MUNICIPAL BROADBAND SUMMIT

Wednesday, July 8, 2015

Clarion Hotel, 1230 Congress Street, Portland, ME

~ AGENDA ~

8:00 a.m.	**Registration** ~ coffee/tea/muffins/danish
8:30 a.m.	Panel Member Introductions
8:35 – 9:00 a.m.	**Jeff McCarthy, VP, Maine Fiber Company** *Fiber Optic Connectivity – Using Open Access Fiber to Drive Economic Growth*
9:00 – 9:25 a.m.	**David Maxwell, Broadband Program Director, ConnectME Authority** *Developing Broadband in Maine: A comparison of data and other information in support of expanded availability and Update on broadband legislation for Maine*
9:25 – 9:55 a.m.	**Fletcher Kittredge, CEO, GWI** *Roadmap to Building a Community Gigabit network – A step-by-step Guide for Maine Municipalities*
9:55 – 10:15 a.m.	**Richard Bates, Rockport Town Manager** *High Speed Internet – Why it matters to Rockport and all of Maine*

Break 10:15 – 10:30 a.m.

10:30 – 11:00 a.m.	**Michael Forcillo, Vice President, Redzone Wireless** *4GLTE Advanced Fixed Wireless Technology – a solution for fast, affordable, municipal broadband projects*
11:00 – 11:30 a.m.	**Aaron Paul, Director of Broadband Consulting, Tilson Technology** *Municipal Broadband: Helping Communities Plan for a Faster Internet Future*
11:30 – 11:45 p.m.	**Chris Dumais, South Portland IT Director** *Municipal Broadband: Why & How South Portland chose to become an anchor tenant*
11:45 – 12:15 p.m.	**Michael Edgecomb, Director of Government Relations, Time Warner** *Time Warner Cable and Municipal Broadband Options*
12:15 – 12:45 p.m.	**Sarah Davis – VP, External Relations and Community-based Broadband Development, Fairpoint Communications** *A Collaborative Approach to Ensure Your Broadband Development Project Succeeds*

Question & Answer Period 12:45 – 1:00 p.m.

Buffet Lunch@ 1:00 p.m.

Jeff McCarthy
Vice President, Business Development
Maine Fiber Company, LLC
jmccarthy@mainefiberco.com

Jeff McCarthy holds 30 years of experience in the competitive B2B telecommunications industry, focused on infrastructure creation and service delivery in predominantly rural areas of New England. Before starting his career in telecom, Jeff spent five years working as a staff psychologist for the State of Massachusetts, where he acquired skills that have advanced his career in telecom management. His career has included a broad range of experience, including work as a Sales Agent, managing network operations for a financial institution, establishing and growing a facilities-based CLEC in Vermont, managing a 100+ person B2B sales organization, and establishing a dark fiber leasing business. While working for one of the first true facilities-based CLEC's in the US, he introduced fiber optic-based solutions for public sector and commercial customers throughout the State of Vermont. This fiber infrastructure was extended to over 400 buildings and supported the introduction of competitive voice services, commercial internet, and private IP networking, eventually becoming the dominant provider of commercial telecom services in Vermont before being sold to Level 3. Mr. McCarthy joined Maine Fiber Company (MFC), the recipient of federal stimulus funding for the construction of a middle-mile dark fiber network in Maine. Since joining MFC in 2011, the network has been enhanced to facilitate interconnection and long-haul transport for the 26 customers currently leasing fiber. His current focus is the development of opportunities that utilize the federally funded dark fiber to advance commercial and public sector initiatives.

MFC
Maine Fiber Company

Fiber Optic Connectivity

Using Open-Access Fiber to Drive Economic Growth in Cumberland County

July 8, 2015

MFC Overview

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Maine Fiber Company

A 'Middle Mile' Fiber Optic Network

- Designed to connect regions or clusters of users to service providers.
- Improved reliability, capacity, and reach for service providers.
- Interconnects with 'Last Mile' networks of various types.
- Dark fiber requires equipment and a service provider to be used for broadband or transport

An Open-Access, Non-Discriminatory Network

- Anyone can lease fiber on similar terms
- Leased by the 'strand mile'
- Subsidized rates - $16-$25 strand/mile/month

Our Partners

OXFORD NETWORKS

OTTcommunications

24 Contracted Customers

- ISPs / broadband providers
- Carriers – wireless, local and 'long-haul'
- Content providers
- Public sector networks – UMS/MSLN, UNE
- Private sector

Wide Range of Uses

- Extending coverage area
- Improving performance (more / faster broadband!)
- Reducing cost
- Introducing competition
- ***Capturing new business…***

Cumberland County Assets

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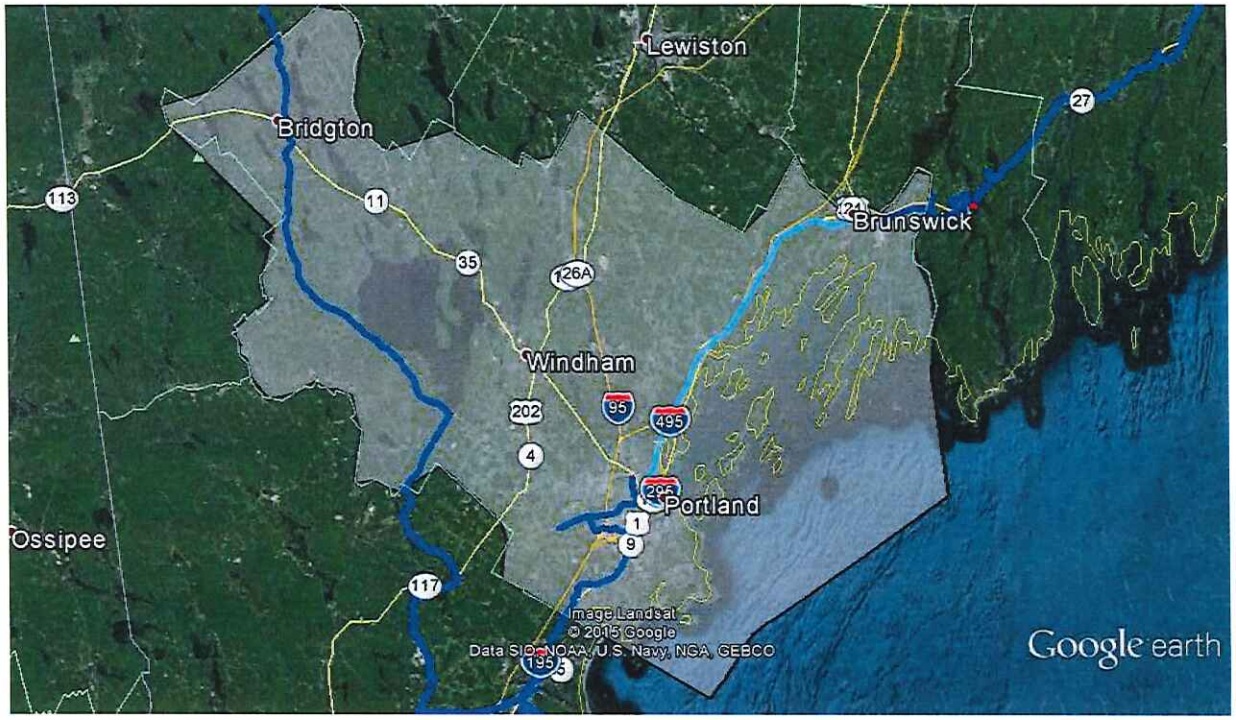
- Eastern Route - From Scarborough -> Portland -> Freeport -> Brunswick
- Western Route – From Standish -> Sebago -> Bridgton
- 97 Fiber Route Miles with 74 existing interconnection (splice) points



Select Cumberland County 'Metro' Assets

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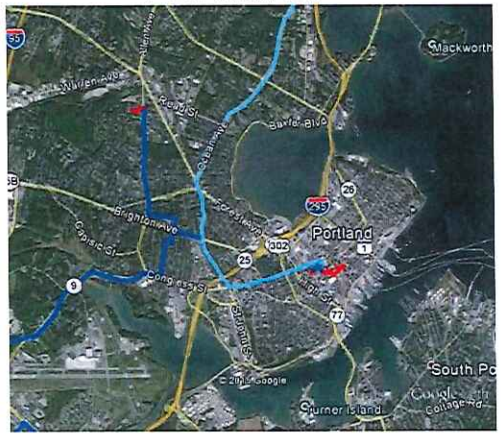
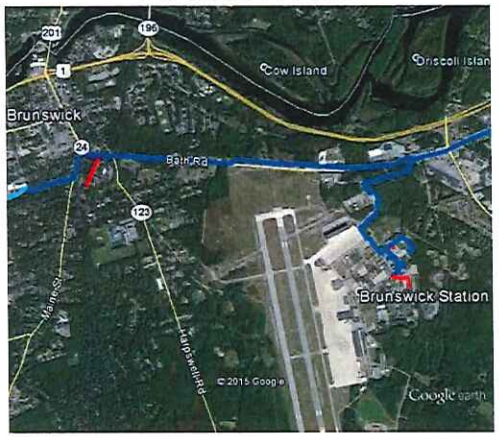
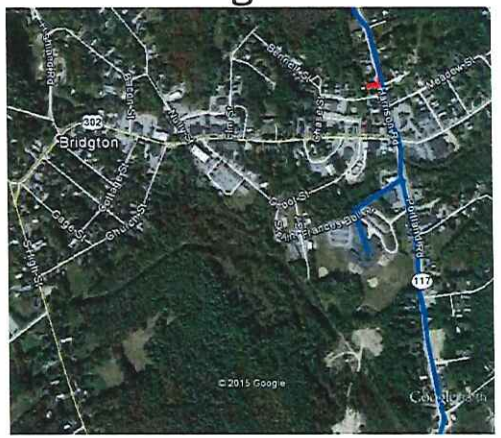
Portland



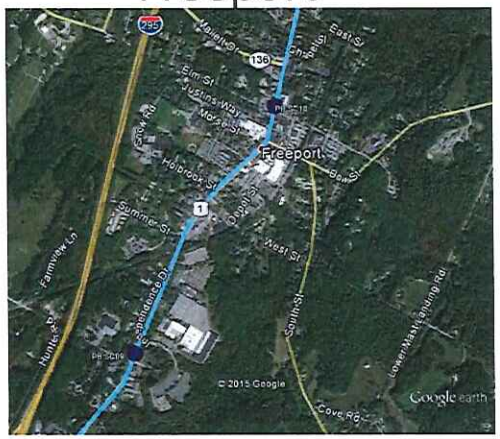
Brunswick



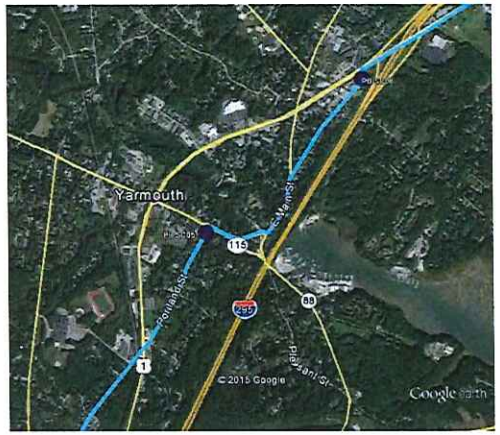
Bridgton



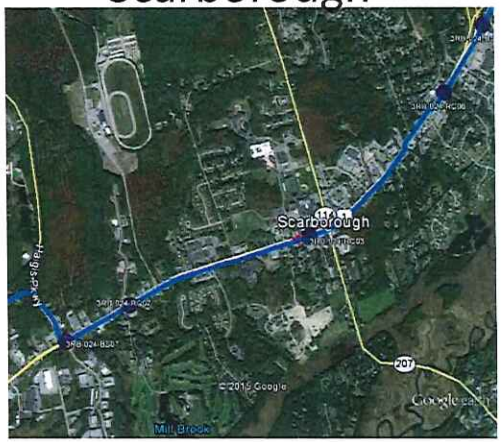
Freeport



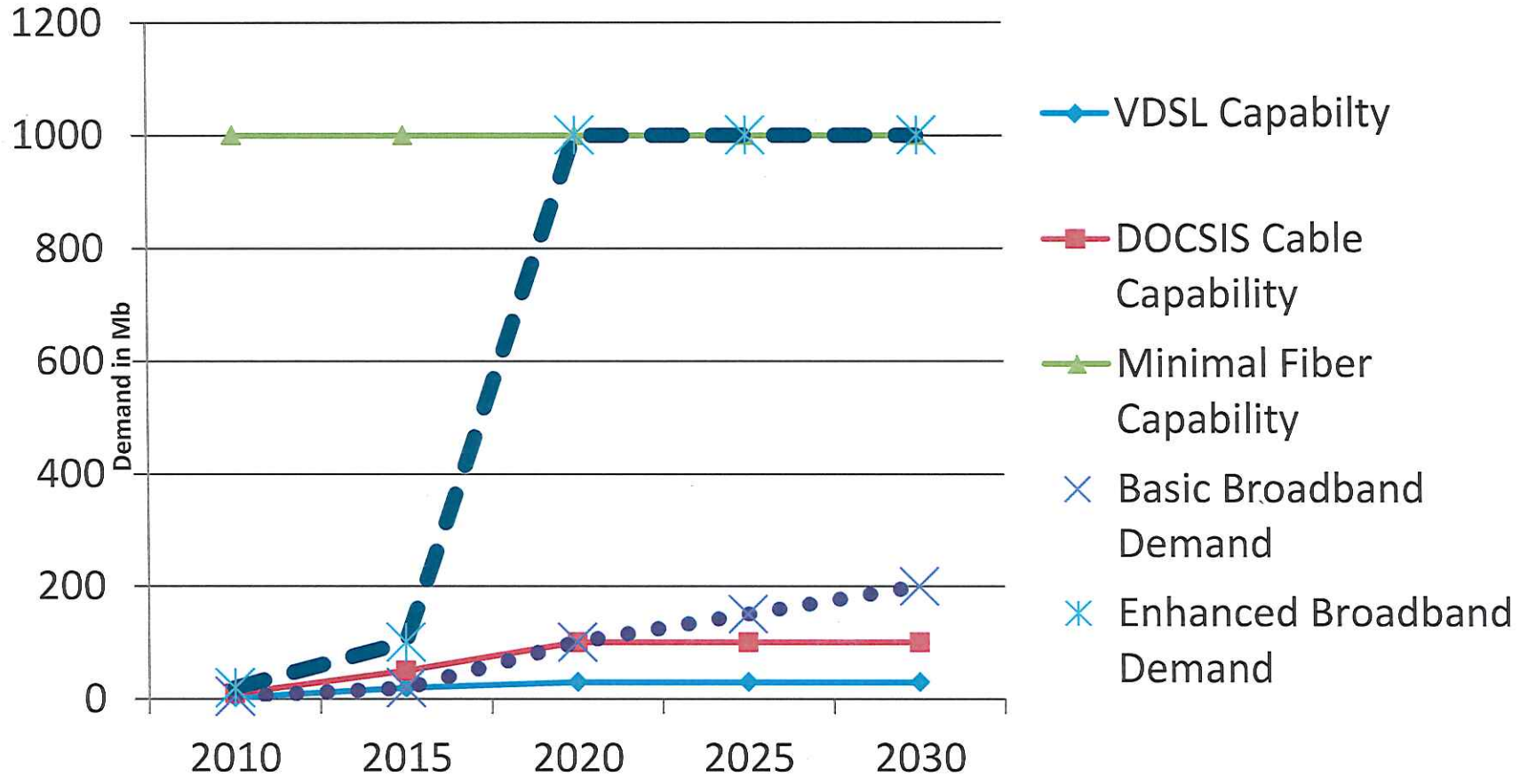
Yarmouth



Scarborough



The Last Mile Challenge (Illustration)



Economic Development and Municipality Roles

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Rapid Learning Curve – Find champions, understand the building blocks

- Infrastructure
  - Copper (DSL), HF Coax (Cable), Fiber (All), and Wireless
- Telecom Service Types
  - Broadband, commercial internet, private networks

Research Demand – Current and projected

- Business
  - Commercial Internet, private networks
- Public Sector
  - Schools, libraries, municipal needs
- Residential
  - Basic and enhanced needs
  - Micro-business needs live here

How Can MFC Help?

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Business Case Development – municipal networks

- High level design and capital cost assumptions
- OPEX components and assumptions
- Middle mile connectivity
- Revenue modeling

Education

- Direct – what is it, how does it benefit the local economy
- Indirect (with vendors and third parties)

Positioning

- Presentations and meetings with constituents and interested parties
- Introductions to potential providers and partners

THANK YOU!

David Maxwell
Broadband Program Director
ConnectME Authority
David.W.Maxwell@maine.gov

David Maxwell serves as the Broadband Program Director and senior member of the FirstNet Project team with the State of Maine ConnectME Authority. The mission of ConnectME Authority, in part, is to facilitate the expansion of broadband services throughout Maine, as well as to oversee the planning and presumed implementation of FirstNET, a national public safety broadband network. David's most recent focus has been on building broadband capacity and demand in various demographic sectors of Maine, notably business/economic development, education, health care, and consumers. Mr. Maxwell advocates for a collaboration among public and private entities in achieving greater and improved broadband access in Maine. A longstanding public servant, his previous work assignments have included IT project management and environmental regulation, clean-up and restoration. A Maine native, David resides in central Maine and spend much of his free time in the remote mountains of western Maine and southern California.

Broadband

The Road to Maine's Future

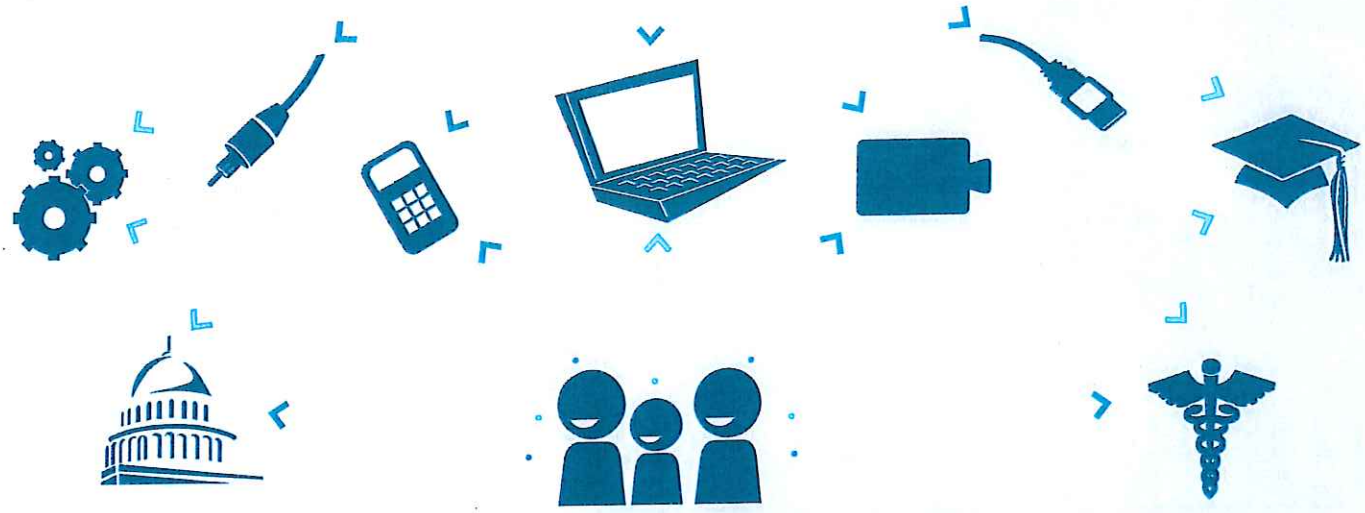
A Summary of Task Force Recommendations

The internet is fun. It's a way to keep up with your friends, follow sports teams, play games and shop.

But it is also something very serious — a technology that offers the promise of more jobs, better health care, more effective schools, and less expensive government services for Maine. It is a vital connection to the world economy. It brings us into intimate contact with people around the nation and the world.
The internet presents us with a great opportunity if we take advantage of it.

This report provides a strategy for using broadband - i.e., high-speed internet connections that are always on - to transform Maine.

The internet is a vital connection to the world economy.



We see Maine businesses using the internet to:

- communicate rapidly with customers;
- stimulate new ideas and reach new markets;
- create jobs and attract talented young workers.

We see health care organizations enabling:

- specialists to consult directly with patients;
- people with chronic diseases to monitor themselves;
- elderly to stay in their homes;
- health planners to use in-depth data.

We see schools empowering:

- students to have access to the most talented teachers in the world;
- teachers to make use of diagnostic information;
- principals to collaborate with neighboring schools.

We see local governments:

- sharing back office functions electronically - assessing, budgeting, licensing;
- providing a wide range of other services more effectively and less expensively—from tax filing to camp site reservations to appointment scheduling;
- attracting visitors.

This strategy envisions a Maine that is attractive to young people as a place to live, work, and play; that is growing in jobs and income; that has reduced the cost of living, the cost of health care, and the cost of government; and that provides individuals with choices at work, at school, in health care, and in dealing with government.

In fact, if Maine follows the recommendations set forth within, the cumulative impact on the Maine economy over the coming decade would be to add 11,000 jobs, create $500 million in new income, and pass along $70 million new dollars a year to state and local governments.

About 75% of Mainers use broadband in the home. That's about the U.S. average. But it's below other places. Neighboring New Hampshire and Canada are somewhat higher, and the Nordic countries and South Korea (at 98%!) are much higher. Not surprisingly, the rate of annual economic growth from 2003-2013 roughly corresponds with broadband usage: U.S. (1.7%); Canada (1.9%); Sweden (2.3%); and South Korea (3.7%).

Recommendations for Broadband Expansion

1 Consider redefining minimum broadband service at a speed level 3 to 6 Mbps, formalizing the definition of underserved as provisioned in the Advanced Technology Infrastructure Act. [1]

Enlarging the area of unserved and identifying areas of underserved in the state will:

- Help focus funding on higher-capacity broadband services to meet critical business, educational, healthcare, and public safety needs, promoting "availability to all individuals, businesses, and institutions,... including those that require ultra-high-speed internet access"
- Bring support to the underserved, targeting broadband development in areas with the highest level of broad-based benefit

2 Encourage public-private partnerships to fund a complete buildout of existing infrastructure, leveraging initiatives of healthcare, schools and libraries, business, and the public safety broadband network.

Completing the buildout will:

- Maximize Maine's existing physical infrastructure to support, strengthen and integrate Maine's logical infrastructure, including business, healthcare, education, and public safety initiatives
- Grow business and retain IT expertise in the state, attract business from out of state, and improve Maine's national ranking in the deployment of broadband telecommunications
- Promote service provider competition, invigorating the drive to innovate, to invest in higher-capacity technologies, and to provide service that creates more consumer value for the dollar

3 Provide educational outreach on broadband's value proposition (the benefits for the cost), targeted to specific audiences within each stakeholder group, including older citizens and small businesses.

Education on broadband's benefits and opportunities will:

- Encourage non-adopters to obtain a computer and to connect to the internet, closing the computer/internet gap and increasing the number of subscribers in the state
- Encourage adopters to seek the advantages of higher-speed broadband, including distance-learning opportunities, telemedicine, and business out of state, advancing the knowledge, health and welfare of Maine's citizens
- Increase broadband uptake in the state, improving Maine's ranking nationally

4 Embrace mobile technology as broadband and leverage its power as a demand generator to drive broadband adoption.

Recognizing 4G mobile technology as broadband will:

- Support the use of mobile devices as an introductory learning tool for computer and internet non- and late-adopters, helping to offset the challenge of Maine's demographics
- Increase availability of high-speed broadband service, particularly in remote areas with challenging terrain, helping to solve the problem of last-mile access
- Increase broadband uptake in the state, improving Maine's ranking nationally
- Increase broadband funding through additional monthly surcharges on mobile services
- Encourage mobile providers to innovate, including advancing transmission speeds and capacity

[1] http://www.mainelegislature.org/legis/statutes/35-A/title35-Asec9204.html

Developing Broadband in Maine

Baseline Update 2013

The ConnectME Authority has recently released **Developing Broadband in Maine: Baseline Update 2013**, a new study on Maine broadband availability and adoption. Part of the Authority's five-year Broadband Planning Project (2009 – 2014), the study updates the baseline findings of the 2011 Broadband Needs Assessment, identifies factors driving recent broadband growth, and provides recommendations for use in strengthening the Authority's broadband strategies as outlined in the 2012 Broadband Strategic Plan. A full version of the study report is available at:

maine.gov/connectme

CONNECTME

The Status of Maine Broadband Today – Five Key Findings

The general need and demand for higher levels of broadband service driven by social, economic and technological factors are increasing.

Although households and businesses report increased satisfaction with the delivery of basic internet services for communications, email and social media, particularly for the cost they pay, a growing number of consumers in business, government, health and educational sectors identify a growing need for higher-speed broadband with greater bandwidth to conduct more business functions online and to deliver new, enhanced services to Maine citizens and communities. With faster internet, Maine businesses indicate they would do more web site development and business in general; community anchor institutions would do more online training and recordkeeping; schools would engage in innovative digital testing and learning; libraries would advance digital literacy efforts; and healthcare organizations would provide more telemedicine services. Among state agencies, the demand for wireless broadband access, online data sharing, and advanced public safety communications is driving the need for greater bandwidth.

Although Maine's coverage for basic broadband services has increased, current service levels in many locations are still too low to support the growing network demands of higher level applications.

Most of Maine (93% of street locations) is now served with lower-speed broadband (from 768 kbps to 1.5 Mbps), and the availability of broadband internet technologies, specifically DSL, fixed wireless, cable and fiber, has increased across the state. Although access to higher-speed services (3 Mbps and above) has increased, lower-speed broadband and the use of traditional copper wire networks still prevail. Consumers and businesses are satisfied with the basic level of internet service for communications and social media, the primary activity for which they subscribe. At the same time, more stakeholders recognize the need for speeds as high as 25 Mbps and greater network capacity to support such beneficial applications as telecommuting and videoconferencing, remote education and digital learning, telemedicine and real-time medical image consultation. Although Maine's national rankings in deployment of broadband and in broadband download capacity have increased, the state continues to lag behind most other states, and a large population of Maine citizens remains underserved.

Lack of perceived value in computer use and internet adoption has solidified as the most significant factor for nonsubscribers of broadband services.

The primary barrier to broadband subscribership among Maine households and businesses is lack of interest or perceived value in owning a computer or in having an internet connection, respectively. Although household and business subscribership has increased, reducing the number of non-adopters in both stakeholder groups, the percentage of non-adopters that cite these barriers as primary has risen, as opposed to the percentage that cite cost, which has decreased. In addition, among residential consumers, the gap between the desire to purchase a computer and the actual plan to do so has widened. A major influencing factor is Maine's demographics, particularly an aging population and households of only senior citizens.

Maine's demographics continue to present a challenge to broadband advancement.

Relative to other states, Maine's demographics continue to rank high in areas that retard broadband uptake (see table at left). Key drivers of broadband advancement that offset the challenge of Maine's demographics are shown to be educational attainment among households and the type of internet technology used among households and businesses, including mobile devices. Accessible, easy to learn, and multipurpose, mobile devices can remove barriers to computer and internet use, particularly among older citizens, and generate demand for broadband services.

