

Southport Internet Planning Report

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By

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Axiom

every connection counts

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Report Overview

This report is the end product of a 2020 solicitation by the Town and the Southport Broadband Working Committee (referred to within as Broadband Committee) . The goal of this report is to present a high-level comprehensive overview of two broadband infrastructure models that can meet the committee's goals of providing a fast, affordable, fiber-to-the-premise (FTTP) broadband solution to all locations on the island.

The Broadband Committee has been meeting for some time now, but the climate for implementing high speed broadband has never been more favorable than it is today. The COVID-19 pandemic has made broadband disparities across the nation far more apparent, and both state and federal funding opportunities have increased as a result. Using the information compiled in this report, the committee intends to work with the Select Board and the community to generate consensus for the implementation of a universal FTTP solution for the island.

Benefits of Fiber

There is no question that fiber optic connections can bring tangible benefits to Southport. With COVID-19, even those that might have been previously skeptical about the need for broadband now know of the importance of a speedy, reliable connection for working or schooling from home. Demands on the current technology being utilized by Spectrum and Consolidated Communications are finding their limitations as consumer demand increases.

Whichever broadband infrastructure model the community chooses to pursue, the Broadband committee recommends a Fiber Optic internet system which is-

- A generational investment that will last 30 years or more
- Scalable and able to meet increasing demand
- The most reliable technology on the market today- it just works

Incumbents

The major current providers of internet service in Southport are Spectrum and Consolidated Communications. The Broadband Committee is not particularly favorable toward either provider expanding their current service given the feedback from subscribers. However, given the footprint of Spectrum, the committee remains open to an expansion plan by Spectrum, even though they would expand using their current copper-based technology, not fiber optics, and that typically expansions by Spectrum do not include every address, but only those most profitable.

Both of the incumbent providers could be a serious choice for Southport to consider, but it depends on several factors and compromises that the town would have to make. First, it is unlikely that the town be able to own the system with either provider. Second, the town would be acknowledging the status quo. Either Spectrum or Consolidated bring very different views to a partnership.

- Spectrum- would need to expand their network, which would likely save on cost as they would not need to replace their existing network.
 - Co-Axial copper system
 - Unclear if they would expand to every home if asked

- Consolidated Communications- would likely build fiber across the whole island, replacing their current DSL (Digital Subscriber Lines) service with a fiber optic system, if you requested a price from them.
 - Agreement would commit the town to 20-year relationship with Consolidated

New Providers

If either incumbent provider is unresponsive or does not provide a solution that meets the objectives of the Broadband Committee and community, working with an Internet Service Provider (ISP) not currently in Southport is the second viable option. There is a strong desire within the Broadband Committee to explore other options beyond Spectrum or Consolidated, however the work of the Committee and outreach to the community over the next several months will help develop the path forward for the Committee to make final recommendations to the Select Board.

- New Providers more open to municipal ownership model
- New Providers not needing to own the infrastructure, but act as an operator of system
- New Provider may meet more of the Broadband Committee’s goals and objectives

Ownership Models

There is an increasingly large number of ownership models in Maine for the Broadband Committee to draw inspiration. Owning your own system does have benefits, most importantly having the ability to contract with the ISP of your choosing and having the ability to change ISP’s if they are not performing to your satisfaction. Determining if the Town is going to work with the incumbent providers or consider a new provider will clarify ownership options.

Generally speaking, there are four ownership models for the community to consider:

1. Owned and Operated by the community
2. Owned by the Town (either in part of fully), operated by Internet Service Provider
3. Owned by investors, operated by ISP
4. Forming a public utility

Cost

Whether the community chooses to work with an incumbent provider, attract another Internet Service Provider (ISP), or form a public utility, deciding what ownership model works best to meet the community needs, the cost of building a totally new system or expanding on current provider networks will require significant public subsidy. No provider will build out a system using their capital, the Return on that Investment (ROI) would take too long. This is why even the current providers have not expanded (Spectrum) or improved (Consolidated) service on the island. Internet Service Providers will only take communities seriously if the town is willing to explore public funding options.

Cost Estimate to build to every premise on island	\$1,970,250
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Grants

There are a variety of federal and state grant opportunities for the Town to consider. It is likely these opportunities would not be available for Spectrum served areas of the island. However, given that some pockets are not served by Spectrum, identifying and pricing those areas may create an opportunity to apply for state funding which we believe would be the most likely opportunity for success.

Recommendations

Based on research the Broadband committee has done over the past year, and the information provided in this report, the committee recommends the following:

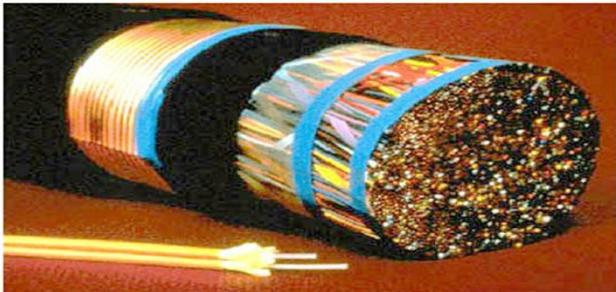
Decisions	Recommendation
Technology choice	Fiber optic technology rather than copper-based technology currently provided by Consolidated and Spectrum
Working with Incumbents	More information needed, but strongly lean toward a public option with new ISP (Internet Service Provider)
Choosing an ISP willing to support a FTTP network	Yes, especially if the fiber network is owned by the Town
Ownership model	If not working with an incumbent provider, explore various models for what fits best
Should community own system	Yes, this is a good option, saves money, town retains control over the long run
Cost	Will require capital from town- committee recommends a municipal bond because of historically low rates
Grants	Potentially eligible for some small areas of project, a state grant through ConnectMaine Authority
Requests for Proposals	Committee strongly favors an RFP for final construction cost to obtain best price and meeting all goals of community

Why Fiber?

Fiber optic internet systems are built for the future. Broadband Committees are often asked about the differences between the available network technologies and the reasons why one is more desirable than another. The following section will help community members understand the benefits of fiber optics and its superiority over other technologies, including DSL and co-ax cable, the two technologies currently in use to provide internet service on Southport.

- Fiber is a long-term investment in a community's future
- Fiber supports 21st century economic opportunities
- Fiber leapfrogs communities that are left behind to the front of the pack
- Fiber, over the long run, is a less expensive technology

One of the major concerns with fiber systems is the up-front cost. However, over time, other technologies will need to be replaced, upgraded or will be deemed obsolete. On the other hand, fiber will allow you to scale the bandwidth delivered as needed, while using the same fiber distribution network over a period of decades.



The optical fiber cable in the foreground has the equivalent capacity of the copper cable in the background.

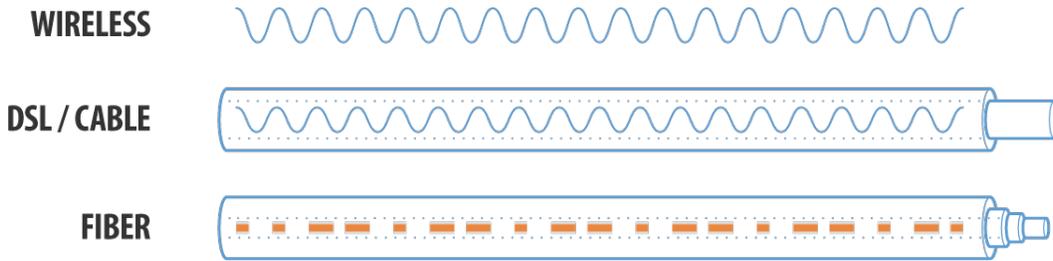
Just one visual example will underscore the capabilities of a fiber connection versus a legacy copper network connection. With today's technology, one fiber the thickness of a human hair can carry more data than 4,000 top-speed DSL lines.

