aging State, ensuring a more prosperous future for all Maine residents.

Education

Equal access through universal connectivity eliminates "the homework gap." Students who are required to complete assignments online but lack a fast, reliable fiber internet connection at home fall into that gap.

High-speed internet goes beyond closing the gap, providing access to a world of distance learning, including music lessons, museum tours, and interactive classes around the globe. High school students can also access advanced opportunities and placement courses that allow them to jumpstart their college education.

Increased Home Values

A Broadband Communities study indicated that FTTH networks increase the value of a $300,000 home by an average of $5,000-$6,000. Another study by the FTTH Council in conjunction with the University of Colorado showed that homes with an FTTH connection are worth, on average, 3.1% more than homes that do not have a fiber connection. Conversely, areas with poor, unreliable internet service experience below-market home values.

Increasingly, Maine real estate professionals anecdotally report that the number one question of potential homebuyers used to be about the quality of the schools—now it's high-speed internet access. Not only are

home values increased by high-speed internet connectivity, but we are also increasingly seeing a world where homes will not sell to many buyers without them.

IV. Existing Providers

Existing providers are those that currently provide internet service in your communities. The primary providers of service are Consolidated Communications and Spectrum. Consolidated is the mainline telephone service provider and offers internet over DSL lines. Their current service is poor, unreliable, and built on outdated copper technology, as described in the technology section of this report. Spectrum is a cable company that uses coaxial copper cabling to deliver a "Triple Play" of service- Cable TV, internet service, and phone. The technology that Spectrum uses also has limitations that directly affect user experiences. Because it's a shared system, users often experience inexplicable dips in service as demand increases for a finite amount of internet resources. In addition, the technology cannot deliver equal up and down speeds (symmetrical), hampers the increasingly important two-way communication required in teleconferencing, gaming, and other applications. Last, Spectrum has a strong interest in protecting its monopoly status and has become increasingly aggressive with advertising against fiber technology and community-driven broadband efforts.

Over the past few months, Spectrum and a front group funded by Spectrum and various other groups, including the Maine Policy Heritage Center and the Alliance for Quality Broadband- https://broadbandformaine.org have started to run campaigns in communities that are considering providing their broadband infrastructure. The results are mixed- they were successful in Readfield and Southport but were defeated in Leeds and Wayne. Increasingly Broadband committees that have Spectrum service in their territories but are committed to publicly-lead, publicly-owned infrastructure have been looking for resources that might combat some of the negative information being disseminated. Below are shared concerns the allies of the cable industry use to create uncertainty within communities and the responses to those messages.

- **The private sector is better at this, and putting public dollars at "risk" is a bad idea that has failed in other places.**

FACT: Spectrum in your community has refused to serve the whole community, leaving parts of the community with abysmal internet.

FACT: The three big cable companies in the United States have effectively divided up regions so that they have a monopoly- they are afraid of losing that status and losing business

FACT: There are now 1000s of successful community-owned fiber networks across the United States, and growing. The Institute for Local Self-Reliance has a resource page on successful Community Broadband initiatives across the United States. https://ilsr.org

By undertaking this risky internet business, communities jeopardize money for other critical infrastructures like roads and schools.

FACT: Internet connectivity IS critical infrastructure and even more crucial to rural communities where services, jobs, and education are sometimes far away and require broadband connectivity to access

FACT: The lack of fast, reliable internet hinders economic opportunities. Decisions by potential homeowners coming to your community are suppressed because of the lack of good internet

- **Spectrum already has great internet; it works fine in my house.**

FACT: The technology that Spectrum uses will NEVER be better than fiber. Fiber is the most reliable, future-proof technology and will remain so.

Spectrum's technology relies on a "shared" signal, so when many multiples are using the system, your speeds and reliability are degraded- not with fiber. A single fiber strand can simultaneously handle 3,000,000,000 – Billions of phone calls.

- **Spectrum is built for the future and is "testing" even better use of the current technology they will roll**

out soon.

FACT: This is what they always say. Not just today but anytime they are threatened. It's a tried and successful argument. "Just wait; no need to invest your dollars; our technology is improving." This is the same argument people who are against the project say things like what about satellites, 5G, etc.?

FACT: The world is changing, and the old, stale monopoly cable model is dying. The top cable providers lost over ½ a million subscribers in 2020, and that trend continues. The fact is that Spectrum will not be the same company five years from now as the environment for content changes rapidly to online streaming services.

FACT: Spectrum is expensive. You can cut the cord by installing one fiber line and receive all your communications content with one fiber strand- entertainment, phone, and internet. Now you can receive local TV, regional sports, and 10s of thousands of movies and TV shows- online and at a significantly reduced price than a traditional cable subscription - saving people money and is the trend.

V.   Cutting the Cord

One of the most compelling arguments for investing in fiber optic technology is the opportunity to save money by fully leveraging fiber's capabilities. Fiber allows you to buy services over one fiber line- Cable TV-like content tailored to your viewing needs that can be far less expensive than current Cable TV offerings.

Cable

- More expensive for generally the same content you can purchase through streaming services
- Requires a set-top box vs. watching content on any internet-enabled device anywhere
- Premium channels often only come with an upper-level service subscription
- Big, legacy cable carriers control cable TV content, and relationships with the content providers drive their pricing
- Packages of channels are greatly limited- often giving consumers less than five options

Streaming

- Less expensive and increasing content every day, including sports and local TV
- Requires a robust internet connection- especially in households that plan on streaming on multiple devices at once
- Not limited to a set of bundles provided by the cable company
- It provides an à la carte system where you can buy precisely what you want for content- then switches every 30 days if you desire
- You must have a "smart" TV or use one of the streaming service connectors like Roku, Amazon, or AppleTV.
- Streaming offers a significant amount of content for free
- More companies are joining the streaming segment all the time- it's the wave of the future

With high-quality fiber internet, it becomes possible to replace traditional phone and television services with internet-based subscriptions that are often less expensive while simultaneously offering advanced features not available from traditional cable providers.

Internet-based streaming video providers come in many flavors, ranging from streaming-only services like Netflix and Amazon to providers that attempt to replicate the feel of old-school set-up box Cable TV options, including access to local TV stations. Phone service options range from free or very-low-cost no-frills options to easy-to-use landline replacements and up to highly full-featured business-class phone systems. These

options allow consumers to save money, experience new entertainment options, and telecommute or work remotely more efficiently and seamlessly than ever.

TV/Cable Content

Many consumers receive television content through the local cable provider, Spectrum, or satellite services such as Dish and Direct TV. These services often run well over $100 a month, delivering dozens of channels you might never watch. Most people we interview who have these services complain about the ever-increasing costs.   To add insult to injury, the bundled services purported to save consumers money end up costing more without always providing proportionate value.

Internet systems based on fiber optics can support ultra-sharp picture quality, including content streamed in resolutions of 4K and above. By eliminating your satellite or cable service and carefully matching your viewing habits to one or more of the streaming options available, with an improved selection of high-quality content, savings of $50 or more a month are possible.