Mobile wireless service is more widely available and used by consumer and business communities to complement other internet technologies.

Significant growth in the use of mobile devices has occurred across all stakeholder groups. As with most other internet technologies, the migration to mobile wireless is at a basic level—for email, social media and other forms of communications—and at current speeds and network capacities, mobile cannot support many business, healthcare, educational and public safety applications. Also most stakeholders use mobile in conjunction with other internet technologies. With the advent of 4G mobile technology and spread of mobile provider coverage, however, more stakeholders will use mobile devices as their sole means of connecting. Given its popularity and ease of use, mobile wireless can be a powerful digital learning tool, increasing access to, demand for and adoption of broadband in Maine.

Drivers of Computer Use and Broadband Internet Subscribership in Maine

Factors that increase use/subscribership:	*Maine's ranking relative to all US states:*
Households with one or more children under the age of 18	48th out of 50 in % of households with one or more children under 18
Households with more than 3 people	48th out of 50 in % of households with more than 3 people
Small businesses in the finance and insurance industry	48th out of 50 in % of small businesses in the finance and insurance sector
Factors that decrease use/subscribership:	*Maine's ranking relative to all US states:*
Households with annual incomes of less than $15,000	18th out of 50 in % of households with annual incomes of less than $15,000
Households comprised of people over the age of 64	5th out of 50 in % of households with one or more people over the age of 64
Small businesses with fewer than 5 workers	9th out of 50 in terms of % of establishments with 1 to 4 employees

Broadband

The Road to Maine's Future

BUSINESS

Commercial
Retail
Industrial

More jobs for Maine.

21% of economic growth from 2004 to 2009 is attributed to the internet

Start-up businesses can save $16,500 annually

Companies grow more quickly

EDUCATION

Students
Teachers
Distance Learning
Digital Materials

Individualized, interactive, affordable education.

Student access to the best teachers

Quality diagnostic information available to teachers

Individualized learning programs

CONSUMER

Communication
Entertainment
Online shopping

97% of American consumers look online for purchases and services.

HEALTHCARE

Health Providers
Laboratories
Pharmacies
Tele-medicine

Better and more affordable health care.

More individual control of care

Faster access to experts

Lower insurance costs

GOVERNMENT

Transportation
Public Safety
Emergency Services
e-government

Responsive, affordable government.

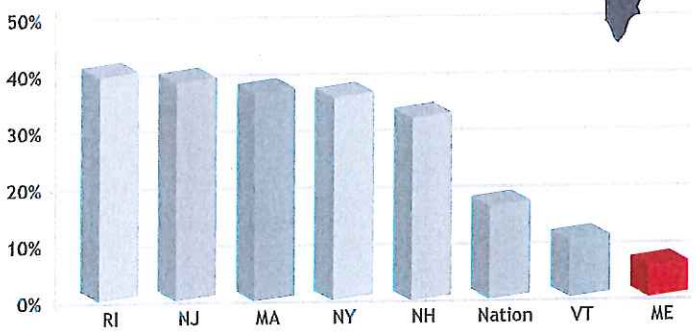
No waiting in line for licenses and permits

Interactive feedback to officials

Reduced administrative costs

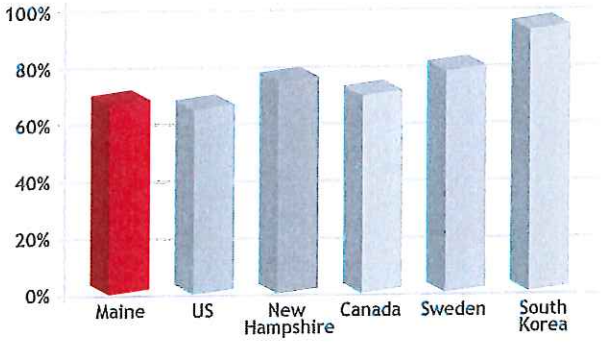
Lower cost to taxpayers

Percentage of Connections with Speeds 10Mbps or Greater



Source: James W. Sewall Company for the ConnectME Authority, *Developing Broadband in Maine: Baseline Update 2013, Volume 1*, Retrieved from http://www.maine.gov/connectme

Maine Household Broadband Use, 2013



Sources: The Whole Picture: Where America's Broadband Networks Really Stand, February 12, 2013, by Richard Bennett, Luke A. Stewart and Robert D. Atkinson, http://www.itif.org/publications/whole-picture-where-america-s-broadband-networks-really-stand, and Exploring the Digital Nation: America's Emerging Online Experience, Prepared by National Telecommunications and Information Administration and Economics and Statistics Administration, June 2013, http://www.ntia.doc.gov/report/2013/exploring-digital-nation-americas-emerging-online-experience.

What Can Maine Do? › help maine businesses get online › teach/learn online › connect to tele-medicine › shift government services online

For the complete broadband report and recommendations, see:
Broadband - The Road to Maine's Future *Report of the Governor's Broadband Capacity Building Task Force*
http://www.maine.gov/connectme

CONNECT ME

So how do we get there? And how do we pay for it?

1. Build the demand.

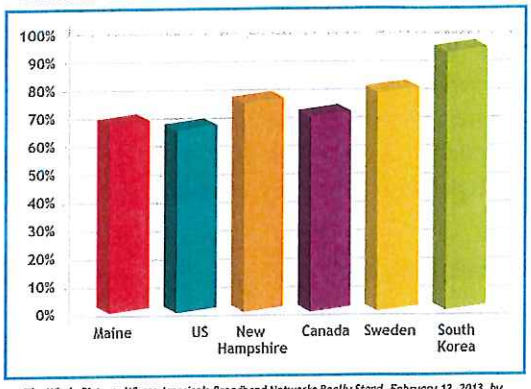
8% of Maine households (50,000) don't have broadband access. It will cost $60 million to build the infrastructure to reach them. How can we stimulate the private sector to pick up more of this tab? The answer is to increase the take rate—the proportion of households who subscribe to broadband internet when it is available. In Maine today the take rate is around 75%.

2. Be neutral among technologies.

Broadband technology is rapidly changing. There are multiple ways to access the internet that meet multiple needs. Government must be open to least-cost solutions to the problem, without preconceptions.

With these two principles in mind, we recommend the following broadband strategy.

Maine Household Broadband Use, 2013



The Whole Picture: Where America's Broadband Networks Really Stand, February 12, 2013, by Richard Bennett, Luke A. Stewart and Robert D. Atkinson, http://www.itif.org/publications/whole-picture-where-america-s-broadband-networks-really-stand.
Exploring the Digital Nation: America's Emerging Online Experience, Prepared by National Telecommunications and Information Administration and Economics and Statistics Administration, June 2013, http://www.ntia.doc.gov/report/2013/exploring-digital-nation-americas-emerging-online-experience.

Broadband Policy Recommendations

1. **Help Maine businesses move to the internet:** We recommend a 3-year tax credit for internet-related staff training and marketing expenditures for all Maine small and medium-sized businesses.
2. **Help Maine elderly stay home:** We recommend changing MaineCare program incentives to grow the proportion of elderly receiving home care in Maine from 35% today to 80% in 2020.
3. **Educate health data analysts:** We recommend expanding the talent pool of health data specialists by upgrading data competency in elementary and high schools, and expanding health data offerings at the college level.
4. **Make the UMaine system a model for blended learning:** The University of Maine is ideally configured to create blended learning opportunities statewide. We recommend that the UMaine System get 25% of courses online by 2015.
5. **Provide every elementary and high school student an internet connected device:** Maine's laptop initiatives have improved student test scores. We recommend expanding Maine's middle school laptop program to all students K-12, and paying for this expansion by switching to digital textbooks.
6. **Save tax dollars by shifting administrative functions online:** We recommend reducing state and local government administrative spending by expanding the use of InforMe, the public-private state internet provider.
7. **Make the Maine Turnpike a model for smart roads:** We recommend that the Maine Turnpike Authority make its roadway "smart" by installing fiber optic cable for the entire length. We also recommend that the State Government develop and adopt a state Dig-Once policy in 2014. A Dig-Once policy would make the installation of broadband conduit a regular practice in road construction projects. This would decrease the costs of deploying fiber and eliminate the need for multiple excavations.
8. **Redeploy existing funds to support broadband growth:** Maine has a Universal Service Fund, supported by fees on telephone use. We recommend that companies receiving Maine State Universal Service Fund assistance be required to support broadband expansion as well as telephone service. Maine also has a ConnectME Fund to support broadband extension. We recommend this fund be allowed to support broadband expansion projects with a major economic impact - even if the project does not involve extending service to an unserved area.

Broadband Resources in Maine

Get Online and Trained at Your Local Library

All Maine public libraries provide free public access to broadband internet connections. The Maine State Library website offers free online tutorials on basic computer skills, social media, email, Microsoft Office, job searches, and other internet uses.
http://www.maine.gov/msl/digital/resources.shtml

Get the Skills

Adult Ed Classes
Centers throughout Maine offer internet and computer skills classes, from beginning to advanced levels. Use their web page to find a course near you at http://www.maineadulted.org/

Get the Website

Google's "Get Your Business Online" project offers free website design, business listing on Google, a customized web address and free website hosting for a year - see http://www.gybo.com/maine/

Get on Social Media

Facebook can help build a page for your business and Twitter offers "Twitter 101" for businesses:
https://www.facebook.com/business
https://business.twitter.com/twitter-basics

Get Help

For information about broadband availability at your address, and state policies concerning broadband expansion, see the ConnectME website at http://www.maine.gov/connectme/index.shtml

Maine Broadband Task Force Members

Warren Cook, Chair, Co-founder of Maine Network Partners
Devore Culver, Executive Director and CEO, HealthInfoNet
Lisa Smith, Senior Planner, Governor's Energy Office
Allyson Handley, President, University of Maine at Augusta
George Hogan, Senior Vice President and Chief Information Officer, Wright Express
Christopher Jerome, Executive Vice President, Global Services, Unum
Peter Mills, Executive Director, Maine Turnpike Authority
Bob Montgomery-Rice, Executive Vice President, Bangor Savings Bank
Ryan Pelletier, Director of Economic and Workforce Development, Northern Maine Development Commission

For the complete broadband report and recommendations, see:
Broadband - The Road to Maine's Future
Report of the Governor's Broadband Capacity Building Task Force
http://www.maine.gov/connectme

CONNECT ME

Factors Influencing Changes in Maine Broadband Development: 2011-2013

MEASUREMENT CRITERIA	BASELINE 2011	UPDATE 2013	FACTORS/INFLUENCES
Broadband Availability & Use			
Maine Locations			
• Percent of street locations having access to broadband at speeds of 768 kbps or above from at least 1 service provider ➤ Increase in fixed wireless	91.1% 15.7%	93.1% 19.8%	• ConnectME Authority grant awards have influenced growth in specific Maine counties. Projects completed since 2011 now serve over 1000 households. Projects funded since inception now provide broadband availability to over 36,000 households. • Many providers have invested in additional buildout. • Fixed wireless is a lower-cost technology to implement than wired networks.
• Percent of street locations having access to broadband at speeds of 3 Mbps or above from at least 1 service provider ➤ Increase in cable	13.3% 6.3%	84.9% 82.8%	• Majority of increase is due to technology upgrades on part of cable service providers rather than that of local incumbent telephone companies. Cable companies realize far less investment costs to offer higher-capacity cable services.
• Percent of street locations having access to broadband at speeds of 10 Mbps or above from at least 1 service provider ➤ Increase in DSL ➤ Increase in fixed wireless	6.3% 0.0% 0.0%	20.8% 11.5% 5.0%	• A number of providers are maximizing throughput of physical plants in which they have invested. This represents incremental improvements over full replacement. • The increase in broadband coverage at speeds from 10 Mbps to 25 Mbps is attributable to GWI service offerings.
• Percent of geographic area coverage having access to mobile broadband at 4G speeds	0.0%	43.0%	• The growth of new mobile technology and the presence of new mobile providers in Maine are major factors. • Large telecommunications companies are investing in cellular service/wireless and not wired networks. • The advance of smartphones and tablets is creating an entry point for adoption by non-owners of traditional computers.
• Average number of broadband service providers per Maine community	4.3	4.7	• Inclusion of resellers increases service provider options.
Maine Households			
• Percent of surveyed Maine households having some form of internet connection	89.6%	89.8%	
• Percent of surveyed Maine households using mobile devices	24.2%	47.6%	• Growth in mobile technology and mobile providers are major factors.
• Percent of surveyed Maine households subscribing at broadband levels	72.7%	75.3%	• Households are upgrading service from dialup to DSL, cable and fixed wireless
Maine Businesses			
• Percent of surveyed Maine businesses having some form of internet connection	90.1%	93.7%	
• Percent of surveyed Maine businesses using mobile devices	32.3%	46.3%	• Growth in mobile technology and mobile providers are factors.
• Percent of surveyed Maine businesses subscribing at broadband levels	85.7%	93.1%	• A shift toward less expensive internet has occurred.
Consumer Identified Barriers to Broadband Use			
• Barriers for surveyed households ➤ Lack of perceived value in owning a computer (major reason households do not connect) ➤ Cost	44.7% 21.3%	54.1% 18.3%	• The 2013 survey sample is an older demographic—a segment with less interest in computers. Non-adopters, the group on which these percentages are based, have decreased over time, as the group of adopters has increased.
• Barriers for surveyed businesses ➤ Lack of perceived value in having an internet connection ➤ Cost	39.1% 28.3%	54.6% 18.2%	• Maine businesses are conducting less business out of state, and generating less income in 2013. • Price businesses are willing to pay for faster internet has decreased.
Maine's Broadband Infrastructure			
• Average broadband download capacity ➤ Maine ➤ National • Percent of households having at least 10 Mbps (download) • Maine's ranking in deployment of broadband telecommunications	768 kbps 3.9 Mbps 6.0% 45th	4.8 Mbps 6.4 Mbps 11.1% 37th	• Advances from plant improvements and cable upgrades have contributed to the rise in broadband download capacity. • 2013 data is more inclusive than 2011 data due to more comprehensive service provider reporting.

Factors Influencing Changes in Maine Broadband Development: 2011-2013

MEASUREMENT CRITERIA	BASELINE 2011	UPDATE 2013	FACTORS/INFLUENCES
Focused Stakeholder Groups			
The Healthcare Community			
• Broadband availability and use			• Federal incentives for implementing and adopting meaningful use of electronic health records and growing confidence in and use of the HealthInfoNet system have contributed to the rise in broadband access and internet use.
> Percent of surveyed facilities with access to broadband	88.0%	95.0%	
> Percent of surveyed facilities with some form of internet connection	90.0%	98.0%	
> Percent of surveyed facilities subscribing at broadband levels	—	95.0%	
> Percent using mobile devices	1.0%	12.0%	
• Barriers to broadband adoption			
> Lack of perceived need or value	42.0%	40.0%	
> Cost	12.0%	20.0%	
> Lack of adequate service	—	30.0%	
The Education Community (K-12)			
• Broadband availability and use			• Small growth in fiber is a factor of available funding. Schools still primarily served by copper-based networks. Fiber plant may be in community, but not to building. • Schools are not taking advantage of speeds available to them. • Mobile devices are used for communications, not as a classroom tool.
> Percent with broadband service	100%	100%	
> Percent with fiber optic connections	44.0%	48.0%	
> Percent using mobile devices	18.2%	72.7%	
• Barriers to broadband adoption			• Middle mile fiber now exists, but is still not accessible.
> Price	Yes	Yes	
> Sufficient bandwidth	Yes	Yes	
> Lack of middle/last mile infrastructure	Yes	No	
> Lack of access to middle/last mile infrastructure	—	Yes	
Community Anchor Institutions			
• Broadband availability and use			• Increase in respondents in 2013 survey provided more accurate numbers than limited survey sample in 2011.
> Percent with access to broadband	94.4%	95.4%	
> Percent of surveyed CAIs with some form of internet connection	—	95.9%	
> Percent of surveyed CAIs subscribing at broadband levels	—	88.0%	
> Percent using mobile devices	—	43.7%	
• Barriers to broadband adoption			
> Cost	—	28.6%	
> Perceived value	8.0%	21.4%	
> Outdated equipment	4.0%	7.1%	
> Lack of technical support	3.0%	0.0%	
State Agencies			
• Broadband availability (estimated)	98.0%	99.0%	
• Percent using privately owned mobile devices to connect to State access points	33.3%	66.6%	
• Barriers to adoption (anecdotal)			
> Limited or no carrier access to remote geographic areas	Yes	Yes	
> Funding	Yes	Yes	
Native Indian Tribes			
• Broadband availability			• Broadband trends between Tribal communities and general populations in Maine continue to mirror each other. • Service providers have increased reporting. • Providers have made advancements in physical plants.
> Aroostook Band of Micmacs	98.0%	100%	
> Houlton Band of Maliseets	65%	100%	
> Penobscot Nation			
Indian Island	100%	100%	
Remaining lands	21.0%	100%	
> Passamaquoddy Tribe			
Pleasant Point	100%	100%	
Indian Township	100%	100%	
Remaining lands	12.0%	56.1%	
• Percent of Tribes living on Tribal lands subscribing to broadband	—	75.3%	• In 2013, perceived lack of value was indicated a greater barrier than cost.
• Barriers to adoption—all Tribes			
> Cost	Yes	Yes	
> Perceived lack of value	—	Yes	

Broadband Capacity Building in Maine

Presented at the Cumberland County Municipal Broadband Summit

July 8, 2015

David Maxwell, Program Director

ConnectME Authority

http://www.maine.gov/connectme

CONNECT ME

Genesis of the Broadband Capacity Building Task Force

- Funded by a five-year grant from the National Telecommunications and Information Administration (NTIA)
- Required to develop a broadband capacity building plan
- Met ten (10) times in 2012 and 2013
- Issued report in December 2013

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Status of Broadband Availability

- Maine is served by approximately 40 fixed line broadband providers.
- 93.1% of street locations have access to broadband at 768kbps or greater.
- 84.9% of street locations have broadband available at 3Mbps or greater.
- 20.8% of street locations have broadband available at 10Mbps or greater.
- 43% of the geographical area of Maine has access to 4G mobile broadband.

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Status of Broadband Use

From surveys conducted in 2011 and 2013:

- 75.3% of households with access subscribe to broadband (about the same in 2011 and 2013).
- 47.6% of households use mobile devices (nearly twice the use found in 2011).
- ***93.7% of businesses have some form of internet connection (up 3.2% since 2011).***
- ***93.1% of businesses subscribe to broadband (up 7% since 2011).***
- ***46.3% of businesses use mobile devices (up 14% since 2011).***
- ***59% of Maine small and intermediate businesses do not have a website.***

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Percentage of Addresses with Access to Tier 1 Broadband						
Region	Any Type	Cable	DSL	Fixed Wireless	Optical/ Fiber	Average # of Suppliers
Statewide (n=494)	**93.1%**	**85.3%**	**37.0%**	**19.8%**	**0.4%**	**4.7**
Androscoggin (n=14)	99.6%	99.0%	50.3%	0.3%	0.0%	5.4
Aroostook (n=67)	87.2%	67.8%	27.4%	60.0%	0.0%	4.6
Cumberland (n=26)	**97.8%**	**97.2%**	**35.8%**	**0.2%**	**0.2%**	**4.5**
Franklin (n=23)	70.7%	36.8%	29.3%	28.3%	0.0%	3.9
Hancock (n=36)	80.7%	68.7%	20.3%	37.6%	3.2%	4.1
Kennebec (n=30)	99.1%	98.6%	34.0%	23.2%	0.2%	5.3
Knox (n=18)	98.0%	87.6%	47.1%	86.7%	0.0%	5.3
Lincoln (n=20)	99.4%	95.4%	46.6%	51.1%	0.5%	4.5
Oxford (n=37)	94.5%	89.1%	45.3%	0.2%	0.0%	3.8
Penobscot (n=61)	88.7%	75.8%	41.4%	26.1%	1.6%	4.9
Piscataquis (n=19)	46.1%	37.9%	18.2%	0.0%	0.0%	3.7
Sagadahoc (n=10)	91.9%	82.9%	36.6%	30.2%	0.0%	4.2
Somerset (n=33)	79.8%	55.2%	22.7%	38.6%	0.0%	4.0
Waldo (n=26)	86.7%	49.8%	45.7%	45.5%	0.0%	4.4
Washington (n=45)	88.5%	58.2%	19.7%	70.8%	0.3%	3.8
York (n=29)	98.8%	98.5%	39.3%	0.0%	0.0%	4.9

Percentage of Addresses with Access to Tier 3 Broadband						
Region	Any Type	Cable	DSL	Fixed Wireless	Optical/ Fiber	Average # of Suppliers
Statewide (n=494)	**84.9%**	**82.8%**	**16.9%**	**5.5%**	**0.3%**	**1.9**
Androscoggin (n=14)	99.2%	99.0%	27.5%	0.0%	0.0%	2.1
Aroostook (n=67)	68.0%	64.3%	13.3%	0.0%	0.0%	1.5
Cumberland (n=26)	**97.4%**	**97.2%**	**24.0%**	**0.2%**	**0.2%**	**2.2**
Franklin (n=23)	44.4%	36.8%	9.4%	0.0%	0.0%	1.2
Hancock (n=36)	68.8%	68.7%	3.2%	1.6%	0.1%	1.5
Kennebec (n=30)	98.6%	98.6%	17.5%	0.7%	0.2%	1.8
Knox (n=18)	96.5%	87.6%	19.1%	82.9%	0.0%	2.0
Lincoln (n=20)	97.5%	95.4%	0.0%	51.0%	0.5%	2.1
Oxford (n=37)	89.1%	89.1%	5.2%	0.0%	0.0%	1.4
Penobscot (n=61)	76.2%	74.6%	17.3%	0.0%	1.6%	1.8
Piscataquis (n=19)	38.1%	37.9%	5.1%	0.0%	0.0%	1.1
Sagadahoc (n=10)	83.5%	74.9%	22.6%	30.2%	0.0%	2.1
Somerset (n=33)	58.5%	55.2%	5.7%	0.0%	0.0%	1.4
Waldo (n=26)	62.8%	49.8%	6.0%	23.0%	0.0%	1.3
Washington (n=45)	58.5%	58.2%	4.7%	0.0%	0.0%	1.2
York (n=29)	87.8%	85.0%	18.9%	0.0%	0.0%	2.2

Percentage of Addresses with Access to Tier 5 Broadband						
Region	Any Type	Cable	DSL	Fixed Wireless	Optical/ Fiber	Average # of Suppliers
Statewide (n=494)	**20.8%**	**6.2%**	**11.5%**	**5.0%**	**0.2%**	**0.9**
Androscoggin (n=14)	19.5%	2.7%	17.0%	0.0%	0.0%	1.1
Aroostook (n=67)	10.2%	0.0%	10.2%	0.0%	0.0%	0.5
Cumberland (n=26)	**25.6%**	**10.9%**	**15.9%**	**0.2%**	**0.2%**	**1.3**
Franklin (n=23)	4.7%	0.0%	4.7%	0.0%	0.0%	0.4
Hancock (n=36)	3.7%	0.0%	2.2%	1.5%	0.1%	0.4
Kennebec (n=30)	13.0%	0.0%	12.2%	0.6%	0.2%	0.7
Knox (n=18)	78.9%	0.0%	14.5%	78.8%	0.0%	1.0
Lincoln (n=20)	43.5%	0.0%	0.0%	43.5%	0.0%	1.0
Oxford (n=37)	3.3%	0.0%	3.3%	0.0%	0.0%	0.4
Penobscot (n=61)	14.4%	0.0%	12.9%	0.0%	1.6%	0.9
Piscataquis (n=19)	3.8%	0.0%	3.8%	0.0%	0.0%	0.3
Sagadahoc (n=10)	68.1%	60.6%	16.0%	29.8%	0.0%	1.6
Somerset (n=33)	3.0%	0.0%	3.0%	0.0%	0.0%	0.3
Waldo (n=26)	19.9%	0.0%	4.1%	18.6%	0.0%	0.4
Washington (n=45)	3.9%	0.0%	3.9%	0.0%	0.0%	0.3
York (n=29)	25.2%	13.9%	13.1%	0.0%	0.0%	0.9

Household and Business Survey Respondents by County				
County	Household Respondents (%)		Business Respondents (%)	
	2011	2013	2011	2013
Androscoggin	10.09%	7.33%	8.92%	7.67%
Aroostook	5.89%	5.96%	7.41%	7.95%
Cumberland	**21.24%**	**20.98%**	**24.41%**	**19.89%**
Franklin	2.43%	1.47%	2.53%	1.70%
Hancock	4.76%	4.04%	5.72%	5.11%
Kennebec	9.32%	7.07%	8.08%	8.52%
Knox	4.20%	2.58%	3.20%	2.84%
Lincoln	2.54%	4.36%	2.53%	3.98%
Oxford	2.93%	4.67%	3.03%	3.69%
Penobscot	11.12%	11.56%	12.46%	11.08%
Piscataquis	1.59%	1.33%	0.51%	1.42%
Sagadahoc	1.80%	2.93%	2.02%	3.41%
Somerset	3.88%	6.67%	3.20%	4.55%
Waldo	2.40%	2.80%	2.53%	3.98%
Washington	2.29%	2.80%	2.86%	1.99%
York	13.51%	13.47%	10.61%	12.22%

Household Computer Use & Broadband Subscribership

County	Computer in Home	Broadband	Fiber Optic/T-1	Computer Apps (#)	20 Hrs+ Online
Androscoggin	90.66%	81.02%	3.61%	6.47	41.57%
Aroostook	87.92%	71.67%	1.25%	5.95	40.00%
Cumberland	**94.37%**	**89.67%**	**1.17%**	**7.64**	**51.29%**
Franklin	87.72%	66.67%	3.51%	5.71	35.09%
Hancock	90.45%	65.73%	3.37%	6.62	40.45%
Kennebec	85.14%	75.71%	2.29%	6.26	44.29%
Knox	93.75%	79.69%	3.91%	7.20	50.00%
Lincoln	90.51%	73.72%	0.73%	7.12	41.61%
Oxford	85.41%	70.27%	4.32%	5.70	46.49%
Penobscot	91.62%	73.90%	1.33%	6.58	47.05%
Piscataquis	81.82%	52.73%	1.82%	5.36	34.55%
Sagadahoc	92.54%	87.31%	1.49%	7.35	41.04%
Somerset	89.33%	66.85%	3.37%	5.69	44.94%
Waldo	95.08%	72.13%	0.82%	6.24	41.80%
Washington	88.35%	57.28%	3.88%	5.87	41.75%
York	93.02%	86.23%	1.25%	6.97	48.48%
All households--2011	**86.45%**	**72.71%**	**3.03%**	**6.59**	**41.94%**

