

Regional Technology Plan

Eastern Maine Development Corporation

Submitted by:

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Study Background and Structure

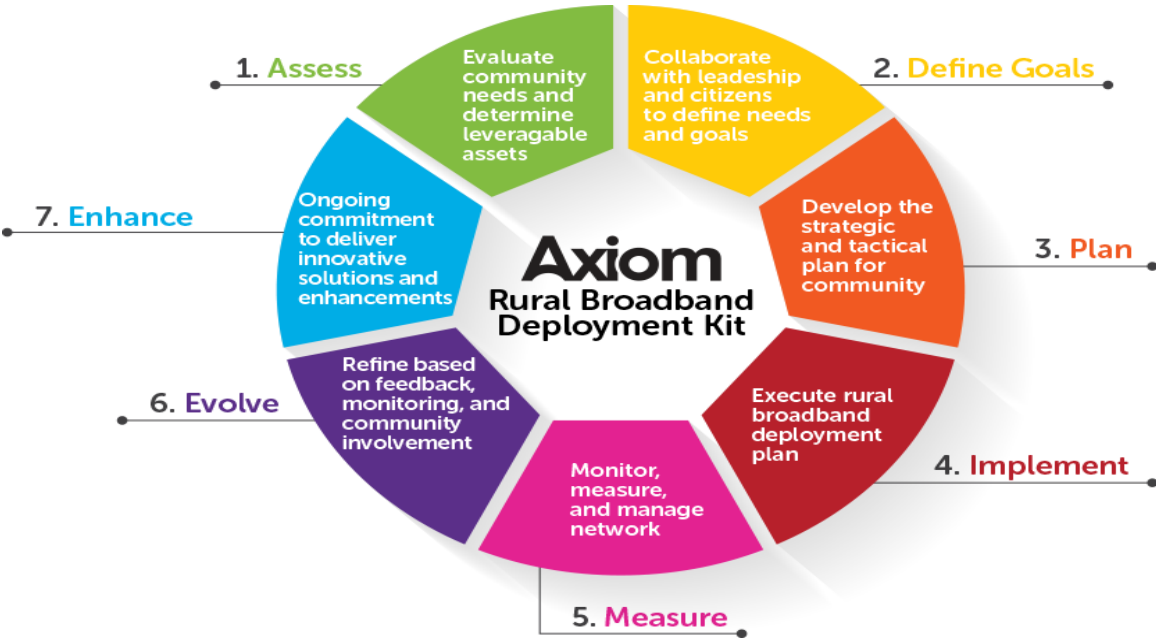
Eastern Maine Development Corporation (EMDC) has been working for several years on a *Re-Engineering the Region* process to help its service area expand economic and social opportunity to the people in the region. The roots of this work lay in a crisis and evolution from traditional manufacturing and paper mill jobs to a more service provider economy where those who were not ready, were in danger of being left behind or marginalized.

The *Re-Engineering* process brought together an impressive mix of local and regional officials, businesses and concerned citizens to help drive projects that will keep the region vibrant by identifying and acting on opportunities. One of the core opportunities that was identified was building a broadband infrastructure that would not only meet the needs of business, but also citizens who could be in a position to take advantage of a new economy that was reliant on broadband connectivity. It was envisioned that developing a pilot project that would create a template for other communities in the region to consider would be the best way to use limited resources.

A plan was developed to create a competitive opportunity for individual communities to apply. At the same time, Axiom was retained as EMDC's broadband planning partner to work closely with the four communities that were ultimately chosen.

This report will be broken down to specifically address each of the four communities chosen:

- Blue Hill
- Bucksport
- Greenbush
- Hampden



To create the plan we followed a Rural Broadband Deployment Kit that Axiom has developed to help regions move through the process of goal setting, decision-making and ultimately deployment. This report takes you through the first 3 steps and makes recommendations on how to approach implementation, Step #4 in our process. Steps #5-#7 are not part of this planning project and are used by Axiom if we are chosen to construct or operate a network deployment.

1. **Assess-** Evaluate community needs and assess assets

Before Axiom makes any recommendation to a community, we do a thorough investigation of the assets that are in the community that could be leveraged.

 - Meetings with current service providers to determine if these assets can be leveraged
 - Investigation of current broadband infrastructure
 - Location of fiber-optics
 - Locations of towers that might serve the community with wireless technology
 - Review of any community barriers
 - Right of way laws
 - Moratoriums or height restrictions

2. **Define Goals-** Collaborate with leadership and citizens to define needs and goals

Through a series of meetings with community, business and civic organization leaders as well as strong community input, define what the community specifically wants to achieve and begin to outline roadmap to achieve goals.

 - Engage the Broadband Committee made up of diverse group of town/city/regional officials and community leaders
 - Reach out to community with a survey to understand community concerns, cost of current service and where service gaps are present
 - Business surveys and meetings- work with Broadband group to identify key businesses for interviews and identify larger list of businesses through Chamber or other organizations to send a business specific survey

3. **Plan-** Develop the strategic and tactical plan for the community

Once goals are defined, develop a gap analysis that describes what the community has for existing assets that can be leveraged, articulates the goals of the community and defines what needs to occur to reach their goal through a step-by-step roadmap that can become part of a communities' Comprehensive Plan.

 - Develop gap analysis
 - Road map that can be implemented over time in phases, or all at once
 - Identify resources to help community be ready for implementation
 - Discuss private-public partnerships and other implementation models

4. **Implementation-** Our planning model provides a roadmap to implementation and works with the region to help them weigh their options for deployment by focusing on Public-Private partnership strategies that include:
 - Revenue Sharing models
 - Shared risk and responsibilities
 - Recognizing and eliminating deployment obstacles
 - Strong, ongoing participation by communities

Executive Summary

Axiom and EMDC worked extensively with each of the four communities to assess their assets and set concrete goals that could be implemented. Because of their diversity, each of them brought unique opportunities and challenges to the planning process- below is a summary of what we found and what we recommended. The details of these plans can be found in each of the sections specifically dedicated to each of the four communities.

Blue Hill

Key findings:

- ✓ **Work with your current provider**
- ✓ **Leverage Franchise Agreement renewal**
- ✓ **Digital Inclusion- Aging in Place**

Summary:

Blue Hill has two main service providers, FairPoint Communications (recently bought by Consolidated Communications) and Spectrum (formally Time Warner Cable). Together, they cover well over 90% of the town. However, there are small pockets that are unserved or poorly served. Our plan gives the town the opportunity, during the franchise negotiations with Spectrum, to help the town articulate specific areas of concern that meet the minimum threshold for service expansion that could be addressed during the franchise renewal negotiations.

As part of the planning process, Axiom identified four possible areas that Spectrum might consider expanding its service. Each of the areas met the threshold for investment that Spectrum has identified- clusters of 20 homes per mile. In addition, Axiom would recommend that Blue Hill consider a robust Digital Inclusion program focused on their older population. With a median age of 49.9, shaping something that meets the unique needs of its older citizens should be a top priority of their approach to better broadband connectivity. Funding sources should be available to help with both the physical expansion of connectivity and helping older citizens age in place.

Bucksport

Key Findings:

- ✓ **Build on the appeal of the downtown/waterfront**
- ✓ **Help diversify economy by creating Gigabyte Industrial Park**
- ✓ **Extend fiber into downtown**
- ✓ **Digital Inclusion- Build on tourism attraction**

Bucksport appeal is evident, and the Broadband Committee wants to build on that attractiveness. It sits at the crossroads of the Three Ring Binder, giving it access to unlimited fiber optic speeds and reliability, has significant internet carrier coverage now and a beautiful downtown and waterfront area to build on. While significantly affected by the shutdown of the Verso Mill that sits at one end of the Main Street, even that economic concern seems to be viewed as an opportunity to create a new

identity. By enhancing downtown attraction amenities, visitors should find more reasons to stay in Bucksport. A relatively low-cost plan to line the waterfront with free Wi-Fi access will help enhance Bucksport's revitalization efforts, for relatively low-cost and low-risk. Coupled with an Industrial Park upgrade to fiber optics, and we believe Bucksport will begin to see its efforts to attract both businesses and downtown revitalization realized. In addition, we have provided the cost of extending fiber across the downtown, to give the community additional options to start to helping downtown business attraction and the possibility of expanding into more residential areas, when resources become available. Last, Digital Literacy efforts should focus on trainings for businesses with a focus on tourism and fits well with the economic development efforts of the community.

Greenbush

Key Findings:

- ✓ **Work with OTT to invest A-CAM FCC money into eligible areas**
- ✓ **Connect Fire Station and other municipal assets to fiber**
- ✓ **Digital Inclusion- Invest in a Business Center with high-capacity internet access**

Greenbush options for expanded service are dictated by their size and location. However, because they are eligible for FCC subsidized improvements, service and speed upgrades are achievable. Currently, FairPoint Communications has upgraded the two remote terminals that service a portion of the town. These upgrades will support bonded speeds of up to 25Mbps in limited areas and 10Mbps service in the more remote locations of their service area in the town. In addition, OTT has indicated that the portion of town that they serve is eligible for A-CAM (Alternative Connect America Cost Model), which is an offshoot of the FCC CAF (Connect America Fund) that FairPoint used to upgrade their service in Greenbush. Because OTT has up to 10 years to build out services in Greenbush, the objective would be enhance the community's opportunity to receive the OTT upgrade sooner rather than later.

In addition to the possibility of upgraded fiber service through OTT and the A-CAM program, it's important that the town work toward upgrading services at its municipal building and the fire station. By upgrading to fiber, these locations would be able to provide a Business Center (at the municipal office) and upgraded interoperability (at the fire station). Upgrading service at the town offices would provide a significant opportunity to establish a recognized and comfortable location with high-capacity service that can help small businesses grow and bridge the Digital Divide for families and individuals in the community.

Hampden

Key Findings:

- ✓ **Concentrate on service to underserved or unserved areas of town**
- ✓ **Work on expanded service through the renegotiated franchise agreement with Spectrum**
- ✓ **Limited Fiber to the Premise Plan**
- ✓ **Digital Inclusion- Focus on business community**

Hampden has always been an attractive residential community for greater Bangor, however residential service lacks in certain areas and residents of those areas would appreciate some concentration on service expansion that would allow for better reliability and speeds. In addition, the town has had a significant uptick in business development opportunities, as Bangor's commercial and industrial market has become scarcer. Ensuring that the business community is well connected, or has opportunity to connect is also a top priority. Ultimately, the town would benefit has a whole with fiber service to both the business and residential clientele, but because the town is currently served by TDS and, in a small area, by FairPoint Communications, it would be difficult to attract another provider to offer such a service without a significant subsidy to reduce risks. Our plan would be to strategically invest in fiber optics to reduce that risk and cost, and act as a beginning of the community taking control over an ever-increasing necessity to 21st century life- high-speed broadband. In addition to the work on enhanced broadband capability, a focused effort on helping businesses with resources in the form of customized classes and workforce development tools will help the community reach its goals.

Conclusion

EMDC's goal to fund broadband planning in four different, diverse communities within its service area provided for different goals and models to expand broadband connectivity and this report should be seen as an opportunity for others to consider how some or all of these recommendations might be implemented in other like communities.

Some of the opportunities identified:

- ❖ Build upon a franchise agreement negotiation
- ❖ Identify specific areas of concern and work with the local provider to expand service
- ❖ Build fiber through an industrial park to attract new business opportunities
- ❖ Enhance your downtown with strategic investment in Public HotSpots
- ❖ Invest in a Business Center/High Speed internet access
- ❖ Enhance Municipal service centers by investing in fiber connections
- ❖ Create a Fiber to the Premises plan that can be built out strategically over time

As part of our plan we also include a section on Digital Inclusion tailored to each community. A Digital Inclusion plan allows for access and educational investments to be made strategically and affectively to help bridge the Digital Divide. When businesses or citizens learn new skills or barriers are reduced to help people get connected, the whole community benefits. The plan will allow the four communities to invest directly in its people's future. A Digital Inclusion Plan includes these four elements:

- Public Access to Computers
- Subsidized or reduced cost Internet
- Low cost computers
- Digital Literacy

The Steps

Step 1: Assess

Axiom assembled and spoke with a number of providers that provided service in each of the communities to discuss their current operational footprint, what service levels they provided and what plans, if any they might have for the region.