Phone

Once upon a time, everyone bought telephone service from the phone company. Even in this age of cell phones, many people still want a landline.   They typically buy that service through Consolidation Communications (formerly FairPoint) or as part of a bundled package from their cable provider. It can be difficult to determine the cost of the phone component of a bundled package, but reports suggest that $35-$40 for stand-alone phone service is typical. A fiber-optic internet connection can inexpensively replace traditional landlines with a VoIP service (Voice over Internet Protocol). Big-name providers include Magic Jack and Skype, but there are many other providers out there as well, with prices ranging from free to $25/mo. Most providers offer excellent call quality, unlimited domestic long-distance, and very reasonable rates on international calling.

WiFi Calling

In addition, a high-quality internet connection allows you to utilize the WiFi calling feature incorporated in most modern cell phones. W i Fi calling allows you to use your home WiFi network to place and receive calls on your cell phone, allowing you to use your cell phone at home even if you have a poor or non-existent cell signal where you live. W i F i c a l l i n g c o s t s no additional costs beyond what you already pay for your cell phone and internet connections.

Antennas

You might be surprised that broadcast TV can still be received over the air, for free, with a simple antenna. Over-the-air antennas are a simple option to provide high-quality access to local TV stations for free, making them a great companion to internet-based streaming TV services. Furthermore, because the signal is not compressed by satellite or cable providers, the picture quality from an over-the-air source with a good signal is far superior to what is available from paid providers.

One of the significant barriers for people moving to purely streaming television services is the loss of local channel content. An antenna can pick up all major broadcast channels for free… and in full HD over the air, allowing you to watch on your regular TV set. While local stations are increasingly streamed, and many can be watched on a computer in real-time, many consumers don't want that hassle.

As you might expect, not everywhere has the same TV signal strength – the signal is affected by hills and distance. You can enter your address at fcc.gov/ media/engineering/dtvmaps to get an idea of what options are available at your location.

Cost Comparison- current services versus fiber

Saving money by ditching Spectrum or Dish/DirectTV

Example communication bills for a household- this should be updated to reflect current pricing, but it gives a good illustration of how expensive Spectrum can be compared to fiber.

The following are some example monthly bills for various combinations of services that households are currently paying for compared to what those costs would look like on a fiber network.

Full Spectrum Bundle

Spectrum TV		$110.95	
Spectrum Internet	100/10 Mbps	$59.99	
Spectrum Voice		$19.99	
Other Charges		$16.45	
Taxes, Fees, and Charges		$7.97	**Total $215.55**

DISH + Consolidated DSL

DISH TV		$118.00	
Consolidated Internet	3/1 Mbps (DSL)		
Phone - Consolidated	Bundle with Internet	$80.00	**Total $198.00**

Typical Spectrum Household

Spectrum Internet	100/10 Mbps	$79.99	
Spectrum TV	Cheapest package	$44.99	
Phone - Consolidated		$34.99	**Total $159.97**

Typical Fiber Household

Fiber Internet	100/100 Mbps	$69.99	
YouTube TV	With local channels	$64.99	
Phone - MagicJack	$26 per year	$2.17	**Total $137.15**

Low-Cost Fiber Household

Fiber Internet	50/50 Mbps	$59.99	
Philo TV	No local channels	$20.00	
Phone	WiFi calling	Free	**Total $79.99**

Endless Choices

The big takeaway here is not just that you save some money. You likely will. The big- picture is more significant than that.   Fiber will get subscribers blazingly fast, outrageously reliable internet service, far superior to your Spectrum or Consolidated service, AND you get an increased choice in your TV viewing options, AND you save money over your current options.   Even when you factor in a potential increase in taxes to pay for the initial

installation of service, many will see savings or modest to no increase in cost while reaping all the benefits of a fiber connection into the future.

Streaming Choices

There is a HUGE and ever-growing list of options for getting television and movie content online these days. The following list is not intended to be comprehensive but will give a taste of what is out there and give you a place to start researching what might work for you and your family.   This list comes from a 2019 Consumers Report article, so the pricing may have changed, but it gives you a good idea of the choices available to consumers looking to find new, less expensive ways of receiving their TV content.

The Big Guys

Amazon Prime Video

Cost: Prime Video is included with an Amazon Prime membership that gives consumers free two-day shipping for $119/yr. Or free with an Amazon Subscription

You can add HBO, Showtime, and other premium channels for $5 to $15/month to access those channels' content, plus other movies. Prime Video's original shows include "Goliath" and "The Grand Tour," and it has exclusive rights to stream "Suits" and "The Americans," among many others. Amazon also has a good selection of big-name movies that you can rent for $2-$5 each.

Netflix

Cost: $9 per month/ $13 per month for HD, $16/month for 4K

Netflix is the king of binge!   In addition to movies and reruns of older shows, Netflix now has original shows such as "House of Cards," "Orange is the New Black," and newer hits like "Stranger Things." Plus, shows from the Marvel Universe, including "Daredevil" and a vast catalog of movies.

HULU

Cost: $6 per month with ads/ $12 per month (no ads) or $55 (with live TV); also available as part of a bundle with Disney+ and ESPN+ ($13 per month)

Hulu favors television over movie content with limited or no ads for $12/month. E n t i r e seasons of exclusive series, HULU Originals, and tons of TV-like content. Easily upgrade to HULU plus TV for $55/month.

Apple TV+

Cost: $5 per month/one year free with the purchase of many Apple devices

Apple TV+ is one of the few significant streamers focused solely on original content, you won't find an extensive library of older shows to binge.   Instead, Apple is looking to build its collection of high-quality scripted dramas and comedies.

CBS All Access

Cost: $6 per month with ads/ $10 per month (no ads)

CBS All-Access is the only major steamer that offers a full broadcast service as part of the basic plan: Subscribers get access to the live feed of their local CBS station, including all NFL games.   Expect much more content as they expand their streaming ambitions.

Disney+

Cost: $6 per month/$70 per year; also available as part of a bundle with Hulu and ESPN+ ($13 per month)

Disney+ is the happiest place in TV land for Disney fans since virtually every major movie can be found here. The focus is on Disney brands such as Marvel, Star Wars, Pixar, and National Geographic.

HBO Max & HBO Now

Cost: $15/month each

HBO Max adds another streaming service that offers everything on HBO Now but adds 1000s of other classic movies. It lets you watch HBO movies and original series ("Game of Thrones," "Veep," and "Silicon Valley," etc.) without signing up for any other cable channels. You can add HBO to other services, including DirecTV Now and Amazon Prime.

Peacock

Cost: Basic Service is Free/ Premium costs $5 per month/ $10 per month (no ads

Peacock is the NBC affiliated streaming service with next-day runs of NBC prime time shows, plus a library of old classics from NBC, including E!, Bravo and Oxygen.

Showtime

Cost: $11/ per month

Showtime is a one-network service, giving you just Showtime movies plus original shows such as "Billions," "Homeland," and "The Affair."