Differences in Household Computer Use & Broadband Subscribership over Time

County	Computer in Home		Broadband		Computer Apps (#)		20 Hrs+ Online	
	2011	2013	2011	2013	2011	2013	2011	2013
Androscoggin	83.92%	90.66%	73.59%	81.02%	6.32	6.47	39.42%	41.57%
Aroostook	81.93%	87.92%	65.06%	71.67%	5.80	5.95	38.99%	40.00%
Cumberland	**88.81%**	**94.37%**	**84.09%**	**89.67%**	**7.38**	**7.64**	**44.98%**	**51.29%**
Franklin	92.65%	87.72%	68.18%	66.67%	6.46	5.71	42.42%	35.09%
Hancock	86.57%	90.45%	59.85%	65.73%	6.74	6.62	38.46%	40.45%
Kennebec	84.47%	85.14%	70.04%	75.71%	6.20	6.26	43.31%	44.29%
Knox	87.07%	93.75%	74.45%	79.69%	7.05	7.20	47.62%	50.00%
Lincoln	81.94%	90.51%	68.06%	73.72%	6.47	7.12	29.41%	41.61%
Oxford	77.11%	85.41%	71.95%	70.27%	5.67	5.70	37.97%	46.49%
Penobscot	88.85%	91.62%	67.74%	73.90%	6.25	6.58	42.62%	47.05%
Piscataquis	75.56%	81.82%	46.51%	52.73%	4.95	5.36	26.83%	34.55%
Sagadahoc	96.08%	92.54%	74.51%	87.31%	7.92	7.35	40.43%	41.04%
Somerset	83.64%	89.33%	61.32%	66.85%	5.72	5.69	40.38%	44.94%
Waldo	91.04%	95.08%	59.70%	72.13%	6.24	6.24	40.00%	41.80%
Washington	87.50%	88.35%	56.45%	57.28%	6.00	5.87	38.71%	41.75%
York	87.40%	93.02%	80.00%	86.23%	6.91	6.97	44.72%	48.48%

Business Computer Use & Broadband Subscribership

County	Heavy Computer Use	Broadband	Fiber Optic/T-1	Computer Apps (#)	IT Specialist
Androscoggin	60.81%	94.59%	8.11%	5.36	31.08%
Aroostook	64.62%	81.54%	6.15%	4.78	30.77%
Cumberland	**70.47%**	**91.19%**	**8.81%**	**5.49**	**32.64%**
Franklin	73.33%	93.33%	0.00%	5.73	46.67%
Hancock	85.11%	95.74%	10.64%	6.51	44.68%
Kennebec	69.12%	88.24%	13.24%	5.54	30.88%
Knox	66.67%	92.59%	0.00%	5.67	14.81%
Lincoln	48.00%	76.00%	0.00%	3.92	20.00%
Oxford	43.33%	80.00%	3.33%	4.40	20.00%
Penobscot	67.35%	85.71%	2.04%	4.87	23.47%
Piscataquis	NA	NA	NA	NA	NA
Sagadahoc	57.89%	84.21%	5.26%	4.79	10.53%
Somerset	60.61%	78.79%	12.12%	4.67	30.30%
Waldo	60.71%	85.71%	0.00%	5.36	25.00%
Washington	59.09%	68.18%	0.00%	5.09	9.09%
York	56.52%	86.96%	5.43%	5.17	32.61%
All bus.—2011	**63.88%**	**85.74%**	**7.64%**	**5.53**	**29.69%**
All bus.—2013	**63.84%**	**93.05%**	**5.74%**	**4.39**	**27.30%**

Barriers to Broadband Use

From surveys conducted in 2011 and 2013:

- Lack of perceived value for consumer in owning a computer (up 10% from 2011).
- Cost (down 3% from 2011).
- ***Lack of perceived value for business in having an internet connection (up 15% from 2011).***
- ***Cost (down 10% from 2011).***

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Current Speeds around the Country – from One Source

- Earlier this year, OOKLA released average speed information for individual states and for the country:
- For the country……37.1Mbps down/12.1 Mbps up
- For Maine……17.2 Mbps down/3.9 Mbps up
- Maine ranks 51st out of 51 in this assessment
- First place is Washington state with 57.88 Mbps down/43.1 Mbps up

Challenges for Broadband in Maine

- Varied topography/geography
- Low population density decreases payback of private investment in expansion/upgrade; and pockets of seasonal populations make investment even more difficult.
- While availability is generally good, notwithstanding the unserved, speeds often fall far below the national average.
- **While broadband availability may be good overall….. ultimately, lack or slowness of broadband inhibits economic growth:** http://www.bloomberg.com/video/maine-s-big-problem-why-is-internet-service-so-bad-tnDyTUOOTlWbsiXM5gBhZA.html

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What Maine is Doing

- Drawing on talented and diverse individuals and entities to collectively address challenges.
- Working with philanthropic organizations.
- Issuing grants to expand and improve broadband service.
- Promoting the Three Ring Binder for middle mile infrastructure.
- Promoting broadband adoption and use of social media through public relations, adult education, and targeted community forums.

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Recent Legislative Activity

- Seventeen (17) bills addressing broadband
- Five (5) primary bills – LDs 68, 465, 826, 1063, and 1185
- LD 68 proposes a $10M General Fund bond issue (carried over to next session)
- LD 465 eliminates BBSF (effective 90 days after adjournment)
- LD 826 increases ConnectME funding, targeting farmers as recipients (carried over to next session)
- LD 1063 updates original statute and adds planning component to grant program (vetoed and overridden)
- LD 1185 creates Gigabit Broadband Network Access Fund w/out funding (vetoed and overridden)

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Fletcher Kittredge is the CEO and founder of GWI. Fletcher grew up in Arundel, Maine, is a graduate of Colby College and Harvard University. GWI is a telecommunications company founded in 1994 specializing in providing gigabit fiber networks and cloud telephone solutions to Maine. A passionate advocate for broadband growth and network neutrality, Fletcher currently serves on and has held the role of Chairman of the ConnectME Authority Advisory Board. Fletcher led GWI's effort to obtain a $25 million dollar federal grant to deploy 1,110 miles of high capacity fiber optics in rural Maine as part of the *Three Ring Binder* project, later transitioning those funds to independent Maine Fiber Company in order to foster competition and lower broadband costs for rural Maine. In 2011, Fletcher was named the Large Business Leader of the Year by MaineBIZ magazine, in recognition for his leadership of GWI and his efforts to bring funding for the Three Ring Binder to Maine. Under Fletcher's leadership, GWI has also been recognized five times by INC magazine as one of the nation's fastest growing companies.

Roadmap to Building a Community Gigabit Network

A step-by-step guide for Maine municipalities

By Fletcher Kittredge, CEO, GWI

Introduction:

Improving Maine's Broadband Challenges with Community Gigabit Networks

The U.S. has fallen from first to 25th in broadband technology while other countries are using public money to build new all fiber networks to deliver Internet access to homes and businesses. In Maine, our broadband Internet access is significantly inferior to other states and the problem is getting worse. Our technology isn't deteriorating, but the rest of the world is developing broadband capacity at a far faster rate. As the economic significance continues to impact Maine's homeowners and business opportunities, at GWI, we're always exploring solutions. We know that the technology is well understood and widely available – we need to build all fiber community networks throughout Maine.

In Maine, Rockport and South Portland are two municipalities that have started building municipal fiber networks and a number of other towns are exploring building their own networks. GWI is a partner in building Rockport's initial municipal fiber network and is also partnering with South Portland.

Did You Know?

Gigabit Fiber to the Home connections offer homes and businesses broadband connections that are 100 times faster than typical connections?

We are excited to see more Maine towns investing in the technology available in Maine to improve broadband access. We know that Gigabit networks can bring great value to a community, but like any technical public works project, there are many ways they can go wrong.

This guide is designed specifically for Maine municipalities and (other interested community members) to serve as a roadmap to insuring your project's success. Skipping steps will only diminish the likelihood of your success

With the exception of the legal and regulatory sections, it is generally applicable to other states, as well.

Step 1: Identify Goals

The first and most important step is to determine your community's high level goals of the project. ***High level goals should not be technical goals***. They should identify the benefits that your community expects from building the network.

For example, some Maine communities have identified goals such as:

- A major employer needs gigabit access in order to remain in the community
- Our economic future is with the digital and creative economy
- We need to connect our town offices, schools, and libraries
- We want to attract manufacturers to the business park
- Our residents want to save money on their video bills

Infrastructure is a shared resource and the more people you have using the same shared resource, the lower the cost for each person.

At least initially, it is not necessary to connect the entire community. You can start small, learn from an initial project and then expand to the entire municipality. A good place to start in developing goals is to review your municipality's comprehensive plan.

After you have developed your high level goals, we have observed that the following technical goals apply to any project. These goals are driven by our experience that: ***infrastructure is a shared resource and the more people you have using the same shared resource, the lower the cost for each person***. Eventually, all businesses and residences will be connected to the network. By designing the network in advance to be shared by everyone, your long-term cost will be much lower.

- **The system should be designed to be expandable to serve the entire municipality and surrounding regions.** By partnering with other municipalities, you may be able to lower the costs for your town. With minimal added initial cost over building a basic downtown system, you can significantly lower

the costs of extending the system to suburban and rural areas of your town.

- **The system should be designed to connect every building passed on the route.**

- **The system should be designed to be an "open access system".** An open access system is one in which there are many service providers sharing the same infrastructure and competing to offer customers service. In an open access system, the emphasis is on wholesaling to service providers on terms that are "just, reasonable and not unreasonably discriminatory." The providers then supply your businesses and residential customers.[1]

- **The default design should be a dark fiber system.** In a municipal dark fiber system such as Rockport or South Portland, the municipality only funds the capital investment for the fiber and does not fund the capital investment for any equipment nor does the municipality have any significant operating expense or responsibility. Instead, service providers are responsible for providing and operating the equipment. This reduces the municipality's capital cost by more than half and avoids the vast majority of operating expense. Dark fiber networks only work as open access networks. These benefits, in terms of capital and operating expense, come with a risk: if there are not enough service providers interested in providing service on the network, a de facto monopoly can develop, or worse there can be no service provider at all! In Maine, the risk of either of these cases is much less for a municipality connecting to the Three Ring Binder (3RB).[2]

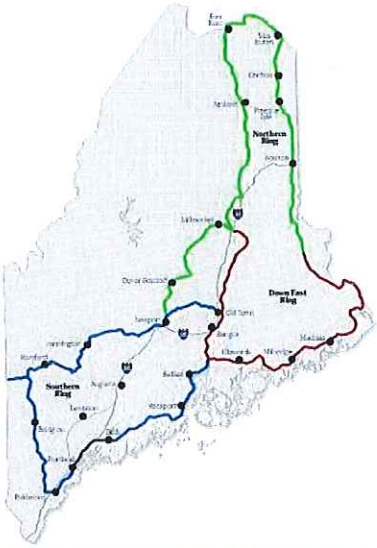

Figure 1: Maine's Thrree Ring Binder Middle-Mile Open Access Dark Fiber

- **Reliability is as important as speed.** Each day, the network is becoming more vital to business, healthcare and public safety. Network reliability should be designed in from the beginning.

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[1] An in-depth discussion of open access systems can be found in ***Business Models for Municipal Networks in Maine***(to be published February 16, 2015).

[2] The Three Ring Binder(3RB) is a federally funded, very large, open access middle mile fiber optic network spanning most of Maine. Dozens of service providers use it and can offer service to customers connected directly or indirectly to the 3RB. Further discussion of the 3RB can be found in ***Business Models for Municipal Networks in Maine*** (to be published February 16, 2015).

Step 2: Gather Data

Gather Capacity Inventory and Demographic Information

Great data is necessary to build a great network. The more detailed information you can make available to community developers, project planners, and network designers, the more likely it is that the goals for the network will be met. Providing capacity inventory and demographic information will allow everyone to evaluate whether or not the business model will be a good match, will insure that the network will be designed correctly and will help keep capital and operational costs to a minimum – all to the benefit of the public.

Important data includes:

- An assessment of current network assets in the community - All carriers should be surveyed
- Municipal and educational telecommunications needs assessment
- Business demographic information and telecommunications needs assessment
- Residential demographic data
- GIS information on parcel data, roads, natural gas lines, sewers, water lines and utility pole locations
- TIF zones
- New market tax credit zones

Step 3: Build Support

Build Constituent Support

It is vital to build constituent support before undertaking a municipal network. A public project should have a majority of the citizens supporting it. In any community, there are going to be technology enthusiasts who understand the benefits of gigabit networks. These enthusiasts can make good community ambassadors for the network, communicating with their neighbors and stimulating demand, but they are usually a small segment of the population. Convincing late adoptors is necessary too. As we touched on in the business model discussions, it is important to reach a "acceptance rate" where at least half of the population is supportive.

As you build support, it's also vital to identify anchor tenants, such as:

- Education
- Government
- Healthcare
- Manufacturing
- Other Large Employers
- Non-profit
- Residential (condo developments, MTUs)

Step 4: Select a Business Model

Getting the business model right is an entire topic in and of itself. For that reason, GWI will release a companion paper to this one: ***Business Models For Municipal Networks in Maine*** on February 16' 2015 that explores case studies of actual Maine towns. What follows is a brief overview.

It is possible the best business model is a partnership between the municipality and one or more for-profit or non-profit organizations. In that case, your municipality will likely benefit from issuing a Request for Information (RFI) in order to identify the best partner[s]. The partners found, and their proposed solutions to the needs identified in steps 1-3, will shape your ultimate business model. For that reason, there are iterations between steps 4 and 5; first identifying a potential business model involving partnerships, learning who wants to partner and then adjusting the business plan. In that case it is best to start exploring business cases first, and then find partners that match the potential business case.

Potential Business Models

There are a variety of business models that you may select based on a number of different ranges of options. One range of options is along the public, public/private and private ownership models. Another range is the amount, if any, of subsidy to be provided to customers. It can range all the way from free service for everyone to subsidies for low income to all subscribers pay the full cost of building, capitalizing and operating the system. A third range of

options is between a closed (monopoly) or partial open access or full open access network. There are a wide variety of methods of identifying funding sources.

Finally, a municipality can initially build out service to a section of the municipality or some limited set of customers, such as businesses, or it can chose to serve all citizens and businesses at once. It is obviously a smaller task to start with a smaller system, but is it also more difficult to convince the public to fund a system that only serves part of the town.

Revenue Models

Americans are accustomed to paying a monthly fee for telecommunications: cellphone, video, Internet access, telephone. The path of least resistance is to fund a municipal fiber system through monthly fees. In an open access dark fiber model, the service providers that are leasing dark fiber from the municipality would pay the monthly fees. In a closed access system, the end user would pay the municipality the monthly service fee. Depending on penetration rate and the price of the monthly fees charged, some or all of the operating costs and capital costs are covered. If all costs are covered with sufficient extra for rapid capital payback and profit, then a pure private system is a possibility. If the costs are only partially covered, if the capital payback is more than a few years or if there is no profit, a public/private partnership is probably necessary.

Sources of Funding

If your system is initially small, there is a great deal of flexibility around funding. Some sources are TIF funds, municipal bonds, grants, and anchor tenants. In the case of an anchor tenant, an initial payment in advance for services can provide part or all of the initial funding or a contract of sufficient strength to allow for bank funding.[3]
For larger public or public/private projects, some of the capital can come from the above sources but it is unlikely they will suffice. A municipality raising the capital through bond funding is necessary in that case. The costs of the funding are directly related to the structure and soundness of the business model. This is a complex topic that will be discussed in detail in ***Business Models for Municipal Networks in Maine***.

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[3] See: ***Business Models for Municipal Networks in Maine***, the Rockport and South Portland case studies (to be published February 16, 2015.)

Step 5: Find Partners/ Vendors

Finding Partners and/or Vendors

During the process of identifying goals and selecting a potential business model, your municipality may feel that you want to handle everything for yourself -- a pure publicly-owned network model. Even in that case, it is worth it to at least preliminarily scan the horizon for potential partners. It satisfies any due diligence questions later and potential partners are probably also potential vendors.

You can issue a Request for Information (RFI) and distribute it to a large number of entities (for-profit and non-profit), outlining a general problem to be solved and requesting from responses from the entities on their ability to solve the problem with outlines of suggested solutions. After your municipality has completed steps 1-3 and step 4 at least initially, it makes sense to put out an RFI to discover what potential partnerships exist and the capabilities of potential vendors.

Helpful Tip:

Issuing an RFP to a large number of entities helps you discover potential partnerships and the skills of potential vendors.

At a minimum, your RFI should include:

1. A clear description of your municipality's goals for the project including concrete requirements (open access, minimum speeds, quality of service, coverage, public buildings to be connected, price range, etc.)
2. As much demographic information as possible from step 2.
3. A clear description of business models your municipality is willing to accept. The RFI might include a statement that "the town is open to suggestions". However, if certain aspects are off the table for your community, save everyone time by clarifying these aspects up front.
4. A defined format for responses so that it is easy to compare solutions proposed by vendors.
5. The required responses should cover all the capabilities necessary to insure vendors successfully supply the municipality's needs (past projects, references, management team, financial resources.)

Step 5: Find Partners/ Vendors

Negotiate Partnership/Letter of Intent

After the responses from the RFI are received, review them and identify any ideal matches for potential partners. If so, negotiate and sign a Letter of Intent (LOI). The LOI is to cover the time period it takes to finalize a partnership contract. Inevitably, the contract will not be finalized until monies are expended to do a detailed design and a RFP and procurement process.

Issue RFP

When your municipality has a concrete business plan in place and has a matching detailed system design and operations plan, your next step is to issue an RFP (Request For Proposals) for the different aspects of a system. The RFP needs to follow the legal procurement process for the municipality and must include enough detail for vendors to submit binding bid proposals. RFPs cover these aspects of the project:

1. Engineering, Procurement and Construction RFP
2. Design RFP
3. Construction RFP
4. Operation and/or Default Provider RFP
5. Maintenance RFP

In the case of a dark fiber network, there is no need for an operational RFP because operations will be the responsibility of the service providers. In that case, it is necessary to have a vendor be the "Default Provider" and commit to offering a basic set of services at agreed upon prices.

Step 6: Select a Vendor

Selecting Construction/Operations Vendor

Based on the RFP responses, pick vendors for the different aspects of designing, building and operating the system. Select the vendor that is most likely to build a successful system rather than offer the lowest price.

Step 7: Oversee Construction

Overseeing Construction

The quality of implementation makes the difference between the success and failure of a community infrastructure project. Primary oversight of the project will belong to the EPC vendor, but your community needs to stay involved. Meet regularly with the vendor, ask many questions, and physically inspect the project as it is built.

Figure 2: Construction worker lashes fiber to poles in Rockport.

Step 8: Operations, Sales & Marketing

Operations, Sales and Marketing

Running a network is as large a task as building one. The size of the task for your community is very different depending on whether you build a dark fiber network or your community operates the network itself. Given the very different paths, it makes sense to look at the two cases separately.

Dark Fiber Networks

Operating a dark fiber network is simpler because there is neither equipment nor moving parts. There are four tasks:

1. Negotiate and manage relationships with lit service providers
2. Keep an inventory of the dark fiber
3. Dispatch to repair broken fiber, and
4. Bill service providers for fiber used

Dark fiber inventory can be performed by town officials or outsourced to companies like GWI or MFC. The good news is that dark fiber infrequently needs repair. There are a wide range of outside plant companies such as Icon, NextGen, OnTarget, and Green Mountain that can be on retainer to repair dark fiber breaks.

Billing for dark fiber usually happens on a monthly basis and is driven off the fiber inventory. Usually bills are simple and only a small number of large bills are generated to service providers. The bills are large both in relative amount and in detail: each fiber used needs to be identified as a separate line item.

The downside to the ease of operating a dark fiber network is the risk of not having enough lit service providers. It is vital that there be at least one **Default Provider**, an ISP that has made a long term commitment to use the network to provide a defined set of services to all customers at some mutually agreed upon price. If you can have multiple service providers competing for your citizens' business, then your citizens will get the best of service at the lowest price. If your community is well connected to the 3RB, there is a high likelihood of there being a wide variety of companies willing to offer service via your dark fiber network. Under current Maine and federal law, municipal dark fiber networks seem not to be regulated utilities.

Lit Service Networks

When a community offers lit services, the task is significantly larger than initially building the network. All of the tasks are ongoing and your community will need to take on the responsibility for at least two decades. It is probably not practical unless a community has at least 5,000 customers. The following is a brief breakdown of the tasks required. Note that all of these are ongoing tasks that will need to be performed for decades. The municipality will either want to start a separate corporate entity or a significant municipal department to act as the broadband utility.

1. **Marketing:** Developing products and product packages and promoting them to potential customers; track competing services and develop market positioning in relation to competitive services. As the financial viability of the network depends on a sufficient number of customers using it, marketing is vital. Communities that provide lit services and are not good at marketing will likely fail.
2. **Sales**: Convincing customers to buy service and answering questions about the service. Sales is as vital as marketing.
3. **Provisioning/deprovisioning/installation/uninstallation**: Updating internal systems when a new customer or service is added and when services and customers are dropped. Physically installing and uninstalling service.
4. **Technical Support**: Answering technical questions and fixing technical problems of individual customers.

5. **Network and Systems maintenance and trouble response**: Fixing problems that affect a wide range of customers or are system-wide; upgrading the network or systems such as routers, switches, and servers; routine maintenance on all of the above.

6. **Outside Plant**: Maintaining the outside plant such as fiber, pole attachments, multi-ports and drop cables; extending that network as necessary.

7. **Customer Support**: Answering customer's questions regarding bills, accounts, address changes, etc.

8. **Billing and Accounting:** Generating bills, accounts receivable and payable.

9. **Taxes, regulatory, and legal:** Under current law, the municipal company or department would probably be a regulated utility under state and federal law. This area of regulation is undergoing significant ferment and will need to be monitored and responded to.

Competition is probably much more of a factor for community lit service providers than for community dark fiber networks. Your community will need to do a superior job in the above components to compete with other providers.

Network Upgrades in Response to Technology Evolution

How will your community deal with the evolution of technology?

Broadband networks are "technical infrastructure". Like most technologies, technical infrastructure is prone to evolving significantly over time. It is difficult to predict how long in advance the rate and direction of evolution. Any plan for a community network should include methods to deal with the evolution. Once again, there is a split in the path between dark fiber and lit service networks. The evolution of fiber is slow; the evolution of lit services is much faster. For a dark fiber network, the burden of technology evolution network falls on the service provider, not the community.

One technique for dealing with technical evolution is to build equipment depreciation due to technological

obsolescence into your business plan. Over the last twenty years, we have found that we usually retire equipment due to obsolescence, rather than it wearing out. We have learned that CPE such as ONTs, wifi stations, customer routers, and modems need to be replaced after three years, service provider equipment such as servers, switches, and OLTs have a useful lifetime of five years and equipment such as routers, WDM equipment have an useful lifetime of seven years. OSP equipment such as fiber, pole attachments, connectors and multiports have a useful lifetime of twenty years. With these depreciation schedules, it has been *very* rare to take equipment out of service before it is fully depreciated.

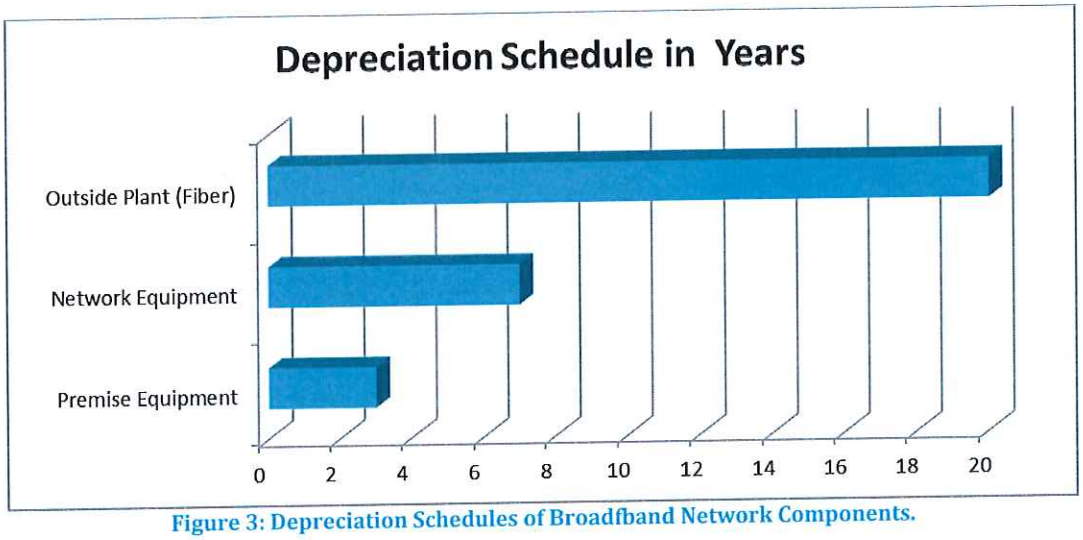

Figure 3: Depreciation Schedules of Broadfband Network Components.

A second technique for dealing with technology evolution is to develop a technology roadmap that predicts the future for a rolling five to seven years and maps out how to respond to the changing technology. The roadmap is then updated periodically depending on changes in existing technology and the competitive landscape. For community lit service providers, the roadmap should be updated at least every six months. For community dark fiber networks, every year or two should suffice.

Network Expansion

In addition to technology evolution, the network will need to be upgraded in response to growth. In expansion, there is not much difference between dark fiber and lit service networks. There are two types of growth: expansion of footprint and more connections in the existing footprint. Both require expanding the fiber network. Lit service providers will also need to add more equipment but conceptually that is not much difference.

One of the greatest failings of past and current networks is failing to planning for future network expansion."

Expansion in footprint takes two forms. The first is expansion internal to the community. Perhaps the network starts out only serving one part of the community, say the business district, and then is extended to other parts of the town. What is important in inter-community expansion is to make sure the fiber connectivity architecture is planned from the beginning to serve all of the community. Enough backbone fiber should be provisioned. Huts and central offices should be sized to handle enough equipment to serve all of the community, or at least designed to be inexpensively expanded.

The second type of footprint expansion is outside the community. Your community and your vendors should consider this during the business and technology plans development phase -- how will your community connect to surrounding communities in the future?

Another way that a network will expand is adding more connections internal to the existing footprint. The network should be designed to serve all existing residential and commercial structures in a community and include a reasonable guess at expansion for the community. A municipality's comprehensive plan is a good place to start for predictions of future growth. In designing for internal expansion, it may be the most cost-effective path to construct connections "just in time." Even in that case, the network connection architecture should be designed so that it is expandable to all structures. Sufficient slack loops and backbone fiber count should be provided and locations of additional splitters, huts, multi-ports should be

designed into the network in advance.

One of the greatest failings of past and current network designs is to build only for seldom last for their anticipated and budgeted lifetimes and need to be replaced. For example, failed municipal networks are those that have been built only to serve municipal buildings, only to serve some commercial properties, only built to serve part of a town or only to serve a particular transmission technology. Not planning for the technology evolution and network expansion is imprudent and a waste of community resources. Infrastructure is a shared resource and the more people sharing it, the more cost effective it is. A design that does not maximize sharing is an inferior design.

Step 9: Decommission or Replace Network

Decommission or Replace Network

Everything has a beginning, a middle, and an end. A good plan should encompass the full lifetime of a project. A business plan should include potential exit strategies. A technical design should include the process of decommissioning or replacing the product.

Given that fiber networks are designed to last a minimum of two decades and with proper maintenance, we can reasonably expect them to last two or three times as long, planning for decommissioning may seem like an unnecessary theoretical exercise. The old telephone network lasted for close to a century. The railroad network is over 150 years old and seems to have a lifetime extending far into the future. Our road network has been around for hundreds of years and we have the expectation it will last for hundreds more. However, things don't always turn out as we expect. Unexpected "black swan" events can happen, both positive and negative. It is only prudent to plan for as many outcomes as possible. This is particularly necessary in a technological field. We can't predict the future, but it is worth it

to try. In this section, we discuss a few possible scenarios that should be incorporated into your technology planning.