Homes that are being served by copper, either through DSL from the phone company, or with co-ax from the cable company have significant limitations in service because of how each technology works. In the case of DSL, not only is the driving technology outdated, but the old copper lines are susceptible to corrosion that can severely impact the reliability of a subscriber connection.

Furthermore, DSL is significantly limited in the distance it can push a signal (3-mile maximum), meaning those homes furthest from the telco equipment are faced with connections that often cannot reach even a paltry 3Mbps of download speed. (explanation: Mbps stands for 'megabits per second' - bits are tiny units of data, with a megabit representing a million of them. The higher the number of Mbps you have, the speedier your online activity should be)

In the case of coaxial cable (co-ax), used by TV cable providers, capacity is still an issue, but for different reasons than with DSL. Compared to a fiber-optic system, cable is not nearly so scalable – for every step up in speeds, equipment needs to be upgraded both at the home and at the cable plant. Furthermore, cable systems were designed primarily to push data down to the customer, an appreciably different model than the emerging needs for telecommuting and interactive video, which require high bandwidth in both directions. Finally, there is a major concern with the fact that cable is a shared system, meaning that the signal strength you receive is dependent on how much bandwidth is being drawn by other users that are also connected to that line of cable. Cable companies commonly oversaturate their subscriber networks by a ratio of up to 100:1, leading to inconsistent speeds for the end user.

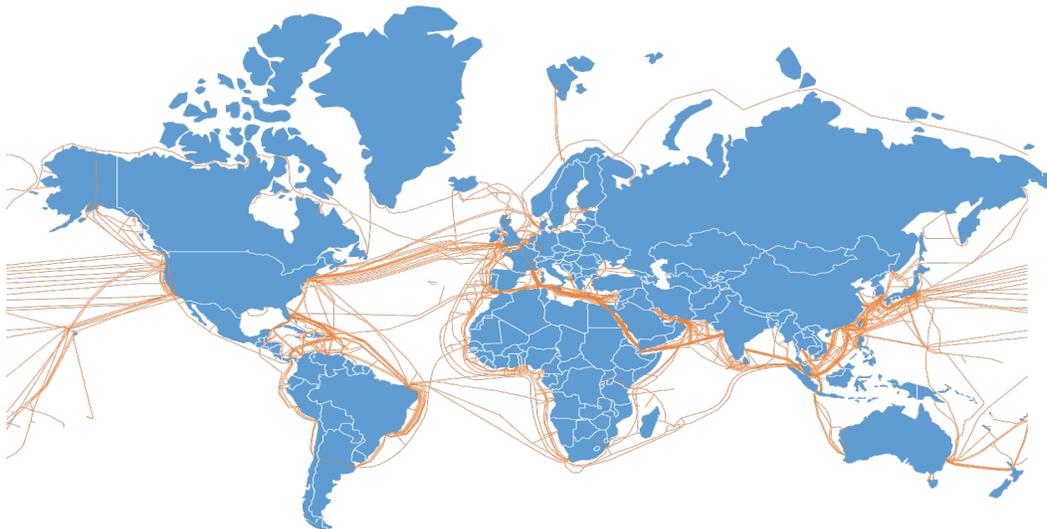
How it works is the secret to higher speeds



“Broadband” describes the fastest method of delivering high-speed internet to subscribers. While DSL and cable utilize existing phone and TV infrastructure to transmit data as frequency “vibrations” over copper wires, fiber networks transmit data using light over specialized cables that contain glass fiber strands. Light moves at 186,000 miles per second, and this is what enables speeds of 1 Gig (1000Mbps) or much more per connection- 100 times faster than a 10Mbps DSL connection and 10 times faster than a 100Mbps cable connection. In addition, both DSL and cable suffer from the limits of their own technology, making them less than ideal choices into the future.

Wireless is an interesting choice and is certainly being considered in major urban markets where the density of buildings makes fiber optic cabling expensive and complicated. Wireless service, while reliable, is not as reliable as fiber optics and can be susceptible to weather conditions and movement of outdoor equipment due to wind. Wireless also requires a direct line-of-sight; obstructions are not a friend of a wireless signal. While it has the capability to be as fast as fiber, reliability concerns and reliance of line-of-sight make wireless installations best suited to very dense urban, or certain rural situations where the physical environment allows for reliable, high speed wireless systems and where costs make wireless a serious consideration. In the case of Southport, wireless connectivity is serving some homes, but a true ubiquitous wireless system that can support ongoing bandwidth demands is not something that should be considered given the other choices that are available to the community.

Will Fiber Become Obsolete Like other Technologies?



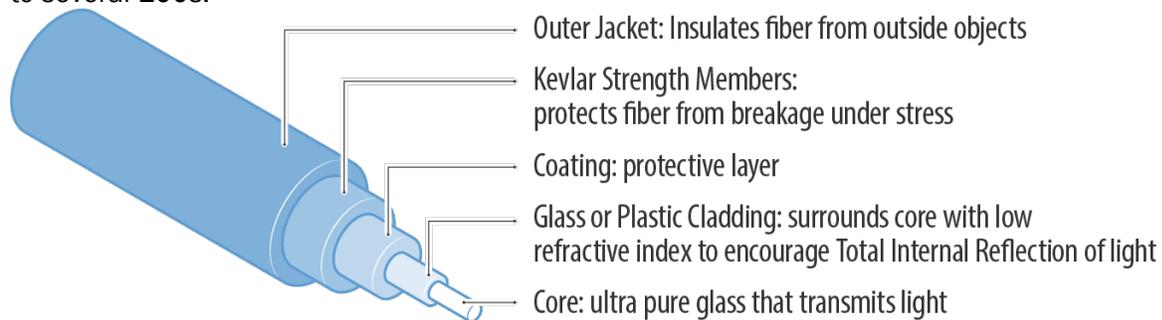
While we cannot predict the future, all indications are that fiber optics is here to stay for a very long time. Frankly, this technology has already been used for many, many years, which means that there are trillions of dollars of fiber installed globally. A whole industry has grown up around how to utilize fiber to its fullest capacity to make all of our lives better. This industry has proven very good at developing new electronics to push more and more data through existing fiber lines.

Most people think of fiber as a new technology, but in reality, it has been used for “backbone” connectivity as far back as the 80s, with hundreds of fiber optic cables running across the sea floor all around the world.

What is new, is that fiber is starting to be used to serve homes in places like Austin and Chattanooga and right here in Maine on the islands of Islesboro and Cranberry Isles and Cliff Island, where FTTH (Fiber-to-the Home) networks are deployed. Because of the extensive network of fiber already installed and continuing to be deployed, it is very unlikely that we would see any major shift in market forces that would make fiber optics obsolete.

What is in a fiber-optic cable?

An individual optical fiber (the size of a human hair) is surrounded by several layers of material that strengthen and protect the fiber. A fiber-optic cable can have any number of “fibers” ranging from 1 to several 100s.



Consumer Benefits

Speed and Capacity. Many experts say that FTTH connections are the only technology with enough bandwidth to support the projected consumer demands over the next decade.

Future proof. Because of fiber’s capabilities, new technological innovations are being invented every day to utilize fiber’s superior ability to transport tremendous amounts of data at blazingly fast speeds. Technologies such as 3D holographic high-definition television and gaming will someday be everyday items in households around the world. FTTH will be able handle the estimated 30 gigabit-per-second needs of such equipment... and this is just one technology. Think about the new ways that you use the internet that seem commonplace now that were not even conceived of 10 years ago.