The providers we spoke with included:

- FairPoint Communications (soon to be Consolidated Communications)
- Charter Communications/Spectrum (formally Time Warner Cable)
- TDS
- OTT
- Premium Choice Broadband

FairPoint Communications (FPC) is the largest provider of Internet and phone services across the region and the state. They offer a variety of home and business solutions at different price points and speeds. Because they are copper to the home or business, their speeds are typically limited by the distance from their equipment that is located in what they call a central office (it's not really an office, just a place where their equipment is located) or a remote terminal (a smaller box on the side of the road), typically approximately 3 miles from the central office that pushes the signal beyond the 3 mile limit to more remote coverage areas. FPC is in the midst of upgrading a number of facilities in the area that will allow speeds of up to 25Mbps within a mile or so of these connection points and up to 10Mbps as you get closer to the 3-mile limit of the technology. These upgrades are a substantial increase in speeds that FPC was previously unable to achieve.

In addition to the upgraded service in many parts of the region, FPC also offers what they call Carrier Ethernet Service; this is a product that delivers up to 10Gigs of service (1 Gigabyte= 1000Mbps) through a direct fiber connection. This type of service is reserved to businesses requiring this type of connection and the fiber that FPC has (and it is extensive) is not used for residential service. CES costs are priced on a competitive, case-by-case basis and vary depending on a number of factors and are difficult to estimate.

Charter Communications/Spectrum is the cable provider and serves a number of communities and in the communities it has service, generally covers the majority of town but not all. They are open and interested in expanding service by working with communities that meet their deployment revenue numbers or applying for ConnectME grants that helps expand Spectrum service to unserved areas. Because Charter Communications is a cable company first, they deliver their signal to the home through coax cable that can deliver higher speed internet, as well as video and phone from longer distances. Charter Communications has recently upgraded its system and will offer only two packages to customers, a 60/5Mbps connection and a 100/10Mbps for \$64.95 and \$104.95 a month respectively. Charter Communications will also be rolling out a low cost option for families on reduced lunch programs or receive Supplemental Security Income (SSI) that will offer a 30/5 connection for \$14.95 a month.

OTT is a diverse company with its roots based on copper-based telephone services that serve a variety of rural communities across Maine. Over time, OTT has evolved into a full service telecommunications company offering fiber optic service to businesses, wholesale Carrier Grade and Transport Services and a number of other business solutions. They typically offer “bundled” services that include both phone and internet, where feasible. Packages can vary but generally fall into the \$59.95- \$99.95/ per month for phone and internet combined.

Premium Choice Broadband is a rural broadband carrier that primarily delivers service via microwave link that allows them to broadcast a signal (internet) to homes in the area that can accept that signal through a receiver mounted to the home. Premium Choice Broadband typically offers enhanced service for customers that have line-of sight (can see the tower that is broadcasting the signal) of up to 10Mbps. For non-line-of-sight customers, a typical connection might be 3Mbps or less with pricing starting at \$49.95 to \$103.95 a month. The majority of their packages limit your usage by restricting the amount of bandwidth you can use in a month. However, Premium Choice Broadband serves customers in difficult to reach areas where coverage would be challenging or non-existent but for a wireless connection. Premium Choice Broadband typically works in areas and with partners by applying for ConnectME grants or other money that can help defray the cost of deploying equipment in a new or expanded coverage area.

TDS is a national telephone company that offers services in a limited number of communities in Maine. Beyond telephone service they also bundle high-speed internet at competitive prices based on the customer service location. TDS delivers its service through traditional copper lines (DSL), but does have service up to 50Mbps in select communities where upgrades have been completed. They do offer fiber optic service in some places. Pricing varies based on promotions and availability but generally are between \$29.95 and \$59.95 for 8-15Mbps.

Step 2: Goals

Each of the four communities built a Broadband Committee, met with their current internet service providers and developed concrete goals for moving forward. Many of the goals articulated in this report are achievable in the short-term or over time and identifying funding sources should be a top priority of the Committees, with EMDC and Axiom assisting on applying for those funds to help them move their process forward to Step #4- Implementation.

Step 3: The Plan

All of our work has focused on developing achievable plans that can be implemented. In each of the sections, specific to each of the communities, detailed plans are presented to help the communities move forward and inspire them to move toward implementation, Step #4 in Axiom’s Rural Deployment Broadband Kit.

Step 4: Implement

Axiom is well versed in developing and implementing public-private strategies, Susan Corbett, Axiom's CEO and Mark Ouellette, Axiom's President have written and attracted millions of federal, state, local and foundation dollars for projects and are committed to assisting with grant proposal strategy, advice and project development.

We also believe that it is important that we provide our experience in helping communities and regions take back control of their own destiny and help give them a strong voice through Axiom's innovative approach to public-private partnerships in our network deployments. As the Broadband Committee in each of the communities engaged providers, Axiom provided insight and assistance to help Broadband Committees understand current and potential issues that providers are concerned with and how to overcome barriers to deployment.

- Revenue Sharing models
- Building a technology Fund for future needs
- Clearing obstacles to deployment
- Measure Progress and User Experience

Axiom also has experience with local investors and business sponsors to provide match for community broadband expansion or Community Hotspots. In the end, it's going to take leadership, community partners, current and potential broadband providers, a variety of funding sources and new agreement possibilities, all working in harmony to develop and implement a Regional Broadband Initiative, that not only serves the four communities highlighted in this report, but a true regional approach.

Community Plan: Blue Hill

Key findings:

- ✓ **Work with your current provider**
- ✓ **Leverage Franchise Agreement renewal**
- ✓ **Digital Inclusion- Aging in Place**

As part of the planning process, Blue Hill received significant input from citizens through a survey that was distributed to every household in the community. Below are highlights that helped inform the Broadband Committee and the planning process.

107 responses were received

60% of respondents reported FairPoint Communications as their internet carrier

20% of respondents Spectrum

A smattering of cellular hotspots, satellite service or Premium Choice made up the balance

Over 70% said they were not happy with their service, however over 60% said they were not interested in paying more

Over 50% said they worked from home, and 24% said they telecommuted; meaning worked from home the majority of the time.

48% believe that more people would live in Blue Hill if there were better service

Comments:

Spectrum will bring internet to my house for \$4000... need I say more

I like the idea of a co-working facility and/or a maker-space with shared equipment like 3D printers, cutters, welders and other small-scale production tools

I would get more and longer visits from my son if we had reasonable internet

Want free Wi-Fi internet all over town center

Take Away from the community survey:

We believe that Blue Hill's issues are related to its uneven coverage. While the majority of the community does have internet coverage, in certain locations it is disappointing. Those who were most frustrated, likely came from those underserved areas. There is a fairly strong commitment from these results to move projects forward that can help the community get better connected, however, there is a significant undercurrent that pricing is an issue and unsurprisingly, many believe they are paying enough already and might not be ready for a new offering that taxes their out of pocket monthly expenses. The survey was helpful in understanding what the appetite might be for expand services. Our suggestions directly track with low risk solutions that reduce risk, yet helps the community work on projects that help meet the goals of the committee.

Blue Hill has two main service providers that together cover over 95% of the town. Below is a synopsis of our meetings with each of them and our recommendations to work with them to expand service.

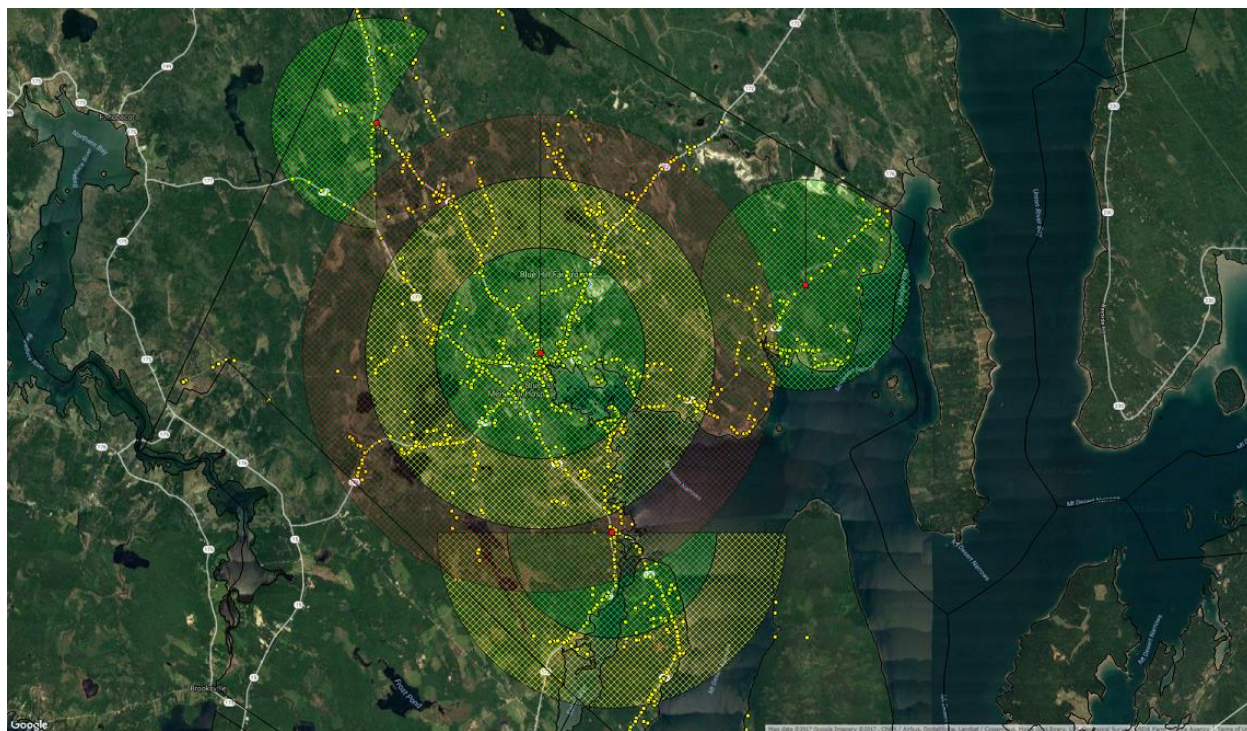
FairPoint

In our meeting with FairPoint, information was provided about recent upgrades to the town of Blue Hill along with their plans for upgrades that are currently being constructed (and could be completed by the time this report is presented to the town and state). The recent upgrades include the Central Office (CO) on High Street, a remote terminal on the Morgan Bay Road in East Blue Hill and a remote terminal along the Salt Pond Road in southern Blue Hill. The one remaining terminal that FairPoint has started construction on, but has not finalized yet is located in the northwest along Pleasant Street.

The upgrades will allow FairPoint to offer bonded DSL. This technology allows customers to receive up to double their current bandwidth. In order for this technology to be effective it requires two phone lines and a special DSL modem to function properly.

Recommendation:

Because FairPoint has built out their current coverage area in Blue Hill, there are no recommendations at this time that can enhance FairPoint service beyond the upgrades that have already been achieved. Please see map for detailed current coverage areas.



FairPoint Coverage Map

When looking at the FairPoint coverage map each 'circle' represents a location of where FairPoint's equipment is located. This is important because the equipment location, and the direction of the DSL lines determines what service levels are available. The Central Office (location of most of major equipment, usually in a cement building) or a remote terminal (equipment boxes located roadside, typically 3 miles from the Central Office) are red dots. The yellow dots are E911 locations of homes and businesses.

- ❖ Green= Speeds of up to 25 Mbps
- ❖ Yellow= Speeds up to 15 Mbps
- ❖ Red= Speeds up to 10 Mbps

Keep in mind that these colored circles are rough approximations of coverage areas and bandwidth speeds and specific location speeds are determined on a case-by-case basis. However, we are confident that this map is a reasonably accurate portrait of FairPoint service in Blue Hill. The good news is that FairPoint has invested in Blue Hill to increase speeds, however, it also means additional support or partnership with FairPoint is very likely not something to consider.

