

Broadband Consultant Proposal

Isle au Haut

Submitted by:

Mark Ouellette & Susan Corbett

Axiom

August 10, 2017
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Dear Isle au Haut Broadband Committee,

We, at Axiom, have been working closely with a number of Maine, Massachusetts and Rhode Island islands to help them plan and implement affordable, reliable and fast broadband networks. Through this ongoing work and partnerships, we have come to believe that high-speed internet connections for the islands are not just a possibility, but achievable. It is in this spirit that we commend the Committee for working toward a sustaining solution for the island.

Axiom is a different kind of company. One of our long time employees described us as being “scrappy” in the sense that Axiom’s mission from its beginnings over 12 years ago was our core belief that every person in Maine deserves a connection. Susan Corbett, our CEO, has been fighting to ensure that all Mainers are able to access the internet and to bridge the Digital Divide.

Because of the type of company Axiom is, we believe in working with partners that share our passions and goals to serve rural, remote customers in Maine AND who are willing to stand with us to create truly unique partnerships that are mutually beneficial, respectful and transparent.

The RFI describes the current conditions for internet service on the island. We understand that TDS has recently upgraded its island systems to create bonded pairs of copper wire that can reach speeds of 50Mbps within a limited range of their current equipment. Axiom had the opportunity to discuss Isle au Haut with TDS many months ago and understand that the upgrade, while expected, still leaves parts of the island with less than adequate service. One of the main concerns that we share is equal access to all. The current situation does not eliminate the “haves and have nots” as your location on the island dictates your ability to receive adequate service. We concur with this concern and believe that a solution that gives everyone access to the same level of service is most desirable. Minimally meeting the federal and/or state standards of 25/3Mbps or 10/10Mbps respectively is a goal of the committee. While we are sure that cost will become a consideration, as it should in any deployment, we believe you

have quite a few options and assets that might be considered to reduce cost, create better reliability and design creative solutions that are mindful of costs.

Axiom has won acclaim nationally and across Maine for its unique skills and approach and out of the box thinking that helps communities understand their options, the tradeoffs and cost associated with the technologies we propose and is familiar with the unique challenges that island communities face. We are skilled and knowledgeable with fiber optics, DSL and a host of wireless solutions, including TV White Space, in which we are in partnership with Microsoft.

As I hope you will see from this proposal, we care deeply about the communities we work with and our Rural Broadband Deployment Kit, brings the process to life. It is our goal to be the Internet Service Provider for Isle au Haut, and to bring you solutions that will keep the island vibrant and connected for many years to come.

We look forward to meeting with you, should we be given an opportunity to discuss in more detail our credentials and commitment to island connectivity.

Sincerely,

A handwritten signature in blue ink that reads "Mark Ouellette". The signature is fluid and cursive, with a long horizontal stroke at the end.

*Mark Ouellette
President*

5.2 Point of Contact

Please communicate any questions to:

Mark Ouellette
President
Axiom Technologies, LLC.
3 Water Street
Machias, ME 04654

(207) 255-0679 x100 (o)

(207) 272-5617 (m)

mark@connectwithaxiom.com

5.3 Company Information and Experience

At Axiom, we believe rural broadband deployment is about much more than a fast connection- it's about people's livelihood and well-being. One of the things we look for in our partnerships is the community's commitment to equal access to all.

Axiom is a pioneer in rural broadband deployment and we are sensitive to rural citizens' desire to be both digitally connected but geographically remote. We have developed the Axiom Rural Broadband Deployment Kit to do just that.



Axiom does not deliver one-size-fits-all solutions. We customize our products and solutions based upon a number of factors including proximity to existing community assets, population density and terrain.

Axiom uses the best combination of product solutions. Our planning and deployment framework provides a methodology that allows for flexibility, but at the same time adheres to a clearly defined path. This helps ensure the best product mix and execution plan is used for each community.

We are constitutently pushing the technology envelope and are deeply familiar with Fiber Optic, DSL and a variety of Fixed-Wireless solutions, including emerging LTE and TV White Space... all are being used to connect real customers in our current operational network now.

We currently operate over 2,500 square miles, with over 100 access points that serve customers in both Washington County and Chebeague Island. We currently serve approximately 1,200 customers and have been in business for over 12 years.