One delivery system. Right now, a consumer can receive telephone, video, audio, television and almost any type of data transmission using a single seamless FTTH connection. That trend will continue as consumers are given increasing array of a la carte choices for how they receive their various communication and data and streaming choices. Subscribers are also realizing that receiving bundled services through a fiber connection can save money.

Reliability. Fiber is the most reliable connection you can have. In surveys across the state of Maine, the #1 complaint about their internet service is reliability. An internet connection is becoming a necessity, not a luxury. When connectivity is interrupted or slowed down unexpectedly or inexplicably consumers are furious that they cannot accomplish the on-line task, leading to a significant loss of productivity or time- Fiber's reliability is far superior to all other technologies.

Community Benefits

Job Creation. There are many examples of fiber networks creating jobs by either supporting existing businesses or attracting new ones

Business Attraction. When we say business attraction, we really mean businesses that are looking for the kinds of connections that can move large amounts of data, quickly- architects, designers, banks and other heavy users

Entrepreneurship. Fiber helps induce young people to locate and work from anywhere

Telemedicine. The medical field and how patients and providers interact is undergoing seismic changes. One of those changes is the way patients are able to be seen, treated, monitored and are increasingly being given tools to manage their own health care, right from their home. A fiber connection has the capacity to manage these data transmission uses, which in turn facilitates our elders aging in place

Telecommuting. As remote work has changed from a luxury to a necessity, having a consistent and strong connection- especially on the upload from the home back to the internet- is crucial. The technology of fiber makes it perfectly suited to telecommuting (virtual meetings, cloud sharing documents, scheduling and a host of other applications made seamless with a fiber connection

Education. Creating equal access for all eliminates “the homework gap” for those students that are increasingly required to complete assignments on-line but are unable to do so from their home because of a lack of an adequate internet connection. Adult learners also benefit from on-line learning options that utilize interactive video or other tools that those with better connections can access

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 a FTTH connection are worth, on average, 3.1% more than homes that do not have a fiber connection

Summary

- Fiber is the only technology that has unlimited capacity, making it a futureproof investment
- 5G and low-orbit satellite are years away and will not meet the same reliability and capacity that fiber currently has
- The benefits of fiber are undeniable
- Fiber is the affordable choice

Incumbent Providers

Over the next few months, the committee will need to gauge the community's interest in working with one of the incumbent providers or to invite a new provider into the community. Either solution offers both pros and cons to achieving an island-wide broadband solution.

Spectrum

Spectrum has worked with a handful of communities to build out their system. They have not made a formal offer to the town to expand service, and it is increasingly apparent that the areas not covered by Spectrum number less than 30 homes. On Cross Road, a recent inquiry to obtain Spectrum service was denied dimming the prospects that Spectrum would be interested in even a limited expansion. Spectrum will sometimes work with a town to expand their current service to other parts beyond their current footprint, meaning they would expand their co-ax copper-based cable system to homes they currently do not serve. But Spectrum is unlikely to install fiber as part of an expansion of service. Also, Spectrum is unlikely to expand service to areas that they would deem unprofitable. In areas where they are willing to expand, Spectrum often prefers to have a blended approach to funding the expansion, applying for state funding, using some of their own capital, and making up the difference with capital from the town they are serving. Spectrum has never entered into any agreement that would not give **them** 100% ownership of any new expansion.

Consolidated Communications (CCI)

CCI has begun work with communities that inquire about replacing existing Consolidated DSL systems with fiber optics. Consolidated recommends that the Town consider issuing an RFP outlining its design requirements and standards asking for a full engineering cost estimate. If the Town decides to work with CCI, CCI has been developing a new program that they have entered into with Long Island, Maine. In the case of Long Island, the Town would own the main fiber trunk and CCI would own the drops to each home. The Town would pay for the building of the system, and CCI would add a fee to the monthly subscriber rates that would pay back the loan/bond over 20 years.

It is not clear if CCI would have interest in working with the Town of Southport and not clear if Southport would have interest in working with Consolidated, so this option would require a significant amount of due diligence to even consider if an arrangement makes sense.

Working with incumbent providers -either Spectrum or Consolidated- can be beneficial in marginally reducing some risks to the Town and may be more comfortable for some consumers who do not feel strongly about the Town owning the infrastructure, preferring instead a more traditional approach where the ISP controls all aspects of the customer experience, and is fully responsible for the expansion of service.

The Southport Broadband Committee, through conversations with community members and the responses received to their recent survey, has learned that many parts of this community have experienced challenges with the service (or lack of) provided by both incumbents. Given this factor, the prospect of a long-term commitment with a private company using a significant amount of public dollars to expand their existing privately owned service may not be seen as being in the best interest of the Town. This may push the community to strongly consider creating a relationship with a new provider that could provide more favorable terms, better reach the goals of the Broadband Committee, better meet the needs of the community, and allow the Town to own the Network. This model is a pathway for the members of a community to have a stronger voice in the network management and the delivery of internet service in their town.

Action Item

- As part of the Town's due diligence, reach out to each incumbent provider and discuss interest and options

Benefits of Public Ownership

Public ownership models are increasing in popularity and several communities have implemented this approach because of the benefits of aligning and assuring that community goals are met by the ISP. This model is a pathway for municipal leaders to have a stronger voice in what is happening in their community. While this model increases the responsibility of the town, it also provides a much more collaborative approach with the ISP, which in turn brings better customer experiences, as well as the ability of the town to change providers if agreements on service are not met. These changes in the relationship foster a better partnership where the ISP is much more accountable to the user experience and the community is much more committed to mutual success for both the town and the provider. Several communities have implemented this approach and there are a number of communities in the planning stage of becoming the public owner of a broadband internet system that will be implemented over the next year.

The following represent real-world examples of various ownership models:

Owned and Operated by the community- Islesboro

Islesboro model was the first in Maine and features several unique aspects.

- Town issued a \$3.8M bond to fund construction
- 600 premises connected
- Town contracts with GWI to run the system
- Town maintains list of subscribers and interacts with stakeholders billing is \$360/year for a shared Gig of service across the island
- They have a volunteer committee to oversee the network

Owned by town, operated by Internet Service Provider- Cranberry Isles

The town successfully received a grant to pay for the system but has not yet received the funds.

- Town paid through property taxes the cost of the build \$1.2M across 4 of the islands that make up the Cranberries
- To date 180 premises connected
- Town entered into a long-term Public-Private partnership agreement with Axiom
- Axiom does all billing, maintenance and tech support
- Axiom returns 5% of gross revenue back to the town
- Various tiers of service, system is capable of 1Gig/1Gig to each home

Owned by island investors, operated by ISP- Cliff Island

This is the only model in Maine that is owned by private investors. Because Cliff Island is part of Portland, and Portland did not want to support effort with municipal dollars, a group of islanders raised \$350,000 from fellow islanders to pay for the fiber network, which was wired on the ground across the island to every home.

- Private investors are getting paid back by receiving \$240/year for each subscriber
- Approximately 75 subscribers
- LLC entered into 10-year agreement with Axiom
- Axiom does all billing, maintenance and tech support

Forming a public utility- Downeast Broadband

Calais and Baileyville have created an open access network that was envisioned to attract multiple providers to service the approximately 2000 homes passed. Currently, Pioneer Broadband is the only operator on the system.