And on and on:

Epix Now- $6/month
Starz- $9/month
Acorn- $6/month
Britbox- $7/month
Kocowa-$7/month
Pantaya- $6/month
Spuul- $5/month
ESPN- $5/month
PBS Passport- Free with a contribution to your PBS station
Smithsonian Channel Plus- $5/month
CuriousStream- $3/month
Urban Movie Channel- $5/month
BET+- $10/month
DC Universe- $8/month
Seed & Spark- $3/month
MUBI- $11/month
Sundance Now- $7/month Broadway HD- $9/month

And this is just the beginning-

British TV- Acorn TV $5/month

Art-House Films- Fandor $10/month; FilmStruck $7/month; Mubi $9/month

Kanopy- FREE

Kanopy is a collection of 30,000 feature films, documentaries, and assorted videos open to members of many libraries and university communities.

Sony Crackle- FREE

A free, ad-supported service launched the popular "Comedians in Cars Getting Coffee." There is an appealing smorgasbord of classic shows ("All in the Family," "Seinfeld") and movies, plus some original series.

If you have a smart television, even more choices can be purchased through your TV.

Cable Replacement Choices

Online "cable replacement" services give potential cord-cutters with a strong Broadband connection unprecedented TV-watching freedom. That trend will only grow, with new TV options regularly coming online.

If these services are appealing, you can go to their websites and plug in your zip code to determine what options are available in your area. This is just a snapshot; pricing and channel offerings can change suddenly, so take this as a guide to better understand your options and the monthly costs.

DirecTV NOW

Cost: $35 and up

What you get:

DirecTV NOW is a streaming version of the DirecTV satellite pay-TV service.   You don't get everything satellite customers can watch. However, it does offer four tiers of service. For instance, you can get 60 channels for $35/month or 80 channels for $50/month.

You can add HBO for $5/month ($15 elsewhere) and Showtime for $8.

Two people can use the service at a time, or you can pay $5 more a month to add one more simultaneous user.   And you have a cloud DVR that lets you record shows for later.

What you don't get:

Like most of these services, DirecTV NOW does not provide live broadcasts in some smaller markets. You can usually watch that program a day or two later.

FUBO TV

Cost: $45 and up

What you get:

Fubo straddles the line between cable replacement services and old fashion streaming. It targets sports fans with live MLB, NHL, NBA, and NFL games plus college, regional, and international sports packages such as golf or cycling for additional monthly fees.

What you don't get:

This service lacks many cable channels, but the missing channel that potential Fubo customers may care about most is ESPN.

Hulu

Cost: $50 and up

What you get:

Hulu with Live TV offers about 50 channels, including major broadcast networks in some areas, a good selection of cable channels, and sports stations such as CBS Sports, ESPN, and Fox Sports.   You can watch on

two devices simultaneously and record 50 hours of programming on a cloud DVR. You can pay extra for more users, extra DVR storage, or the option to skip commercials.

What you don't get:

You can't watch AMC, Discovery, or Viacom stations (Comedy Central. MTV, Nickelodeon, Spike) right now.

Sling Television

Cost: $20 and up

What you get:

Sling's basic orange package costs $20/month and comes with about 30 cable offerings, including A&E, the Food Network, and TBS, but limited broadcast TV.   You can get Fox and NBC in some markets, plus Univision, as part of the $25/month Blue package or about 45 channels.

You can add premium channels, such as HBO and Showtime, for an extra $10 to $15/per month. ABC and Univision are available in some markets in the Orange Plan or a combined Orange and Blue plan as part of a $5/month add-on pack. A cloud DVR is available for most devices.

What you don't get:

Sling lacks CBS, the Discovery Channel, and Fox News.

Summary

- Superior technology to either DSL or coaxial cable
- Future-proof- fiber has unlimited capacity and can deliver symmetrical signal
- Fiber saves money
    - Cutting the Cord
    - Multiple services, including phone over one fiber line

VII.   Benefits of Public Ownership

Communities across Maine and the United States have implemented the public ownership approach and found a synergistic benefit when aligning the interests of internet service providers (ISPs) and the communities they serve. This model gives municipal leaders a strong voice in operation, service level, and internet connectivity pricing.   In a non-profit public ownership model, a notable benefit is that the utility retains the profits to reinvest in the community (instead of corporate shareholders) and can ensure that all premises in their service area have affordable, high-speed FTTP broadband access.

While the public ownership model increases a community's responsibility, it also provides a collaborative approach with the ISP, which brings better customer experience and the ability to change providers if service agreements are not met. This partnership dynamic fosters a relationship where the ISP is accountable to the user experience, and the community is committed to mutual success.

The Institute for Local Self-Reliance (ISLR) is focused on open access and municipally owned networks. The ISLR website (https://muninetworks.org) offers significant resources for communities considering municipal networks.   Peer to Peer learning, podcasts about various issues, and locations of municipal broadband networks across the United States are a sampling of available resources.

Communities throughout the country demonstrate success with the public ownership approach by providing high-speed internet to all premises, generating healthy revenue streams, keeping prices affordable, and staffing local customer service centers. Chattanooga, Tennessee; Wilson, North Carolina; Longmont, Colorado;

Ammon, Idaho; and Huntsville, Alabama, are a handful of the country's successful municipally owned broadband networks.

Communities in various stages of becoming the public owners of their broadband internet systems and working with Axiom Technologies include Georgetown, Arrowsic, Roque Bluffs, Monhegan Plantation, Chebeague, Washington, Somerville, Isle au Haut, and Leeds. Maine municipalities have also successfully implemented community-owned fiber networks, including Downeast Broadband (Calais and Baileyville), Cranberry Isles, Cliff Island, and Islesboro communities. Lubec, Vienna, and Wayne are applying for grant funding through this round of the Maine Connectivity Authority funding. A three-town group in the upper mid-coast has also applied for funding with GWI as their ISP partner.

Benefits of a Broadband Utility District

The public ownership of broadband network assets goes hand in glove with the potential to form a regional broadband utility model. While the benefits of public ownership through individual municipalities are clear, those benefits are enhanced through the collaborative regional approach. For example, a regional broadband utility will:

- Help mitigate risk by spreading out the cost across multiple jurisdictions
- Enhance scale, thereby attracting potential new providers
- Be more likely to attract private investment, a funding method that may be essential without raising local taxes
- Have more potential to generate long-term benefits beyond downward pricing and improved speeds and reliability, allowing the broadband utility to invest profits into expanding the network infrastructure to those areas of the communities where such infrastructure is not financially viable for a profit-making entity
- Be an excellent marketing tool to attract talent, jobs, and other economic benefits like improved productivity and profits for businesses already in the region
- Help unify a strategy to address the affordability gap in each of the communities

In short, the multi-town broadband utility can bring tangible benefits beyond a single community's efforts. However, many communities that have embraced public ownership have not had the advantage of scale; this is a particular shortcoming in Maine, and this project is the same. Even though the three communities comprise more than 4000+ homes passed, more is needed to attract multiple providers or the level of scale that would allow for significant economies of scale on the operational side.