Spectrum

With the merger between Time Warner Cable and Charter Communications; the broadband plans previously offered through Time Warner have changed considerably. With a minimum plan offering of 60M/5M and an upgraded plan of 100M/10M these two plans offer a significant increase in service offering over their existing network. In addition, unlike most other providers, Spectrum offers cable television and phone, a true triple play that now has exceptional internet speeds to each and every residential home in its coverage area.

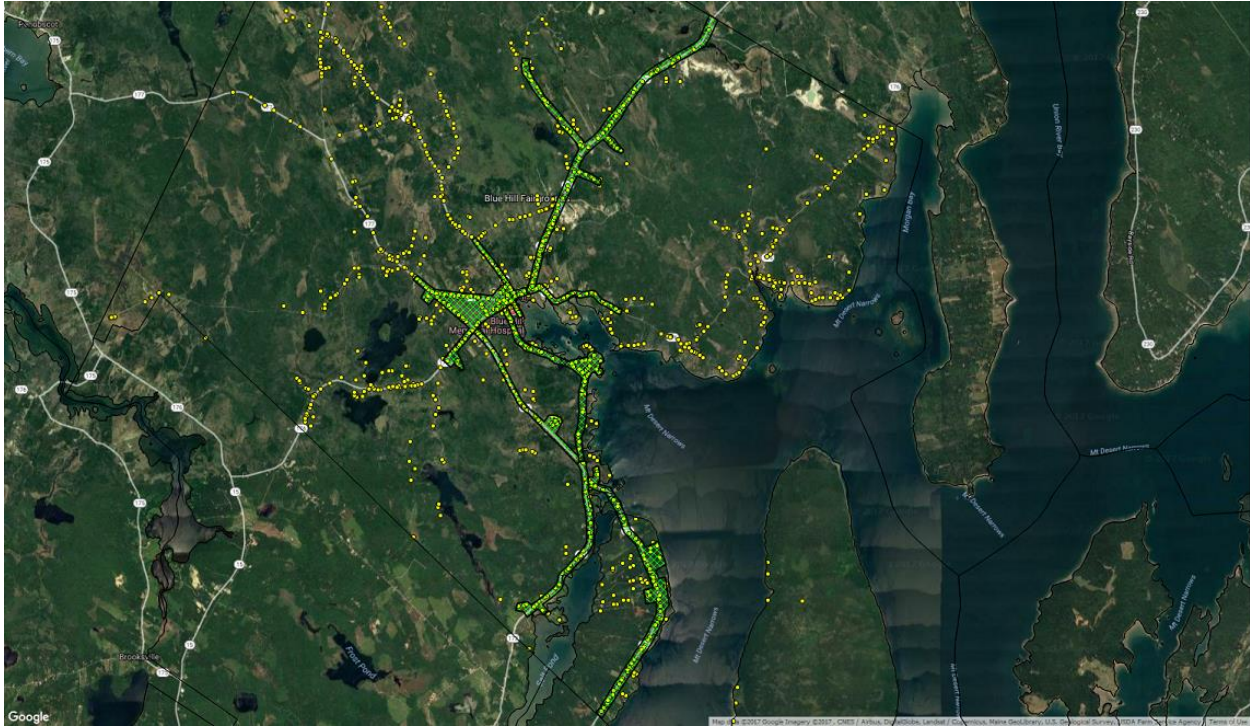
When looking at the coverage map, the green shaded areas show the potential areas that Spectrum can cover. It is clear that Spectrum primarily covers the central Blue Hill area as well as portions of the north and south with no coverage to the east or west.

Recommendation:

During the meeting with the Spectrum representative, their guideline in expanding services to an area was that they need a minimum of 20-25 servable homes per mile of road. Taking this information into consideration we've come up with the following recommendations for possible expansions of the Spectrum service.

- Expansion #1- Hinckley Ridge Road
- Expansion #2- Mines Road to town boarder
- Expansion #3- Pleasant Street extension
- Expansion #4- Mountain Road connector

Maps and explanations on following pages.



Spectrum Coverage Map

Spectrum, formally known as Time Warner Cable, provided the group with a very basic coverage map based on the streets that they have cable service. From this we were able to provide an expanded map based on known distances that they typically cover from their main trunk line. Because of the proprietary nature of service maps, we were able to extrapolate current service coverage areas, but this map most likely will not accurately depict service right down to the E911 addresses on the map and is intended to give a generally accurate view of the Spectrum coverage area.

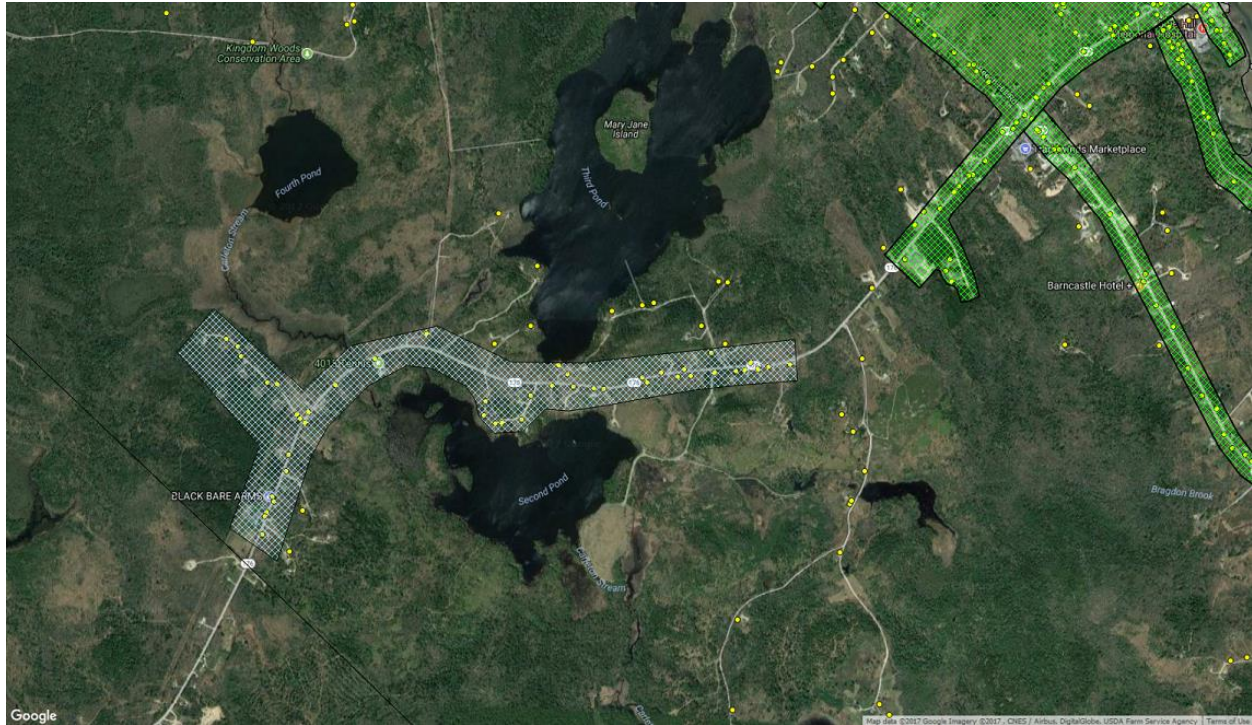
- ❖ **Green lines and shaded areas are streets with Spectrum service**



Spectrum Expansion Plan #1

This plan extends service up the Hinckley Ridge Road while also branching off onto Kingdom Road and Mattson Lane. The total area covered is within 1.5 miles and can reach approximately 33 addresses based on 911 location data.

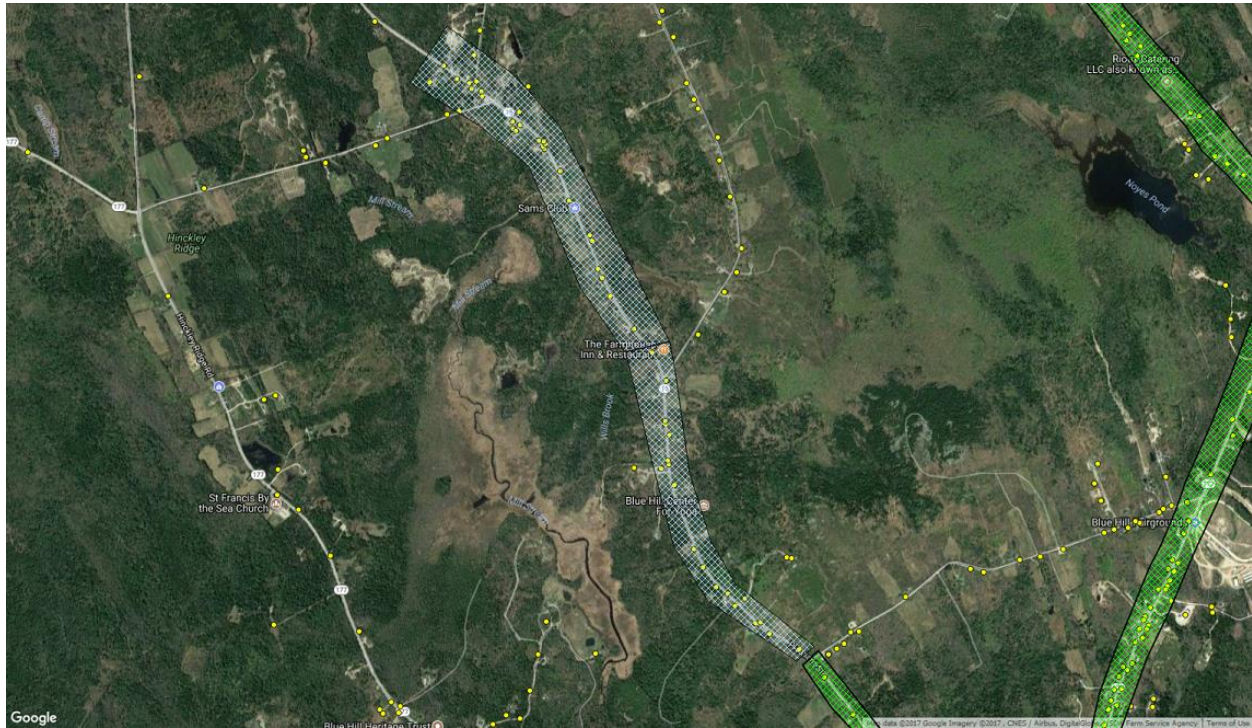
- ❖ Expansion area in gray



Spectrum Expansion Plan #2

This plan extends service along Mines Rd to the town border. In order to reach the number of homes that would meet the Spectrum threshold for build out, there is approximately 0.4 mile gap between the current Spectrum coverage (green) and the expansion (gray). In order to bridge this gap, there will need to be some agreement between the town and Spectrum to build out that gap in order to provide service to the remaining 2 miles of road that can reach approximately 50+ structures.