1. Network Consolidation

Given the history of the last hundred years, the most likely scenario is success and widespread adoption of multi-gigabit fiber technologies. In a future in which every home and business is connected via gigabit fiber, the next natural step would be network consolidation.

The nature of networks is that there are huge economies of scale and it is much cheaper per customer to run a very large network than a very small network. For that reason, the telegraph, railroad, telephone, electricity, and cable TV networks all started out as small, isolated networks that went through a period of consolidation to large, efficient networks. If that is the case in the gigabit fiber world, a day will come where probably the best thing might be for a community to consolidate its network into a larger network with other communities or to sell its network on favorable terms to a large private operator.

In planning for this outcome, your community should make sure that it designs its business plan and technical design in such a way that the transaction is as inexpensive and convenient as possible. The legal structure of any entity and funding should be designed in such a way that a larger organization, public or private, can take on the network. The technical design should as much as possible follow industry standard practices—this is no place to be needlessly innovative –and envision a potential future that includes consolidation with an outside network[s].

2. New Communication Technology Replacement

There is no practical or theoretical potential communications technology replacement for fiber optic networks, at least for the next few decades. However, further out it is not unlikely that unimagined communications technologies may evolve. For example, something like superluminal communication[4]. In that case, the network would probably gradually become outmoded and be completely replaced by new technology. In that case, plan for the fiber and equipment to be decommissioned and any corporate or accounting entity wrapped up.

Business Failure

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[4] According to Wikipedia: "The scientific consensus is that faster-than-light communication is not possible and to date superluminal communication has not been achieved in any experiment."

It is possible that expected cash flow may not materialize either because expenses were greater than anticipated or the demand curve is less than anticipated. In that case, it is important to have backup plans. Your backup plans might include additional funding to cover any shortfall or unexpected expenses. In the case of a dark fiber network, if the failure is no acceptable default provider materializing, the backup might be the community becoming a lit service provider. That decision should not be undertaken lightly for all the reasons outlined above.

Conclusion

Careful planning and oversight is crucial to deploying a successful municipal fiber network. Diligence and transparency between all of the parties involved will allow for a streamlined process. Though the steps referenced in this paper are not mandatory, we feel that they are **all** key components in the development of a municipal network. If these steps are followed, risk is reduced and success is likely.

Conclusion

Broadband is a Necessity in Staying Competitive in the Digital Economy

The topic of broadband expansion continues to gain attention, including from President Obama who recently acknowledging high-speed broadband as a "necessity" in staying competitive in the digital economy. In Maine, towns of all sizes and in all locations of the state are beginning to think about future proofing their locales through broadband. The 127th Maine Legislative session alone has over 30 bills pertaining to broadband. The time to begin thinking about your community and its plan for infrastructure in the future is now, but make sure not to make any hasty decisions.

We hope that you will take the time to read our next paper, "**Business Models for Municipal Networks in Maine**(to be published February 16, 2015). " That paper covers a number of projects in Maine in various stages of completion. It also examines completed projects, both successful and unsuccessful, from other parts of the US.

Make Your Voice Heard

Let's work together to build a broadband infrastructure that's worthy of a leading spot among our national peers.

Please visit:
www.gwi.net/communitygigabit

and join our email list of legislators, business owners and concerned Mainers who want to work toward our goal together.

Richard Bates
Town Manager,
Rockport, Maine
townmanager@town.rockport.me.us

Rick Bates started his municipal career in 1977 as Raymond, New Hampshire's first Parks and Recreation Director, where he developed the department into an award winning organization and a model for small town recreation in New Hampshire. A recipient of a *Recreation Director of the Year* award, Rick was appointed as Raymond, New Hampshire's third town manager; a position he held until his 'retirement' in 2007. After several years in a consulting capacity, Rick was appointed as Rockport's Town Manager in June of 2013. Rick is quick to note that he is 'anything but a technology guru', but says that he understands the key to Maine's economic future and competitiveness in the global digital world lies in the ability of its residents to connect to high speed broadband. The Town of Rockport has gained national attention for building the first municipally-owned dark fiber network in the State of Maine, and has been named as one of the 30 Next Century Cities. Rick says that while their network may be small at the current time, there has been growing attention around it as a potential model for the future for other communities in Maine.

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BROADBAND FOR ME

Presenter - Michael L. Forcillo
Vice President, Redzone Wireless, LLC

Michael is currently head of commercial development for Redzone Wireless, LLC. He is responsible for strategy and business market segment development, including communications, marketing, sales, branding, and strategic alliances.

He has more than 20 years of executive business development leadership experience in diverse markets including broadband telecommunications, biotechnology, healthcare, digital publishing, and consumer services. He previously held Vice President level positions with Express Scripts, Inc including Specialty Pharmacy Strategy and Business Unit Management within the $50B healthcare enterprise. Prior to Express Scripts, he was Vice President of Sales Management for Priority Healthcare Corporation, where he was responsible for a $900M specialty pharmacy sales organization.

Michael also owned and developed a successful regional chain of Planet Fitness health club franchises located in Charlotte, NC. He began his career in trade magazine publishing and developed the Digital Media Group portfolio of magazines and conferences for Advanstar Communications' where he served as national Group Publisher.

Presentation Summary:

The Increasing Role of Wireless Broadband in Municipal Projects to Bring High Speed Internet to Rural and Low Population Communities in Maine

Redzone Wireless is building a next generation wireless broadband network in Maine that represents a game changing technology to address the long term challenge of covering the last few miles of connectivity within a low population density community or region. Redzone's 4G LTE Advanced high powered network, operating on Maine's fiber connected commercial tower footprint, transmitting on FCC licensed EBS spectrum is a significantly improved approach to wireless broadband. The presentation will provide an overview of the technology and Redzone's network deployment plans for Maine. Redzone will highlight the process for county and local municipal leaders to engage in identifying how 4G LTE Advanced wireless could fit within a regional municipal broadband plan.

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BROADBAND FOR ME

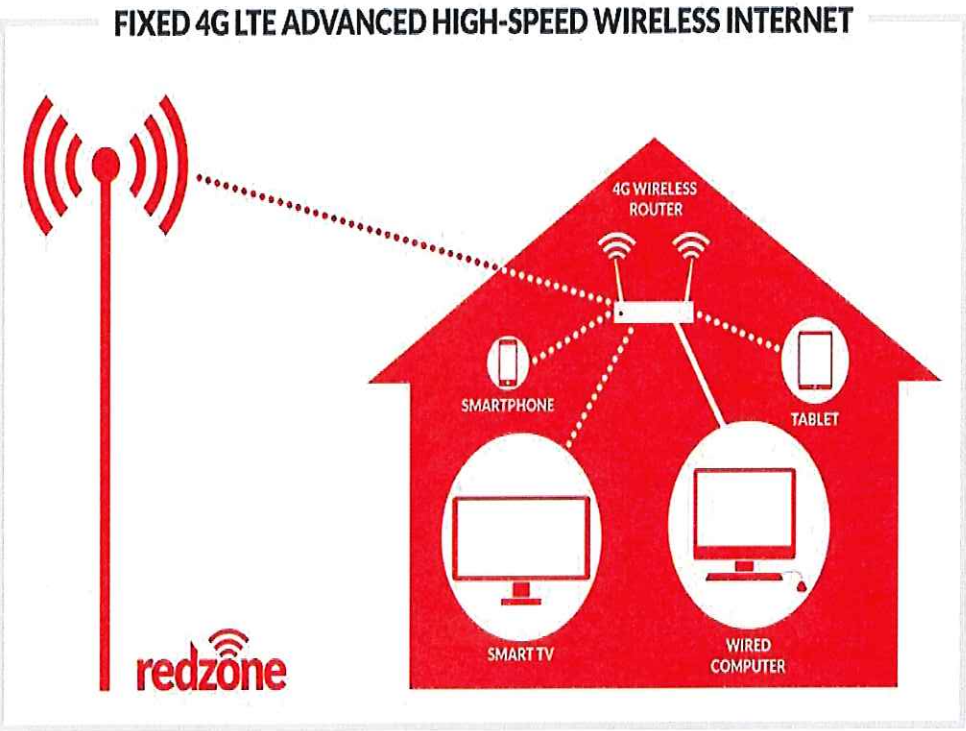
Handout: First in New England: Next Generation 4GLTE Advanced Broadband Network A New Solution for Municipal Broadband Projects

Redzone Wireless, LLC is actively deploying 4G LTE Advanced wireless broadband Internet to Maine residents and businesses. Our network operates on the Federal Communications Commission (FCC) licensed Educational Broadband Service (EBS) spectrum accessed through an exclusive long term agreement with The University of Maine System (UMS). We are headquartered in Camden, and are proud to serve our Maine community.

We have announced additional strategic relationships with the Finance Authority of Maine (FAME), and Pine Tree Development Zone Certification by the Maine Department of Economic and Community Development

Key Benefits of Redzone Wireless Broadband for Municipal Projects

- **Hybrid Technology Leverages Maine's Existing Fiber Connected Tower Network**
- **Performance Exceeds FCC and ConnectME Broadband Standards**
- **Can Provide 100% Coverage to Homes & Businesses**
- **Rapid, Regional Deployment in Less Than 6 Months**
- **90% Lower Capital Costs than Fiber to the Home Projects**



The term 4G LTE is a combination of two terms - 4G means fourth generation of data technology, and LTE means Long Term Evolution. Together these terms describe the most advanced wireless data technology available, and a commitment to advance and improve the technology over time. 4G LTE is simply the fastest wireless Internet service available, and it's getting faster. Current 4G LTE networks are providing speeds that exceed the fastest service offerings from cable Internet services. Speeds of 50 Mbps are not uncommon, and carriers are piloting and testing system speeds approaching 100 Mbps within the next 12 months, and up to 1 Gigabit over the next several years.

For more information on municipal broadband project opportunities, please contact Michael Forcillo at 207-593-7276

Redzone Wireless, LLC | 41 Mechanic St. | Suite 219 | Camden, Maine | 04843

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4G LTE Advanced Fixed Wireless

Maine's Emerging Solution for Fast Affordable Municipal Broadband Projects

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Michael Forcillo

Vice President, Sales & Marketing
Redzone Wireless, LLC

BROADBAND FOR ME

Maine's Competitive Challenge

Consistently Ranked 48th or 49th

for broadband and as a state in which to do business.

New 2015 Broadband Performance Definitions

ConnectME Authority
10 Mbps / 10 Mbps

FCC
25 Mbps / 3 Mbps

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Business Overview

<u>Mission</u> Deploy Statewide Fixed Wireless Network Across Maine to Provide Greater Diversity of Broadband Options for Residential and Business Customers

<u>Key Innovation</u> First in the Nation to Deploy High Powered Next Generation 4G LTE Advanced Network Operating on FCC Licensed EBS Spectrum

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Strategic Partners

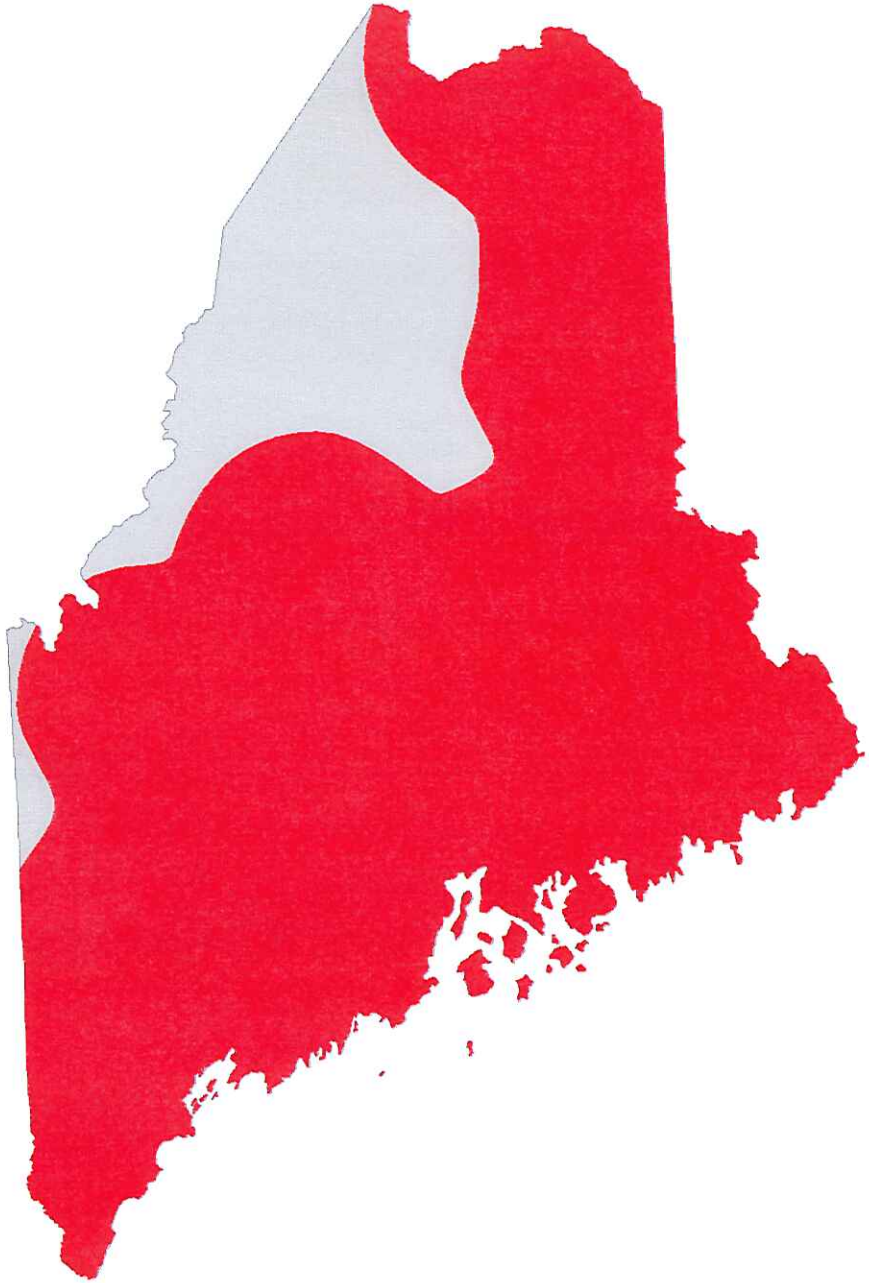
1865 THE UNIVERSITY OF MAINE

CONNECT ME

DECD
Maine Department of Economic and Community Development

FAME
FINANCE AUTHORITY OF MAINE

Camden National Bank



LICENSED SPECTRUM COVERAGE

Maine's Population

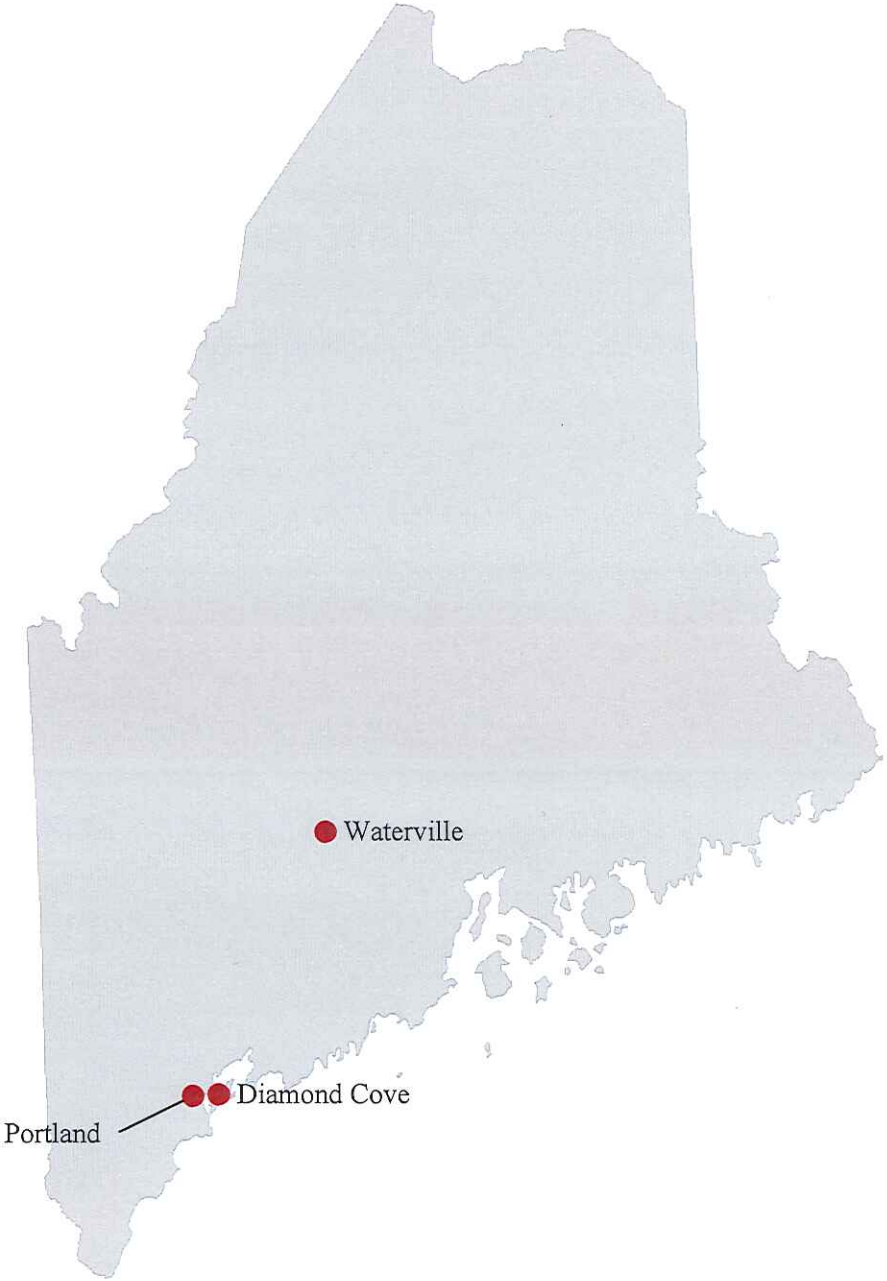
1,330,000

Population in Coverage Area

~1,197,000

Percentage of State Population

~90%



CURRENT SITES

Maine's Population

1,330,000

Population in Coverage Area

~86,030

Percentage of State Population

~6.5%

2015 PLANNED SITES

Maine's Population

1,330,000

Population in Coverage Area

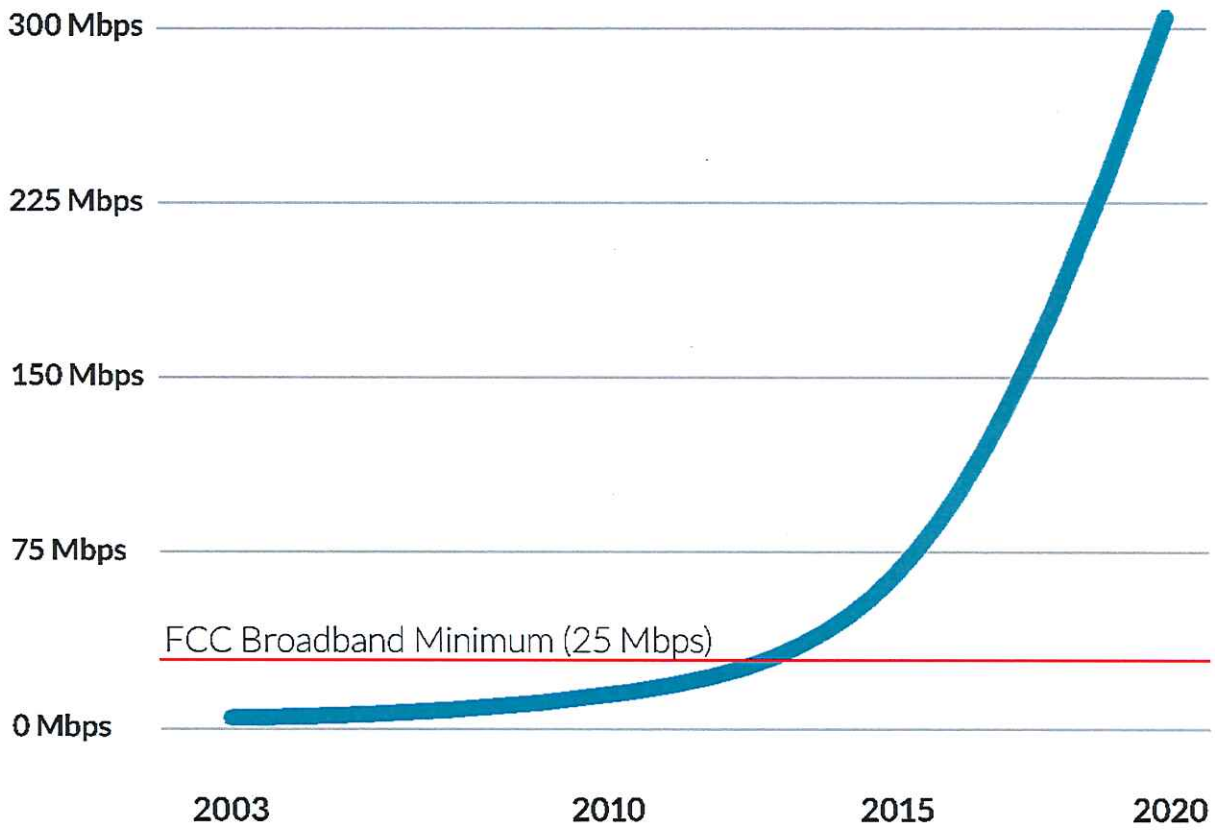
~332,500

Percentage of State Population

~25%

4G LTE

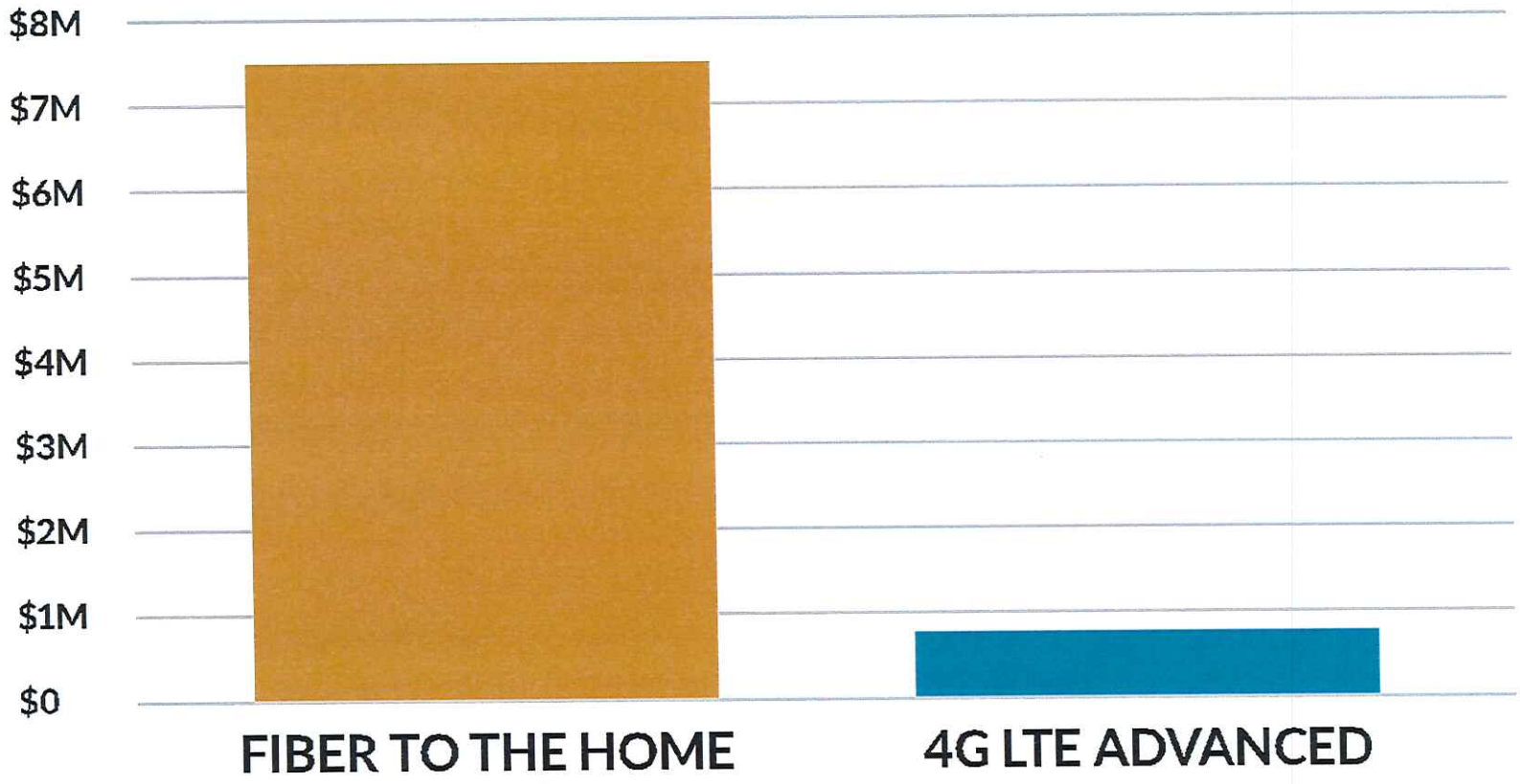
4th Generation Long-Term Evolution



Typical User Download Speed

Fiber vs LTE

Cost of Deployment



Estimate based on town with 1425 households, 60 road miles, and 33 square miles.