Downeast Broadband Utility is the first and only multiple municipalities fiber-optic broadband utility in the State of Maine. Calais, Baileyville, and Alexander own it. At this time, DBU has Pioneer Broadband as its internet service provider. Because of its size and location— approximately 2900 premises being passed—DBU has not yet attracted another provider to operate on the publicly owned network. Relevant elements of the DBU structure in consideration of the MIDC project include the following:

- Each Town took out a bond to pay for the system.

- Payback occurs through the fees collected from ISPs on the system

- Pioneer Broadband is contracted to perform maintenance

- A utility board oversees the system

Summary

- Public ownership models have been successfully implemented in Maine and across the USA
- The cornerstone of a BUD model begins with ensuring that the fiber infrastructure is publicly owned
- A regional broadband utility has added benefits beyond communities working individually

Whether each Town considers moving alone or together in any combination, the benefits of public ownership models are attracting more and more community interests across the state.

VIII.   The Axiom Model- Built community by community

- Taxpayer neutral
- A future-proof- system capable of 10G/10G
- Significant surplus revenue
- Municipally owned

Axiom operates or is set to operate over ten municipally owned or privately funded networks in Maine. The benefit of this model is that municipalities retain ownership and operational oversight of the network. This feature allows a much more collaborative approach with the Internet Service Provider where the goals of the ISP and the community are aligned, and success is mutually beneficial. This model corrects the inequity created by coaxial cable and DSL providers by offering the same world-class connectivity and reliability to every home and business in the community.   Because it is community-driven (owned by Town) and will have superior service to Consolidated or Spectrum internet service, the formula that this model offers can be very successful- and likely not raise taxes, paying for itself and producing surplus revenues in the future years of operations.

The Process
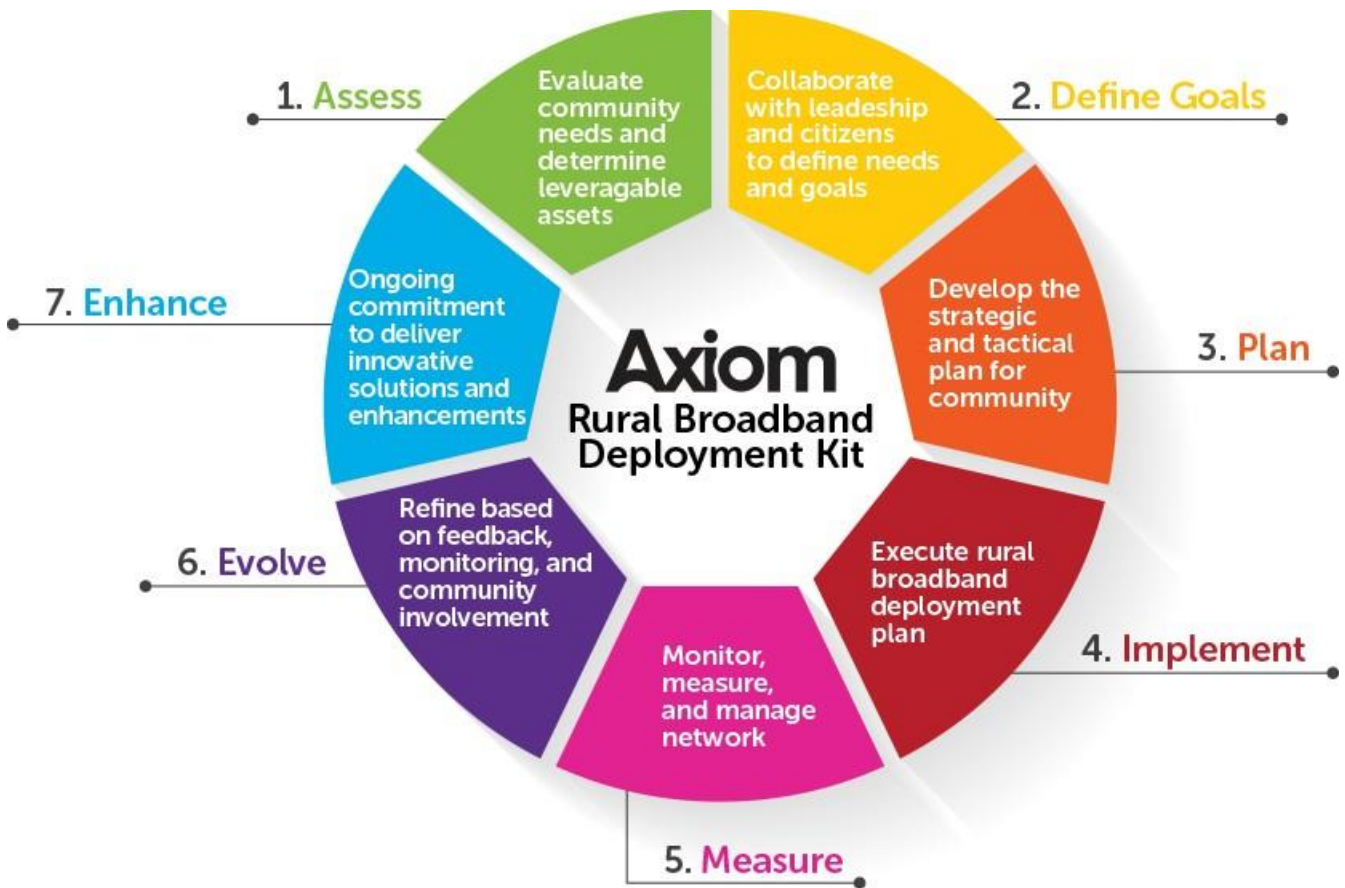
Roles and Responsibilities of the Axiom Model

- Community-owned
  - If the Town owns the network, a new law exempts you from utility pole make-ready cost, the potential for significant savings- this law has not been tested
- The Town must be willing to fund with low-cost capital
  - Our model is based on a municipal bond- the lowest cost interest rates available

- o Other communities have considered low-cost bank financing, but our experience is that the cost of bonding is meager and beats even the best bank finance option
- The Town must be willing to enter into a partnership agreement with Axiom or another ISP to provide exclusive service over the network under a long-term contract
    - o Ensuring a robust payback of the funding instrument, with revenues derived from subscribers covering the cost of financing
    - o In exchange for exclusive operating rights on the system, Axiom would provide a $ 30 per customer/per month payback to the Town to support the bond payments and other expenses

Risks and Mitigation

Risk

- Take rates are not met, and payments to the Town are not as robust as those modeled
    - o Other providers react and create additional competition, reducing take rates
    - o Chosen ISP does not meet its financial obligation to the Town
    - o Risk of taxpayers making up the difference in cost

Mitigation

- Even at much lower take rates, the model still produces enough revenue to cover costs
- Community-driven processes are well received by local citizens and allow them to participate in an active town project
    - o There is a built-in bias against the current providers, whom many see as inadequate
    - o Axiom has had success in meeting estimated take rates and, with the right messaging, believes that the public-ownership model can be successful

IX. Broadband Utility District- Working together

Each Town estimate is in the Appendices and was designed to be built as stand-alone, individual projects. Each community has also been provided cost/revenue estimates as a stand-alone project with its components and ability to work as a complete system within the confines of each community. This section analyzes each community project and envisions the three towns forming a BUD.