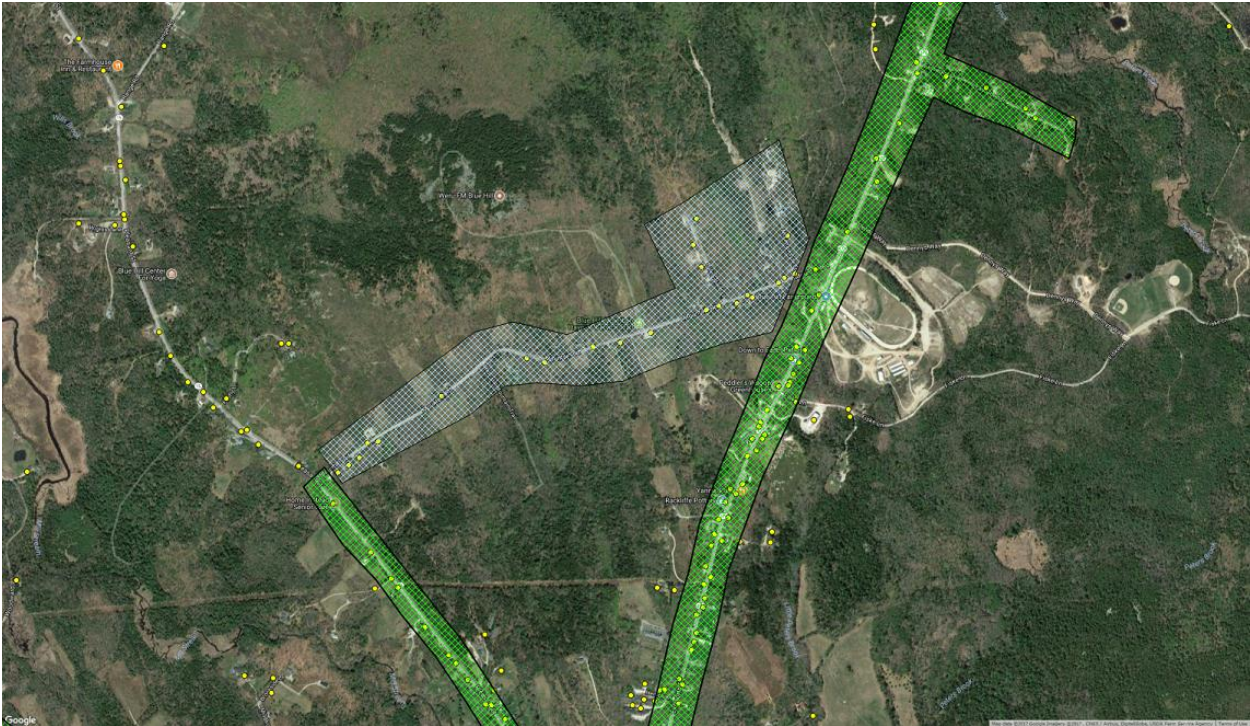
- ❖ Expansion area in gray



Spectrum Expansion Plan #3

Plan 3 extends service beyond Spectrum's existing service along Pleasant Street, extending the line an additional 2 miles to reach approximately 50+ structures based on the 911 data.

- ❖ Expansion area in gray



Spectrum Expansion Plan #4

Expansion #4 does not technically reach the number of homes required for expansion; however, its location might make it less expensive and therefore attractive to Spectrum to consider. The expansion incorporates the entirety of Mountain Rd including Billingsfield and Mountainside Lanes. This is 1.1 miles worth of road including the two side roads has the potential to serve fewer than 20 structures.

- ❖ Expansion area in gray

Approach:

Axiom would suggest working closely with Spectrum to update your franchise agreement, which is long out of date. Below is a synopsis of a memo with itemized list of possible asks of Spectrum for Blue Hill to consider. In Blue Hill's case, we would suggest presenting these expansion options as part of your overall negotiation with them. If the town would prefer, you could also hire someone to help you with the Franchise negotiation, Sewell Company offers this service.

Understanding what towns can and cannot ask for when negotiating franchise agreements:

Can do	Cannot Do
<i>Can require specific cable system capacity and functionality</i>	<i>Cannot require a specific transmission technology</i>
<i>Can require support of PEG (Public, Educational and Government) access through facilities, equipment and channels.</i>	<i>Cannot specify which channels are or are not carried and cannot specify which channels are on which tier of service (other than PEG service)</i>
<i>Can establish customer service standards, including ones related to answering telephone calls, responses to complaints, and imposing of late fees.</i>	<i>Cannot regulate rates (other than lowest cost tier of service)</i>
<i>Through an enabling ordinance can require a specific definition of gross revenue</i>	<i>Cannot require franchise fees of more than 5% of gross revenue, as defined in the franchise agreement</i>
<i>Can regulate the video portion of services offered</i>	<i>Cannot regulate any voice (telephone) services</i>
<i>Can require construction of an Institutional Network (I-Net) linking schools, libraries and public buildings for voice, video and data communications</i>	<i>Cannot grant an exclusive franchise</i>
<i>For the public access channel, can require a specific location</i>	<i>Cannot regulate data services, including Internet services</i>
<i>When a cable company does construction in public rights of way, can specify that it must do so in a manner that does not disrupt those rights of way unreasonably.</i>	

The State of Maine created a Model Franchise Agreement that you can access at:

<http://www.maine.gov/connectme/about/modelcable.shtml>

Conclusion/Action items

Working with Spectrum to expand service has several advantages:

- Allows you to explore connecting and enhancing the Franchise Agreement with prospective new service
 - Gives the community concrete asks of Spectrum

- Potential opportunity to partner and apply for ConnectME Authority infrastructure grants in 2018
 - Helps town understand Spectrum pricing to expand service and possibly go to town meeting with a proposal
 - Opportunity to partner and cost share build outs
- In addition, the new Spectrum offerings of 60Mbps or 100Mbps service levels are robust enough to satisfy heavy users or home with multiple devices
 - Last, potential to significantly reduce risk by partnering with a known company whose offerings are fully understood

Work on funding a Digital Inclusion/Literacy Program for your older population:

- Median age of Blue Hill resident- 49.9 years old
- Barriers to connectivity and usage are greater with older population
- Enrich lives by opening up world of internet with specific programs targeted to them
- Potential to drive take rate or enhanced service demand

Community Plan: Bucksport

Key Findings:

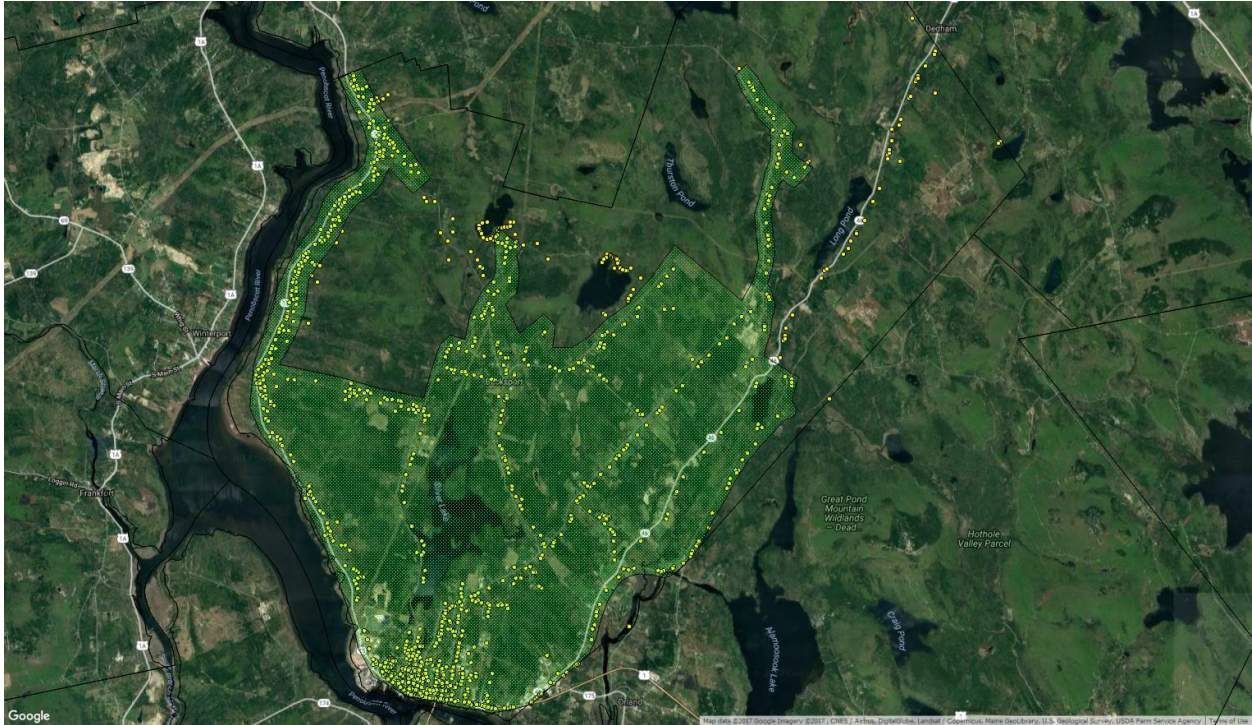
- ✓ **Build on the appeal of the downtown/waterfront**
- ✓ **Help diversify economy by creating Gigabyte Industrial Park**
- ✓ **Extend fiber into the downtown**
- ✓ **Digital Inclusion- Build on tourism**

Bucksport has a robust Broadband Committee that has been fully engaged since the beginning of this planning project and articulated several goals associated with the closing of the Verso Mill and how to move the community forward economically. Let's be clear- Bucksport has a lot going for it and we were immediately struck by the appeal of Main Street and the river walk and marina that sits on the backside of Main Street overlooking Fort Knox and the Penobscot Narrows Bridge. Because this is a scenic area with tourism opportunities, we believe a tourism focused Digital Inclusion Plan would tailor program offerings to enhance this part of the Bucksport economy.

Bucksport's two main broadband carriers are FairPoint Communications and Spectrum. Much of Bucksport has considerable overlap between the two providers but there are some locations where each respective provider is the only coverage option and some limited locations with little to no coverage at all.

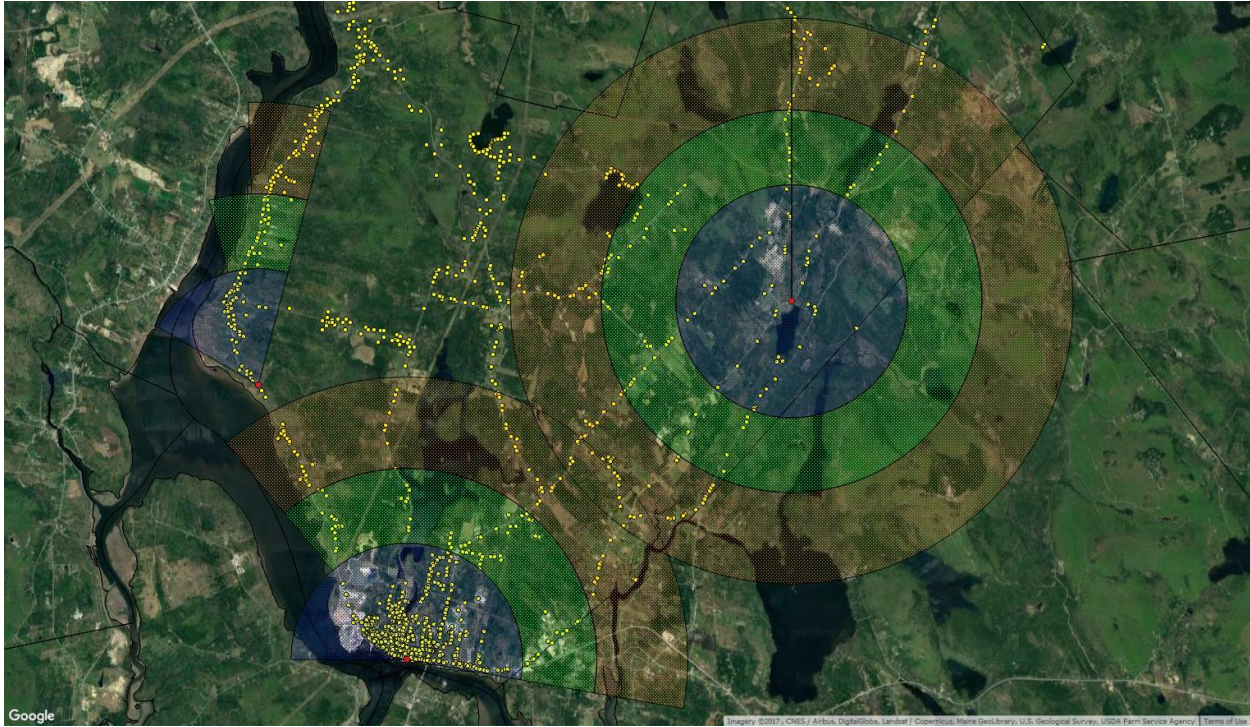
FairPoint Communications operates out of a central office in Bucksport with several remote terminals that extend the DSL service out to some of the furthest locations in town. According to our most recent discussion with FairPoint, nearly all of the terminals either have been upgraded to their latest offering, or are in the process of being upgraded. These upgrades will allow for the maximum bandwidth offering available with the current technology, which is 25Mbps download and 2Mbps upload using bonded DSL. One notable area that was mentioned in meetings with FairPoint was their lack of coverage around the Silver Lake Rd. and the William's Pond Rd. area. As can be seen from the map on the following page, the above-mentioned area is located between several remote terminals and is effectively outside of FairPoint's current service area. The Bandwidth rates mentioned above are primarily for residential services, businesses and other organizations can request higher bandwidth packages under their BBE and CES (fiber optic) solutions which would connect off of their fiber network and are typically negotiated on a case by case basis.