- Towns took out a bond to pay for system
- Payback is expected through the fees collected by ISPs on the system
- Maintenance is performed by contract with Pioneer Broadband
- A utility board oversees system
- Buildout is still occurring, but 2000 homes passed is expected

Elements of a strong Partnership Agreement

Municipal responsibilities

- Own and insure the main backbone and fiber equipment
- Work closely with ISP on marketing efforts and take rates
 - Promote ISP and early commitments to the new system
- Commit to a long-term contract with the ISP to exclusively serve the community
- Develop and maintain expectations for ISP engagement and pricing for citizens

ISP responsibility

- Repair and maintain all fiber drops and home equipment at their cost
- Employ a local representative to support timely responses to customer issues
- Coordinate all operational and managerial responsibility for the system
- Return a % of gross revenue back to the community
- Maintain proper insurance as required of an ISP

Determining if public ownership is the preferred approach will be key to determining what next steps are taken. The Broadband Committee should focus on having a committee meeting to discuss the potential options for a municipally owned model and be ready to bring these options to the community.

Ownership Model Pros and Cons

Private Ownership Benefits	Private Ownership Concerns
The Town would not be responsible for anything. All responsibility would be on the ISP	It is almost a certainty that a public subsidy will be required to build out, so public money would be used to fund a system the Town would have little to no control over
This is a model that Spectrum & Consolidated traditionally use- so if the town works with an incumbent, this is the model to expect	While reducing risk, private ownership also cedes any leverage for pricing or customer service expectations to the incumbent
Keeps the status quo	If you like what you got now, no change
Updated and increased coverage to underserved parts of the island	Must insist that they serve every home- they typically are not willing to do that

In Spectrum's case- the community would retain a cable TV option	Spectrum is expensive, and traditional cable TV is slowly dying as people buy their content through subscription streaming services accessed through their internet connection
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Public Ownership Benefits	Public Ownership Concerns
Locally owned means the Town and the community are committed to its success. This typically drives additional takers of the service	The Town takes on additional responsibility
The Town has control over which ISP they choose and can change ISPs; and work to create good pricing- in short, the Town will have the leverage!	With Town leadership changes over time- having consistent Town oversight of the intent and purpose of the original goals can be a challenge.
The Town can insist on fiber optics- and not worry about becoming obsolete for 20-30 even 40 years	Fiber can be 30% more expensive than other technologies to build
Saves money over the long run- long term investment- can avoid much of make ready cost saving 100s of \$1000s during construction	The cost of the system may not be fully covered by the revenue generated by the subscribers, requiring additional support

Recommendations

- The Broadband Committee should discuss the potential options for a municipally owned model
- The Committee engagement of the current providers should help determine their interest in expanding service to the whole island and help inform the Broadband Committee and the community on the viability of a new service.
- The Committee should work with the community to set a clear goal about ownership and what the community would like to achieve
 - What are the elements of an ownership agreement that need to be addressed?
 - Is there anything unique about Southport that can be leveraged in a relationship with an ISP?
 - What are the important goals that need to be met? (e.g., Own your Own, Equal Access for All, Enhanced business service offerings, Low-income subsidy, etc.)

Construction Cost Estimates

When doing our estimates, these are intended to be high-level and significant due diligence will be required to better understand what the final cost will be. We break these numbers down for you so you can review and ask questions about the components of our estimate.

The construction cost estimate would pay for a fiber connection at any home that wants to be connected. A calculation of expected revenues and expenses has been computed to illustrate the expected viability of the project, as well as the cost of servicing the bond that would fund the project, should the community decide to implement a municipal owned system. Looking at the Financial Modeling section will help the Southport Broadband Committee understand the commitment of the town.

Category	Cost	Calculations	Assumptions
Licensing Application	\$50,000	This is based on the number of poles and likely very close to the cost.	
Make Ready	\$405,000- only needed if the system is not municipally owned	Calc: 900 poles x \$450/pole= \$405,000. As we have discussed, this is a total ESTIMATE	This number will change. It could be lower.
Pole Replacement	\$270,000	Calc: 10% pole replacement \$3000/pole x 90poles= \$270,000, this is a total ESTIMATE	This number can be calculated at 5% pole replacement and half this number
Central Office (Utility Hut)	\$200,000	Includes all equipment inside to light up system.	Could flux a little, but not much.
CPE/Customer install (401 customers)	\$110,275	\$175 for home equipment and \$100 labor for install. Calc: \$275 x 401 homes= \$110,275	Does not include router, which we lease for \$5/month or buy your own.
Construction of main system	\$1,310,000	All in cost from contractor for main lines and drops to the home	This number is based on discussions with a construction contractor.
Flagging- Road safety crews during construction	\$45,000	Total estimate	May use local public works or police to defray costs.
Project Management	\$90,000	Axiom fee for overseeing construction contractor, installing CO, as well as taking orders for service	5% of overall project cost
TOTAL	\$2,480,275	Includes all Make Ready	
TOTAL if Municipal owned	\$1,940,275	EXCLUDES make ready and reduces pole replacement by 5%	

Explanation of Categories

Licensing Application, Make Ready and Pole Replacement

All three of these categories relate to the process of applying for and receiving the approval to run fiber on the utility poles. The application cost cannot likely be avoided, even if you proceed as a municipally owned system. The cost of Make Ready can be avoided, if you are municipally owned and it's unclear if you could avoid all or some of the expected pole replacements that may be necessary to run a new fiber cable.

Central Office

A CO refers to the location where the central operating equipment would be housed, for simplicity sake we propose a new telco hut with heating and cooling, as well as a generator to power the system in the event of lost power.

Customer Premise Equipment (CPE)

We have calculated a 50% take rate as to the number of units needed. It's possible that the Town would only purchase the number of units for people that sign up in the construction period. This may reduce the cost marginally but would increase the burden for those that sign up later.

Construction Cost

Obviously, the largest expense, this number will need to be tested once we are ready and the project is approved and moving forward. There have been increased costs to fiber materials as demand has skyrocketed, and the timing of the build may also affect price. Larger demand on construction crews, building in off-construction season can contribute to final pricing. It will not be clear until the Town gets closer to hiring a contractor. We feel good about this number, but want to be super clear, nothing is set in stone until a contract is agreed to and signed.

Flagging (road safety crews during construction)

Because Southport has two main roads on the east and west side, we anticipate some need for flaggers to provide safety to the constructors and the public. How much will be needed and how much that cost will be is dependent on a number of factors. Some of these costs might be avoided with the use of local crews or police.

Project Management

There is an enormous amount of oversight, questions and inquiries about these kinds of projects. If anyone has ever built a home, you understand the long list of decisions that need to be made- it's analogous to a fiber build project. Overseeing all of the decisions, ensuring that the goals of the community are met, and gathering all of the detailed necessary information from all of the potential subscribers requires a significant effort.

Savings

Being municipally owned and good stewardship of the funds should produce significant savings from the estimated \$2,500,000 project. In addition, if the town were to attract some amount of grant funding this would reduce the cost even further.

Grant Funds to Support Project

In anticipation of a new grant making program at the ConnectMaine Authority, the Committee is working on determining potential eligible areas. So far, the work of the Committee has revealed that the largest concentration of homes unserved by Spectrum run along Cross Road and there is a small scattering of homes in few remote shoreside areas that also may not have Spectrum service. A detailed survey is being produced of these areas. Once Axiom and our Southport Broadband

Committee have a final count and locations, we can derive a cost to serve those homes. As the rule making for this new grant program continues to be finalized, having a plan ready in January would ready the Town to evaluate the criteria and be ready to submit an application when the funding round opens up.