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THE UNIVERSITY OF MAINE

CONNECT ME

FAME FINANCE AUTHORITY OF MAINE

Camden National Bank

Deploy First Municipal Public Private 4G LTE Wireless Networks

DECD
Maine Department of Economic and Community Development

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Network Launch - Cover 15 Communities

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Cover 50% of Maine Population

redzone
Cover 90% of Maine Population

BROADBAND FOR ME

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Municipal Broadband Value Proposition

Municipalities Can Now Partner with Redzone Wireless to Provide 4G LTE Advanced Fixed Wireless for Community Broadband Access

- 90% Lower Cost Than FTH Alternatives
- Meets FCC & ConnectME Broadband Standards
- Can be Integrated with Existing Wired Networks to Increase Coverage and Reliability
- Leverages Existing Fiber Connected Tower Network
- Rapid Network Deployment (6 Months or Less)

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For Further Discussion

- Communities Recognize the Essential Utility Value of Broadband
  - Municipal Broadband is a Competitive Services Business Best Accomplished through Public Private Partnerships
- Consider the Costs, Benefits, & Deployment Timelines for All Technology Approaches to Municipal Broadband
- Contact Redzone for Reasonable Cost Estimates for a Wireless Broadband Network Deployment in your Community
- Redzone will Subsidize 50% of the Capital Cost of a 4G LTE Fixed Wireless Municipal Network for Qualified Projects Through Public Private Partnership

BROADBAND FOR ME

Questions

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INDEX OF MINUTES
2015
COMMISSIONER'S MEETING

DATE

Appointments:

Chairperson for 2015, Thomas S. Coward	1/12
Vice Chairperson for 2015, Stephen F. Gorden	1/12
Board of Trustee Liaison to the Cross Insurance Arena Liaison, Susan Witonis	1/12
CCRCC Board Liaison, Susan Witonis	1/12
Chief Local Elected Officials (CLEO), Liaison Stephen F. Gorden	1/12
Cumberland County Emergency Food and Shelter Program, Liaison James Cloutier	1/12
Maine County Commissioners Association (MCCA) Liaison Thomas S. Coward (nominated 12/14)	1/12
Maine County Commissioners Association Proxy for Risk Pool And MCCA Alternate, Peter Crichton	1/12
Cumberland District Public Health Council, James Cloutier	1/12
Cooperative Extension Services Board of Trustees, James Cloutier	1/12
Local Emergency Planning Committee, Thomas Coward	1/12
Liaison for the Municipal Oversight Committee (CDBG), Neil Jamieson	1/12
Liaison Greater Portland Council of Government Exec. Comm., Steve Gorden	1/12
Alternate to Greater Portland Council of Government Exec. Comm., Peter Crichton	1/12
Council of Government Metro Regional Coalition, Peter Crichton	1/12
Threshold to Maine RC&D Council Rep., Peter Crichton	1/12
Liaison for CC Soil and Water Conser. District, Neil Jamieson	1/12

Authorizations:

CCRCC Emergency Notification System Change from Citywatch To CODERED	1/12
Grant Funding for Advance Mobile Forensic Software & Training	1/12
Adding 2019 to CIP Plan	1/12
Recognition of the United States Marshal Service (USMS) 225th Anniversary	1/12

Renovation at 25 Pearl Street Assessors Offices	**2/10**
CCSO Aimpoint Pro Rifle Optics	**2/10**
CCSO Forfeiture of $12,803.20 in U.S. Currency Seized	**2/10**
CCSO Commissions for January and February 2015	**2/10**
CCEMA Homeland Security Grant Program (HSGP) Award	**3/9**
CCEMA Grant Award from NACCHO for the CCMRC	**3/9**
Forfeiture of $1,230 in US Currency Seized in Drug Investigation	**4/13**
CCRCC Board of Directors Appointment	**4/13**
CCSO Commissions for March and April 2015	**4/13**
CCSO 2015 Seat Belt Enforcement Grant	**4/13**
Violence Intervention Partnership - VIP Grant Renewal App.	**4/13**
Adoption of CDBG Annual Action Plan	**5/11**
CCRCC Add Recorder Channels at Westbrook Public Safety	**5/11**
Cumberland County's Got Health Wellness Program 2016 Incentive	**5/11**
Forfeiture Of $2,315 in Seized Currency	**6/8**

Bid Awards:

2015 Vehicle Bids for Chevy Tahoe Police 4WD PPV and Chevy Tahoe 4x2PPV	**1/12**
CCSO 2015 Vehicle Bid for Ford Police Interceptor Utility A WD	**2/10**
CCSO 2015 Vehicle Bid for Ford Police Interceptor Sedan A WD	**2/10**
Cumberland County Carpet Replacement – State Side	**4/13**
Cumberland County Security Upgrade – LEC	**4/13**
Cumberland County Courthouse – Mech. Services	**4/13**
2015 Vehicle Bid for Chevy Silverado	**5/11**

Bonds:

Budget:

Carry Over Requests:

Contract Approvals:

MOU American Farmland Trust-Growing Food Connections	**2/10**
CCRCC – Crown Castle Lease	**3/9**
CCRCC – Men's Correctional Center (MCC) MOU	**3/9**
CCRCC – Schedule Express	**3/9**
CCSO Town of Harpswell Patrol and Marine Contracts (2015-2016)	**4/13**
CCRCC Westbrook Evacuation Build Out	**4/13**

Town of Chebeague Island Summer Contract	**6/8**
Collective Bargaining Agreement between Cumberland County Commissioners and Teamster Local 340, Supervisors Unit TABLED	
Violence Intervention partnership (VIP) Electronic Monitoring Pilot Project Agmt.	**6/8**

INFORMATIONAL:

Joanna Aronica and Wanda Pettersen, Annual Wellness Program Review	**4/13**
Aaron Shapiro, Dir. CDBG, 2015 Presentation of Public Hearing	**3/9**
Aaron Shapiro, Dir. CDBG, 2015 Presentation of Public Hearing	**4/13**
Aaron Shapiro, Dir. CDBG, 2015 Presentation of Public Hearing	**5/11**

Interest Rate for Delinquent County Taxes:

Finance – Interest on Delinquent County Taxes for 2015	**3/9**

Resolutions/Proclamations:

Recognitions:

Retiring Board of Assessment Review Chair Ned Kitchel	**5/11**
Retiring CCRCC Board of Directors	**5/11**

2015 Tax Anticipation Notes

2015 TAN	**1/12**
2015 Tax Anticipation Notes Review	**2/10**
2015 Tax Anticipation Note	**7/13**

No meetings:

Aaron Paul
Director Broadband Consulting
apaul@tilsontech.com

Aaron Paul is the Director of Energy and Broadband Consulting at Tilson Technologies. A Maine-based firm, Tilson Technologies provides capital project advisory to municipal broadband developments throughout Maine, New England and the nation. A former management consultant and land conservationist, Aaron has advised on public-private partnerships worth over $3 billion dollars. His past clients include all five branches of the military, the three largest land conservation groups in the US, Maine-based energy developers, and fortune 500 companies. Aaron holds an MBA and a Masters of Environmental Management from Yale University, as well as a BA in History from Reed College. Aaron is currently publishing a history on Maine's nineteenth-century maritime granite industry with Seapoint Books.

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Your broadband planning and project people

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About Tilson

- 100 employee team of broadband planners, engineers, and project managers
- We have a division that builds networks for our customers (wireless and fiber)
- Passionate about building infrastructure for the sectors that drive the economy for a more connected world
- HQ Portland ME
- 50% veterans
- Not a carrier

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What is Broadband and Why is it Important?

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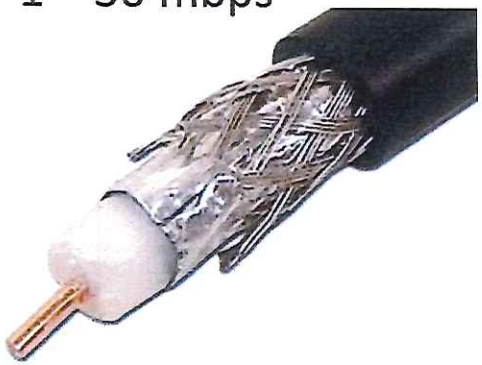
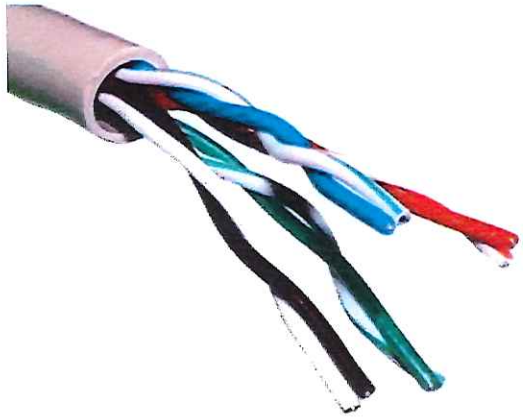
What are Broadband Technologies?

Coaxial Cable
1 – 30 mbps



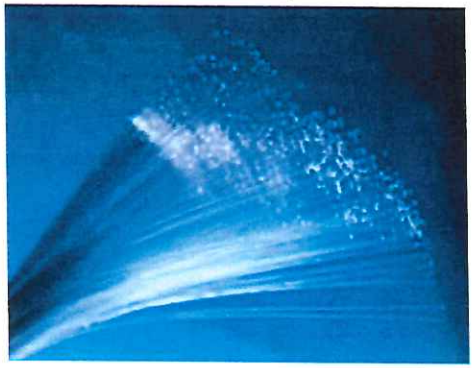
Copper Wire
0.75 – 6 mbps



Wireless (Cellular)
2 – 100 mbps (4G)

Commercial Satellite
200 kpbs – 2 mbps

Fiber Optic Cable
Up to 1 Tbps



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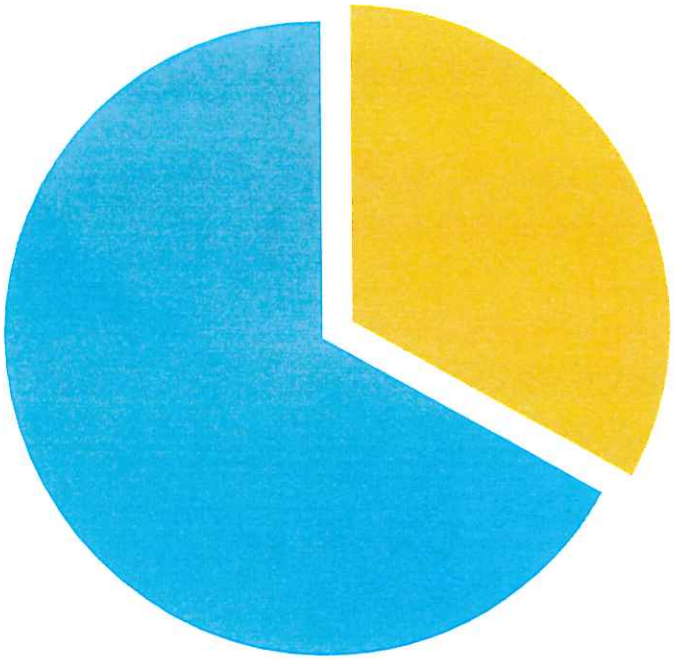
It's an Economic Necessity

- Roughly one third (33%) of GDP growth in the last thirty years of the 20th century was due to advances in telecommunications technology.

Causes of OECD Economic Growth (1970-2000)



- Telecom Infrastructure - $6.5 Trillion
- Everything Else - $13.2 Trillion

This includes improvements in industrial efficiency, lower energy costs, education, improved access to capital, etc.

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Structured Approach to Municipal Broadband Planning and Integration with Economic Development Goals

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What We Do

- Provide independent consultation to communities who want better broadband- state/regional governments, municipalities, and non-profits
  - Articulate goals
  - Design networks
  - Advise on operational/business models
  - We show governments their broadband options and write their broadband plans
  - We can stick around and manage RFPs, negotiations, and implementations
- Specialize in remote and rural areas

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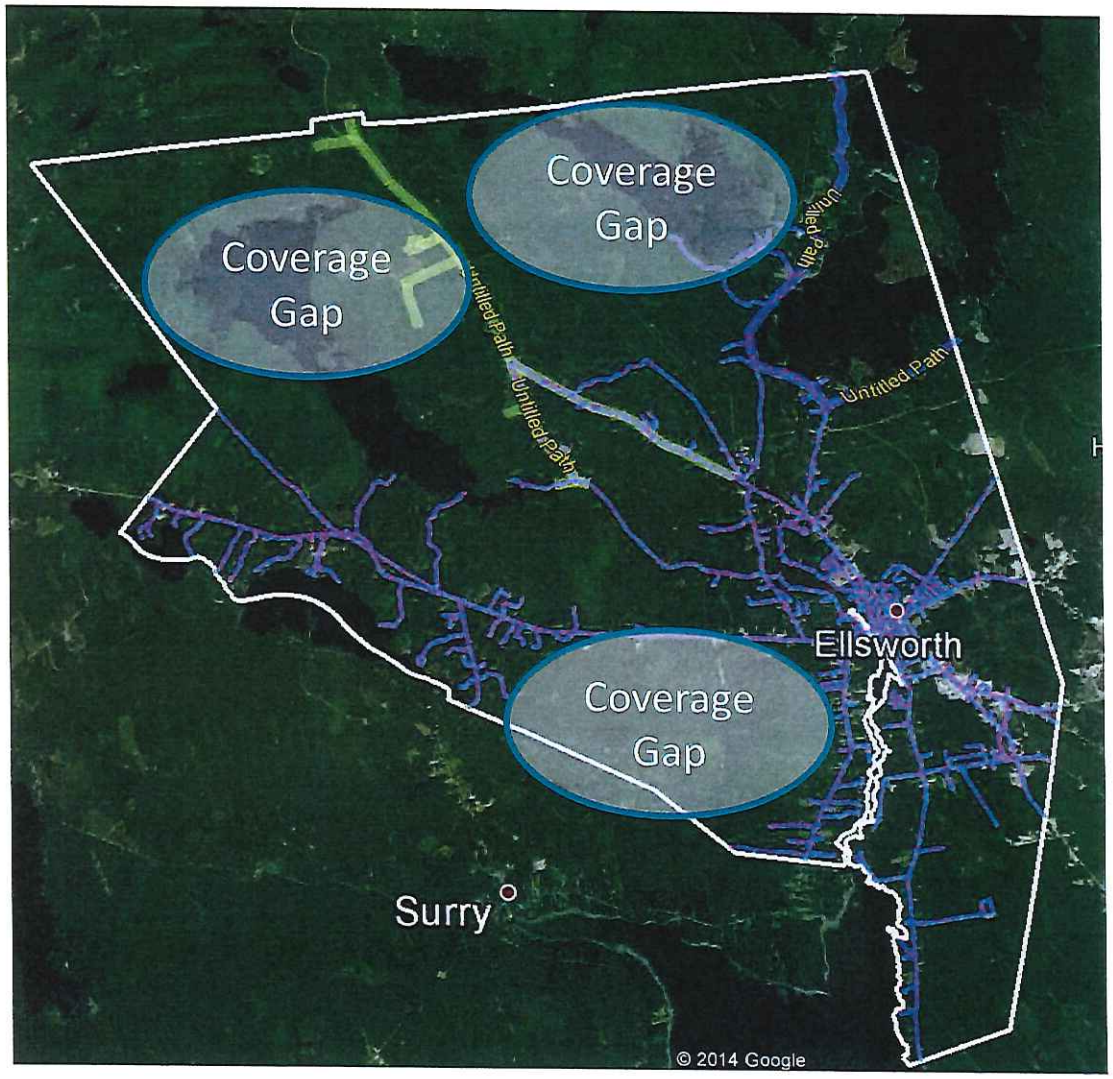
Project initiation (Ex: Ellsworth, ME)

- Articulate goals/ define community broadband standard
- Inventory telecommunications assets
- Gap analysis



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Network Engineering and Costing

- Design a network that meets the need
  - Not a construction grade design, but sufficient for planning
- Include a review of current telecom technology platforms
  - Copper
  - Fiber
  - Wireless
  - Hybrid
- Capital cost estimate
  - Required to attract additional grants or bond funding

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Municipal Clients/Projects

Municipality	Project Overview
Town of Islesboro, ME	Broadband inventory, Recommendations Report, Universal Fiber Network Design, RFI management, Service Provider selection, negotiation
Block Island and Aquidneck, RI	Broadband inventory, service gap analysis, RFI management
City of Sanford, ME	Broadband inventory, Gap Analysis, RFI Management, Vendor Selection
City of Ellsworth, ME	Plan for business and residential access, successful NBRC grant application advisory

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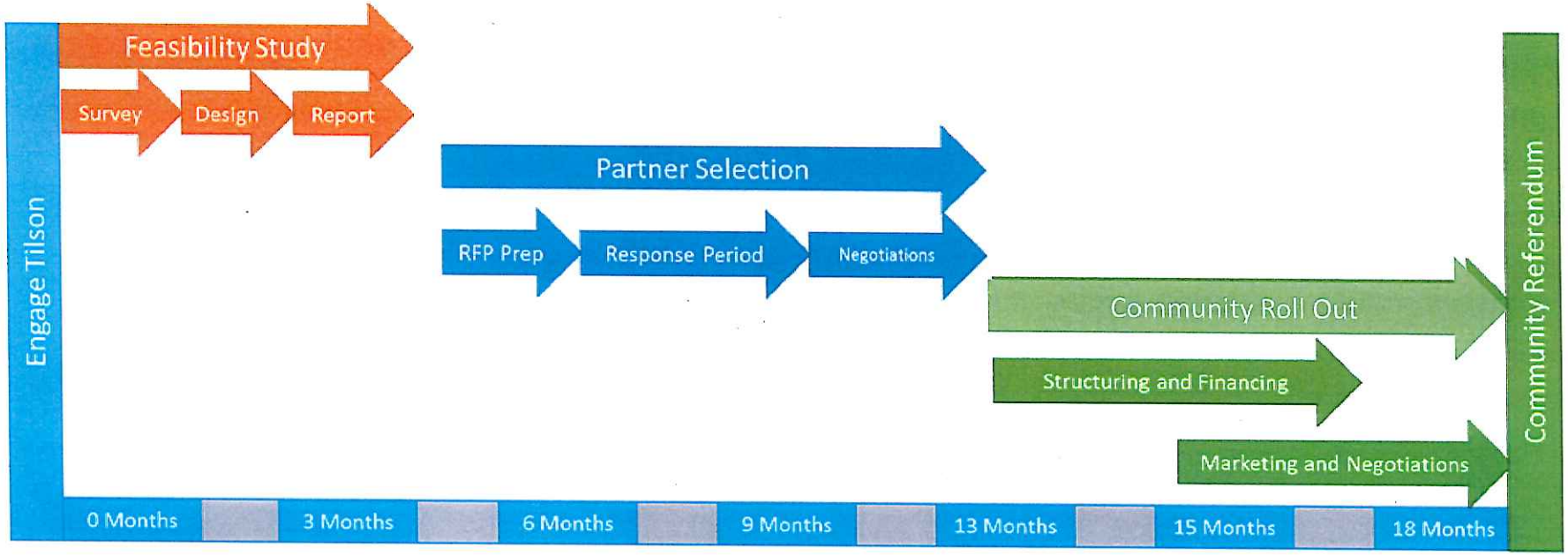
Sample Project for One Northeast Municipality



- Tilson served as the advisor to this municipality from project conception to funding. We plan to continue to advise through construction.
- Our team prepared the feasibility study, negotiated a deal with a network operator and ISP, and advised through the community outreach.

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Islesboro, ME

- **Who Was Involved?**

-Town selectmen

-Town Tax/financial expert

-Town IT specialist

-Town residents

- **How long did it take?**

-Ongoing, began in January 2014

- **Project Scope**

-Fiber-to-the-premise design

- **How did Tilson get involved?**
- **Major Milestones**

-Funding for broadband study

-RFP Process to select ISP

-Town Referendum to approve design and construction

- **Objectives met**
- **Project Cost**
- **Financing Options**
- **Fees charged**

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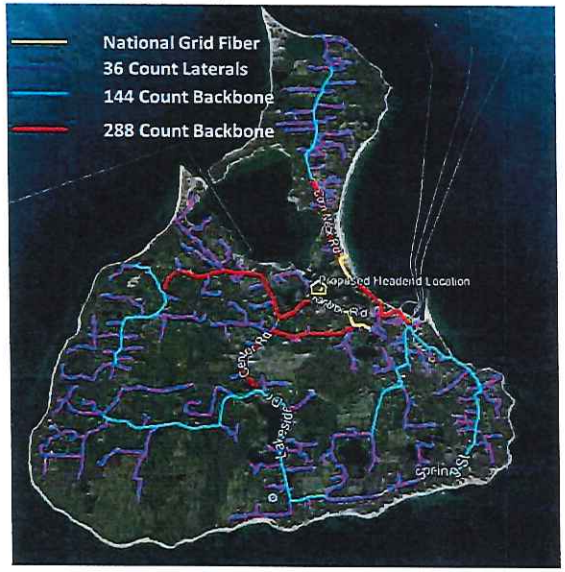
Network Designs (Ex: Block Island, RI)

1) FTTH



Advantages
1) Unlimited Speeds
2) Very Discrete
3) Resilient and durable

Disadvantages
1) High Capital Costs
2) Some home installation necessary

Capital Cost	$4.3M
Operational Cost	$355k-$652k
Speeds	1 Gbps
Who Pays	Private, Public or Hybrid

2) Hybrid Fiber/Wireless

Advantages
1) Less expensive
2) Potential improvement for cell coverage

Disadvantages
1) Partially weather dependent reliability
2) Variable speeds
3) Similar operating costs
4) Visually intrusive
5) Drawback of needing four towers

Capital Cost	$1.4M
Operational Cost	$312k-$568k
Speeds	30 – 100 mbps
Who Pays	Private, Public or Hybrid

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Business modeling

- Define business model options
  - City builds and operates network
  - Third party builds and operates network
  - Hybrid structures, e.g. town builds, third party operates
- Business model considerations
  - Construction/operational/ performance risk
  - Optimize required subsidy
    - Access to grants
    - Cost of capital
    - Tax shifting

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A Broadband Plan. . .

- Enables control of critical infrastructure
  - Akin to water, sewer, roads, library
  - Not regulated like phone service – coverage, quality and price protection not guaranteed
- Aligns investment with community goals
- Considers operational realities
  - Current and projected technology
  - Alternate providers
  - Geographic constraints like density, topography, distance to middle-mile fiber
- Is necessary for attracting bonding, grants, or other financing

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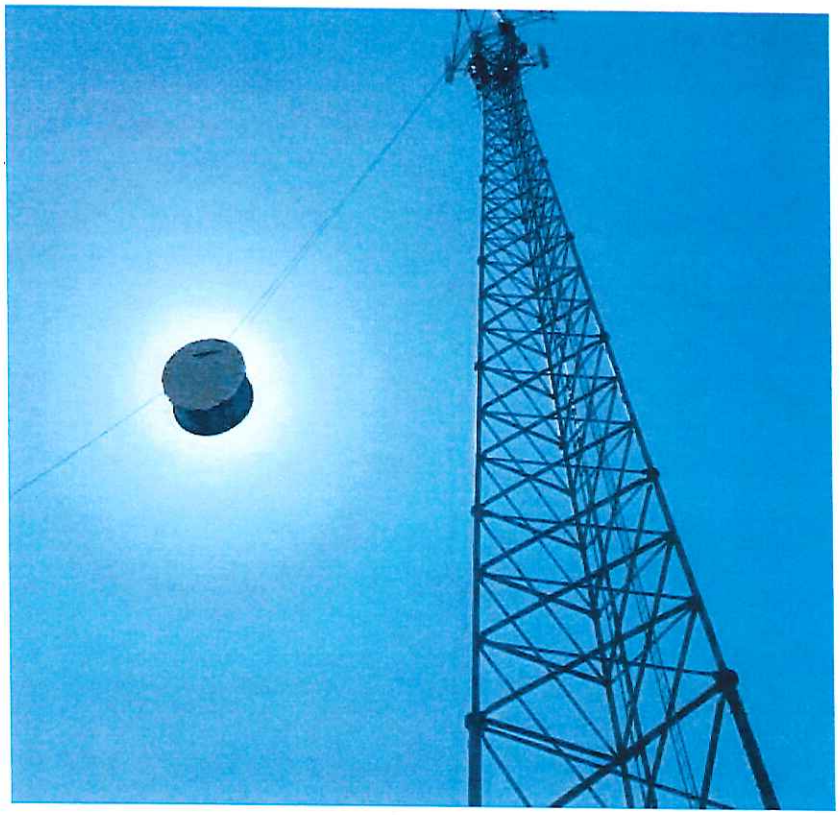
Questions and contact

- Aaron Paul, Director broadband consulting apaul@tilsontech.com

- Our TED talk on FTTP http://youtu.be/8iAtCdxgzms



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Chris Dumais
IT Director,
City of South Portland,
cdumais@southportland.org

Chris Dumais serves as the Information Technology Director for the City of South Portland. Chris also teaches as an Adjunct Professor of Information Technology for Southern Maine Community College. Chris graduated in 1996 with a degree in Computer Technology form Southern Maine Technical Colege. Chris's previous employers include Maine Yankee Atomic Power Company, Maine Medical Center, and Central Maine Healthcare.

FINANCE DEPARTMENT

GREGORY N. L'HEUREUX
Finance Director

KRISTIE BRADBURY
Deputy Finance Director

COLLEEN C. SELBERG
Purchasing Agent

Bid #

City Dark Fiber Infrastructure

INVITATION TO BID

Proposals are being requested for furnishing and installation of "Open Access" Dark Fiber to the City of South Portland, Maine as specified below, in the attached General Specifications, Proposal and Contract, and Project Specifications, will be received by the City Purchasing Agent, Room 102, City Hall, 25 Cottage Road, South Portland, Maine until 2:00 P.M., Tuesday, May 20 2014, at which time they will be publicly opened and read aloud. Proposals received after that time and date shall not be accepted.

Proposals shall be submitted with a KMZ file printout and a spreadsheet explaining all costs in sealed envelopes, plainly marked "RFP # for City Dark Fiber Infrastructure" and shall be addressed to the Purchasing Agent at the above address. **Each proposal must be accompanied by a deposit of 5% of the amount bid.** This may be properly certified check, bank treasurer's check, bank cashier's check, bank money order, cash, or a bid bond. Checks and money orders shall be made payable to the City of South Portland and will be deposited in its account. Such deposits will be returned to bidders within a reasonable amount of time after signing of contract.

All material offered on this bid shall be brand new and the latest type available. Bidder will state in their bid the make and model number, if any, and guarantee of the materials they are offering and will include a catalog or descriptive literature with their bid clearly showing the material on which they are bidding.

Questions regarding the work specifications may be directed to Chris Dumais, Information Technology Director at 207-767-7681 or e-mail at cdumais@southportland.org and arrangements to schedule a voluntary site visit may also be made by contacting Chris.

Since a prompt completion time is desired, the completion time as well as the price may be made a factor in determining the award of this bid.

It is the custom of the City of South Portland to pay its bills within 20 to 30 days following completion of work and receipt of bills for all work covered by the contract. In submitting bids under attached specifications bidders should take into consideration all discounts, both trade and time, allowed in accordance with the above payment policy. All bidders should quote net prices, therefore, exclusive of all Federal Excise Taxes.

The City of South Portland reserves the right to waive all informalities in bids, to accept any bid, or any portion thereof, or to reject any or all bids should it be deemed in its best interest to do so. Except as otherwise required by law or as specifically provided to the contrary herein, the award of this bid shall be governed by the City's purchasing ordinance.

Colleen C. Selberg
Purchasing Agent

Mailing address: P.O. Box 9422, South Portland, ME 04116-9422
Telephone (207) 767-3201, Fax (207) 767-7620

BID SPECIFICATIONS FOR CITY DARK FIBER INFRASTRUCTURE

GENERAL SPECIFICATIONS

The City of South Portland, Maine (herein called the "City"), invites bids submitted with a KMZ file printout and a spreadsheet explaining all costs.

The City may consider informal, any bid not prepared and submitted in accordance with the provisions hereof, and may waive any informalities in, or reject, any and all bids. Any bid may be withdrawn prior to the scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No bidder may withdraw a bid within sixty (60) days after the actual date of the opening thereof.

PREPARATION OF PROPOSAL

Proposals must be submitted with a KMZ file printout and a spreadsheet explaining all costs before bid can be considered for award. All bid prices must be clearly marked as onetime or ongoing costs. The City prefers no ongoing costs.

Proposals shall contain no recapitulation of the work to be done. Each bidder is required to state in his proposal his name and place of residence; the names of all persons interested with him; also that it is made without any connection with any other person making any proposal for the above work.

All bids must be submitted in sealed envelopes bearing on the outside the name of the bidder, his address, and the name of the project for which the bid is being submitted. If forwarded by mail, the sealed envelope containing the proposal and marked as directed above, must be enclosed in another envelope addressed as specified in the proposal form and preferably by "registered mail".