Spectrum operates throughout a large portion of Bucksport with only a small area of the north and northeast not being covered. Spectrum has performed upgrades throughout their Maine network and has significantly upgraded their offerings to two broadband packages, with their lowest residential package offering 60Mbps down and 5Mbps up and their upper end package offering 100Mbps down and 10Mbps up. Consumers who already have their service through Time Warner will remain at their current speeds unless they call and request an upgrade. These rates are for residential and small business. Larger businesses and organizations who might need a higher upload capacity can request fiber service from Spectrum and could potentially get up to a Gigabit of service or more if there is need.



Spectrum Coverage Map

The map provided shows a broad coverage area but in reality, Spectrum will only install to locations within a certain distance from their trunk lines, leaving some in their coverage without an option for Spectrum service.



FairPoint Coverage Map

When looking at the FairPoint coverage map each 'circle' represents a location of where FairPoint's equipment is located. This is important because the equipment location, and the direction of the DSL lines determines what service levels are available. The Central Office (location of most of major equipment, usually in a cement building) or a remote terminal (equipment boxes located roadside, typically 3 miles from the Central Office) are depicted as red dots. The yellow dots are E911 locations of homes and businesses.

- ❖ Blue= Speeds of up to 25 Mbps
- ❖ Green= Speeds up to 15 Mbps
- ❖ Orange= Speeds up to 10 Mbps

Keep in mind that these colored circles are rough approximations of coverage areas and bandwidth speeds and specific location speeds are determined on a case-by-case basis. However, we are confident that this map is a reasonably accurate portrait of FairPoint service in Bucksport.

Carrier Conclusion

FairPoint:

FairPoint has performed many of the upgrades that have been planned for in Bucksport utilizing Federal CAF II funding. These improvements include expanding their trunk fiber to their remote terminals as well as upgrading the electronics in each terminal allowing increased single line DSL speeds of up to 15Mbps as well as bonded DSL speeds up to 25Mbps.

Due to the limitations in how far a DSL signal can be pushed it still leaves a few areas within Bucksport's footprint where some homes and businesses are left with service at 3Mbps or less.

With the merger of FairPoint and Consolidated Communications there is a potential for more upgrades to occur as Consolidated has agreed to invest \$52.2 million into Maine's network and facilities with a focus on "building out their broadband network and upgrading network speeds."

If the town were to consider working closely with FairPoint to expand speed and service offerings, you might consider approaching them with a proposal to help the community's more underserved outskirts see improvements. This might involve adding a RT (remote terminal), which they would quote at approximately \$70,000 to help cover those problem areas much better.

Spectrum:

Spectrum has already performed upgrades to their network, which has increased service speeds to nearly all of the locations that reside along their cable route. In regards to expanding their service areas, Spectrum has stated that they have no current plans to expand service and is focusing primarily on increasing the quantity of the service to areas they are already deployed in. This in no way indicates that Spectrum will not expand services in an area but will require proper justification and ROI/funding in order to consider an area for new service, typically 20-25 homes per mile.

Both Spectrum and FairPoint have partnered with communities to apply for State of Maine ConnectME infrastructure grant money to expand service. Given the relatively good coverage in Bucksport and the recent upgrades by both companies, a compelling case would need to be made to attract future investments by either of these companies, even with grant funding expected to be available in 2018.

Approach and Plan

We agree that the committee was correct to focus on an economic revival given the closing of the Verso paper mill and the loss of a significant tax and job contributor to the community and the region. Early on in the process, a discussion around the mill redevelopment and the need for fiber optics was discussed. However, the current owner is moving ahead with plans to rehabilitate the site and with fiber located at the entrance to the mill site, it was determined that there was no need to plan for fiber optics, as it would be at the behest of the current owner to request such service and have it brought into the site as needed.

Three other important projects did emerge from our planning:

- Creating a high capacity industrial park with a level of internet service that attracts tenants
- Extending fiber down Main Street
- Creating a tourism/visitor experience on the waterfront and marina with Wi-Fi HotSpots



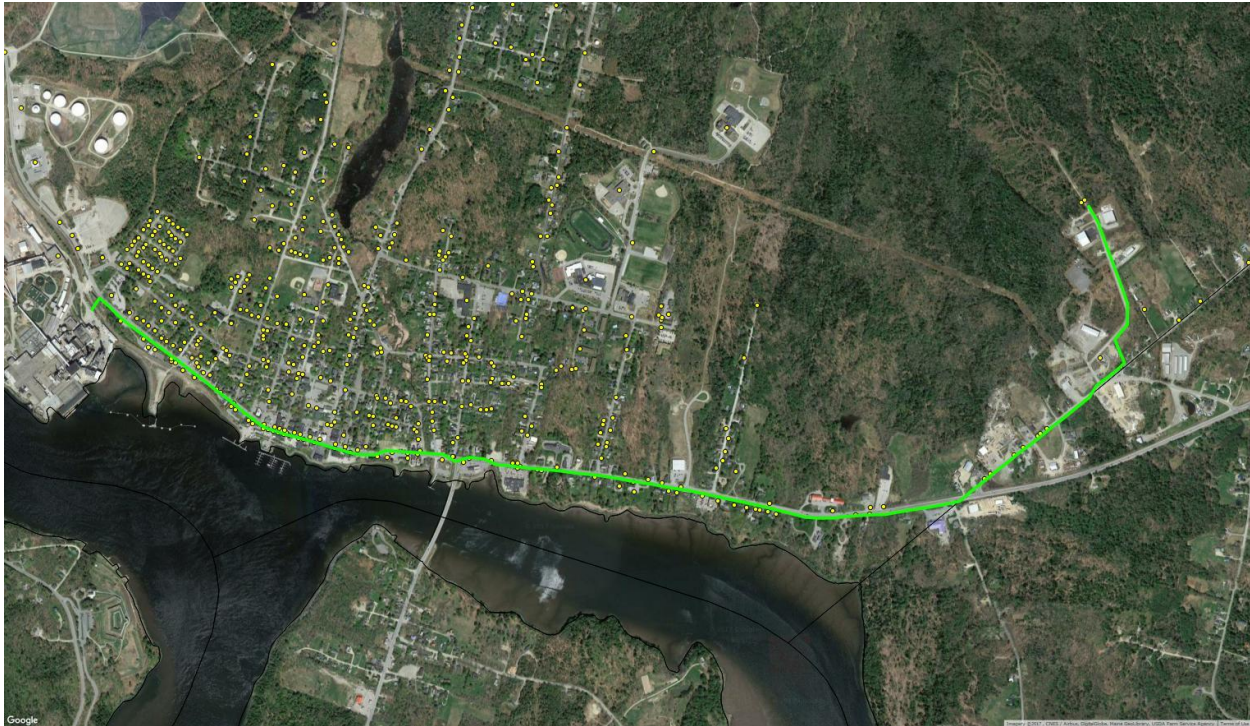
Gigabyte Industrial Park

The industrial park along Heritage Park Rd. has not seen the type of interest that should be expected for this location and currently is home to only a handful of businesses. A fiber line installed could increase the attractiveness and make it more desirable for new businesses- especially those that need unlimited bandwidth, which this project could make available giving the town the ability to market Gigabyte connections to prospective tenants.

The approximate cost to install fiber along the route shown above would be in the range of \$20,000. Cost for installation could vary depending on “make ready” cost. That is the cost of acquiring pole attachment rights to allow a company, on behalf of the town, to run fiber through the park. Depending on where those funds come from, we would recommend that the town own the fiber and that they lease it to an operator, who would then deliver the service to the current or future businesses that would locate there. Because the number of businesses and therefore opportunities to provide service would be limited, it would be most likely that the town would enter into a no cost lease with a carrier.

Once the fiber is in place, it would need to be “lit”, meaning it would need to have a provider provision internet service to deliver service to existing or prospective tenants of the park. Depending on the level of service required, this could be a significant cost to the carrier that would need to be recouped through fees for service or other means.

One of the interesting advantages of this approach is that it starts to help the community understand the benefits of fiber connectivity, for relatively little cost, and gives the town an asset that can be expanded into the downtown and other residential areas as funds are identified.



Main Street Fiber Extension

While this was not a specific ask of the committee, we believe this creates a conversation about a town owned fiber infrastructure that would provide the foundation to begin a Fiber to the Home project in the future. This recommendation is only intended to help the community understand the costs and considerations of such an infrastructure program. This type of investment gives the community the most leverage to build and serve the community over time, with world-class connectivity. It also involves more risk. Currently, both of your providers can provide fiber service to individual businesses, along this proposed route. However, this type of investment allows you to consider three things:

- Aggregate demand to lower cost to all businesses along the route
- Expand into residential areas over time, which are currently not served by fiber
- Differentiate Bucksport for business and family attraction

This fiber network would start at the industrial park on the eastern side of the town and extend through Main St. in Bucksport and ending in front of the Mill on the Western side of town measuring approximately 3 miles in total length and utilizing a little over 100 utility poles. This fiber would be built as a dark fiber network that would be open for local businesses to use in order to assist them in getting the bandwidth that they need for their business to operate efficiently. This build out is similar to what the Maine Fiber Company did across the State but on a much smaller scale.

Some considerations will need to be taken if such a project is deployed particularly in managing the fiber strand allocations, including who would market and manage it and who would be responsible

for maintenance. These questions typically get answered once you engage various providers to propose service.

This project also has a complication in that it extends through the heart of the town and many of the utility poles are already full with other providers. This would potentially entail new, larger poles being installed at a significant increase to cost that is not included in the figure provided below. Pole licensing, that allows additional wiring to be strung on the poles is managed by FairPoint and a relatively lengthy evaluation of the current pole infrastructure and what is called in the industry, “make ready cost” would need to take place to determine exactly the cost of using the existing pole structure. This could make our estimates, if poles need to be replaced or other extensive work would be necessary on the current pole structure. Please take the estimate below as a starting point.

The approximate cost to deploy this dark fiber network would be:

Fiber Materials: \$140,000

Install Labor: \$150,000

Total: \$290,000

*The total above includes an average cost to attach to the utility poles, but does not include the annual cost to maintain it. This would be approximately \$1000 annually.



Waterfront HotSpot Proposal

Community HotSpots are open access networks that allow citizens visiting your downtown and river front free or low cost access to the internet. There are several advantages to consider:

- Allows people to access email and other smartphone tools in a faster, more efficient manner, *without* using cellular data
- Allows town or other business “sponsor” to advertise through the portal created by the HotSpot
- Can advertise town amenities
 - Public restrooms
 - Restaurant offerings
 - Tourism related activities, parks or boat launch and marina
 - Pharmacy or other emergency services

Downtown HotSpots offer several advantages to traditional cellular networks. First, a HotSpot tends to allow for faster downloads, on any device- a laptop, tablet or phone. Because you can use any device, it makes it easier for those who want to work and use a device other than their phone. Second, the HotSpots allow the community to create a landing page, which can direct people to community assets and amenities. Last, it allows the town to work with a local sponsor to help cover or defray the cost of equipment and installation. These advantages make community hotspots a low-cost, smart first step bringing new interest into the downtown and riverfront walk and marina.

Hotspots deployed along the downtown waterfront would provide a much-desired service to both residents and visitors, especially in this digital age where email, social networking and video blogging are in demand.

The proposal offered here utilizes three hotspots spaced out from the bridge to just prior to the large plant facility to provide a near ubiquitous wireless signal along the waterfront and parts of Main St. The HotSpots can be customized to offer free or paid service, and can limit the amount of time someone can use the service or how much of the internet speed an individual user might be allowed. In addition, it was already mentioned that a customer portal page and restrictions on the types of sites people could visit are all achievable.