Further Cost Savings

Some further cost savings could be derived depending on a number of factors:

- Utility Pole conditions
- Construction cost RFP
- Central Office location
- And a few others like the need for flaggers

Revenue and Expense Modeling

Be aware that the Revenue and Expense modeling is just one set of assumptions based on our experience with over 25 planning processes and deployments of FTTH. Each ISP would have its own internal modeling and calculations. Below we have calculated two sets of assumptions, the first is best case, the second is more conservative so that the community can understand the cost difference.

Best Case Model:

Year	Total # of Homes Served	Revenue	Expenses + 30%	Net Profit for bond
#1	266	\$219,469	\$158,435	\$61,034
#2	301	\$247,647	\$175,406	\$72,241
#3	365	\$299,001	\$206,386	\$92,615
#4	444	\$364,272	\$245,192	\$119,080
#5	522	\$428,704	\$211,612	\$145,201

The best-case modeling has these Revenue assumptions take rates:

Year	Year Round Take rate	Seasonal Take Rate
#1	30%	35%
#2	35%	40%
#3	40%	50%
#4	50%	60%
#5	60%	70%

If the town were to bond \$1,940,275 for 20 years, the cost chart is included below. We have added a column to represent the “gap” between the revenue generated that would help pay for the bond and the difference between that revenue and the cost of the bond. This project would be cash flow positive, meaning the full amount of the bond would begin to be fully paid with revenues from subscribers in 2028. The gap in the previous 7 years (in red) will need to be made up with town money. However, the cash flow will increase after year 7 while the debt payments start to go down, actually paying back the first 7 years of payment gaps. See below.

Maine Municipal Bond Bank Estimate of Borrowing

Date	Principal	Rate	Interest	Total Payment	FY Total	Revenue	Gap
11/1/2021			\$31,085.63	\$31,085.63			
05/1/2022			\$31,085.63	\$31,085.63	\$62,171.26	\$61,033.73	(\$1,137.53)
11/1/2022	\$97,013.75	2.2000%	\$31,085.63	\$128,099.38			
05/1/2023			\$30,018.48	\$30,018.48	\$158,117.86	\$72,241.35	(\$85,876.51)
11/1/2023	\$97,013.75	2.2900%	\$30,018.48	\$127,032.23			
05/1/2024			\$28,907.68	\$28,907.68	\$155,939.91	\$92,614.50	(\$63,325.41)
11/1/2024	\$97,013.75	2.3600%	\$28,907.68	\$125,921.43			
05/1/2025			\$27,762.92	\$27,762.92	\$153,684.35	\$119,079.75	(\$34,604.60)
11/1/2025	\$97,013.75	2.4500%	\$27,762.92	\$124,776.67			

05/1/2026			\$26,574.50	\$26,574.50	\$151,351.17	\$145,200.65	(\$6,150.52)
11/1/2026	\$97,013.75	2.5300%	\$26,574.50	\$123,588.25			
05/1/2027			\$25,347.27	\$25,347.27	\$148,935.52	\$145,200.65	(\$3,734.87)
11/1/2027	\$97,013.75	2.6300%	\$25,347.27	\$122,361.02			
05/1/2028			\$24,071.54	\$24,071.54	\$146,432.56	\$145,200.65	(\$1,231.91)
11/1/2028	\$97,013.75	2.7300%	\$24,071.54	\$121,085.29			
05/1/2029			\$22,747.30	\$22,747.30	\$143,832.59	\$145,200.65	\$1,368.06
11/1/2029	\$97,013.75	2.8300%	\$22,747.30	\$119,761.05			
05/1/2030			\$21,374.56	\$21,374.56	\$141,135.61	\$145,200.65	\$4,065.04
11/1/2030	\$97,013.75	2.9200%	\$21,374.56	\$118,388.31			
05/1/2031			\$19,958.16	\$19,958.16	\$138,346.47	\$145,200.65	\$6,854.18
11/1/2031	\$97,013.75	2.9900%	\$19,958.16	\$116,971.91			
05/1/2032			\$18,507.80	\$18,507.80	\$135,479.71	\$145,200.65	\$9,720.94
11/1/2032	\$97,013.75	3.2430%	\$18,507.80	\$115,521.55			
05/1/2033			\$16,934.72	\$16,934.72	\$132,456.27	\$145,200.65	\$12,744.38
11/1/2033	\$97,013.75	3.4580%	\$16,934.72	\$113,948.47			
05/1/2034			\$15,257.35	\$15,257.35	\$129,205.82	\$145,200.65	\$15,994.83
11/1/2034	\$97,013.75	3.6400%	\$15,257.35	\$112,271.10			
05/1/2035			\$13,491.70	\$13,491.70	\$125,762.80	\$145,200.65	\$19,437.85
11/1/2035	\$97,013.75	3.7430%	\$13,491.70	\$110,505.45			
05/1/2036			\$11,676.09	\$11,676.09	\$122,181.54	\$145,200.65	\$23,019.11
11/1/2036	\$97,013.75	3.8420%	\$11,676.09	\$108,689.84			
05/1/2037			\$9,812.46	\$9,812.46	\$118,502.30	\$145,200.65	\$26,698.35
11/1/2037	\$97,013.75	3.9090%	\$9,812.46	\$106,826.21			
05/1/2038			\$7,916.32	\$7,916.32	\$114,742.53	\$145,200.65	\$30,458.02
11/1/2038	\$97,013.75	3.9300%	\$7,916.32	\$104,930.07			
05/1/2039			\$6,010.00	\$6,010.00	\$110,940.07	\$145,200.65	\$34,260.58
11/1/2039	\$97,013.75	4.0000%	\$6,010.00	\$103,023.75			
05/1/2040			\$4,069.73	\$4,069.73	\$107,093.48	\$145,200.65	\$38,107.17
11/1/2040	\$97,013.75	4.1630%	\$4,069.73	\$101,083.48			
05/1/2041			\$2,050.39	\$2,050.39	\$103,133.87	\$145,200.65	\$42,066.78
11/1/2041	\$97,013.75	4.2270%	\$2,050.39	\$99,064.14	\$99,064.14		
TOTALS							
	\$1,940,275.00		\$758,234.83	\$2,698,509.83			

This report is an estimate only. Actual borrowing costs may vary. But if you look at the revenue generated over the life of the project, there is very little risk to the town, as the losses in the early years make are made up in the out-years positive cash flow.

The \$196,061 gap over the first 9 years is overcome with revenues of \$268,795 in the last 11 years, allowing the town to accelerate payments and reduce the interest cost even further.

The Best-Case Model makes this project entirely payable with subscriber revenue over the 20-year period, likely over 15 years or better.

Conservative Model:

The conservative model adjusts the take rates, topping out at just over 50%, as opposed to the 65% take rates achieved in the best-case modeling.

Year	Total # of Homes Served	Revenue	Expenses + 30%	Net Profit for bond
#1	266	\$219,469	\$158,435	\$61,034
#2	301	\$247,647	\$175,406	\$72,241
#3	365	\$299,001	\$206,386	\$92,615
#4	404	\$333,268	\$226,157	\$107,111
#5	448	\$372,329	\$248,574	\$123,755

The conservative modeling has these Revenue assumptions take rates:

Year	Year Round Take rate	Seasonal Take Rate
#1	30%	35%
#2	35%	40%
#3	40%	50%
#4	42%	52%
#5	44%	55%

Again, if the town were to bond \$1,940,275 for 20 years, the cost chart is included below. We have added a column to represent the “gap” between the revenue generated that would help pay for the bond and the difference between that revenue and the cost of the bond. As you will see, the project takes much longer to sustain itself on subscriber revenues.