We currently operate our main office in Machias and have satellite workers on Chebeague Island with a total of 12-20 employees, depending on the season and our workload. We tend to do things ourselves, and all of our customer service, field crew, billing and engineering is done in-house in Machias. We are currently building a full fiber to the premise solution on the three islands that comprise the Cranberry Isles with an expected completion in spring of 2018. We are currently planning for a number of communities, including Piscataquis and Oxford Counties, the Lakes region (Windham, Standish, Grey and Raymond), the Down Bay Broadband Taskforce (Chebeague, Long and Cliff Islands) and the Town of Bowdoin and City of Belfast.

Key Staff Expertise and overall experience of the proposed team

Axiom has been a pioneer of Broadband deployment in Maine. From its roots, the first wireless Broadband connection in Washington County in 2005, Axiom has grown to be a full service engineering, planning and deployment, management and professional services team that assists communities to get connected or upgrade connectivity, while maintaining a network both in Washington County and on Chebeague Island. Many of our team has been with Axiom over 5 years, and some from the company's beginning.

We currently have a 30 mile high-capacity fiber-optic link capable of transporting or delivering 10 Gigabytes and are deployed in the field with a number of cutting edge technologies that we are currently testing including TV White Space, 3.6GHz licensed LTE and a high capacity licensed link utilizing 11GHz. This testing of new technology and our expertise to think outside of the box and deliver blended solutions is unparalleled in Maine.

Key Team Members:

SUSAN CORBETT

Chief Executive Officer

Susan Corbett is the Chief Executive Officer at Axiom Technologies. She is a provider and advocate of fast, affordable, and reliable broadband services for rural communities. In 2005, Ms. Corbett joined Axiom Technologies as Chief Financial Officer. Under her leadership, the telecommunications company has designed and constructed more than 100 access points connecting more than 2,500 square miles in one of America's roughest terrains — rural Maine.

Ms. Corbett is a preeminent authority on rural broadband deployment and works closely with economic development and rural organizations to advance Internet and wireless technologies and their adoption.

Ms. Corbett's clear company-wide direction has garnered Axiom tremendous recognition in the form of awards, media coverage, and grants. Most recently, Axiom was awarded a Microsoft grant to provide Internet access to homes in Washington County, Maine, using TV white space. In 2016 Maine Magazine named her as one of 50 *Dreamers and doers making the state better every day* and was also named as a *Maine Icon* in an online publication of Maine Icons and this year Axiom was named Corporate Livewire's *Innovation & Excellence Award as the Residential Telecommunications Provider of the Year for the United States*.

Ms. Corbett is a public speaker, educator, and advocate who is dedicated to providing broadband access and digital literacy to rural communities everywhere.

MARK OUELLETTE

President

Mark Ouellette is the President of Axiom with responsibility for overseeing and growing Axiom's Internet and wireless businesses. Mr. Ouellette has held a number of senior leadership positions in the state of Maine. Previously, Mr. Ouellette was the Executive Director of Mobilize Maine, where he worked with regions across the state to help develop and implement measurable, private sector economic development strategies. Before that, Mr. Ouellette served as Director of Business Development for the State of Maine. Earlier, he served as Chief of Staff to U.S. Representative Tom Allen.

Mr. Ouellette has 20 years of economic and community development experience. He has a strong track record of successfully writing and securing federal, state, and foundation grants. Most recently, he was pivotal to receiving Axiom's premiere Microsoft grant award to provide Internet access to homes in Washington County, Maine, using TV white space. Under Mark's leadership the company has begun to grow, acquiring Chebeague.net in 2016 and is working with over a dozen communities and counties across Maine to expand broadband and bridge the Digital Divide.

Mr. Ouellette is an active speaker and participant in panel discussions on a wide range of economic development topics and strategies, including providing broadband access to rural communities.

KIM EMERSON

Director of Special Projects

Kim Emerson serves as Director of Special Projects for Axiom, where he oversees wireless technologies, DSL, and fiber optic build-outs. His role includes network and technology planning, development of architecture and roadmaps, and the continued evolution of broadband deployment methodologies.

Mr. Emerson is proficient in a multitude of programming scripts and languages including Perl/CGI, Javascript, SQL, and ASP. He completed training and received certifications to administer and deploy the Mikrotik RouterOS platform including MTCRE, MTCWE and MTCTCE, as well as an A+ Certification, which he obtained to teach a certification course to high school and adult education students.