The cost of installing and configuring the hotspot solution described above would be \$10,000 with an annual maintenance fee of \$2000. These figures however do not include the monthly costs required for a broadband provider. These costs can run anywhere from \$60/mo. to \$200/mo.

Action items

- ✓ Explore funding sources for downtown HotSpot project to be completed by summer of 2018
- ✓ Work with town officials to find local funding for fiber expansion into the industrial park area
- ✓ Do more downtown business work to look at fiber connectivity and business needs related to expanding tourism

Community Plan: Greenbush

Key Findings:

- ✓ **Work with OTT to invest A-CAM FCC money into eligible areas**
- ✓ **Connect Fire Station and other municipal assets to fiber**
- ✓ **Digital Inclusion- Invest in a Business Center with high-capacity internet access**

Greenbush has two telephone providers that serve distinct sections of the community. FairPoint Communications operates the portion of the lines in the southwestern section of the community with two remote terminals feeding the majority of their service area. According to the most recent discussion with FairPoint both terminals either have been upgraded to their latest offering, or are in the process of being upgraded. These upgrades will allow for the maximum bandwidth speeds available with the current technology. For those closest to the terminals, they would have the potential for up to 25Mbps/2Mbps and as you are farther away, speeds up to 10Mbps/1Mbps are available. In FairPoint's farthest service area, speeds remain 3Mbps/1Mbps.

OTT Communications operates the portion of the lines in the northeastern section of Greenbush and the majority if not all of their physical plant in Greenbush is located underground. According to the most recent discussion with OTT, their current network in Greenbush is DSL based with maximum bandwidth offerings as high as 10Mbps download and 1Mbps upload.

Carrier Conclusion

FairPoint has performed the upgrades that they have already planned for in Greenbush utilizing Federal funding from the Connect with America fund, commonly called CAF II funding. These improvements include expanding their trunk fiber to the two remote terminals in Greenbush as well as upgrading the electronics in each terminal allowing increased single line DSL speeds of up to 15Mbps as well as bonded DSL speeds up to 25Mbps.

Due to the limitations in how far a DSL signal can be pushed it still leaves a few areas in FairPoint's footprint where some homes and businesses are left with service at 3Mbps or less.

With the merger of FairPoint and Consolidated Communications, there is a potential for more upgrades to occur as they have agreed to invest \$52.2 million investment into Maine's network and facilities with a focus on "building out their broadband network and upgrading network speeds". Given that these upgrades took place in 2017, we would not be inclined to rely on additional upgrades by FairPoint at this time.



FairPoint DSL Coverage area

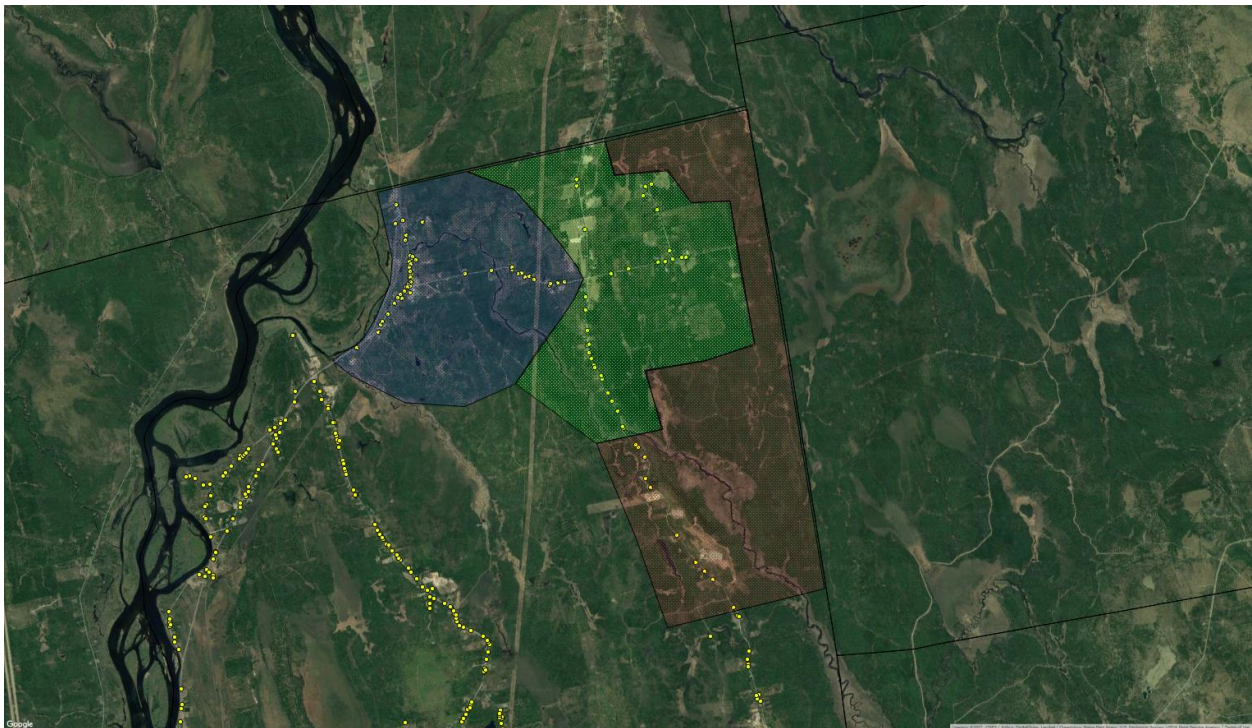
- ❖ Blue= Speeds of up to 25 Mbps
- ❖ Green= Speeds up to 15 Mbps
- ❖ Orange= Speeds up to 10 Mbps

As part of the FairPoint upgrade, fiber optic cable was run to each of its two remote terminals. Some on the Broadband Committee have expressed frustration at the inability or reluctance of FairPoint to allow individual customers to tap into their fiber. FairPoint's business model does allow businesses or high bandwidth users to utilize its fiber network and FairPoint's representatives do encourage those businesses interested in fiber service to reach out to them to discuss a quote. However, it is also true that FairPoint will not run fiber to any home that is currently served by its DSL service, as it is not cost effective for them to do so. Their current upgrades while helpful, does not allow for residential speeds beyond 25/2Mbps, approximately 1000 feet from each of their remote terminals.

OTT has indicated that certain areas of Greenbush have been targeted for funding from the Alternative Connect America Model (ACAM). This area encompasses 142 locations in Greenbush and OTT plans on using these funds to roll out a Fiber to the Home network within the next ten years. (10 years is the maximum eligible timeframe for them to use federal funding). The current FTTH bandwidth offerings from OTT are 25Mbps, 50Mbps, 100Mbps and 150Mbps symmetrical service (same speeds for both upload and download). Once the upgrade is complete, customers can expect these speeds to be available to them.

Even though the targeted areas for the ACAM funding do not cover all of OTT's footprint in Greenbush they have stated that there is a high likelihood of being able to serve other locations along the path the fiber will be installed in order to reach the eligible areas.

OTT's expansion plans offer the best upgrade path to date but the timing on when these upgrades may happen are rather open as no particular dates have been provided on when these might occur. It is recommended that the town take the initiative and seek out commitments from the residents in the ACAM funded areas. If OTT were approached with confirmed list of individuals that would take new service from them, it might incentivize them to commit to a timeline for this investment in the next couple of years.



OTT Current DSL Service

- ❖ Blue= Speeds of up to 10 Mbps
- ❖ Green= Speeds up to 5 Mbps
- ❖ Red= No Service



OTT ACAM Eligible Service Area

Our recommendation would be to position Greenbush in the best possible way to help OTT make a decision to invest in a fiber to the home network using Federal ACAM money within the next year or two. Because it is likely that OTT will be able to make a significant number of these investments over the 10-year life of the program, Greenbush would do well to ensure that customers within the ACAM eligible area, and those that the fiber will pass outside of the eligible area, express their enthusiasm for connecting to fiber. If Greenbush were to facilitate a petition or individual expressions of support, it might give OTT the necessary understanding to move Greenbush toward the top of the list. While this is not a guarantee, and other engineering and cost estimates may override a campaign by the town and its citizens, we believe OTT would be sympathetic to Greenbush, if enough people expressed interest in upgraded service.

Other investments

Beyond facilitating a campaign to help OTT commit investment funds, creating a space in the town office that could act as a business/community center with high capacity broadband service is a worthy idea to serve the community or those citizens that do not have access to higher speeds. This commitment is an investment in the citizens of the community and can accomplish several goals:

- ✓ Address Digital Inclusion
 - A free or low cost space to work or do homework
 - An accessible location with after school or evening hours of operation
 - Perhaps attain computers or tablets for those who don't have proper equipment

- ✓ Helps Greenbush home and small businesses explore more online business opportunities
- ✓ Allows town to access high capacity service that will enhance municipal offerings
 - Ability to connect other buildings, like the school
 - Ability to provide a public HotSpot at the town office for 24/7 use

Axiom is committed to assisting the community search for funding for this project. A recent application through a Community Bank was submitted in which Axiom collaborated with town officials. We envision identifying ongoing grant and foundation opportunities that can help the town reach this goal. This type of project could be budgeted for less than \$10,000 with ongoing yearly broadband cost from a provider at approximately \$1000.

Community HotSpot

If the community were to create a business/community center, the connectivity necessary could be broadcast to the public outdoor area in and around the town office. This is another low cost way to help citizens and visitors get connected, when the business/community center may not be open, or when visitors want to connect their cell phone without using their costly data plan.

Axiom is a leader in installing and maintaining Community HotSpots and would be pleased to work with the community to help install and maintain the system. However, we encourage the town to look into other companies to compare cost and capabilities. Currently we charge \$3000 for an install and a yearly maintenance fee of \$1000/year starting in year #2 to fix equipment and handle any technical issues. Also, the town would receive monthly usage updates to let them know how many people were using the hotspot.

Last, the community was interested in bringing fiber to the fire station, located on Cardville Road. FairPoint has a Remote Terminal on Greenfield Road, approximately .03 miles from the fire station. FairPoint indicates that they could/would extend fiber to the Fire Department, and most likely would not charge for that extension, if the department/town take service there from FairPoint. Current pricing received (wholesale to Axiom) would be \$1,086.00/month for a 100Mbps. There are various other speeds and pricing if the town would like to consider more options. No other carrier has fiber connectivity in the area of the fire station.

Conclusion

Greenbush has options available to them to help expand broadband availability both for municipal and residential connections and is a good example of how moving forward can open up opportunities. Since our planning began:

- FairPoint has invested and upgraded service in the area of Greenbush it serves
- OTT is committed to a FTTH project, hopefully within the next couple of years in their service area
- Town officials have collaborated with Axiom to submit a grant for funding the Business/Community Center
- The Broadband Committee is looking at other options to help fund projects that bridge the Digital Divide of their citizens

Action Items

- ✓ Town should work with Greenbush citizens to help facilitate OTT investment
- ✓ Axiom and the town should continue to explore grant and foundation options that focuses on a Community and Business Center
- ✓ Given the expense of a fiber connection at the fire department, perhaps the town could explore that connection with OTT as part of a larger conversation around connecting municipal resources together

Community Plan: Hampden

Key Findings:

- ✓ **Concentrate on service to underserved or unserved areas of town**
- ✓ **Work on expanded service through the renegotiated franchise agreement with Spectrum**
- ✓ **Limited Fiber to the Premise Plan**
- ✓ **Digital Inclusion- Focus on business community**

During the course of several Broadband Committee meetings it became clear that some areas of town were not connected as well as the residents in those areas would like to have. And as the discussion evolved, it is important to recognize that a community, even as affluent as Hampden (family median income estimated in 2015- \$74,523 vs Maine- \$51,494) have pockets that can only attain service of 3Mbps or less.

In addition, as land becomes scarcer in Bangor, Hampden has become an attractor of businesses and is in a building phase to add business parcels to accept new and growing businesses to the community. Taken together we believe our key findings can help continue the ongoing success of this community.

As part of the planning process, Hampden received significant input from citizens through a survey that was distributed to every household in the community. Below are highlights that helped inform the Broadband Committee and the planning process.