Costs Overview

The following estimates contemplate a complete build to Woolwich, Wiscasset, and Dresden.

Cost of construction: **$15,101,317**

Number of Homes passed: **4,241**

Town	Construction cost estimate	Anticipated grant	Total funding from BUD needed for match-$700 / per pass
Dresden (1479)	**$3,915,304**	**$3,304,904**	**$610,400**
Wiscasset (2044)	**$5,206,169**	**$3,889,469**	**$1,316,700**
Woolwich (1497)	**$5,979,844**	**$4,944,544**	**$1,035,200**
Total construction cost	**$15,101,317**	**$12,138,917**	**$2,962,300**

Construction cost by category

Category	Cost	Calculations	Assumptions
Licensing Application	Woolwich- $117,839 Wiscasset-$80,234 Dresden-$70,841 Total- $268,164	This is based on the number of poles and is likely very close to the cost.	
Make Ready	Woolwich- $633,750 Wiscasset-$441,750 Dresden-$392,750 Total-$1,468,250	Calc: # poles x $250/pole This is an ESTIMATE.	This number will change. It could be lower.
Pole Replacement	Woolwich- $379,500 Wiscasset-$264,000 Dresden-$235,650 Total- $880,950	Calc: 10% pole replacement $1500 pole = estimated cost	10% pole replacement, which could be less depending on the heights of poles and the amount of equipment on poles now.
Central Office (Utility Hut)	Woolwich- $375,000 Wiscasset- $400,000 Dresden- $375,000 Total-$1,150,000	Includes all equipment inside to light up the system.	A redesign may save money on this line item
CPE/Customer install **(749 customers)- Wool**	Woolwich- $337,050 Wiscasset- $424,800 Dresden- $196,200	$200 for home equipment and $250 for the installation labor. Calc: $450 x # of homes	It does not include a router, which we lease for $7.50/month or buy your own.

Category	Cost	Calculations	Assumptions
(944 customers)-Wiscasset (436 customers)-Dresden	Total-$993,150		
Construction of the primary system	Woolwich- $3,869,120 Wiscasset- $3,384,731 Dresden- $2,471,554 Total- $9,689,254	All in cost for main lines and drops to the home	Drops are calculated at a 50% take rate
Project Management	Woolwich- $267,585 Wiscasset- $210,654 Dresden-$173,308 Total- $651,547	Axiom fee for overseeing construction contractors, taking orders for service, Central Office assembly, etc.	8% of the construction project cost- includes the cost of bonding
TOTAL	**Woolwich- $5,979,844 Wiscasset-$5,206,169 Dresden- $3,915,304 Total $ 15,101,317**		

The construction cost should be considered an estimate. A 10% contingency for unexpected expenses in this size project has not been added but should be considered.

Revenue/Expense Modeling Overview

Axiom has modeled a consistent take rate across all three communities understanding that each community has unique characteristics that may vary the take rates in different areas. Taken together across all three communities, the number of subscribers generates a revenue return to the BUD to operate the system. For the system to be viable, the return from ISP operating on the system must cover these costs to make the system sustainable.

BUD Revenue before expenses

	Take rates	Woolwich	Wiscasset	Dresden	Total BUD Yearly revenue
Year 1	**40%**	$213,120	$272,160	$125,640	$610,920
Year 2	**45%**	$235,800	$300,600	$138,600	$675,000
Year 3	**50%**	$261,720	$333,360	$154,440	$749,520
Year 4	**53%**	$276,840	$353,520	$163,080	$793,440
Year 5	**55%**	$286,920	$366,480	$169,560	$822,960

Yearly debt service on projected match $2,962,300	$201,937/20 years

BUD Cash Flow over the first five years of operation

	Revenue	Bond	Other expenses	Operating cash flow after expenses
Year 1	$610,920	$201,937	$243,487	$165,496
Year 2	$675,000	$201,937	$243,487	$229,576

Year 3	$749,520	$201,937	$243,487	$304,096
Year 4	$793,440	$201,937	$243,487	$348,016
Year 5	$822,960	$201,937	$243,487	$377,536

Potential BUD Expenses

BUD Expense Categories	Calculation	Estimated Cost/year
Insurance	Estimate	$70,000
Legal	40 hours x $160/hr.	$6,400
Systems Operations	1% of gross revenue	$6,357
Accountant/bookkeeper	8 hours a week x$25/hr.	$12,000
Maintenance Fund	Per year	$60,000
Office Lease	$500/month	$6,000
Marketing	$1000/month	$12,000
Field Equipment	Splicer and materials	$12,000
Pole Licensing Fee	5873 poles x $10/yr.	$58,730
Total yearly expenses		**$243,487**

Summary

- Financial modeling confirms the viability of a regional project
- Even at more conservative take rates, the model works
- Reducing the overall cost of construction by attracting grants or private investment is critical
- Given the additional surplus cash flow, you should consider price reductions on the cost to subscribers-but that reduction would also reduce the revenue return, or you could also consider saving more in the Maintenance Fund for anticipated fiber breaks or equipment failure.

Individual community modeling is attached in the Appendices to allow each community to understand its costs and to help the committee understand the viability of this project if it is built out in stages.

X.   Final Thoughts

- The public ownership model, either as a regional BUD or individual towns, is viable

- Private ownership is also workable but will require support from low-cost capital

    o   Towns will lose the benefits of ownership

- Cash flow is substantial, and it de-risks the project considerably because the projects still work financially even at lower take rates

- Substantial cash flow suggests that you can offer even more competitive rates- which likely raises take rates

- Fiber reduces communications budgets- consumers save money while enjoying content specific to them- and choices are increasing

- Outreach to the community is essential to project success- BUD or individual Town

XI.   APPENDICIES

Appendix A: Woolwich – Public Ownership Model

Appendix B: Wiscasset – Public Ownership Model

Appendix C: Dresden – Public Ownership Model

Appendix D: Maps of service location data

Appendix A: Woolwich- Public Ownership Model

Construction cost breakdown

Category	Cost	Calculations	Assumptions
Licensing Application	$117,839	This is based on the number of poles and is likely very close to the cost.	
Make Ready	$633,750	Calc: 2535 poles x $250/pole= $633,750	ESTIMATE
Pole Replacement	$379,500	Calc: 10% pole replacement- $1500/pole x 253poles= $379,500	ESTIMATE
Central Office (Utility Hut)	$375,000	Includes all equipment inside to light up the system and a telco hut	Different designs will depend on location- this is for discussion to get you a better number
CPE/Customer install (50%) 749 customers	$337,050	$200 for home equipment and $250 for the installation labor. Calc: $450 x 749 homes= $337,050	It does not include a router, which we lease for $7.50/month, or buy your own.
Construction of the main system	$3,869,120	All-in cost from the contractor for main lines and drops to the home	*does not include sales tax, assumes muni owned- will need to add 5.5% to materials if owned by ISP
Project Management (8%)	$267,585	Axiom fee for overseeing construction contractor, installing CO, as well as taking orders for service	8% of the overall project cost- will cover bond costs
TOTAL	**$5,979,844**	Includes all Make Ready	

State grant- next round due sometime in Spring of 2023

Total construction cost estimate	$5,979,844
Minimum local match (1479* homes x $700)	$1,035,300
State grant request	$4,944,544

*2 homes are considered ineligible for grant money

In the Axiom Model, instead of deriving the local match from tax dollars, you bond the match at the lowest interest rate and pay that bond with revenue from the subscribers.