At the time of the opening of bids, each bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the Plans and Contract documents including all addenda. The failure or omission of any bidder to examine the site or to receive any form, instrument, or document shall in no way relieve any bidder from any obligation in respect to his bid.

The Contractor shall make his proposal from his own examinations and estimates, and shall not hold the City, its agents, employees or independent engineer or his agents, hired by the City, responsible for or bound by any schedule. If any error in any plan, drawing, specification or direction, relating to anything to be done under this contract, comes to his knowledge, he should report it at once to the City.

Any item of material, equipment or labor not mentioned in these specifications, but which is required to complete specified project, must be included in the bid by the bidder.

SITE VISIT

Before submitting proposals, bidders are advised to visit the job site for the purpose of familiarizing themselves with all existing conditions and take their own measurements, etc. Failure to visit the job site may be grounds for rejection by the City of a submitted bid.

QUALIFICATION OF BIDDERS
The City may make such investigation as it deems necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the City all such information and data for this purpose as the City may request. The City reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the City that such bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein. Conditional bids will not be accepted. The City may require pre-qualification data from bidders unknown to it.

BID SECURITY
Each bid must be accompanied by a deposit of 5% of the amount bid. This may be properly certified check, bank treasurer's check, bank cashier's check, bank money order, cash, or a bid bond. Checks and money orders shall be made payable to the City of South Portland and will be deposited in its account. Such deposits will be returned to bidders within a reasonable amount of time after signing of contract.

DAMAGES FOR FAILURE TO ENTER INTO CONTRACT
If the successful bidder fails to sign and return the contract with the required certificate of insurance and performance bond within 14 days after notification by the City that it is ready for signature, his bid will lapse at the election of the City and his bid deposit shall be forfeited and retained by the City as an agreed amount of liquidated damages. Should any bidder withdraw his bid prior to contract signing, his deposit will be retained by the City as an agreed amount of liquidated damages.

ADDENDA AND INTERPRETATIONS
No interpretation of the meaning of the plans, specifications, or other contract documents will be made to any bidder orally. Every request for such interpretation should be in writing, addressed to the Purchasing Agent, City of South Portland, P.O. Box 9422, South Portland, ME 04106, and to be given consideration, must be received at least five (5) days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, if issued, will be mailed or faxed to all prospective bidders, at the respective addresses furnished for such purposes, not later than one (1) day prior to the date fixed for the opening of bids. Failure of any bidder to receive any such addendum or interpretation shall not relieve any bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the contract documents.

AWARD OR REJECTION OF BIDS
The contract will be awarded to the lowest responsible bidder complying with the conditions of the Invitation for Bids, provided his bid is reasonable and it is to the interest of the City to accept it. The bidder to whom the award is made will be notified at the earliest possible date. The City, however, reserves the right to reject any and all bids and to waive any informality in bids received, and to accept any bid whenever such rejection, waiver or acceptance is in the interest of the City. The City also reserves the right to reject the bid of a bidder who has previously failed to perform properly or complete on time contracts of a similar nature, or a bid of a bidder who is not in a position to perform the contract. To better ensure fair competition, and to permit a determination of the lowest bidder, bids obviously unbalanced may be rejected by the City at its discretion.

AGREEMENT/CONTRACT
The successful bidder will be required to sign a standard City contract. See attached Agreement.

PERFORMANCE AND PAYMENT BONDS
If the contract price is $10,000.00 or more, the successful bidder shall provide a performance bond and a labor and material payment bond each in the full amount of the bid. If the contract price is greater than $1,000.00 but less than $10,000.00, the Director of Finance shall re-quire surety in such form and amount as he deems necessary.

TIME OF COMPLETION
Since prompt starting and completion times are desired, they may be considered a factor in determining the award of this bid. Bidders will state in the proposal the number of working days to elapse after signing of contract after which they will start the work, and the number of working days after which they will complete the work according to the specifications.
The contractor shall prosecute the work continuously until completion.

INSURANCE
The successful bidder shall agree to save the City harmless from all losses, costs or damages caused by his acts or those of his agents and will provide a certificate of insurance for Public Liability and Automobile Liability coverage in the amount of not less than $1,000,000.00 combined single limit for personal or bodily injury, death and property damage, protecting the contractor and the City from all such claims, and Worker's Compensation Insurance. The City disclaims any and all responsibility for injury to contractors, their agents or others while examining the job site or at any other time. See Section 8 of attached Agreement.

EXEMPTION FROM SALES TAX
Materials and equipment purchased for permanent installation in this project will be exempt from the State sales tax. Each bidder shall take this exemption into account in calculating his bid price for the work.

PERMITS AND LICENSES
All permits and licenses necessary for the prosecution of the work shall be secured and paid by the bidder.

MATERIALS AND APPLIANCES
The successful bidder shall furnish all labor, materials, and equipment necessary to do this work as specified in a workmanlike and orderly manner and all work shall be performed in accordance with the best trade practice.

GUARANTEE OF LABOR, MATERIALS AND EQUIPMENT
See Network Fiber Specifications, **page 13,** Section 1, sub-section 9.

PROTECTION AND RESTORATION OF PROPERTY
All waste material shall be removed from the site and area left clean upon completion of work. Any equipment or building structure damaged by successful bidder shall be repaired or replaced to the satisfaction of the owner.

STATUTORY REQUIREMENTS IN GENERAL
All work to be furnished to the City shall be performed with equipment, methods, and use of personnel in conformance with the pertinent Occupational Safety and Health Act Requirements of all existing and future State and Federal laws.

RFP #

CITY OF SOUTH PORTLAND

AGREEMENT

THIS AGREEMENT is made this XX day of XXXXXXX 2014, by and between the CITY OF SOUTH PORTLAND, a municipal corporation existing under the laws of the State of Maine and located in the County of Cumberland, State of Maine (hereinafter "CITY"), and XXXXXXX (hereinafter "CONTRACTOR"),
WITNESSETH:

In consideration of the mutual covenants and conditions contained herein, the CITY and the CONTRACTOR agree as follows:

SPECIFICATIONS:

1. The CONTRACTOR shall furnish all of the material and perform all of the work shown on the drawings and described in the specifications entitled: Bid # City Dark Fiber Infrastructure and contractors proposal dated XXXXXXXX, 2014 which are attached hereto and made a part hereof, and the CONTRACTOR covenants that it shall do everything required by this Agreement, the Special Provisions of the Agreement, the Specifications, and the Drawings in return for payment as provided herein.

COMPLETION DATE:

2. The work to be performed under this Agreement shall be started on or before XXXXXXXX and fully completed by XXXXXXX.

CONTRACT PRICE:

3. The CITY shall pay the CONTRACTOR for the performance of the Agreement the sum of $XXXXX.

PERFORMANCE BOND:

4. The CONTRACTOR shall furnish to the CITY at the time of the execution of this Agreement a performance bond and a labor and material payment bond each in the amount of $XXXXX executed by a surety company satisfactory to the CITY, guaranteeing the performance and payment by the CONTRACTOR

GUARANTEE:

5. The CONTRACTOR shall guarantee his work against any defects in workmanship and materials for a period of one year from the date of the CITY's written acceptance of the project.

PERMITS AND LICENSES:

6. Permits and licenses necessary for the prosecution of the work shall be secured and paid by the CONTRACTOR.

CITY'S RIGHT TO TERMINATE CONTRACT:

7. If the CONTRACTOR should be adjudged a bankrupt, or if it should make a general assignment for the benefit of creditors, or if a receiver should be appointed on account of its insolvency, or if it should persistently or repeatedly refuse or should fail, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if it should fail to make prompt payment to subcontractors or for material or labor, or persistently disregard laws, and ordinances, or otherwise be guilty of a substantial violation of any provision of the Agreement, then the CITY when sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the CONTRACTOR, and his surety, seven (7) days written notice, terminate the employment of the CONTRACTOR and take possession of the premises and of all materials, tools and appliances thereon and finish the work by whatever method it may deem expedient. In such case the CONTRACTOR shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the Agreement price shall exceed the expense of the finishing the work, including compensation for additional architectural, managerial and administrative services, such excess shall be paid to the CONTRACTOR. If such expense shall exceed such unpaid balance, the CONTRACTOR shall pay the difference to the CITY.

CONTRACTOR'S LIABILITY INSURANCE:

8. The CONTRACTOR shall not commence work under this Agreement until he has obtained all insurance required under this paragraph and such insurance has been approved by the CITY, nor shall the CONTRACTOR allow any subcontractor to commence work on his subcontract until all similar insurance required of subcontractor has been so obtained and approved.

(a) **Commercial General Liability** to include products and completed operations, and blanket contractual. The limits of liability shall be as follows:

Bodily Injury and Property Damage	$1,000,000
Personal Injury and Advertising Injury	$1,000,000
Per Project Aggregate	$1,000,000
General Aggregate	$2,000,000
Products and Completed Operations Aggregate	$2,000,000
Medical Payments	$10,000

(b) Business Automobile Liability

The CONTRACTOR shall maintain and cause all sub-contractors and lower tier contractors to maintain business automobile liability insurance covering all owned, non-owned, leased, rented or hired automobiles (symbol 1). The limits of liability shall be as follows:

Bodily Injury and Property Damage	$1,000,000

Automobile physical damage coverage shall be at the option of the CONTRACTOR, all sub-contractors and lower tier contractors. The CITY shall not be liable for physical loss or damage to any owned, non-owned, leased, rented or hired automobile.

(c) **Workers' Compensation Insurance**

The CONTRACTOR shall maintain and cause all sub-contractors and lower tier contractor's to maintain Workers' Compensation and Employers Liability in accordance with the laws and regulations of the State of Maine. The limits of liability provided shall be as follows:

Coverage A:	Statutory
Coverage B:	$100,000/$500,000/$100,000

(d) **Professional Liability**

If the CONTRACTOR is an Architect, Engineer or Surveyor, they shall maintain a policy of insurance to pay on their behalf whatever amounts that may become legally required to pay on account of an error, omission or negligent act.

Limits of Liability shall be as follows:

$1,000,000 per occurrence and in the aggregate site specific.

It is a requirement that this policy be maintained for a period of three (3) years following completion of the project.

(e) **Certificates of Insurance** of the types and in the amounts required shall be delivered to the CITY prior to the commencement of any work by the CONTRACTOR, subcontractor or lower tier contractor or any person or entity working at the direction or under control of the CONTRACTOR. The CONTRACTOR shall assume the obligation and responsibility to confirm insurance coverage for all sub-contractors or lower tier contractors who will participate in the project.

(f) The Certificate of Insurance and the policies of insurance shall include a sixty (60) day notice to the CITY of cancellation, non-renewal or material change in coverage or form.

(g) It is recommended that the CITY be named as an Additional Insured on the General Liability and Automobile Liability policies.

(h) The CONTRACTOR and his surety shall indemnify and save harmless the CITY, his officers and employees from all suits, actions or claims of any character brought because of any injuries or damage received or sustained by any person, persons or property on account of the operations of the said CONTRACTOR; or on account of or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials in construction of the work; or because of any act or omission, neglect, or misconduct of said CONTRACTOR; or because of any claims or amounts recovered from any infringements or patent trademark, or copyright; or from any claims or amounts arising or recovered under the "Workmen's Compensation Act" or of any other law, ordinance, order or decree; and so much of the money due to the said CONTRACTOR under and by virtue of his/her contract as shall be considered necessary by the CITY for such purpose, may be retained; or in case no money is due, his surety may be held until such suit or suits, action or actions, claim or claims, for injuries or damages as aforesaid shall have been settled and suitable evidence to that effect furnished to the CITY.

(i) **Waiver of Subrogation**
Payment of any claim or suit including any expenses incurred in connection therewith by the CITY, or any insurance company on behalf of the CITY shall not constitute a waiver of subrogation against the CONTRACTOR, sub-contractors or any lower tier contractor in the event that such claim or suit was caused by or contributed to as a result of the negligent acts of the CONTRACTOR, any sub-contractors or lower tier contractors.

(j) **Construction Agreement**

The CONTRACTOR shall and does hereby agree to indemnify , save harmless and defend the CITY from the payment of any sum or sums of money to any person whomsoever on account of claims or suits growing out of injuries to persons, including death, or damages to property, caused by the CONTRACTOR, his employees, agents or sub-contractors or in any way attributable to the performance and execution of the work herein contracted for, including (but without limiting the generality of the foregoing), all claims for service, labor performed, materials furnished, provisions and suppliers, injuries to persons or damage to property, liens, garnishments, attachments, claims, suits, costs, attorney's fees, costs of investigation and defense. It is the intention of this paragraph to hold the CONTRACTOR responsible for the payment of any and all claims, suits, or liens, of any nature character in any way attributable to or asserted against the CITY, or the CITY and the CONTRACTOR, which the City may be required to pay. In the event the liability of the CONTRACTOR shall arise by reason of the sole negligence of the CITY and/or the sole negligence of the CITY's agents, servants or employees, then and only then, the CONTRACTOR shall not be liable under the provisions of this paragraph.

DAMAGES:

9. The CONTRACTOR shall defend, indemnify and save harmless the CITY and all persons acting for or in behalf of it against all claims for injuries (including death), loss or damage, arising out of the performance out this contract.

LIENS:

10. Neither the final payment nor any part of the retained percentage shall become due until the CONTRACTOR, if required, shall deliver to the CITY a complete release of all liens arising out of the Agreement, or receipts in full in lieu thereof and, if required in either case, an affidavit that so far as it has knowledge or information the releases and receipts include all the labor and material for which a lien could be filed; but the CONTRACTOR may, if any subCONTRACTOR refuses to furnish a release or receipt in full, furnish a bond satisfactory to the CITY to indemnify it against any lien. If any lien remains unsatisfied after all payment are made, the CONTRACTOR shall refund to the CITY all moneys that the latter may be compelled to pay in discharging such a lien, including all costs and a reasonable attorney's fee.

ASSIGNMENT:

11. Neither party to the Agreement shall assign the Agreement or sublet it as a whole without the written consent of the other, nor shall the CONTRACTOR assign any moneys due or to become due to it hereunder, without the previous written consent of the CITY.

SUBCONTRACTS:

12. The CONTRACTOR shall not sublet any part of this Agreement without the written permission of the CITY. The CONTRACTOR agrees that it is as fully responsible to the CITY for the acts and omissions of its subCONTRACTORs and of persons either directly or indirectly employed by them, as it is for the acts and omissions of persons directly employed by it.

USE OF PREMISES:

13. The CONTRACTOR shall confine its apparatus, the storage of materials and operations of its workers to limits indicated by law, ordinance and permits and shall not otherwise unreasonably encumber the premises with its materials. If any part of the project is completed and ready for use, the CITY may, by written and mutual consent, without prejudice to any of its rights or the rights of the CONTRACTOR, enter in and make use of such completed parts of the project. Such use or occupancy shall in no case be construed as an acceptance of any work or materials.

CLEANING UP:

14. The CONTRACTOR shall at all times keep the premises free from accumulation of waste materials or rubbish caused by its employees or work, and at the completion of the work it shall remove all its rubbish from and about the project, and all its tools, scaffolding and surplus materials and shall leave its work "broom-clean" or its equivalent, unless more exactly specified. In case of dispute, the CITY may remove the rubbish and charge the cost to the CONTRACTOR.

PAYMENTS:

15. The CITY shall make payments on account of the Agreement as follows:

wthin 20 to 30 days upon satisfactory completion and acceptance by the CITY and receipt of bill for all work covered by the contract. The CITY holds as retainage ten percent (10%) until fifty percent (50%) of the work has been completed, retainage shall then be reduced to five percent (5%) for the balance of the project. At no time prior to the final release of retainage shall the retainage be less than five percent (5%) of the adjusted Contract sum based on any future Change Orders.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the day and year first above written.

CITY OF SOUTH PORTLAND, MAINE

BY:_____ BY:_____

Witness

James Gailey
City Manager

CONTRACTOR

BY:_____ BY:_____

Witness

Project Specifications

The City of South Portland is seeking proposals for a multi-phase "Open Access" Dark Fiber project. The primary phase will pull fiber from 25 Cottage Road, 30 Anthoine Street, and 637 Highland Avenue to various locations. The City is looking to lock in prices for the future phases of the project that will be specified at the end of this section. Proposals for future revenue sharing partnerships will also be accepted,

The CONTRACTOR for the City of South Portland will be responsible for running fiber optic cable(s), to the locations as specified below. This CONTRACTOR must participate in the "OPEN ACCESS PROVIDER" model and show proof of participation. The CONTRACTOR shall be responsible for determining the best path routing of the cable. The CONTRACTOR shall be responsible for obtaining any pole attachment rights, or use of conduit as required. The CONTRACTOR shall be responsible for the ongoing support and repair of all fiber run. The CONTRACTOR shall run the fiber optic cable into each municipal building specified and will fusion splice a minimum of 6 fibers in the Fiber Distribution Units at all locations. The exceptions will be 25 Cottage Road and 30 Anthoine Street with 24 fibers and 637 Highland Avenue with 12 fibers.

Phase One Locations of Fiber

25 Cottage Road – 24 Strands Terminated

2 – Strands to 21 Nelson Road
2 – Strands to 637 Highland Avenue
2 – Strands to 487 Broadway
2 – Strands to 111 Waterman Drive
4 – Strands to 30 Anthoine Street*

30 Anthoine Street – 24 Strands Terminated

2 – Strands to 111 Waterman Drive
2 – Strands to 637 Highland
4 – Strands to 25 Cottage Road*

637 Highland Avenue – 12 Strands Terminated

2 – Strands to 240 Ocean Avenue

120 Wescott Road – 12 Strands Terminated

2 – Strands to 34 James Baka Drive (West End Fire Station)

Future Phases Locations of Fiber

Phase 2 - 120 Wescott Road – Existing Terminated Strands

2 – Strands to 637 Highland Avenue
2 – Strands to 240 Ocean Street

Phase 3 - 929 Highland Avenue (New Facility to be built) – 12 Strands Terminated

2 – Strands to 25 Cottage Road
2 – Strands to 30 Anthoine Street

Cable Specifications

I. New Project Construction Guidelines

1. **General.** Subject to Section 7.1 of the Agreement, the intent of this Part I is to delineate the general specifications and standards for the underground and aerial portions of the Strands **CONTRACTOR** shall construct any new facilities for **THE CITY OF SOUTH PORTLAND** at a level of quality no less than what **CONTRACTOR** constructs for itself or for any other similarly situated customer. **CONTRACTOR** may deviate from the specifications and standards described below in those instances where either strict compliance is not feasible due to physical (including environmental and geological) conditions, right-of-way issues or code restrictions or other generally accepted standards that mandate deviation. For all Strands which have already been constructed prior to the date of a Service Order, **CONTRACTOR** shall, to the extent of its knowledge, inform **THE CITY OF SOUTH PORTLAND** of any deviations from the Specifications set forth below.

2. **New Underground Construction**.

   a. Material.

      i. Steel casings will be minimum ASTM A252 Grade 2.

      ii. Any exposed steel conduit, brackets or hardware (i.e., bridge attachments) will be galvanized.

      iii. Hand holes will have a minimum 20,000 pound loading rating with 6 to 12 inches of cover.

      iv. Manholes will have a minimum H-20 loading rating.

   b. Minimum Depths. Minimum cover required in the placement of conduit will be 36 inches, except where geologically unfeasible or in the following instances:

      i. Subject to permission from property owners, which **CONTRACTOR** will use commercially reasonable efforts to obtain, the minimum cover in borrow ditches adjacent to roads, highways, railroads, and interstate will be 36 inches below the clean-out line or existing grade, whichever is greater.

ii. The minimum cover across streams, river washes and other waterways will be 36 inches below the clean-out line or existing grade, whichever is greater.

iii. At locations where conduit crosses other subsurface utilities or other structures, the conduit will be installed to provide a minimum of 12 inches of vertical clearance; otherwise the conduit will be installed under the existing utility or other structure.

iv. In rock, the conduit will be placed to provide a minimum of 8 inches below the surface of the solid rock with a steel or concrete cap, or 18 inches below the surface of the rock or provide a minimum of 42 inches of total cover, whichever requires the least rock excavation. HDPE conduit will be back-filled with 2 inches of select materials (bedding) and 4 inches of select cover in rock areas.

v. In the case of the use/conversion of existing steel pipelines or salvaged conduit systems, the existing depths will be considered adequate.

c. Buried Cable Warning Tape. All conduit will be installed with buried cable warning tape except where existing steel pipelines or salvaged conduit systems are used. The warning tape will generally be placed at a depth of 12 inches below grade and directly above the conduit.

d. Conduit Construction.

i. Conduits may be placed by means of trenching, plowing, jack and bore, or directional bore. Conduit will generally be placed on a level grade parallel to the surface, with only gradual changes in grade elevation.

ii. Steel conduit will be joined with threaded collars, Zap-Lok or welding.

iii. Railroad crossings will be encased in steel conduit where required.

iv. All underground crossings of major streams, rivers, bays and navigable waterways will be placed in either HDPE Schedule

40 or greater or steel conduit at a minimum depth of 20 feet below the bottom of the waterway.

v. All conduits placed on DOT bridges will be bulletproof fiberglass where allowed by the authority and all other bridges galvanized steel conduit will be installed.

vi. All conduits placed on bridges will have expansion joint placed at each structural (bridge) expansion joint or at least every 100 feet, whichever is the shorter distance.

e. Innerduct Installation.

i. HDPE innerducts, where utilized, will be 1-1/4 inches.

ii. HDPE innerduct(s), where utilized, will be encased by a PVC or steel conduit

iii. HDPE innerduct(s) will extend beyond the end of all conduits a minimum of 18 inches.

f. Cable Installation.

i. The fiber optic cable will be installed using a powered pulling winch and hydraulic powered assist pulling wheels. The maximum pulling force to be applied to the fiber optic cable will be 600 pounds.

ii. Bends of small radii (less than 20 times the outside diameter of the cable) and twists that may damage the cable will be avoided during cable placement.

iii. The cable will be lubricated and placed in accordance with the cable manufacturer specifications.

iv. A pulling swivel break-away rated at 600 pounds will be used at all times.

v. When necessary to provide continuity for underground sections, all splices will be contained in a hand hole or manhole if geologically feasible. Provided, however, that all splices will be contained in an appropriate splice case or other secure enclosure.

vi. Space permitting, a minimum of 13 feet of slack cable will be left in all intermediate hand holes or manholes.

vii. A minimum of 50 feet of slack cable from each cable end will be left in all splice locations.

viii. A minimum of 100 feet of slack cable will be left in all Regeneration and ILA Facilities.

g. Manholes and Hand Holes.

i. Hand holes and manholes placed in traveled surface streets be HS-20 loading rated and will have locking lids or 5 star bolt system for securing the manhole.

h. Cable Markers (Warning Signs). Cable markers will be installed at all changes in cable running line directions, waterways, subsurface utilities, hand holes and at both sides of street, highway, bridge or railroad crossings. At no time will any markers be spaced more than 1000 feet apart. Markers will be positioned so that they can be seen from the location of the cable and generally set facing perpendicular to the cable running line.

i. Compliance. All work will be done in strict accordance with federal, state, local and applicable private rules and laws regarding safety and environmental issues, including those set forth by OSHA and the EPA. In addition, all work and the resulting fiber system will comply with the current requirements of all governing entities (FCC, NEC, DEC, and other national, state, and local codes).

j. As Built Drawings. As-built drawings will contain a minimum of the following:

i. Information showing the location of running line, relative to permanent land marks, including but not limited to, railroad mileposts, boundary crossings and utility crossings.

ii. Manhole and hand hole locations

iii. Conduit information (type, length, expansion joints, etc.)

iv. Notation of all deviations from specifications (depth, etc.)

v. ROW detail (type, centerline distances, boundaries, waterways, road crossings, known utilities and obstacles)

vi. Cable marker locations and stationing

vii. Fiber Optic Cable Data (type, manufacturer, reel Ids, sequentials, slack coils, splice points, etc.)

viii. Metro area scale will not exceed 1 inch = 200 feet

ix. Rural area scale will not exceed 1 inch = 500 feet

3. **New Aerial Cable Construction.**

a. General Precautions.

i. Care will be taken to avoid cable damage during handling and placing. Avoid sharp bends and take precautions to prevent crushing the cable during placement. Such damage may alter the transmission characteristics to the extent that the cable section will have to be replaced.

ii. Cable pulling tensions and bending radii will not exceed manufacturer's recommendations.

iii. Cable reels will be transported in an upright position.

iv. Personnel involved in placing aerial fiber optic cable will be familiar with standard practices and precautions and with manufacturers' specifications.

b. Aerial Cable Placement.

i. Conventional aerial construction techniques will be used in the placement of fiber optic cable.

ii. Cable tension will be monitored as the cable is pulled through cable rollers.

iii. Cable rollers will be spaced at a maximum interval of 35 feet. Type "B" rollers will be used. Contractors are required to provide sufficient rollers and pull-line to place at least 5 km of cable in a single pull.

iv. Aerial cable guides will be used where necessary.

v. 6M-suspension strand will be used and tensioned with a strand dynamometer for construction of cable on newly placed poles, cable will be sagged in to match existing cables elsewhere on the pole.

vi. Strand will be placed, as specified on engineering plans and as directed by the pole CONTRACTOR/governing entity.

vii. Cable will be lashed per BELLCORE standards.

viii. A swamp anchor with a 15-inch diameter plate and a 2-inch diameter extra heavy galvanized pipe rod will be used in wetland areas.

ix. 1-1/2" galvanized steel U-guards (or as specified) will be placed over cable at all dip poles from 12 inches below ground level to 24 inches below the cable suspension strand.

x. Plastic cable warning tags will be placed at every pole.

xi. Through wetland areas, strand dead ends will be made no further than 5,000 feet apart.

xii. Preformed guy grips will be used for all suspension strand dead ends, as well as at both ends of guy wires.

xiii. An adapter will be placed from the U-guard to a 4-foot long, 4-inch diameter PVC sweep that connects to a minimum 1-foot long, 4-inch diameter section of PVC that connects to hand holes.

II. Fiber Specifications

The intent of this Part II is to delineate the manufacturer specifications for any Fiber Optic Cable installed in the future by **CONTRACTOR** and the conduit housing the Cable.