**Maine Municipal Bond Bank
Estimate of Borrowing**

Date	Principal	Rate	Interest	Total Payment	FY Total	Revenue	Gap
11/1/2021			\$31,085.63	\$31,085.63			
05/1/2022			\$31,085.63	\$31,085.63	\$62,171.26	\$61,033.73	(\$1,137.53)
11/1/2022	\$97,013.75	2.2000%	\$31,085.63	\$128,099.38			
05/1/2023			\$30,018.48	\$30,018.48	\$158,117.86	\$72,241.35	(\$85,876.51)
11/1/2023	\$97,013.75	2.2900%	\$30,018.48	\$127,032.23			
05/1/2024			\$28,907.68	\$28,907.68	\$155,939.91	\$92,614.50	(\$63,325.41)
11/1/2024	\$97,013.75	2.3600%	\$28,907.68	\$125,921.43			
05/1/2025			\$27,762.92	\$27,762.92	\$153,684.35	\$107,110.95	(\$46,573.40)
11/1/2025	\$97,013.75	2.4500%	\$27,762.92	\$124,776.67			
05/1/2026			\$26,574.50	\$26,574.50	\$151,351.17	\$123,755.25	(\$27,595.92)
11/1/2026	\$97,013.75	2.5300%	\$26,574.50	\$123,588.25			
05/1/2027			\$25,347.27	\$25,347.27	\$148,935.52	\$123,755.25	(\$25,180.27)
11/1/2027	\$97,013.75	2.6300%	\$25,347.27	\$122,361.02			
05/1/2028			\$24,071.54	\$24,071.54	\$146,432.56	\$123,755.25	(\$22,677.31)
11/1/2028	\$97,013.75	2.7300%	\$24,071.54	\$121,085.29			
05/1/2029			\$22,747.30	\$22,747.30	\$143,832.59	\$123,755.25	(\$20,077.34)
11/1/2029	\$97,013.75	2.8300%	\$22,747.30	\$119,761.05			
05/1/2030			\$21,374.56	\$21,374.56	\$141,135.61	\$123,755.25	(\$17,389.36)

11/1/2030	\$97,013.75	2.9200%	\$21,374.56	\$118,388.31			
05/1/2031			\$19,958.16	\$19,958.16	\$138,346.47	\$123,755.25	(\$14,591.22)
11/1/2031	\$97,013.75	2.9900%	\$19,958.16	\$116,971.91			
05/1/2032			\$18,507.80	\$18,507.80	\$135,479.71	\$123,755.25	(\$11,724.46)
11/1/2032	\$97,013.75	3.2430%	\$18,507.80	\$115,521.55			
05/1/2033			\$16,934.72	\$16,934.72	\$132,456.27	\$123,755.25	(\$8,701.02)
11/1/2033	\$97,013.75	3.4580%	\$16,934.72	\$113,948.47			
05/1/2034			\$15,257.35	\$15,257.35	\$129,205.82	\$123,755.25	(\$5,450.57)
11/1/2034	\$97,013.75	3.6400%	\$15,257.35	\$112,271.10			
05/1/2035			\$13,491.70	\$13,491.70	\$125,762.80	\$123,755.25	(\$2,007.55)
11/1/2035	\$97,013.75	3.7430%	\$13,491.70	\$110,505.45			
05/1/2036			\$11,676.09	\$11,676.09	\$122,181.54	\$123,755.25	\$1,573.71
11/1/2036	\$97,013.75	3.8420%	\$11,676.09	\$108,689.84			
05/1/2037			\$9,812.46	\$9,812.46	\$118,502.30	\$123,755.25	\$5,252.95
11/1/2037	\$97,013.75	3.9090%	\$9,812.46	\$106,826.21			
05/1/2038			\$7,916.32	\$7,916.32	\$114,742.53	\$123,755.25	\$9,012.72
11/1/2038	\$97,013.75	3.9300%	\$7,916.32	\$104,930.07			
05/1/2039			\$6,010.00	\$6,010.00	\$110,940.07	\$123,755.25	\$12,815.18
11/1/2039	\$97,013.75	4.0000%	\$6,010.00	\$103,023.75			
05/1/2040			\$4,069.73	\$4,069.73	\$107,093.48	\$123,755.25	\$16,661.77
11/1/2040	\$97,013.75	4.1630%	\$4,069.73	\$101,083.48			
05/1/2041			\$2,050.39	\$2,050.39	\$103,133.87	\$123,755.25	\$20,621.38
11/1/2041	\$97,013.75	4.2270%	\$2,050.39	\$99,064.14	\$99,064.14		
TOTALS							
	\$1,940,275.00		\$758,234.83	\$2,698,509.83			

This report is an estimate only. Actual borrowing costs may vary.

This scenario produces a gap of \$286,370.16 over the 20-year life of the bond. Unlike the Best-Case model that fully recovers the revenue shortfall from the early years, this model cannot overcome those shortfalls. While this gap would likely get paid for with additional public money, even the more conservative estimates pay off a significant percentage of the overall cost of the \$2M- over 87% of it. Is Broadband internet worth \$286,370.26- 13% of the overall cost over twenty years? And this is without any additional grant funds that the town may attract to pay for the unserved pockets.

Public Access Internet HotSpots

While considering a large broadband project for the community, many broadband committees are taking interim steps to help their citizens gain better access through community HotSpots. Axiom is a leader in installing and operating HotSpots in many communities- most recently in Searsport, Biddeford, Lisbon and Monson. Community HotSpots are open access networks that allow citizens in your downtown, or other public spaces, to connect to the internet- free of charge.

Community leaders often question the reasoning behind these types of projects when most folks have smart phones and can access the internet using those networks. Beyond the difficulties many experience using their cellular phone in rural setting where service can be spotty, HotSpots offer several advantages to traditional cellular networks.

First, a HotSpot allows for much faster downloads, which makes surfing the web much easier. HotSpots also allow you to connect to a computer or tablet if you desire, making HotSpots ideal places for connecting those who do not have a connection at their home, or cannot afford one.

Second, a HotSpot allows the community to brand the HotSpot with a customized landing page, which can communicate community assets or amenities that the town wishes to highlight. Where public restrooms are located, key businesses, such as the pharmacy or other amenities like the public park or boat launch are all customized to fit your splash page that 100s of users would see each month.

Last, these HotSpots are often sponsored by local businesses, such as the bank to help defer the cost of installation or upkeep.

Pricing

Pricing will depend on each locations' configuration and other factors, but a typical install of one HotSpot would be \$3,500. These HotSpots cover an area roughly 400 feet in diameter- if there are no obstructions. The cost of installation covers repairs or replacement for one year and monthly reports on usage. Typically, additional HotSpots cost less, but it depends again on the circumstances and type of connectivity required.

Other costs

Two other costs to consider will be electrical power and Broadband access. Just like residential or commercial Broadband service, Hotspots require a Broadband connection to work. So just like at your home or business, the town would be responsible for that monthly cost. Typically, there is a one year commitment to purchasing Broadband, which the town or sponsor would be responsible for. Those costs can vary depending on the provider, but a good rule of thumb would be \$65-\$100/month. Electrical cost can also vary but are nominal. We also would work with your public works department to get some signage up to advertise this new service and there would be some minimal cost to getting some branding done. If you were to work with one or more of your island businesses to get sponsored, they could be offered an advertising opportunity on your signage, if you so choose.

The bottom line is that Community Hotspots are an affordable, convenient way to help visitors and residents get an internet connection without a large financial burden to install and upkeep.