IAN SAWYER

Director of Network Services

Ian Sawyer serves Axiom's entire organization across many disciplines including managing Axiom's network infrastructure, maintenance and installations. Ian is the architect of many of Axiom customized builds for clients and communities and is an advisor on all significant projects at Axiom.

Mr. Sawyer is a CompTIA A+ Certified Technician with over ten years of hands-on experience with hardware and software technologies. He has the proven skills necessary to support complex IT infrastructures across rural communities. Mr. Sawyer has extensive experience in Windows Operating Systems, networking, firewalls, as well as identifying and preventing malware.

5.4 Projects

Axiom currently serves 1,200 customers that utilize a variety of technologies; wireless, DSL and fiber optics. During our 12 years in business, we have done whatever it takes to get a connection to a potential customer to locations that the incumbent carriers will not connect. It is no understatement that 100s of customers would be left unserved without Axiom's efforts. We have done this work in some of the most difficult and remote areas in Maine.

Cranberry Isles

In 2017, Axiom responded to an RFI for Cranberry Isles to plan, design, construct and operate a network on three of the islands that consist of Cranberry Isles. Axiom was awarded a contract of up to \$1.2M to construct and operate the network. According to a selectperson on the

island, Malcolm Fernald, “Axiom’s proposal was so far superior to the other submissions that an RFP for the finalist that was planned, was cancelled, because Axiom’s proposal did everything the town was looking for.” We are in the midst of a final FTTP design for all three islands with a high capacity microwave link that will connect the three islands and are contracted with FairPoint Communications to deliver a 1 Gig wholesale connection to serve the community. Our proposal made several recommendations that will save the Cranberries over \$100,000 of build cost, plus a revenue sharing model that will return over \$8000 a year back into a town technology fund.

Contact:

James Fortune- james@cranberryisles-me.gov

Address: Town of Cranberry Isles, Town Office on the Island of Islesford

Telephone: (207)244-4475

- ✓ Designing FTTP infrastructure on all three of the Cranberry Islands
- ✓ Out of the box thinking that will save over \$100,000 on project
- ✓ First service expected in October 2017

Chebeague Island

In 2016, Axiom took over Chebeague.net, which was in danger of closing from the threat of a FairPoint build out on the island. We immediately doubled the bandwidth available to the island, suspended \$99 connection fees and stabilized the receiving end of the link to create better reliability. Since the acquisition, we have grown our customer count on the island to close to 250 subscribers and are beginning to work with the community to deliver a FTTH solution to all residents. Chebeague is one of the most unique situations in all of Maine as it relies on three technologies; a fixed microwave wireless connection from Portland to Chebeague, a fiber optic connection that receives the signal and runs 1.9 miles to a DSL remote terminal that then distributes a connection to each home. We would very much like to deliver a FTTP solution to Chebeague Islanders, in the next two years and are actively planning that deployment through the planning process with the Down Bay Taskforce.

Contact:

Bev Johnson- beverly.johnson@connectwithaxiom.com

Address: Chebeague Island, Maine

Telephone: (207) 846-4850

- ✓ Designed and built wireless link and took over full operations of network in 2016
- ✓ Have met all deadlines for all of our proposals including designing and building wireless link, doubling Broadband capacity, introducing phone service and supporting network infrastructure 24/7

Indian Township

Axiom, in partnership with Microsoft, is deploying TV White Space technology to extremely hard to reach locations on tribal lands in Washington County. Expected number of homes is 40

and this program is nationally and internationally recognized through the Microsoft Affordable Broadband Initiative, of which Axiom was the only United States recipient (out of over 200 applications worldwide). In addition, Maine (through Axiom) was named as one of twelve states that Microsoft will work with to expand offerings to unserved homes through its Rural Airband Initiative.