- Tax Neutral
- Payback of bond is from subscribers to the system, not from the taxpayers who may not choose to subscribe
- By spreading the payments out over 20 years, the yearly cost payment can be reasonably covered by take rates of subscribers

Bond payment on $1,035,300 = $67,864 for 20 years

Revenue and Expense Modeling

Year	Total # of Homes Served	Take Rate- based on VETRO calculations of 1476 homes	Town payment from ISP- $30 per sub/per month	Bond Payment	Additional Town expenses- As detailed below	Surplus to Town after expenses
Construction	0	0%	$0	$23,868- (interest only)		($23,868)
#1	592	40%	$213,120	$67,864	$50,000	$95,256
#2	666	45%	$235,800	$67,864	$50,000	$117,936
#3	740	50%	$261,720	$67,864	$50,000	$143,856
#4	784	53%	$276,840	$67,864	$50,000	$158,976
#5	813	55%	$286,920	$67,864	$50,000	$169,056

Additional Town Expenses

Category	Yearly cost	Notes
Insurance for the Central office	$15,000 (est.)	MMA Insurance
Self-insurance/Equip Replacement	$25,000	Build up a $125,000 self-insurance/Equipment replacement fund
Miscellaneous	$10,000	Lawyer, oversight
Total	**$50,000**	This does not include the one-time cost of surety bond/LOC for pole licensing

Revenue Return covers Bond payments and Insurance and self-insurance fund. Plus, additional surplus beyond these expenses starting in Year 1.

The only expense not accounted for is the construction year internet-only bond payments. That amount is estimated at $23,868.

Revenue based on these pricing categories

Speeds	% of takers	Monthly cost
100/100Mbps	60%	$59.99
250/250Mbps	30%	$64.99
500/500Mbps	10%	$109.99

Details

Estimated Road Miles Served		95.57
Pole Count		2535
Eligible Locations		1479
Ineligible		2
Total locations		1481
Cost of construction built on Take Rate of		50.00%

The Maine Connectivity Authority uses a VETRO program that determines the eligible/ineligible locations in a geographic area. "Ineligible," in this case, is a home that has been reported as being able to receive 100/100Mbps or better. These numbers are derived from a combination of databases, including self-reporting by internet service providers.

According to the data (and we know these locations), these homes would be ineligible for MCA grants because they are already considered served. To proceed with a grant application, you would have to remove these homes, and if you wanted to serve them, you would add the cost of serving these homes to the local match.

Appendix B: Wiscasset- Public Ownership Model

Construction Cost breakdown

Category	Cost	Calculations	Assumptions
Licensing Application	$80,234	This is based on the number of poles and is likely very close to the cost.	
Make Ready	$441,750	Calc: 1767 poles x $250/pole= $441,750	ESTIMATE
Pole Replacement	$264,000	Calc: 10% pole replacement- $1500/pole x 176 poles= $264,000	ESTIMATE
Central Office (Utility Hut)	$400,000	Includes all equipment inside to light up the system and a telco hut	Different designs will depend on location- this is for discussion to get you a better number
CPE/Customer install (50%) 944 customers	$424,800	$200 for home equipment and $250 for the installation labor. Calc: $450 x 944 homes= $424,800	It does not include a router, which we lease for $7.50/month, or buy your own.
Construction of the main system	$3,384,731	All-in cost from the contractor for main lines and drops to the home	*does not include sales tax, assumes muni owned- will need to add 5.5% to materials if owned by ISP
Project Management (8%)	$210,654	Axiom fee for overseeing construction contractor, installing CO, as well as taking orders for service	8% of the overall project cost- will cover bond costs
TOTAL	**$5,206,169**	Includes all Make Ready	

Total construction cost estimate	**$5,206,169**
Minimum local match (1881* homes x $700)	$1,316,700
State grant request	$3,889,469

*7 ineligible locations that are not fundable by state grant dollars

Bond payment on $1,316,700 = $86,301 for 20 years

Revenue and Expense Modeling

Year	Total # of Homes Served	Take Rate- based on VETRO calculations of 1888 homes	Town payment from ISP- $30 per sub/per month	Bond payment	Additional town expenses	Surplus to Town
Construction	0	0%	$0	$30,352		($30,352)
#1	755	40%	$272,160	$86,301	$70,000	$115,859
#2	835	45%	$300,600	$86,301	$70,000	$144,299
#3	927	50%	$333,360	$86,301	$70,000	$177,059
#4	982	53%	$353,520	$86,301	$70,000	$197,219
#5	1018	55%	$366,480	$86,301	$70,000	$210,179

Additional Town Expenses

Category	Yearly cost	Explanation
Insurance for CO	$20,000 (Est.)	MMA Insurance
Self-insurance/Equip Replacement	$40,000	Build up a self-insurance fund/equipment replacement
Misc. expenses	$10,000	A lawyer or other unexpected
Total	**$70,000**	

Revenue Return covers Bond payments and Insurance and self-insurance fund. Plus, additional surplus beyond these expenses starting in Year 1.

The only expense not accounted for is the construction year internet-only bond payments. That amount is estimated at $30,332.

Speeds	% of takers	Cost
100/100Mbps	60%	$59.99
250/250Mbps	30%	$64.99
500/500Mbps	10%	$109.99

Details

Estimated Road Miles Served		75.23
Pole Count		1737
Eligible locations		1881
Ineligible		7
Total locations		1888
Construction cost based on a Take Rate of		50.00%

The Maine Connectivity Authority uses a VETRO program that determines the eligible/ineligible locations in a geographic area. "Ineligible," in this case, is a home that has been recorded as being able to receive 100/100Mbps or better. These numbers are derived from a combination of databases, including self-reporting by internet service providers.

To proceed with a grant application, you would have to remove the ineligible homes, and if you wanted to serve them, you would add the cost of serving these homes to the local match.