1. **Fiber.** **CONTRACTOR** shall furnish Single Mode Fibers that meet or exceed the performance specifications set forth below:

    a. Attenuation at 1310 nm = 0.35 dB/km max

b. Attenuation at 1550 nm = 0.25 dB/km max
c. Attenuation at 1625 nm = 0.30 dB/km max
d. Zero Dispersion wavelength = 1312nm typical (between 1302nm and 1322nm)
e. Wavelength cutoff<1260nm typical
f. Dispersion slope =<.0902ps typical
g. Mode Field Diameter = 9.2+- 0.4 μm at 1310 nm & 10.4 +-0.8 at 1550 nm typical
h. Cladding Diameter = 125.0 +- 1.0 μm
i. Core/Clad Concentricity <=0.5 μm

2. **Conduit or Innerduct**

a. OSP Conduit SDR 13.5
b. 1-1/4" (inside diameter)
c. High density polyethylene (HDPE) duct
d. Tensile yield 3000 psi
e. Flexural modulus 80,000 to 110,000 psi
f. Smoothwall inside & outer
g. Un-lubricated

Acceptance Testing Specifications

1. Splicing and Testing. **CONTRACTOR** will perform all splicing and testing with industry accepted equipment. **CONTRACTOR** will perform two stages of testing during the construction of a new fiber cable Segment. Optical Time Domain Reflectometer ("OTDR") and power meter tests will be taken as soon as fiber connectivity has been achieved with **CONTRACTOR** bi-directionally verifying and recording the continuity of all licensed strands. The pigtail terminations will also be qualified at this stage using an OTDR and a minimum 1 km launch reel.

    a. During the initial construction, it is only possible to measure the licensed strands from one direction. Because of this, splices may be preliminarily qualified during construction with an OTDR from only one direction. The profile alignment system or light injection detection system on the fusion splicer may also be used to qualify splices. All measurements at this stage of construction will be taken at 1550 nm.

    b. After **CONTRACTOR** has completed end-to-end connectivity on the licensed strands, bi-directional OTDR span and power meter testing will be done. These measurements must be made after the splice manhole or hand hole is closed in order to check for macro-bending problems. Continuity tests will be done to verify that no licensed strands have been "frogged" or crossed in any of the splice points. OTDR traces will be taken and splice loss measurements recorded. **CONTRACTOR** will store OTDR traces in an electronic format and on data sheets. Loss measurements will be recorded using an industry-accepted laser source and a power meter. Copies of all electronic testing data and tables will be provided to **THE CITY OF SOUTH PORTLAND**.

    c. The OTDR traces will be taken and power loss measurements will be made at 1550 and 1625 nm and performed bi-directionally on the licensed strands.

2. Splicing Standards. The splicing standards are as follows:

    a. During installation, the objective for each splice is a loss of 0.15 dB or less. If, after three attempts, **CONTRACTOR** is not able to produce a loss value of less than 0.15 dB, then 0.25 dB will be acceptable. If, after two additional attempts, a value of less than 0.25 dB is not achievable, then the splice will be marked as Out-of-Spec ("OOS") on the data sheet. Each splicing attempt will be documented on the data sheet.

b. During end-to-end testing of a span (a span will be the licensed strands between points of interconnection with THE CITY OF SOUTH PORTLAND or third party facilities), the objective for each splice is a bi-directional average loss of 0.15 dB or less.

c. The maximum allowable splice and connection loss for the licensed strands is 0.26dB/km, including all fiber, splice, pigtail and connector losses (excluding any loss resulting from interconnection with the **THE CITY OF SOUTH PORTLAND** collocation space).

d. The entire fiber optic cable system will be properly protected from foreign voltage and grounded with an industry-accepted system. For non-armored cable industry standard bonding and grounding techniques shall be used.

DARK FIBER USE AGREEMENT
BY AND BETWEEN

Biddeford Internet Corp.
(GWI)

AND

City of South Portland
(LICENSEE)

THIS AGREEMENT (the "Agreement") entered into as of the __ of September, 2014 ("Effective Date") between **Biddeford Internet Corp. (d/b/a Great Works Internet and GWI)**, its successors and assigns, a Maine corporation ("**GWI**"), and the City of South Portland, its successors and assigns, a municipal corporation existing under the laws of the State of Maine, having its principal offices in South Portland, Maine ("**LICENSEE**") (individually, each as a "Party" or collectively, the "Parties").

WHEREAS, **GWI** plans to install certain fiber optic cable (the "Fiber Optic Cable") totaling approximately 3.75 miles in various locations within the City of South Portland, Maine and depicted generally in Schedule A ("Fiber Optic Cable Network"); and

WHEREAS, **LICENSEE** desires **GWI** to provide designated Dark Fiber (defined below) strands to **LICENSEE** between designated Termination Points (defined below) to be identified along the Fiber Optic Cable Network at such time as the Fiber Optic Cable is installed and becomes available;

WHEREAS, **LICENSEE**'s entering into this Agreement with **GWI** has provided the further inducement necessary for **GWI** to undertake the design, engineering, financing and construction of the Fiber Optic Cable Network;

WHEREAS, **GWI** is willing to provide **LICENSEE** the right to use the requested Strands (defined below), subject to and in accordance with the terms and conditions set forth herein;

NOW THEREFORE, in consideration of the covenants contained herein, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows.

1. Grant of Use and Access Rights

1.1 License. Effective as of the applicable Grant Date (defined below), **GWI** shall grant to **LICENSEE**, and **LICENSEE** shall accept from **GWI**, the exclusive license to use ("License"), for lawful communications purposes, a quantity and length of dark fiber strands located within the Fiber Optic Cable Network along

routes designated in Schedule 1.1 ("Strands"). **GWI** shall terminate the Strands at the locations listed in Schedule 1.1 ("Termination Points") onto facilities and equipment designated and supplied by **LICENSEE**. The term "Dark Fiber" means single mode strands within a bundle of fiber optic cable through which an associated light signal or light communication transmission must be provided to furnish service and that **GWI** does not hereby undertake to furnish. Without limiting any other provision of this Agreement, **LICENSEE** acknowledges and agrees that the Dark Fiber is being provided to **LICENSEE** without electronics or optronics, and that **GWI** shall have no obligation hereunder to light or otherwise activate such Dark Fiber.

1.2 Applicable Grant Date. The "Grant Date" shall be the date on which **GWI** provides notice in writing to **LICENSEE** that the Fiber Optic Cable Network has been substantially completed and that the Strands are available for their intended uses to **LICENSEE**. **GWI** intends that the Grant Date shall have occurred within one hundred fifty calendar days of the execution of this Agreement and will proceed diligently and in good faith to assure the achievement of that goal.

1.3 Contingency. Notwithstanding anything to the contrary herein, **GWI** shall have no obligation hereunder unless and until it shall have secured any necessary licenses, permits, and permissions for the construction of the Fiber Optic Cable Network.

1.4 Rights Limited to Strands. Nothing contained herein shall be construed to grant a license to use or permit **LICENSEE** to have access to any other facilities or fiber strands of **GWI** other than the Strands. Neither this Agreement nor any conveyance, license or use permitted hereunder shall constitute a conveyance, transfer or assignment of property rights of any nature, or otherwise create or vest in **LICENSEE** any ownership interest or property rights in the Strands or in the Fiber Optic Cable except the right provided under the License specifically granted herein. Nothing herein contained shall be construed to compel **GWI** to construct, retain, extend, place or maintain facilities, other than the Fiber Optic Cable Network. **LICENSEE** acknowledges and agrees that the Fiber Optic Cable Network will contain more Dark Fiber strands than the Strands subject to the License. Nothing contained in this Agreement shall be construed to limit or restrict **GWI**'s right to grant and renew rights to any entity to use the Fiber Optic Cable Network or any strands which are not actually licensed to **LICENSEE** hereunder. Further, except as expressly provided in this Agreement, nothing herein contained shall be construed as a limitation, restriction or prohibition against **GWI** with respect to any agreement(s), licenses and arrangement(s) which **GWI** has heretofore entered into, or may in the future enter into, with Third Parties, provided that any such agreements, licenses and arrangements shall not interfere with the exercise of **LICENSEE'S** right to use the Strands under this Agreement.

1.5 LICENSEE's Equipment and Accessories. **LICENSEE** acknowledges and agrees that (i) **GWI** is not supplying, and is not obligated to supply, **LICENSEE** with any optronics, transceivers, electronics or optical or electrical equipment or other facilities, including without limitation, any equipment to light the Dark Fiber, any generators, batteries, air conditioners, fire protection and monitoring and testing equipment, all of which are the sole responsibility of **LICENSEE**; and (ii) **GWI** is not responsible for performing any work other than as specified in this Agreement. Nothing contained in this Agreement shall be construed to obligate **GWI** to construct, install or maintain any fiber optic equipment or other electronic and associated equipment beyond the Fiber Optic Cable. **LICENSEE** shall be responsible, at its sole cost and expense, for supplying, constructing, installing and maintaining any and all associated equipment and facilities other than the Strands and the associated connection boxes, including without limitation, any and all equipment necessary to interconnect with the Fiber Optic Cable and to light and monitor the Strands (hereinafter "**LICENSEE**'s Equipment and Accessories").

1.6 Liens. **LICENSEE** shall not permit any liens or other encumbrances (except liens or other encumbrances related to **LICENSEE**'s taxing authority) by reason of its actions or failure to act to be placed on the Fiber Optic Cable, or any facilities of **GWI** or its affiliates.

1.7 Designation of Specific Strands. **GWI** shall have the sole right to designate the specific strands on a designated route to be licensed hereunder and to determine the means by which the Strands will enter and exit the Fiber Optic Cable and be connected to **LICENSEE**'s Equipment and Accessories, said determination to be made in a commercially and technically reasonable manner.

2. GWI's Obligations with Respect to Fiber Optic Cable Network

2.1 Network Obligations. During the term of this Agreement, **GWI** shall maintain the Fiber Optic Cable Network substantially in the form and with the equivalent functionality as depicted in Schedule 1.1.

2.2 Open Access Network. **GWI** shall operate the Fiber Optic Cable Network as an open access network. For this purpose, an open access network shall mean a network that, within limitations of available capacity, is available for use by any qualified purchaser of lit fiber or dark fiber services on terms that are just, reasonable and not unreasonably discriminatory. Specifically, **GWI** shall undertake the following:

2.2.1 Lit Services. To the extent that **GWI** provides similar services to its retail customers along the route of the Fiber Optic Cable Network, **GWI** shall offer Ethernet Service on a wholesale basis at rates that are no more than 75% of the comparable rates charged to retail customers. "Ethernet Service" shall be defined as a service or services made

available by **GWI** for the purpose of electronic transmission of data within the Fiber Optic Cable Network through the use of standards-based Layer 2 Ethernet technology. **GWI**'s obligation to offer lit services under this Agreement shall terminate ten (10) years after the Grant Date.

2.2.2 Dark Fiber Service. During the term of this Agreement, **GWI** shall offer to qualified service providers dark fiber service. Dark fiber service shall include a license to use dark fiber between specified points along the Fiber Optic Cable Network. It shall not include any obligation on the part of **GWI** to supply any optronics, transceivers, electronics or optical or electrical equipment or other facilities, including without limitation, any equipment to light the dark fiber, any generators, batteries, air conditioners, fire protection and monitoring and testing equipment. Rates for dark fiber service shall be based upon market rates at the time the service is ordered and shall be assessable without consideration of the length of the dark fiber strands ordered. As soon as reasonably practicable and in order to facilitate use of the Fiber Optic Cable Network by service providers, **GWI** shall arrange for the extension of the Fiber Optic Cable Network to connect with the central office facilities owned by FairPoint Communications at 78 E Street in South Portland, Maine.

3. Payment Obligations

3.1 **LICENSEE**'s Payment Obligations. In consideration for the license to use the Strands hereunder permitted, **LICENSEE** shall pay to **GWI** the sum of $149,490.20 as follows:

3.1.1 $74,745.10 within thirty (30) days of the Effective Date.

3.1.2 $74,745.10 within thirty (30) days of the Grant Date.

3.2 **GWI**'s Retail Revenue Sharing Obligation. To the extent that **GWI** provides retail Internet or data transport services to customers connected directly to the Fiber Optic Cable Network, **GWI** shall make payments to **LICENSEE** as follows:

3.2.1 Retail Revenues. Retail revenues shall be defined as revenues received by **GWI** from retail business or residential customers for Internet and data transport services connected directly to the Fiber Optic Cable Network, exclusive of any applicable taxes or surcharges. Retail Revenues shall not include revenues received for other services including, by way of example only, revenues from consulting services,

managed services, cloud services, telephone service or long distance service.

3.2.2 Connection Costs. Connection Costs shall be defined as all out of pocket costs, internal labor costs and reasonable associated overheads associated with the connection by **GWI** of an individual residential or business customer.

3.2.3 Application of Retail Revenues. Whenever **GWI** establishes Internet or data transport services to a new customer connected directly to the Fiber Optic Cable Network, it shall record any Connection Costs associated with the establishment of those services. Subsequent Retail Revenues received from that new customer for those services shall be recorded as an offset to those Connection Costs. When Retail Revenues for that customer have been recorded in a sufficient amount to offset fully the Connection Costs, all future Retail Revenues received from that customer shall be subject to Revenue Sharing. Within thirty (30) days of receipt from a customer of amounts subject to Revenue Sharing, **GWI** shall remit five percent (5%) of such amounts to **LICENSEE**.

3.2.4 Internet Connection or Equivalent. As soon as reasonably practicable following the Grant Date, **GWI** shall establish an Internet connection for the benefit of **LICENSEE** at a termination point along the Fiber Optic Cable Network to be designated by **LICENSEE** and at no cost to the **LICENSEE**. The connection shall be designed to provide for data transfer of at least 100 Mb/sec in both directions. For the remainder of the Term of this Agreement, **GWI** will provide that Internet connection at no charge to the **LICENSEE**. In lieu of providing that connection, **GWI**, at its option, may elect to pay to **LICENSEE** on an ongoing basis the estimated retail market value of such a connection.

4. Term

4.1 Term of Agreement. This Agreement shall expire on the day that is twenty (20) years from said Grant Date, unless otherwise terminated in accordance with this Agreement. Upon expiration of this Agreement, to the extent that Strands connected at the termination points remain operable and in service, **LICENSEE**'s license to use said Strands shall remain in effect for as long as the Strands remain operable and in service. During any such extended term of the license, all other rights and obligations created by this Agreement, except for **GWI's** obligations with respect to Revenue Sharing as provided in Section 3.2, shall be deemed terminated and of no effect.

4.2 Effect of Termination. Upon the later of the termination of this Agreement or the expiration of any extended term of the license, **LICENSEE** shall, at its sole cost and expense, cause **LICENSEE**'s Equipment and Accessories to be disconnected from the Fiber Optic Cable and shall remove **LICENSEE**'s

Equipment and Accessories from **GWI**'s property. In the event **LICENSEE** fails to do so within thirty (30) days of said expiration or termination, **GWI** shall have the right, but not the obligation, to undertake to make such disconnection without further notice to **LICENSEE**, and without liability to **LICENSEE** or Third Parties resulting from interruption of service. Upon termination of this Agreement, the parties shall be relieved of, and not remain liable for, any of their obligations under this Agreement, except as expressly provided in this Agreement.

5. Rights and Permits

5.1 Governmental Approvals. **LICENSEE** is, and shall continue to be during the term of this Agreement and any renewals hereof, responsible for the acquisition of, and payment for, any and all federal, state, local, and commercial permits, approvals and consents necessary for its intended use of the Strands.

5.2 Non-interferences. **LICENSEE** agrees that it shall not use any rights granted hereunder, including the Strands, in any way that physically interferes with or adversely affects the use of the Fiber Optic Cable, or the equipment of any Third Party including any utility upon whose facilities the Fiber Optic Cable is located, it being expressly agreed that the Fiber Optic Cable is co-located on utility-owned and/or maintained facilities and that the Fiber Optic Cable will be used by other parties, including **LICENSEE** or other holders of Dark Fiber use and access licenses. **LICENSEE** shall ensure that any agreements it enters into with respect to the use of the Fiber Optic Cable by a Third Party shall include a similar requirement prohibiting the physical interference with **LICENSEE'S** use and enjoyment of the Strands, which agreement shall afford **LICENSEE** the right to enforce said provisions against the Third Party.

5.3 Certification. Upon request of **GWI, LICENSEE** shall provide certification or other evidence that it has all permits, approvals and consents as may be necessary for its use of the Strands.

5.4 **LICENSEE** Compliance with **GWI** Rights. **LICENSEE** agrees that it shall, to the extent applicable to its permitted use and access rights hereunder provided, comply with any and all requirements, restrictions and limitations imposed under **GWI** easements, licenses, leases or aerial attachment rights (hereinafter "Underlying Rights") provided that GWI first provides LICENSEE with notice of the Underlying Rights. **LICENSEE** represents warrants and covenants that it shall use the Strands and any access rights permitted hereunder, in compliance with any such rights, provided that GWI first provides LICENSEE with notice of such rights, and applicable law.

6. Construction Acceptance

6.1 Cable Specifications. The Fiber Optic Cable shall generally consist of the Fiber Optic Cable described in Schedule 1.0 (the "Cable Specifications"), provided that **GWI** shall have the right to install, replace or modify any or all sections of the Fiber Optic Cable Network with any other fiber optic cable so long as the specifications are within commonly accepted industry standards.

6.2 Date of Delivery; Installation of **LICENSEE**'s Equipment and Accessories. The parties acknowledge that **GWI**'s Fiber Optic Cable Network shall be installed in stages, with separate segments and Termination Points along the Fiber Optic Cable Network. **GWI** shall provide notice to **LICENSEE** at such time as the Fiber Optic Cable has been installed and is available for use by **LICENSEE**. Such notice shall identify any applicable Termination Points.

7. Maintenance and Repair of the Fiber Optic Cable

7.1 Emergency Maintenance. During the Term of this Agreement, **GWI** shall perform maintenance and repair on the Fiber Optic Cable to correct any failure, interruption or impairment of the Strands (reasonable wear and tear, and reasonable resulting changes in quality, excepted). When trouble is encountered on the Strands, **LICENSEE** shall provide such assistance, diagnostic or otherwise, as may be reasonably necessary to assist **GWI** in its maintenance and repair activities, including without limitation the locating of any fault within the Fiber Optic Cable. During the Term of this Agreement, the parties agree to the following Emergency maintenance standards: (a) **GWI** shall respond to any failure, interruption or impairment in the operation of the Strands within two (2) hours after **GWI** has actual knowledge, whether by means of receiving a report from **LICENSEE** or otherwise, of any such failure, interruption or impairment; and (b) **GWI** shall use commercially reasonable efforts to have the Strands restored to proper working order within twenty-four (24) hours of any such failure, interruption or impairment.

7.2 Ordinary Maintenance. During the Term of this Agreement, **GWI** will schedule from time to time and perform at its own cost specific periodic maintenance and repair checks and services of the Fiber Optic Cable. To the extent such work shall involve any interruption in **LICENSEE**'s use of the Strands, **GWI** shall: (a) provide notice of at least 72 hours to **LICENSEE** of such schedule prior to performing any such maintenance and repair; and (b) use commercially reasonable efforts to schedule the same so as to minimize the impact on **LICENSEE**'s use of the Strands.

7.3 Maintenance of **LICENSEE**'s Equipment and Accessories. **GWI** shall have no maintenance or repair responsibility with respect to any portion of **LICENSEE**'s network on **LICENSEE**'s side of each Termination Point. Nothing contained in this Agreement shall be construed to obligate **GWI** to operate, maintain or repair any of Licensee's Equipment and Accessories. **LICENSEE** shall periodically inspect **LICENSEE**'s Equipment and

Accessories and shall be obligated, at its sole cost and expense, to keep, operate, maintain and repair **LICENSEE**'s Equipment and Accessories in accordance with **GWI**'s Underlying Rights, provided that GWI first provides LICENSEE with notice of the Underlying Rights.

7.4 Excluded Maintenance. In the event that it is necessary for **GWI** to undertake any repair, replacement or relocation work relating to the Fiber Optic Cable, which is not the responsibility of **GWI**, as set forth above, **LICENSEE** agrees to reimburse **GWI** for such cost reasonably incurred by **GWI**. To the extent that delay in the repair, replacement or relocation work would not affect the performance or reliability of the Fiber Optic Cable Network, **GWI** will notify **LICENSEE** before undertaking such work and will solicit from **LICENSEE** a work order authorizing the work.

8. Relocation And Re-Designation Of Strands; Unauthorized Use of Strands

If, following the Grant Date, **GWI** is required by a party with legal authority to do so, including without limitation under any of **GWI**'s Underlying Rights, to relocate a portion the Fiber Optic Cable, and any such relocation demand is not the result of the failure of **GWI** to comply with its obligations under such **GWI** Underlying Rights, **GWI** shall provide **LICENSEE** reasonable notice of such requirement, and **GWI** shall be permitted to proceed with such relocation provided that it does not materially alter the Route. In the event that such relocation requires the removal, re-splicing, and/or reconnection of any of **LICENSEE**'s Equipment and Accessories, **LICENSEE** shall, upon notice from **GWI**, promptly cause such action to be taken at its sole cost and expense.

9. Representations And Warranties

9.1 **LICENSEE** represents and warrants to **GWI** that:

9.1.1 This Agreement is fully authorized by all necessary and appropriate organizational actions, is fully enforceable according to its terms and its execution and performance by the **LICENSEE** will not constitute a breach of any other agreements to which **LICENSEE** is a party.

9.1.2 No further consents or approvals are required from any Third Party or governmental agency, as a condition to the execution, delivery and performance of this Agreement by **LICENSEE**.

9.1.3 **LICENSEE** will comply with all applicable laws.

9.1.4 **LICENSEE** has rights and approvals for its intended use of the Strands.

10. Liability, Indemnities And Insurance

10.1 Limitation of **GWI** Liability. EXCEPT AS PROVIDED IN SECTION 10.2.2, IN NO EVENT SHALL **GWI**'s LIABILITY ARISING OUT OF DELAYS IN INSTALLATION OR RESTORATION OF THE STRANDS OR OUT OF MISTAKES, ACCIDENTS, OMISSIONS, INTERRUPTIONS, ERRORS OR DEFECTS IN THE ORDERING, PROCESSING, PROVISIONING, OR TRANSMISSION OF SERVICE OR FOR ANY OTHER BREACH HEREUNDER, HOWEVER CAUSED, EXCEED $150,000. WITHOUT LIMITING THE FOREGOING, **GWI** SHALL HAVE NO OBLIGATION TO PROVIDE ALTERNATIVE ROUTING WITH RESPECT TO ANY DARK FIBER CAPACITY PROVIDED PURSUANT TO THIS AGREEMENT. EXCEPT AS PROVIDED IN SECTION 10.2.2, IN NO EVENT SHALL **GWI** BE LIABLE TO **LICENSEE** OR ANY OTHER PERSON, FIRM OR ENTITY, FOR ANY INDIRECT, CONSEQUENTIAL, SPECIAL, INCIDENTAL, OR PUNITIVE DAMAGES, OR FOR ANY LOST PROFITS OF ANY KIND OR NATURE WHATSOEVER, EVEN IF FORESEEABLE, ARISING OUT OF ANY MISTAKE, ACCIDENT, ERROR, OMISSION, INTERRUPTION, OR DEFECT IN TRANSMISSION, OR DELAY ARISING OUT OF OR RELATING TO THE LICENSING OF DARK FIBER OR THE OBLIGATIONS OF **GWI** PURSUANT TO THIS AGREEMENT INCLUDING, WITHOUT LIMITATION ANY FAILURE TO TIMELY OR ACCURATELY PROVISION OR INSTALL, MAINTAIN OR REPAIR ANY PORTION OF THE FIBER OPTIC CABLE, OR CONDITIONS WHICH MAY RESULT FROM ACTIONS BY REGULATORY OR JUDICIAL AUTHORITIES PARTIES TO ANY OF **GWI**'S UNDERLYING RIGHTS, OR BY ANY CARRIERS OR THIRD PARTIES THAT **GWI** RELIES ON TO PROVIDE ANY SERVICE TO **LICENSEE**. **GWI** MAKES TO **LICENSEE** ONLY THE EXPRESS WRITTEN WARRANTIES, IF ANY, SET OUT HEREIN. OTHERWISE, **GWI** MAKES NO WARRANTY WHETHER EXPRESS, IMPLIED OR STATUTORY, AS TO THE DESCRIPTION, QUALITY, MERCHANTABILITY, COMPLETENESS OR FITNESS FOR ANY PURPOSE OF THE STRANDS OR FIBER OPTIC FACILITIES OR LOCAL ACCESS OR AS TO ANY OTHER MATTER, ALL OF WHICH WARRANTIES BY **GWI** ARE HEREBY EXCLUDED AND DISCLAIMED.

10.2 Damage to Facilities.

10.2.1 Damage to Fiber Optic Cable. **LICENSEE** shall exercise due care to avoid damaging the Fiber Optic Cable, the Utility's facilities, and any other **GWI** equipment or facilities or the equipment or facilities of Third Parties attached to, or making use of, the Utility's facilities. **LICENSEE** assumes all responsibility for any and all loss from any damage to such facilities caused by **LICENSEE**'s employees, agents or contractors. **LICENSEE** shall make an immediate report to **GWI** and any other user of the occurrence of any such damage and agrees to reimburse the respective parties for all costs and losses incurred in making repairs. In addition to the foregoing indemnities and without

limiting the application or effect thereof, **LICENSEE** hereby agrees and acknowledges that it shall be liable to **GWI** for any and all damages to **GWI**'s facilities resulting from or caused by the use of the Fiber Optic Cable by **LICENSEE**, its agents or employees or assigns, including without limitation, the operation and maintenance of **LICENSEE**'s Equipment and Accessories.

10.2.2 Damage to **LICENSEE**'s Equipment and Accessories. **GWI** shall exercise due care to avoid damaging **LICENSEE**'s Equipment and Accessories. Except as provided in Section 12.1, **GWI** assumes all responsibility for any and all loss from any damage to such facilities caused by **GWI**'s employees, agents or contractors. **GWI** shall make an immediate report to **LICENSEE** and any other user of the occurrence of any such damage and agrees to reimburse **LICENSEE** for all costs and losses incurred in making repairs. In addition to the foregoing indemnities and without limiting the application or effect thereof, **GWI** hereby agrees and acknowledges that it shall be liable to **LICENSEE**, for any and all damages to **LICENSEE**'s Equipment and Accessories resulting from or caused by **GWI**'s maintenance of the Fiber Optic Cable.

10.3 Indemnity. Except as provided in Section 10.2.2, **LICENSEE** shall defend, indemnify and hold harmless **GWI**, and its officers, directors, contractors, agents and employees from and against any and all claims, damages, judgments, criminal, civil or administrative claims, proceedings, or actions, losses, settlements, penalties, interests, and expenses, including attorney's fees, accounting and other expenses in connection therewith ("Claims and Costs") which they may suffer or incur, relating to this Agreement, arising out of or resulting from **LICENSEE**'s use of the Strands or **LICENSEE**'s breach of this Agreement. Said indemnity and hold harmless shall also cover, without limitation, and whether or not brought by Third Parties or **LICENSEE**, Claims and Costs resulting from, relating to or arising out of (i) improper or illegal use of **LICENSEE**'s Equipment and Accessories, patent infringement claims, actions, suits and proceedings relating thereto, (ii) damages, losses or claims of or relating to business interruption or consequential damages, and (iii) any other claims, actions or suits brought in connection with or relating to **LICENSEE**'s use or occupation of the Fiber Optic Cable, except as provided in Section 10.2.2, or except to the extent solely caused by negligence or misconduct on the part of an **GWI**, damage to or destruction of property or injury to or death of persons occasioned by **GWI**'s equipment, facilities, products, or services, and (iv) the failure to pay any taxes when due (or file necessary returns relating thereto), including any obligations to pay taxes set forth in this Agreement.