Contact: Haiyun Tang- haiyun@adaptrum.com

(Adaptrum is the equipment manufacturer of the TVWS equipment and a partner on project)

Address: 2740 Zanker Road, Suite 100, San Jose, California

Telephone: (408) 850-9996

- ✓ First deployment of TV White Space in the United States
- ✓ TVWS is a low cost solution for difficult or near impossible places to serve
- ✓ Expected build to complete by summer of 2017

Over the past year, Axiom has been planning and proposing hybrid networks in a variety of locations including:

- Brooklin (\$1.6M FTTP of 800 homes and businesses)
- Millinocket (\$300K FTTP, downtown business district plus 120 homes)
- Somerset County (Several projects, including high capacity wireless and wireless/fiber)

Through our practical, on the ground experience with fiber-optic, DSL and wireless deployments, we are never wed to any one solution and work closely with our partner communities to deliver the best solution that meet community goals of cost, coverage and reliability. We work to serve remote and last-mile customers and communities in some of the most difficult terrain in all of the United States.

5.5 Reference

Mike Faloon

Our Katahdin (Millinocket, E Millinocket and Medway)

(617)248-6043

faloon@ourkatahdin.com

Heather Johnson

Somerset County Economic Development Commission

(207)474-0166

hjohnson@somersetcounty-me.org

5.6 Committee Broadband Goals & Timeline

If awarded, we would meet your deadline to complete our assessment by October 6th, giving the community plenty of time to consider a public-private partnership with an operator, grant opportunities in 2018 and the ability to educate votes ahead of the island's annual town meeting. We would want to start the process with an island visit before Labor Day.

There are several assets that we believe could be leveraged to assist with our planning and design:

Electrical Coop/Pole Attachments- It was exciting to learn that the island's electrical coop own the poles on Isle au Haut. Pole attachment "make ready" can typically be up to ½ of total deployment cost and have a significant ongoing cost that affect the operational side of a budget. With pole ownership clearly established and not anticipated to be an issue, we would strongly support using the poles for fiber optic cabling, if the community moves in this direction. In addition, we believe it's worth exploring the electrical coop becoming the service provider, if there is interest or at the very least entering into a contract for support (using coop personal and equipment to service any new deployment).

Towers- The Island already supports a TDS tower. We would presume that one additional tower could be placed in a discrete location, if a wireless bulk backhaul solution would save on costs. This is what we currently use to transport wirelessly 200Mbps of bandwidth to Chebeague Island and Axiom is familiar with these types of deployments. We are currently engineering two microwave wireless connections for the Cranberries that will serve the Islands of Islesford and Sutton. This is a low cost solution worth exploring.

Island participation- If Isle au Haut were to consider building a network and choosing Axiom as the operator, we believe that Isle au Haut should consider helping Axiom build out the network, this would cut cost, create pride of ownership and build community by participating in a truly transformative project for their island.

- ✓ Leverage island assets to help with construction, debris clearing and site prep work
- ✓ Create "Fiber Days" where the public would be invited to assist the Axiom crews to lay fiber and help with other tasks
- ✓ Help with marketing service on town website(s), Facebook page(s) or other list serves that shows the commitment of the islands to make this a successful project

In addition to the assets above, there may be an opportunity to micro-trench or lay cable on the ground as described below.

Micro trenching- To save cost and time, we would strongly recommend considering laying fiber on the ground or micro trenching it to save the cost on the connections to the homes. This has been done on Squirrel Island in the mid-coast and Axiom supported that project through a Service Level Agreement. We understand the pros and cons of utilizing poles vs. micro trenching and believe on balance this should be a consideration for Isles of Haut, where practicable.

These are just the assets we can think of! I am sure there are more and we would work with you through the planning stage to understand how to leverage those assets to build a truly special project.

Last, as part of the planning process, you might consider wireless technology as a stopgap measure for the most difficult and expensive areas of the island that are currently not being served. This ~could~ be considered as a 5-7 year life span before possible upgrades might be needed. We, at Axiom, are leading experts in wireless technology and would thoughtfully work with you if this type of deployment might meet your goal to serve the underserved parts of the island.

We would be pleased to discuss in more detail all of the options in front of you.

5.7 Target Speeds

We think the Taskforce should consider symmetrical speeds starting at 25/25Mbps and going up to 150/150Mbps with an option for those requiring more to be available as needed. There are a couple of factors that need to be taken into account. A Gig to every home might be cost prohibitive given the seasonal nature of the island. Second, our experience is that cost sensitivity is important, especially for year round residents and we would want to deliver tiers of service that are affordable. Third, with having large seasonal populations, seasonal rates are going to be important and can significantly affect the operational budget and profitability of the Internet Service Provider who is chosen to operate the system.