Grant Funding

What can communities do now to get ready and anticipate grant opportunities- and what are the grant opportunities available? This section communicates several areas of focus that communities can work on now, so they are ready when grant opportunities are available. In addition, we have compiled a list of the grant opportunities we are aware of, this list should help your community investigate potential sources of funding.

Goal: Be Ready

Funding

Because most rural communities are governed through a town meeting, typically a warrant needs to be developed and approved several months ahead of the actual meeting. For these communities, we suggest that you begin exploring the possibility of getting something on the warrant.

For those communities that have a Town Council, the funding timeline may be different, but just as importantly all Broadband Committees should educate themselves on the process at council or town meetings. Often, funding opportunities don't line up with town processes and opportunities can be missed simply because of timing.

We recommend having a community set aside a small amount of money; \$5000-\$20,000 have been amounts that other towns have earmarked that can be used on activities to create grant applications, install HotSpots or used as a match for a future grant opportunity. In other cases, it was just as important to get language endorsing the work of a Broadband Committee and authorizing the Committee to explore any and all funding sources or to regularly report back on findings to town officials as to progress. All positive steps that can move the process forward.

Plans

Starting early engagement with any possible Internet Service Provider is very important. Building trust, agreeing to common goals and roles and responsibilities will go a long way when opportunities arise to work together.

Goals

After looking at your town plan, you should consider and settle on your goals. "My internet stinks" is not a goal. Typically, communities that do well are able to articulate the answer to this fundamental question: Why? Why should the town focus on this? Why should we spend taxpayer dollars? Why is this important? The Broadband Committee must settle on their goals and be able to articulate those goals not only to their town leaders but to other citizens to build support. And speaking of support, I have mentioned this many times- find a champion- someone who I like to call EF Hutton- when they speak, people listen. This could be a town elected official, but many times it's someone else who has significant influence in the community. This person can be critical to the success of any project. Start now and create a narrative for when you appear before the Select Board or Council and find a champion if you don't have one yet.

Explore the Criteria of Funding Opportunities

The Committees should look at each of the potential funding sources listed below to see if the criteria can be met by the community. Whether it's a cash match, or will only serve areas with minimal speeds, or a host of other eligibility requirements, many small communities are not used to the level of intensity required to successfully apply for a grant. Be prepared. Know what the

requirements are and start to assemble the needed documentation to give your community the best chance.

Advisory resources: Beyond Axiom, Peggy Schaffer, the Director of the ConnectME Authority can be a good resource for communities. She is one person- be mindful of that- and can be reached at Peggy.Schaffer@maine.gov.

Island Institute is also another great resource- Kendra Jo Grindle can be a great resource. As you get closer to implementation, she should be part of Committee discussions and a supporter of your efforts. She can be reached at kgrindle@islandinstitute.org

Grant Opportunities

The **ConnectMaine Authority** offers two types of grants- Infrastructure and Community Broadband Planning Grants. For the purposes of this report, the planning grant is not a consideration. We would recommend looking toward an Infrastructure grant, details can be found here: <http://maine.gov/connectme/grants/>

Axiom has extensive knowledge of these grants and have received many of these grants totaling over \$1M.

- ❖ Grant proposals must meet the state standard of 10/10Mbps
- ❖ Grant limits are suggested, but typically \$100,000, which must be matched 1 to 1 with a combination of cash and in-kind services
- ❖ Area targeted must be unserved or underserved (Service that is less than 25/3Mbps)

Typically grant is open for applications in the March- April timeframe, but is not clear this year when grants may be available.

**** A \$15M bond for Internet construction was passed in July. Those rules governing that grant program may be different than the ones currently used on past infrastructure grant submissions. You should follow these developments closely to understand the new requirements when they are announced ****

The **Maine Community Foundation** has regional grants that can support initiatives up to \$10,000 a year found here: <http://www.mainecef.org/GrantsNonprofits/AvailableGrantsDeadlines/CommunityBuildingGrantProgram.aspx>

- ❖ Grants available up to \$10,000
- ❖ Local decision makers by county
- ❖ Various criteria that needs review
- ❖ Deadline February 15th of each new year

The Foundation also has grants up to \$15,000 for Community Broadband related activities, the deadline just passed but details of requirements can be found here: <https://www.mainecef.org/apply-for-a-grant/available-grants-deadlines/community-broadband-grant-program/>

- ❖ Grant Awards up to \$15,000
- ❖ Typically, 10 awards every year
- ❖ Application deadline October 15th

Northern Border Regional Commission Grants located here: <http://www.nbrc.gov/>

The Commission accepts grant applications from across the northern border regions of Maine, New Hampshire, Vermont and New York.

- ❖ Requires at least a 1 to 1 cash match
- ❖ Must be tied to quantifiable job creation
- ❖ Very competitive

Contact: Andrea Smith at (207) 624-9813 or andrea.smith@maine.gov for information on deadlines and program parameters.

Grant Funding Resources- Federal

Federal Stimulus Package

Expected to pass before Christmas containing these provisions for Broadband.

- **\$3.2 billion** – Affordability: emergency funds for low-income families to access broadband through an FCC fund.
 - \$50 monthly emergency broadband benefit for low-income households and households where the recently unemployed reside, and \$75 monthly for eligible households on Tribal lands. This benefit will be available to those households in which one member qualifies for 1) the Federal Communications Commission’s Lifeline program; 2) Free and reduced-price lunch; 3) Pell grants; and 4) broadband providers' low income or COVID-19 programs.
 - In addition, households that include recently unemployed individuals will be eligible
- **\$1 billion** tribal broadband fund.
- **\$250 million** in FCC telehealth funding
- **\$65 million** to complete the FCC broadband maps in order for the government to effectively disperse funding to the areas that need it most.
- **\$2 billion** for ‘rip n replace’ to small telecommunication providers to rip out Huawei/ZTE equipment to replace it with secure equipment
- **\$300 million** grant program to fund broadband in rural areas (getting more details)

U.S. Department of Agriculture (USDA) has several potential programs that would fund Broadband expansion opportunities. The most important of these is the **Reconnect Program** which is now in its second round of funding. Details of the program can be found here:

<https://www.usda.gov/reconnect/program-overview>

We are anticipating a third round of \$550M available to be divided in three categories- 100% grant, 50/50 grant-loans and 100% loans. Each of these categories have slightly different criteria. This year Axiom was a significant contributor to two pending Reconnect applications.

- ❖ Extremely difficult to apply for with lots of different document and eligibility requirements
- ❖ Most importantly, only 10% of homes in the proposed service area can have the capability of getting service of 10/1Mbps or higher
- ❖ Even in the 100% grant, the municipality or applicant is required to have a 25% cash match

After looking through the program overview and other details, please contact Mark Ouellette, the author of this report, as he is familiar with this opportunity and can try to answer questions- mark@connectwithaxiom.com. Also available is the USDA Regional staff, Tim Brooks- timothy.brooks@usda.gov.

USDA-RUS Programs offer a number of other potential opportunities to investigate located here: <https://www.rd.usda.gov/programs-services/all-programs/telecom-programs>. By far the easiest is the Distance Learning and Telemedicine Grants.

U.S. Department of Commerce- **Economic Development Administration (EDA)** provides funding for economic development projects across the state of Maine. Maine projects are reviewed and administered by EDA's local representative, Alan Brigham at (215) 316-2965 or abrigham@eda.gov. Programs and eligibility can be found at www.eda.gov.