Hampden received 261 responses to the survey

- 61% served by Spectrum (formally Time Warner Cable)
- 30% served by TDS (Hampden Telephone Company)

Almost 63% are unhappy with their current service

- Expensive
- Unreliable
- Slow speeds

Over 62% are not interested in paying more

- 32% would pay more for higher speeds or better reliability

Almost 34% work from home (87 respondents)- almost 25% telecommute (work from home the majority of the time (58 respondents)

Over 50% of businesses say internet is “really important”

33% said more people would live in Hampden if there were better internet

Survey Conclusion:

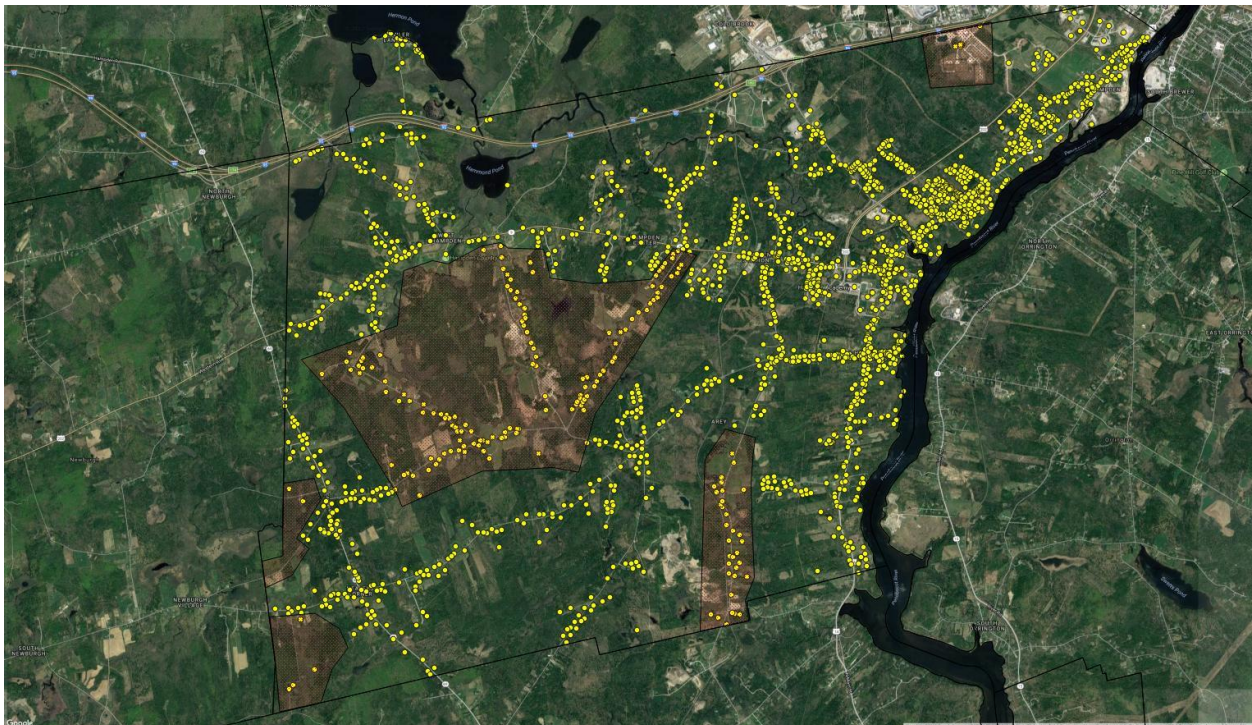
- Council believes in attracting competition, given the current situation with a franchise agreement and good coverage with recent upgrades from TDS and Spectrum, unlikely to attract an additional provider, without some incentive
- Without movement from town to get to fiber optic solution, town will be at whim of current provider pricing and limitations of technology
- Because of its location and proximity to Bangor, Hampden is in a position for growth, but needs the tools (should include high capacity broadband) to compete and win with business and family attraction

Current Provider Coverage

Spectrum covers the majority of the community, with some notable suggestions. As the town thinks about possibly renewing their franchise agreement with Spectrum, we would suggest that leveraging that negotiation to help expand Spectrum's new upgraded internet service speeds (50/5 Mbps or 100/10Mbps) to areas currently not covered by their service would be a strong option for the town to proceed.

On the map below, we have identified (yellow dots) all of the E911 addresses that show where the homes and businesses in the community. Spectrum covers the vast majority of the Hampden with the exception of those areas highlighted in red.

Spectrum Map- areas in RED not covered



By coupling the renewal of the Franchise agreement with expanded coverage areas, it gives Hampden officials the opportunity to leverage the agreement to help get better coverage at a reduced or no cost. Below is a chart of the types of elements contained in a franchise agreement and what kind of asks the town can make. Most of these agreements focus on the 5% return to the town, but other communities have used this agreement to create a municipal fiber network, or used the Franchise Fee as a match for a ConnectME infrastructure grant to expand service. At any rate, a variety of options and opportunities open up, once you bring Spectrum to the table.

Franchise Agreements:

Understanding what towns can and cannot ask for when negotiating franchise agreements:

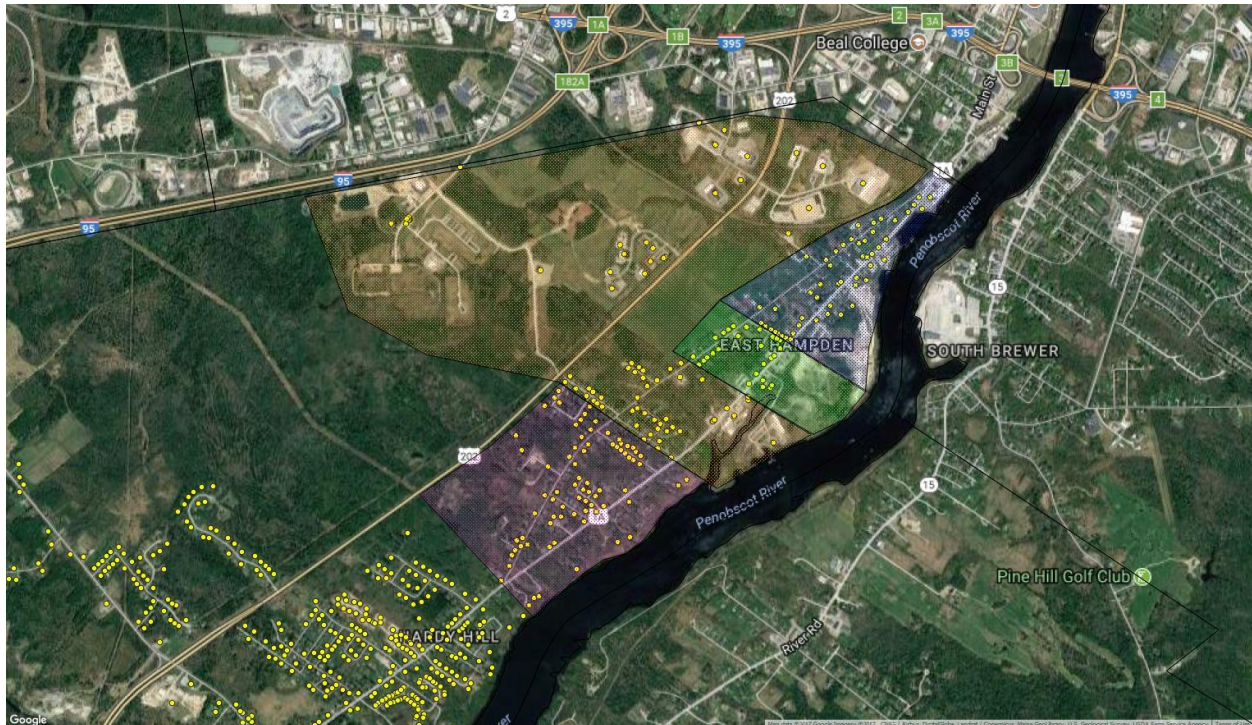
Can do	Cannot Do
<i>Can require specific cable system capacity and functionality</i>	<i>Cannot require a specific transmission technology</i>
<i>Can require support of PEG (Public, Educational and Government) access through facilities, equipment and channels.</i>	<i>Cannot specify which channels are or are not carried and cannot specify which channels are on which tier of service (other than PEG service)</i>
<i>Can establish customer service standards, including ones related to answering telephone calls, responses to complaints, and imposing of late fees.</i>	<i>Cannot regulate rates (other than lowest cost tier of service)</i>
<i>Through an enabling ordinance can require a specific definition of gross revenue</i>	<i>Cannot require franchise fees of more than 5% of gross revenue, as defined in the franchise agreement</i>
<i>Can regulate the video portion of services offered</i>	<i>Cannot regulate any voice (telephone) services</i>
<i>Can require construction of an Institutional Network (I-Net) linking schools, libraries and public buildings for voice, video and data communications</i>	<i>Cannot grant an exclusive franchise</i>
<i>For the public access channel, can require a specific location</i>	<i>Cannot regulate data services, including Internet services</i>
<i>When a cable company does construction in public rights of way, can specify that it must do so in a manner that does not disrupt those rights of way unreasonably.</i>	

The State of Maine created a Model Franchise Agreement that you can access at:

<http://www.maine.gov/connectme/about/modelcable.shtml>

FairPoint Communications covers only a small portion of Hampden and FairPoint’s DSL service, because it comes from Bangor, does not have the types of speed and reliability that other parts of its network achieves. The map below shows its coverage area and the areas that are generally covered by those speeds. This map is an approximation, and individual homes or businesses may not be able to achieve speeds shown, however, this is generally what to expect FairPoint’s coverage to look

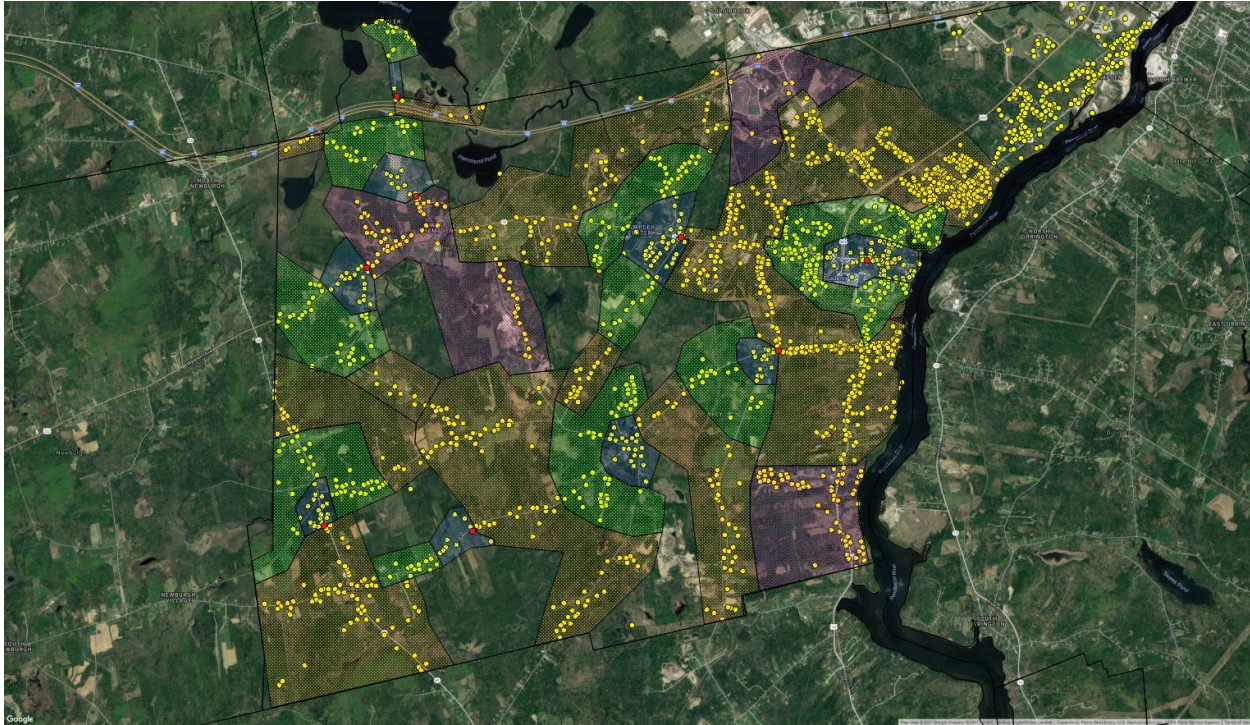
like. This is an area that is also covered by Spectrum, so working with FairPoint to upgrade service in this area is unlikely.