If cost of a fiber to the home solution prove to be too great, we would consider a wireless TV White Space solution that can meet the federal standard of 25/3Mbps or a 3.6Ghz wireless solution that could deliver speeds up to 20Mbps. All will depend on the goals around ability to scale the desired solution, the cost, reliability and speeds. These are the questions and solutions that will be explored in the planning phase.

As far as cost of service, more work on the capital and operational budget needs to be considered through the engineering process, but our goal would be to compete with current provider pricing or beating them to take market share and to bundle services to create overall

savings to the consumer. You can refer to our contact on Cranberry Isles or we can discuss service levels and costs that we are proposing there.

Our proposal would be for \$10,000 to engineer a FTTH solution and to consider any and all options including a blended solution to save costs and meet the needs of the community.

5.8 Engineering Design

Axiom has planned and engineered close to 20 projects over the past two years and we utilize our Broadband Deployment Kit described in Section 5.3 to help guide the process and get communities ready for deployment. Our planning and engineering work on this project will:

- Create a clear implementation plan, with alternatives and recommendations that are customized to meet Isle au Haut's unique needs
- Review and contemplate all existing assets that might be leveraged
- Include recommendations and cost of all proposed equipment
- Mapping of proposed fiber route and wireless coverage maps
- Financial analysis of micro-trenching vs. pole attachment (as applicable)
- Street by street cost to deliver service
- Consideration of possible backhaul bottlenecks or other contributors to speed variations in current system
- Backhaul options
- Cost of increasing service levels in the future
- Financial analysis that includes the cost of the build and operational expenses and revenue model
- Quality assurance plan
- Capacity and need for upgrades of various technology proposals

5.9 Business Model

Axiom is committed to working with the Isle au Haut to build political momentum for implementation and will work hand in hand with each of the three islands individually or in concert to secure federal, state or local funding. Both Susan Corbett and Mark Ouellette have been successfully awarded millions of dollars in funding and we would work closely with you to assist with any grant opportunities that are available.

These projects are only as successful as the partnership between the build/operator and the communities. By leveraging town owned equipment to help with such tasks as debris removal, clearing a tower site and readying for construction and inviting citizens to help with the laying of the fiber or “sponsoring” a section of fiber on their road, we can build community ownership pride in the project and reduce cost. In addition, creating a plaque or some other form of recognition for investors or road sponsors would be a fun way to get people involved and create private investment opportunities and recognition.

Axiom has created a model Operating Agreement that includes:

- Returning 5%-10% of gross revenue (potentially up to \$15,000 a year) to a Technology Fund
- Committing up to 20% of our labor cost to the project construction
- An evaluation of equipment every three years for possible enhancements
- Potentially add Community HotSpots, Digital Literacy classes or other resources at our expense
- Support efforts to identify and support outside and unconventional funding opportunities that can help defray cost
- Hiring an on-island installer and troubleshooter to be trained by Axiom and enhance service and installation response times to island residents

Axiom is fully prepared to execute an engineering and implementation plan and negotiate an operational framework. We also are excited about the construction process, working with the community on unique strategies to build the network, save cost and deliver a world-class connectivity system that will be an investment that lasts for 20 years and leap frog the connectivity on the island beyond 85% of Maine.

If the Taskforce would consider Axiom to be the builder and operator of the engineering proposal we would incorporate the \$10,000 fee into the build budget as a credit. Essentially, we would do the engineering for no cost to the island. In addition, we are not concerned about ownership and believe the island can and should own the infrastructure.

Final Thoughts

Axiom believes that every connection counts and has been advocating for, building and sustaining networks in rural and remote parts of Maine for over 12 years. Axiom’s CEO, Susan Corbett’s mission is to connect every home in Maine and believes that giving citizens the tools they need to succeed in an ever increasing digital economy is how Maine will sustain and

grow... invest in our people. Islands, like other parts of rural Maine, have been left behind and continue to struggle with a host of issues that threaten the island way of life. We would appreciate your giving Axiom an opportunity to be your partner, advisor and supporter through this process. From all of us at the Axiom team, thank you for the opportunity and we look forward to ongoing discussions, should we be afforded the opportunity to discuss our credentials further.