Appendix C: Dresden- Public Ownership Model

Construction Cost breakdown

Category	Cost	Calculations	Assumptions
Licensing Application	$70,841	This is based on the number of poles and is likely very close to the cost.	
Make Ready	$392,750	Calc: 1571 poles x $250/pole= $392,750	ESTIMATE
Pole Replacement	$235,650	Calc: 10% pole replacement- $1500/pole x 157 poles= $235,650	ESTIMATE
Central Office (Utility Hut)	$375,000	Includes all equipment inside to light up the system and a telco hut	Different designs will depend on location- this is for discussion to get you a better number
CPE/Customer install (50%) 436 customers	$196,200	$200 for home equipment and $250 for the installation labor. Calc: $450 x 436 homes= $196,200	It does not include a router, which we lease for $7.50/month, or buy your own.
Construction of the main system	$2,471,554	All-in cost from the contractor for main lines and drops to the home	*does not include sales tax, assumes muni owned- will need to add 5.5% to materials if owned by ISP
Project Management (8%)	$173,308	Axiom fee for overseeing construction contractor, installing CO, as well as taking orders for service	8% of the overall project cost- will cover bond costs
TOTAL	**$3,915,304**	Includes all Make Ready	

Total construction cost estimate	**$3,915,304**
Minimum local match (872 homes x $700)	$610,400
State grant request	$3,304,904

Bond payment on $610,400 = $40,093 for 20 years

Revenue and Expense Modeling

Year	Total # of Homes Served	Take Rate- based on VETRO calculations of 872 homes	Town payment from ISP- $30 per sub/per month	Bond Payment	Additional Town Expenses	Surplus to Town
Construction	0	0%	$0	$14,101		($14,101)
#1	349	40%	$125,640	$40,093	$50,000	$35,647
#2	385	45%	$138,600	$40,093	$50,000	$48,507
#3	428	50%	$154,440	$40,093	$50,000	$64,347
#4	453	53%	$163,080	$40,093	$50,000	$72,987
#5	471	55%	$169,560	$40,093	$50,000	$79,467

Town Expenses

Category	Yearly cost	Revenue Return
Insurance for CO	$20,000- est.	MMA Insurance
Self-insurance/Equip Replacement	$20,000	Build up a self-insurance/equipment replacement fund
Miscellaneous	$10,000	Lawyer, oversight
Total	$50,000	This does not include the one-time cost of surety bond/LOC for pole licensing

Rate Group	Cost
100/100Mbps	$59.99
250/250Mbps	$64.99
500/500Mbps	$109.99

A final note on Dresden

While we modeled our revenue return at $30/per subscriber/per month across all three towns for consistency, if Dresden decides to move forward on its own, we will remodel the revenue return at $20 to reflect the reduced overall revenue from the total number of homes.

Details

Estimated Road Miles Served		61.90
Pole Count		1571
Eligible Locations		871
Ineligible Locations		1
Total locations		872
Construction cost calculated at Take Rate of		50.00%

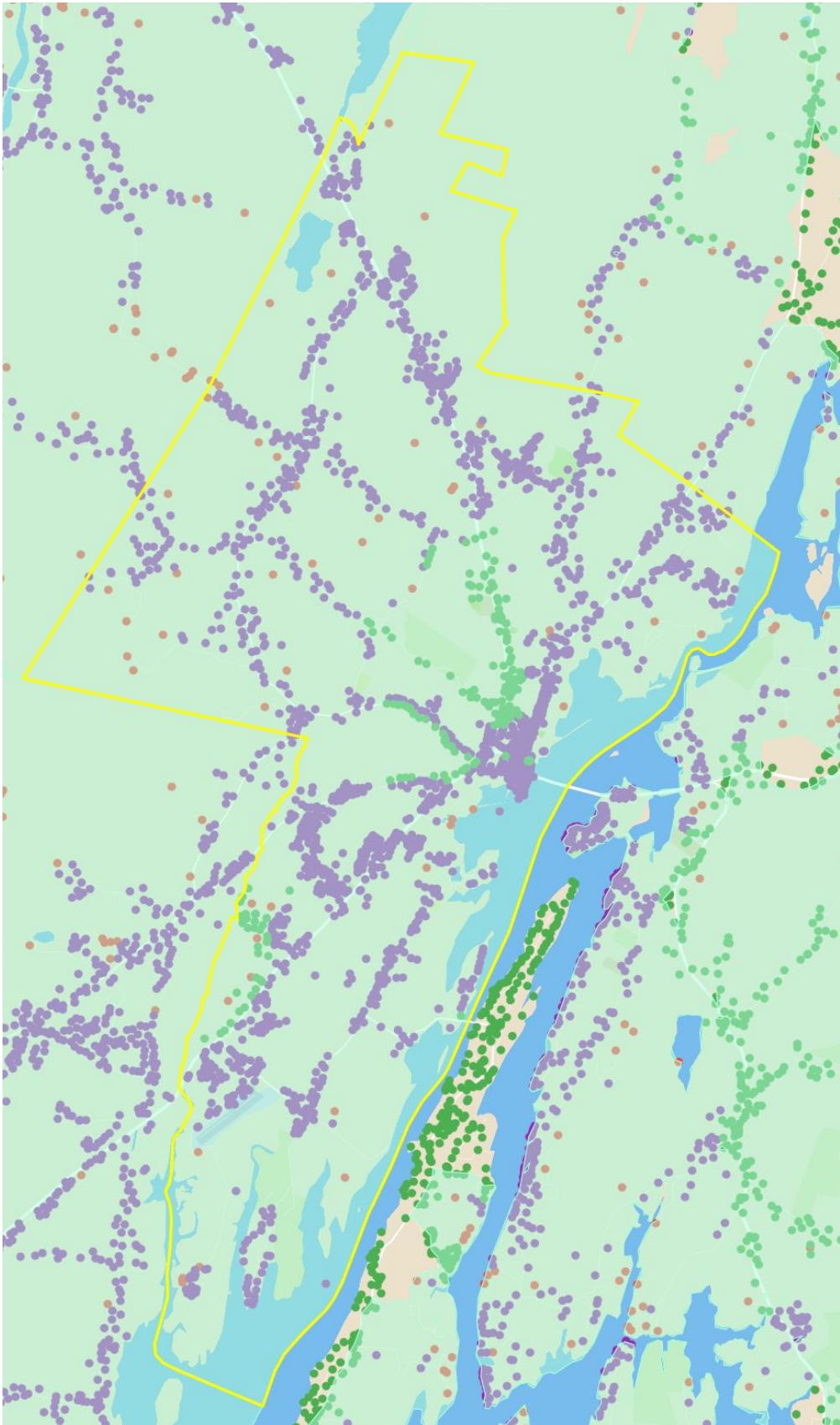Questions about this report?