FairPoint Communications Coverage Area

- ❖ Blue= Speeds of up to 10 Mbps
- ❖ Green= Speeds up to 7 Mbps
- ❖ Orange= Speeds up to 3 Mbps
- ❖ Red= No or Minimal Service

TDS is the incumbent telephone provider for the town and offers near ubiquitous phone and internet service. They recently upgraded or are in the process of upgrading their facilities in Hampden and will soon offer 50Mbps service in some parts of the network. Below is the map of their coverage area and speeds. Because they have recently upgraded their speeds, it is unlikely that they would make another major investment in the near future.



TDS Coverage Area

- ❖ Blue= Speeds of up to 50/10 Mbps
- ❖ Green= Speeds of up to 25/5 Mbps
- ❖ Orange= Speeds of up to 15/2 Mbps
- ❖ Purple= Speeds of up to 10/1 Mbps

Carrier Conclusion

Because Hampden is relatively well covered by three providers, it's unlikely to attract another provider to compete and bring cost down. We believe these are your options with current providers:

FairPoint: In order to upgrade FairPoint service it is likely they would need to place a Remote Terminal in Hampden, quotes from FairPoint have generally ranged in the \$60,000- \$70,000 range, but they have not been approached directly for this project. This would give their service area speed upgrades of up to 25Mbps. Because this is a small area, although densely populated, and because Spectrum offers broadband speeds of up to 100Mbps, we would not recommend this investment.

TDS: TDS is in the midst of a major upgrade in Hampden that will offer speeds up to 50Mbps. Because the end of 2017 will most likely complete this upgrade, we would not expect TDS to be interested in working with the community to upgrade further, as that would require additional investments and technology that we would not think TDS would consider.

Spectrum: Spectrum has also recently upgraded their internet service across all of Maine and now offers up to 100Mbps to residential customers. They typically will consider expanding service at a

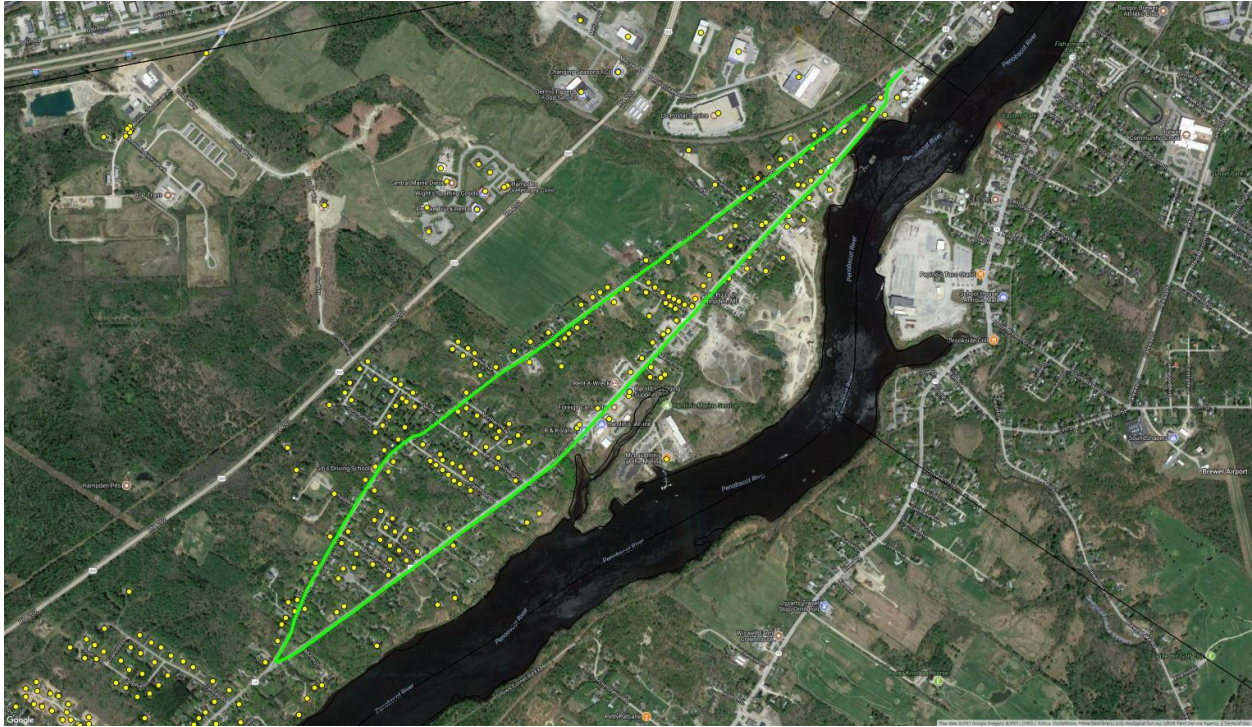
density level of 20-25 homes per mile. Because there are some gaps in their coverage area, perhaps a portion of the Franchise Fee that they currently pay or would pay in a new Franchise Agreement could be diverted to help defray the cost of expanded service in those areas on the map not covered. Or Spectrum, as part of their agreement may agree to expand service at their cost to one or more of the areas not currently covered with their service. By expanding service, residents in those areas would not only have access to higher internet speeds but the benefit to access cable TV and phone (Triple Play).

Fiber to the Premise

Fiber optic cable offers unlimited speeds, unrivaled reliability and a return on investment of at least 20 years. However, it is also the most expensive, running between \$25,000- \$30,000 a mile, plus the cost of the electronics to run it and the cost of the actual internet. However, we believe this is a sound investment that Hampden should consider, if only in small upgradable increments.

Currently, FairPoint, TDS and Spectrum all offer fiber to businesses in the community. Pricing can vary widely depending on the location, but generally speaking is beyond what a small business might be willing or able to pay. Beyond the cost of actually hooking someone up to the fiber infrastructure, which can cost from a few hundred dollars into the thousands, the recurring cost of the broadband can also be prohibitive because these connections usually require a dedicated link that is only for that one business. In these cases, a typical connection can run in the hundreds of dollars a month. Those businesses that require this type of connection, most likely already have it. For some smaller group of businesses that would require large amounts of bandwidth, high cost are typically the barrier to acquiring such service. In addition, fiber connectivity is not generally available to residential homes leaving home-based businesses with high bandwidth needs frustrated.

As the needs of an increasingly interconnected world continue to demand better and better internet speeds, capacity and reliability, cities and towns are looking at investments that might help keep them from falling behind. The Millennial generation (generally those between the ages of 25-35) is now the dominant percentage of the workforce, as Baby Boomers continue to age out, and those communities that are thinking about how to accommodate the needs of this generation will remain vibrant. One of the needs of this generation of workers is strong connectivity. Given the current situation in Hampden, we would not recommend a fiber to the home solution that would be prohibitively expensive and most likely unachievable. However, by building strategic fiber that can start to help parts of the community with enhanced choices for high-capacity broadband, the town can create an attractor for businesses and residents who are increasingly demanding this level of connectivity. By building small sections at a time, you can have the effect of increased visibility for the town, while containing and managing cost of such a network.



Fiber to the Premise Proposal

The following will outline a proposed fiber deployment in Hampden with a focus on the municipality building and owning the trunk fiber and offering the fiber as an open access network to ISP's or other vendors willing to utilize the facilities to offer a fiber to the premise (FTTP) service. When looking at Hampden for a prospective fiber deployment there are several factors that should be taken into consideration in choosing an area for deployment.

First is density: Does the area have enough homes and businesses. This is important as the numbers determine whether serving the potential customers off of this fiber would be cost effective and/or beneficial to the ISP offering service off of this municipal trunk fiber.

Second is broadband availability: What other providers and types of technology are present. The number of other providers in the area determine take rate and if there are a significant number of providers that can compete with this potential fiber deployment it goes to the first point in providing enough customers to make it beneficial for any provider to use this fiber.

Third is location: Is the fiber deployment close to any municipal centers or major broadband nodes. The further away from a city or town center, typically the more it could cost a provider to bring in bandwidth to feed the customers served off of the municipal trunk fiber.

All of these factors determine whether it would be an appealing and beneficial prospect for potential broadband providers to extend their services onto this network.

This proposal focuses on the eastern area of Hampden along Main Rd and Old County Rd. This location fits the criteria above best as there are only two providers offering broadband in this area

and one of them, FairPoint Communications, only offers up to 10M service. The other provider, Spectrum, does offer significantly faster service, up to 300M packages but both of these providers offer their services over copper line technology, which is inferior to a fiber optic delivery method. The density is available, offering over 250 potential homes and businesses with two municipality centers at less than 2 miles on either side that could provide backhaul for this network.

Design and Cost:

The fiber run along Main Rd consists of approximately 100 utility poles spanning 2 miles from the southern and northern intersection of Old County Rd. and Old County Rd. consists of approximately 70 utility poles spanning 2 miles along its entire length with a potential for a fiber cabinet located at either intersection point. This build would consist of the trunk fiber only with drops to homes and businesses the primary responsibility of the contracted broadband provider.

The approximate cost to deploy this fiber network would be:

Fiber Materials: \$140,000

Install Labor: \$145,000

Total: \$285,000

The total above includes an average cost to attach to the utility poles, but does not include the annual cost to maintain it. The yearly maintenance fee for the pole licensing would be approximately \$1000. This could be included as a requirement for the broadband provider to upkeep.

Conclusion

Hampden is in a good position to increase broadband coverage and increase speeds and reliability. In fact, all three current providers have done just that. Given this upgraded service, we would concentrate our focus on completing upgrades to those areas identified by leveraging a renegotiation of the town's outdated Franchise Agreement with Spectrum. Second, we would recommend a strategically limited fiber network that could be built upon in future years, while starting to build an attractive asset for businesses and residential customers alike. Last, a focus on business needs through Digital Literacy classes customized to the Hampden business community would be an investment in the town's citizens and businesses that should drive take rates and economic development.

Action items

- Initiate Franchise Agreement negotiation with Spectrum
 - Work with Spectrum to build out to underserved areas of the community
- Identify funding sources to implement Business Digital Literacy campaign
 - Use Axiom recommendations to organize regional partners
 - Survey businesses for programing/classes important to them
- Town should consider funding the beginning of a municipally owned fiber network- position itself for the future

Regional Summary

EMDC and the Axiom team worked together to identify and bring Community Broadband Planning services to four distinct communities in the region with the hope that other communities might see themselves in this work. For the communities that participated, actions have already begun to move forward to implement the plans and recommendations contained within this document. Some ideas that we believe are worth replicating are listed in the Executive Summary section at the beginning of this report.

However, we wanted to make some additional recommendations to those communities thinking about how to come together effectively and start talking about moving forward. These are the elements worth considering:

- You must have a champion, someone in the community that cares and is passionate about broadband
- Form a Broadband Committee that includes a town official, a local business and possibly 2-3 concerned citizens (a committee of 3-7 people that can move forward)
 - Identify the right people who need to be in the room
- Identify what your goals are- is it to serve a part of the community that does not have good connections, is it to bring fiber to the industrial park or to help support telemedicine and those aging in place. Whatever it is, the committee should focus on what it is they want to achieve
 - Don't think of cost first- money, or lack of, has a way of stopping creative thinking and stifling potential projects before they even start- leave the money talk till later
- Identify key assets in your town that might be used to deliver better service (telecommunication towers, key businesses and other opportunities that might be used to help meet your goals
- Work with regional and local entities to help identify resources for potential projects

Those communities that embrace the process and are committed to moving forward generally find resources to start to reach their goals. The only way to get to the finish line is to start. Do not hesitate to contact Vicki Rusbult at vrusbult@emdc.org or (207) 942-6389 or Mark Ouellette at mark@connectwithaxiom.com or (207) 272-5617 for more information on this report or how to get a broadband process started in your town.