- ❖ Various funding programs
- ❖ Guidelines encourage regions to incorporate BB investments in their regional strategies (CEDs)
- ❖ Funding requires match

U.S. Department of Commerce- **Broadband USA** is helping communities nationwide ensure they have the broadband infrastructure, digitally literate workforce and engaged citizens to thrive in the Digital Economy. Details can be found here: <https://www2.ntia.doc.gov/>

- ❖ Provides direct (one-to-one) assistance to communities
- ❖ Resource rich website- no direct grants
- ❖ Building a self-assessment tool for community

Action items

- **Create talking points from this report**
 - A unified message
 - There will be negativity- be ready to answer alternative technology questions (what about low orbit satellite or 5G)- Illustrate the overwhelming benefits of fiber
 - Make sure that unserved areas are front and center (i.e., Cross Road)- not everyone is served the same
 - A state grant may help serve those unserved pockets, lowering the overall cost somewhat
 - Cost modeling has this project being 87% paid for by subscriber revenue generated in the Conservative Model, 100% paid for in the Best-Case Modeling
- **Expand the Broadband Committee**
 - Add key constituencies
 - School representative
 - Key Businessperson
 - Village or area residents from various regions of the community
 - Embark on a serious outreach campaign
- **Create a series of outreach opportunities for the public to provide feedback- and to communicate message**
 - How do they feel about their current service?
 - Would they be in favor of a new municipally owned system with significantly upgraded reliability and speeds?
 - Is this a priority over other town issues?
 - Is the report a call to action?

QUESTIONS ABOUT THE REPORT?

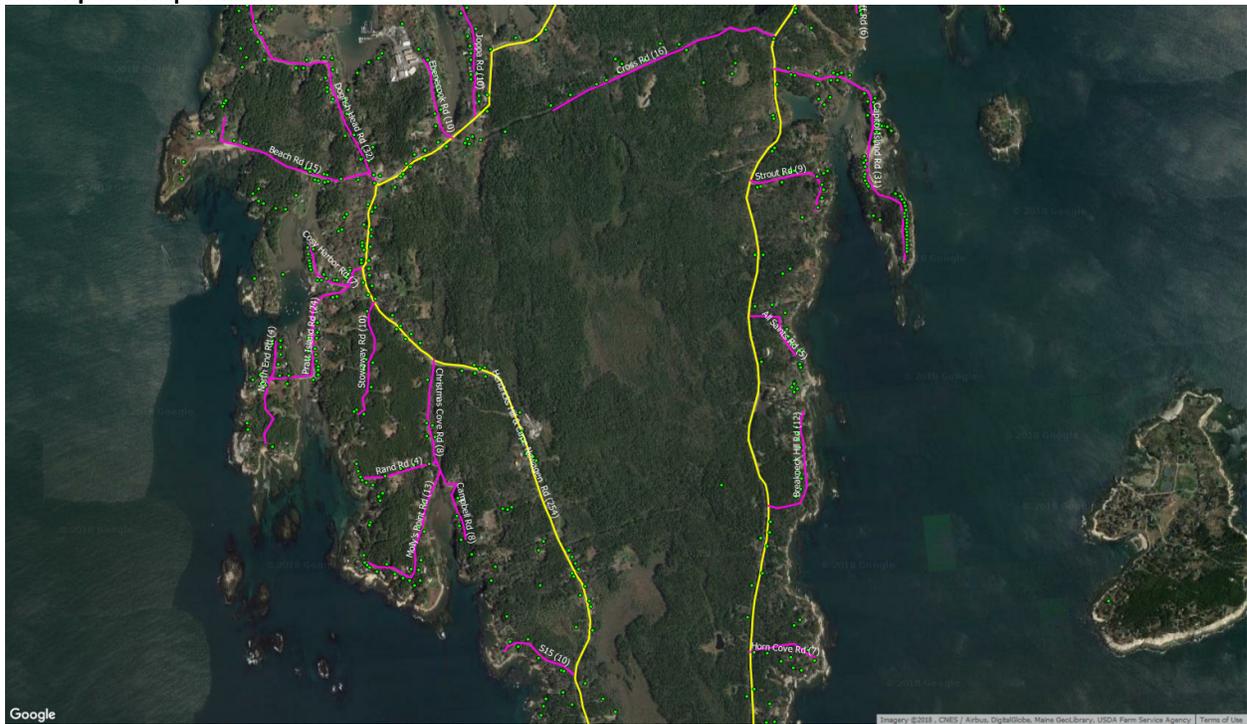
Mark Ouellette, President & CEO of Axiom Technologies- a full-service internet service provider and professional services company based in Machias. Please contact him on his mobile phone at (207)272-5617 or via email at mark@connectwithaxiom.com.

Maps

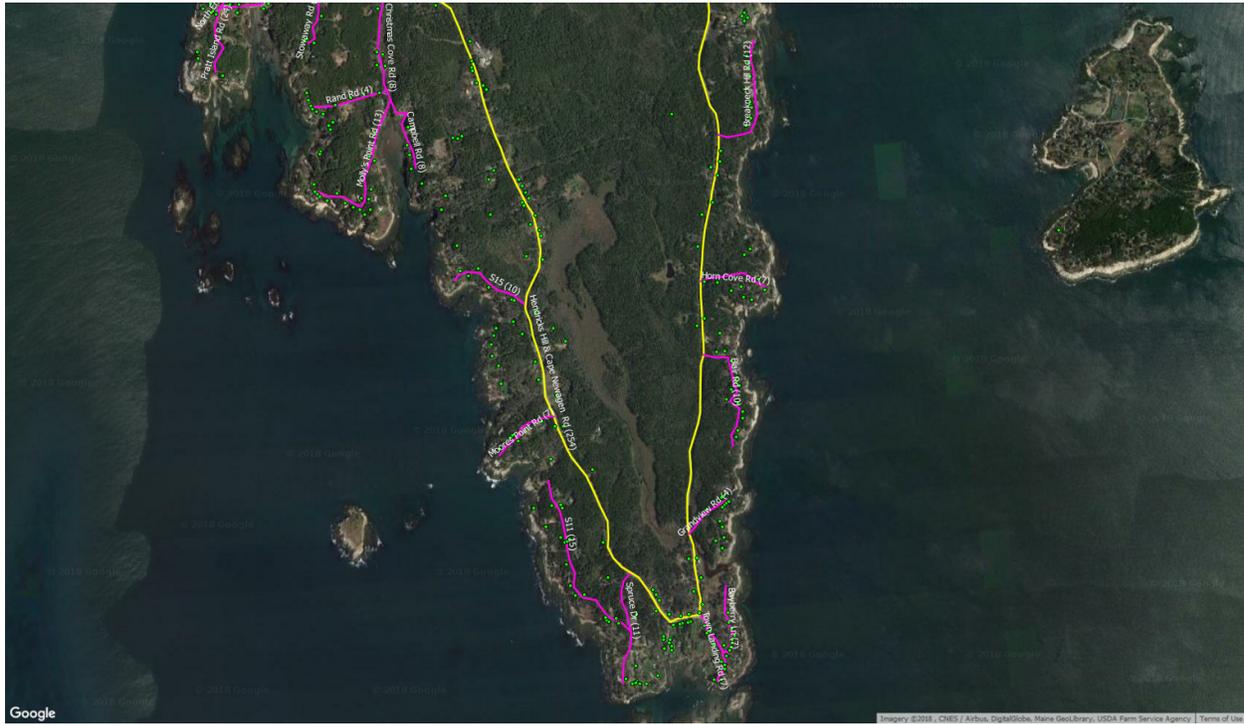
Southport Map-North



Southport Map-Middle



Southport Map- South



- **Green Dots** are 911 reported homes, businesses and structures
- **Yellow line** is trunk fiber
- **Pink line** is Drop Fiber on utility poles (less fiber strand count)