Please get in touch with Mark Ouellette at mark@connectwithaxiom.com or directly on my cell phone at (207)272-5617

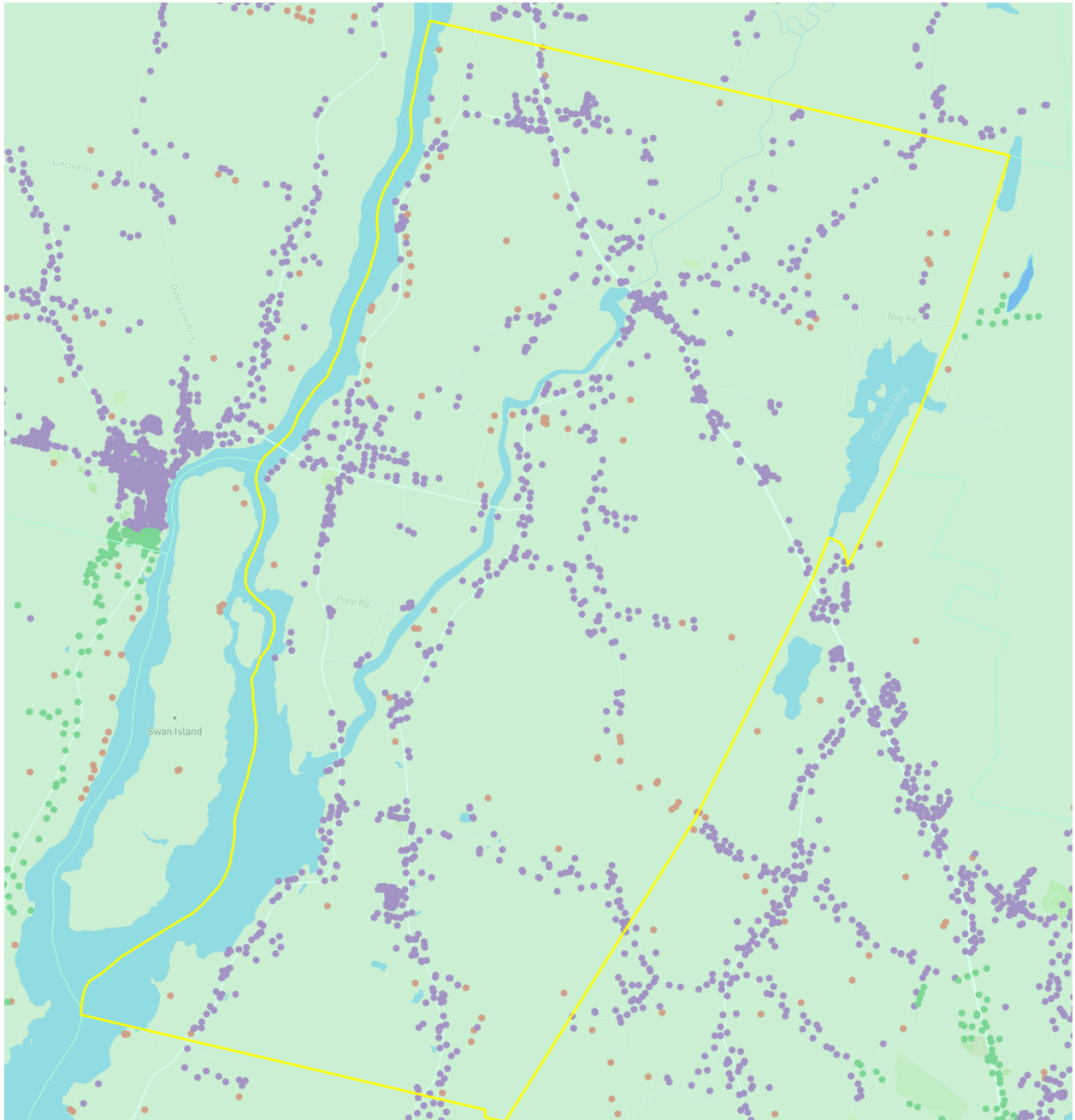# Appendix D: Maps of service location data

Woolwich
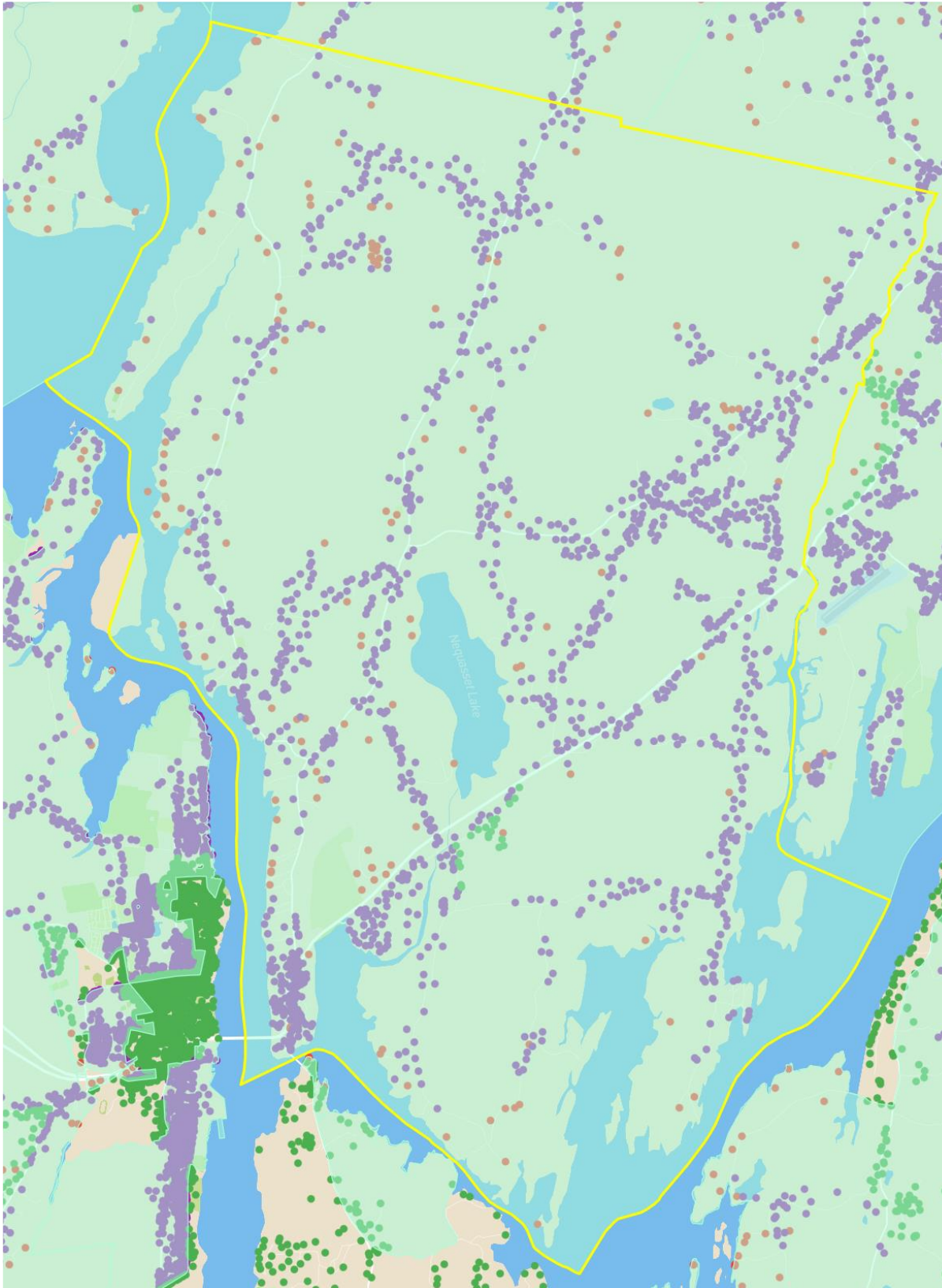
Dresden

Legend

- 🟢 Served Locations
- 🟣 Underserved Locations
- 🔴 Unserved Locations