10.4 Insurance Requirements. LICENSEE shall purchase and maintain a policy of commercial general liability insurance in at least the amount of Four Hundred Thousand Dollars ($400,000) per occurrence for causes of action pursuant to the Maine Tort Claims Act, and will be increased from time to time, if required to

meet the maximum coverage provisions of the Maine Tort Claims Act, as it may be amended, and in at least the amount of One Million Dollars ($1,000,000) per occurrence and Two Million Dollars ($2,000,000) in the aggregate for causes of action pursuant to federal law or State law for which immunity is not provided under the Maine Tort Claims Act. Such insurance shall include contractual liability insurance. Nothing in this Agreement is intended, or shall be construed, to constitute a waiver of any defense, immunity or limitation of liability that may be available to LICENSEE, its officers, agents and employees, pursuant to the Maine Tort Claims Act or as otherwise provided by law. For all insurance, the LICENSEE shall, upon request by GWI, deliver an industry-recognized certificate of insurance evidencing the amount and nature of the coverage, the expiration date of the policy and stating that the policy of insurance issued to LICENSEE will not be cancelled or changed without prior written notice to GWI within such period of time as is reasonable under the terms of the insurance policy.

The provisions of this Section 10 shall survive the expiration or earlier termination of this Agreement and any license granted hereunder as to events occurring prior to expiration or termination of this Agreement.

11. Force Majeure

In the event of circumstances which constitute Force Majeure and causes impairment in the performance of **GWI**'s obligations under this Agreement, then such performance shall be excused to the extent of such impairment. **GWI** shall resume such performance with reasonable dispatch after cessation of the Force Majeure event, and will use reasonable efforts to cause the Force Majeure event to cease. If **GWI** is unable to perform its obligations under this Agreement due to a continuing Force Majeure event, after reasonable effort to cause the cessation of such event, then either **GWI** or **LICENSEE** shall have the right to terminate this Agreement without liability to the non-terminating Party. In the event of any such termination, Section 4.2 of this Agreement and **LICENSEE**'s obligations hereunder shall apply.

12. Miscellaneous

12.1 Assignment. This Agreement shall bind each Party and its heirs, executors, administrators, successors and assigns. **LICENSEE** shall not assign or sublicense this Agreement or any portion thereof, including any rights or permissions granted by **GWI** to **LICENSEE** hereunder, without the express written consent of the **GWI**, which permission shall not be unreasonably withheld. No consent shall be required for an assignment by: (i) **GWI** to assign its interest under this Agreement as security for any debt of **GWI**, including making a collateral assignment of its rights under this Agreement; and (ii) **GWI** to assign its interest to any other entity.

12.2 Third Parties. The representations, warranties, covenants and agreements of the parties set forth in this Agreement are not intended for, nor shall they be for the benefit of or enforceable by, any Third Party, except to the extent that such the rights shall have been assigned in accordance with of Section 12.1 hereof to such Third Party.

12.3 Relationship of the Parties. This Agreement is not intended to create nor shall it be construed to create any partnership, joint venture, employment or agency relationship between **GWI** and **LICENSEE**, and except as otherwise provide in Section 10, neither **GWI** nor **LICENSEE** shall be liable for the payment or performance of any debts, obligations, or liabilities of the other Party, and neither Party shall have the right or authority to bind the other by contract or otherwise make any representations or guarantees on behalf of the other.

12.4 Severability. If any part of any provision of this Agreement or any other agreement, document or writing given pursuant to or in connection with this Agreement shall be invalid or unenforceable under applicable law, said part shall be ineffective to the extent of such invalidity only, without in any way affecting the remaining parts of said provision or the remaining provisions of said agreement; provided, however, that if any such ineffectiveness or enforcement of any provision of this Agreement, in the good faith judgment of either Party, renders the benefits to such Party of this Agreement as a whole uneconomical in light of the obligations of such Party under this Agreement as a whole, then the other Party shall negotiate in good faith in an effort to restore, insofar as possible, the economic benefits of this Agreement to such Party.

12.5 Notice. All notices, requests, demands, and other communications under this Agreement shall be in writing and shall be deemed to have been duly given on the date of such service if served personally or via fax on the Party on whom the notice is given, (with oral confirmation of receipt) or on the fifth (5th) day after mailing if mailed to the Party to whom the notice is to be given by first class mail, registered or certified, postage prepaid, and properly addressed as follows:

If to **GWI**, then the following address:

Biddeford Internet Corp. d/b/a GWI
8 Pomerleau Street
Biddeford, ME 04005

If to **LICENSEE**, then the following address:

City of South Portland
Attention: City Manager
25 Cottage Road
South Portland, ME 04106

Either Party may change its address by giving the other Party written notice of the new address in the manner set forth above. **GWI** may from time to time authorize, in writing, that certain written communications may be made by email in a manner acceptable to **GWI**.

12.6 Integration. Except as noted below in Section 12.8, this Agreement constitutes the entire agreement between the Parties on the subject matter hereof and shall supersede all prior writings, understandings or agreements thereon. This Agreement may not be altered or amended except by an instrument in writing signed by the Parties. All schedules referenced herein are expressly made a part of this Agreement and any references to this Agreement shall be deemed to refer to and include this Agreement and any such schedules.

12.7 No Waiver. No waiver by a Party of any term or condition of this Agreement shall be binding unless in writing and signed by the Party, nor shall any such waiver, if given, be deemed a continuing waiver.

12.8 Failure to Exercise Rights. No failure or delay on the part of the Party in exercising or enforcing any right, power or privilege hereunder, and no course of dealing between the Parties, shall operate as a waiver thereof; nor shall any single or partial exercise of any right, power or privilege hereunder preclude any other or further exercise thereof or the exercise of any other right, power or privilege.

12.9 Choice of Law and Jurisdiction. All questions relating to the validity, construction, performance and enforcement of this Agreement shall be governed by the laws of the State of Maine and all actions by either Party against the other shall commence in such state.

12.10 Benefit and Binding Effect. This Agreement shall be binding upon or inure to the benefit of the Parties hereto and their respective successors and assigns permitted hereunder. If any provision of this Agreement is deemed to be in violation of law, such provision shall not be deemed to impair the validity of any other provision hereof.

12.11 Further Assurances. A Party and its respective officers and directors, if any, will take such further action after the execution of this Agreement as may be reasonably requested by the other Party in order to carry out the purposes of this Agreement.

12.12 Section Headings. The section and other headings contained in this Agreement are for convenience or reference only and shall not affect the meaning or interpretation of any part of this Agreement.

12.13 Counterparts. This Agreement may be executed by one or more Parties on any number of separate counterparts, and all of said counterparts, taken together shall be deemed to constitute one and the same instrument.

12.14 Interpretation. No portion of this Agreement shall be construed against either Party based on any claim that said Party drafted said portion.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed as the date first above written.

Biddeford Internet Corp. ("GWI")

By: _____

Title: CEO

City of South Portland ("LICENSEE")

By: _____

Title: City Manager

Schedule 1.0, Cable Specifications

The Fiber Optic Cable shall be SMF28e+ or equivalent fiber meeting the following specifications:

a. Attenuation at 1310 nm = 0.35 dB/km max
b. Attenuation at 1550 nm = 0.25 dB/km max
c. Attenuation at 1625 nm = 0.30 dB/km max
d. Zero Dispersion wavelength = 1312nm typical (between 1310nm and 1322nm)
e. Wavelength cutoff <1260nm typical
f. Dispersion slope =<.0902ps typical
g. Mode Field Diameter = 9.2 +/- 0.4 μm at 1310 nm & 10.4 & 10.4 +/- 0.8 at 1550 nm typical
h. Cladding Diameter = 125.0 +- 1.0 μm
i. Core/Clad Concentricity <=0.5 μm

Schedule 1.1 - Fiber Optic Cable Network

Phase One Locations of Fiber

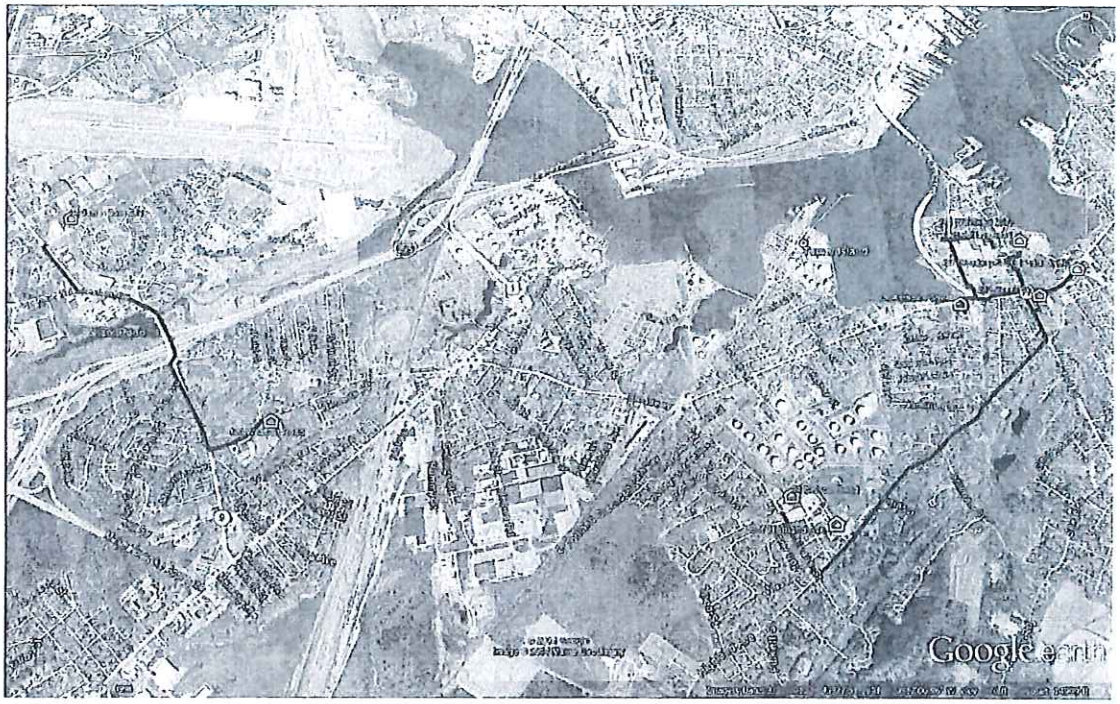
25 Cottage Road – 24 Strands Terminated
- 2 – Strands to 21 Nelson Road
- 2 – Strands to 637 Highland Avenue
- 2 – Strands to 487 Broadway
- 2 – Strands to 111 Waterman Drive
- 4 – Strands to 30 Anthoine Street*

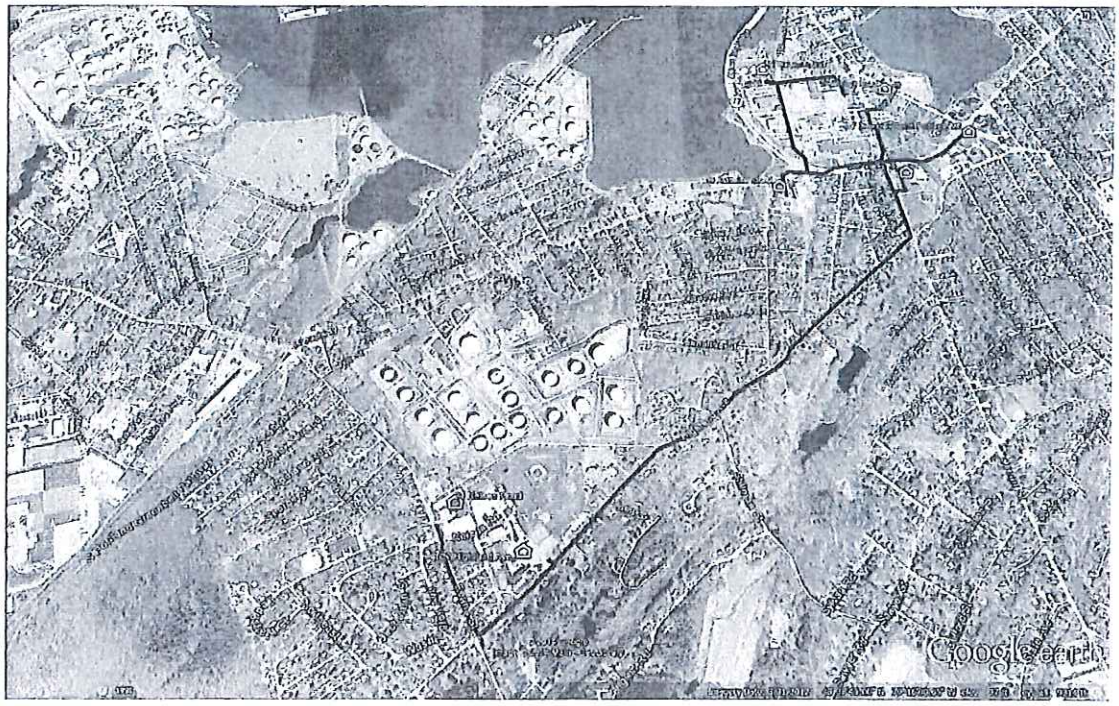
30 Anthoine Street – 24 Strands Terminated
- 2 – Strands to 111 Waterman Drive
- 2 – Strands to 637 Highland
- 4 – Strands to 25 Cottage Road*

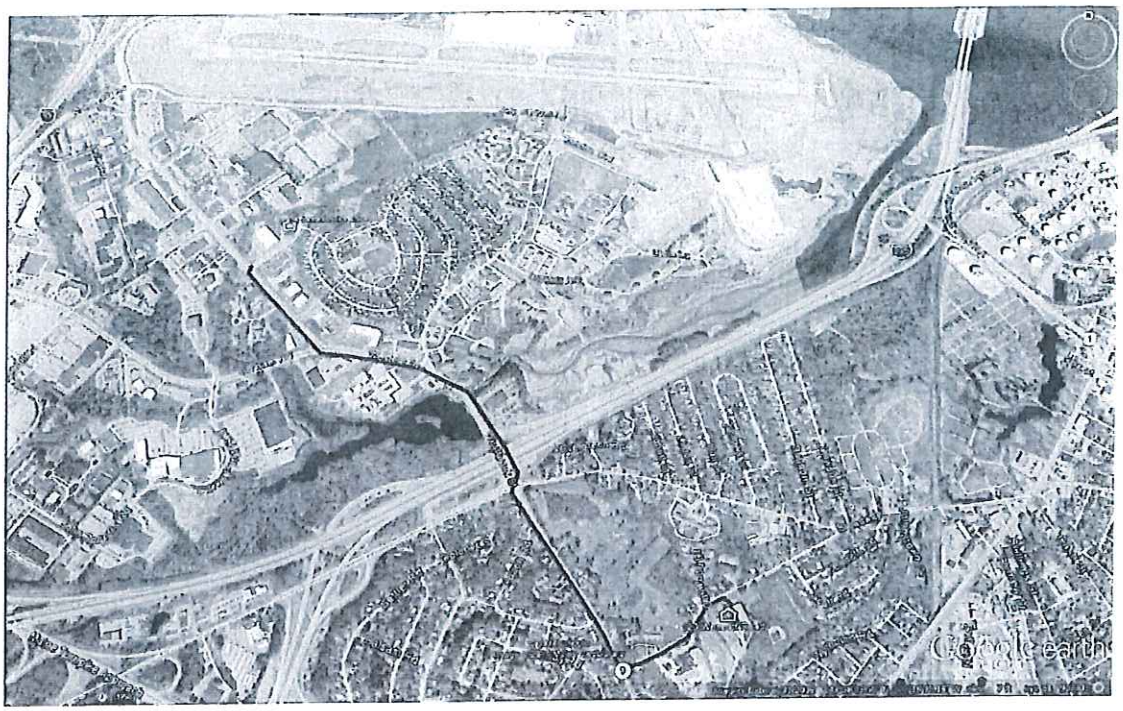
637 Highland Avenue – 12 Strands Terminated
- 2 – Strands to 240 Ocean Avenue

120 Wescott Road – 12 Strands Terminated
- 2 – Strands to 34 James Baka Drive (West End Fire Station)

Illustrative Diagrams of Intended Route






Google earth

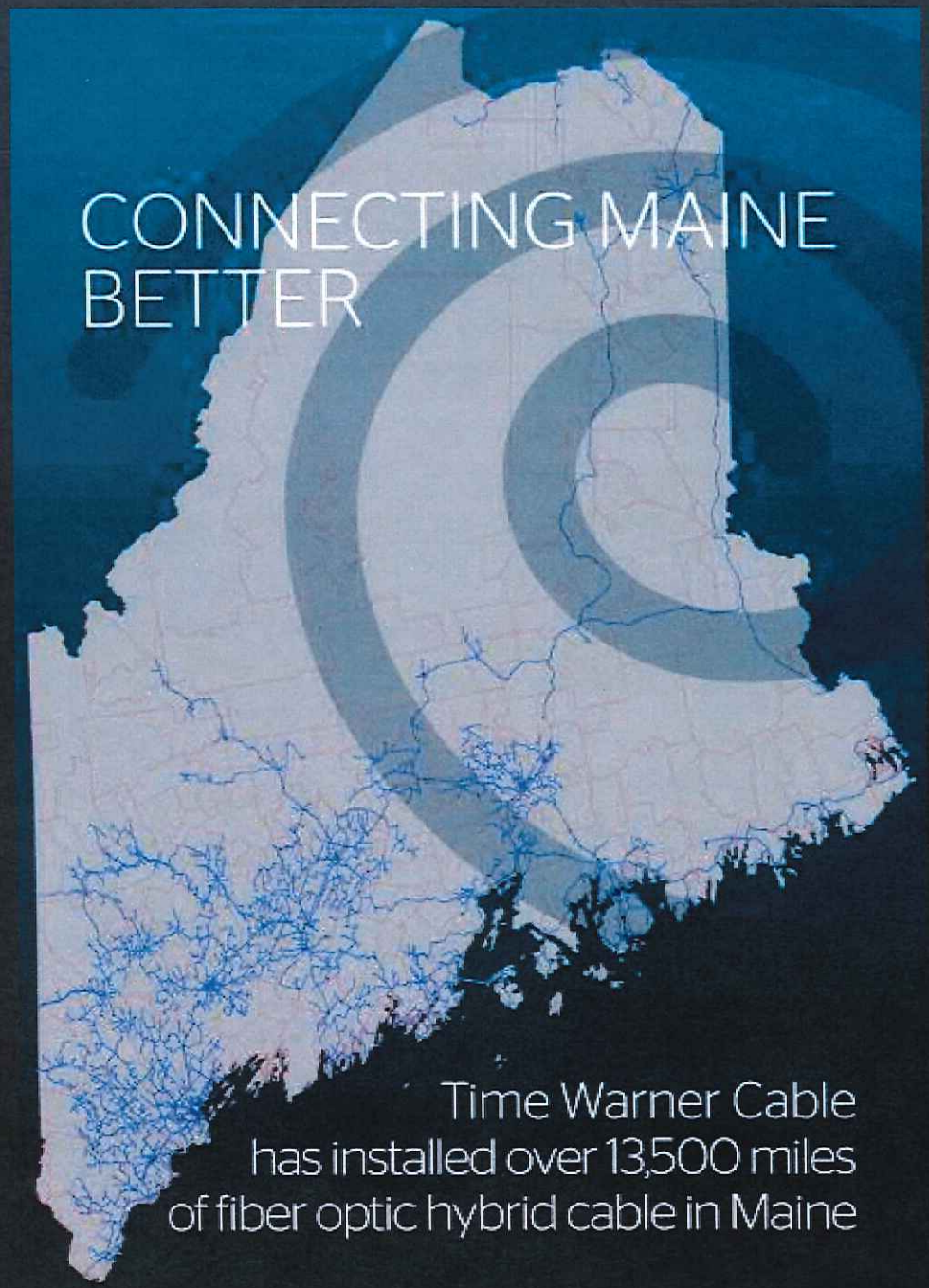
Michael Edgecomb
Director, Government Relations
Time Warner Cable
michael.edgecomb@twcable.com

Mike Edgecomb holds over 35 years of experience in the Cable TV industry, starting in Aroostook County in 1980. Mike spreads his time lobbying at the Maine legislature, monitoring cable issues with Maine's congressional delegation, legislature, Governor's office and state agencies. Mike works directly with municipalities to address local franchise and broadband issues, as well as overseeing and managing State and Federal regulations relating to cable television operations. Mike has testified on numerous occasions before the Maine Utilities Commission and legislature both in support and opposition to proposed cable and broadband legislation, as well as pole attachment legislation. Mike represents Time Warner Cable at the ConnectME Authority meetings and local broadband committees.

Time Warner Cable and Municipal Broadband

Mike Edgecomb – Director Government Relations

Time Warner Cable® | ENJOY BETTER



900+ Employees

291 Communities in Maine

570K Homes and Businesses w/ access

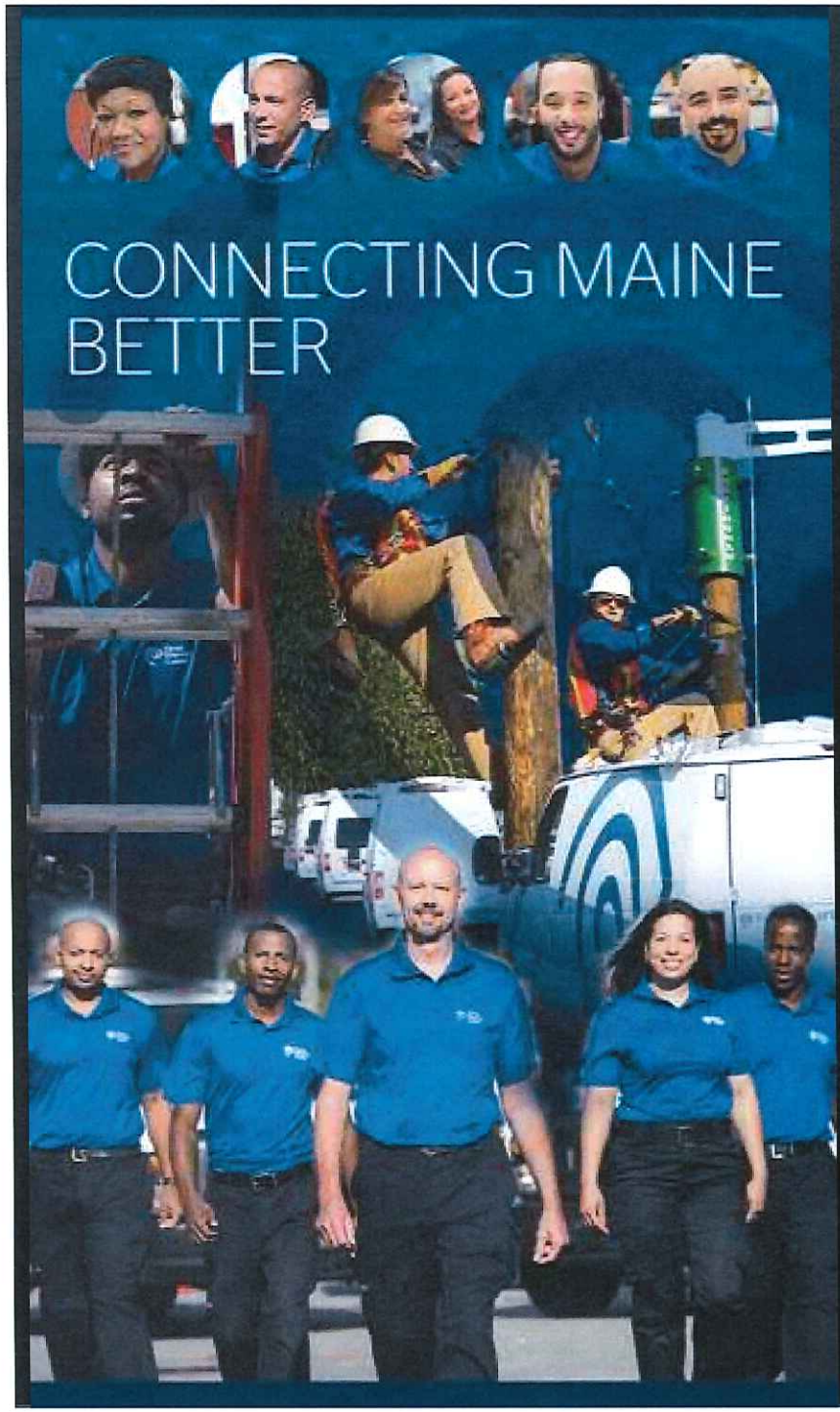
$288 Million Invested/ 6 years

Residential

Cable Television
Broadband
Telephone
Intelligent Home

Business Class

Television
Broadband
E-Mail
Web Hosting
Telephone
Hotspots



FCC's October, 2014 Internet Access Services: Status as of 12/31/2013 report, which is the most recent publically available data shows that Maine is 14th among all states in its subscription rate

FCC's recent January, 2015 Broadband Availability in America report found that the percentage of Maine's rural population which had access to the FCC's 25Mbps/3Mbps standard was 9th best which is an impressive result when you consider that Maine is the most rural state in the country by population

Residential Internet Packages

Increased speeds - Same/Lower prices

2008	Speed	Price	2015	Speed	Price
Lite	768kbps x 128kbps	$19.95	Every Day low price	2 Mbps x 1 Mbps	$14.99
Basic	1.5Mbps x 256kbps	$29.95	Basic	6 Mbps x 1 Mbps	$29.99
Standard	5Mbps x 384kbps	$44.95	Standard	15Mbps x 1 Mbps	$34.99
Turbo	10Mbps x 1Mbps	$54.90	Extreme	30 Mbps x 5 Mbps	$54.99
			Ultimate	50 Mbps x 5 Mbps	$64.99

Web applications and speed-what is Recommended?

- Skype (source: Skype Support)
- For voice calls: 0.1 Mbps download / 0.1 Mbps upload
- For video calls: 0.5 Mbps download / 0.5 Mbps upload
- For HD video calls: 1.5 Mbps download / 1.5 Mbps upload

- Netflix (source: Netflix Help)

  Recommended broadband connection speed: 1.5 Mbps download

  For HD quality: 5.0 Mbps download

- YouTube (source: YouTube Help)

  Recommended: at least 0.5 Mbps download

- Hulu (source: Hulu Help)

  Recommended: for SD viewing 1.5 Mbps download

  Recommended: for HD viewing 3Mbps download

Experiences with Government Owned Networks

- **GROTON, CT**
- **Year of Network Launch:** 2004
- **Current Status:** Built and Sold
- Initial startup and construction costs totaled $16.9 million. The city borrowed $34.5 million between 2006 and 2008 to build and expand the network. This was substantially more—in terms of total dollars and total
- City was forced to sell it in early 2013, because it was failing and mired in debt:
- It was losing over $2M a year
- Ultimately, the financials of the system caused the city's credit rating to be downgraded
- It was sold for $550,000 – representing a loss of over $30M
- The city remains with a nearly $28M debt and will have to pay $2.5M/year for 14 years to pay it off.

Experiences with Government Owned Networks

- **Provo, Utah** City Population: 115,919 (2012)
- **Year of Network Launch:** 2001
- **Current Status:** Built and Sold
- Revenues $570K Operating expenses $1.89 Million
- Provo sold its GON to Google for $1, saddling the city with $40 million in debt.
- This $60M GON failed due to tepid demand. City officials propped it up several times with loans and other support.
- In 2013, the city sold the failing system to Google for $1. Provo will incur additional costs on items related to the transfer to Google.
- Meanwhile, city taxpayers remain on the hook for $40M in outstanding debt.

Experiences with Government Owned Networks

- **Monticello, Minnesota**
- **Year of Network Launch:** 2010
- **Current Status:** Built and sold
- In early 2013, the city sold the system to private investors for $550,000, representing a loss of over $30 million. The city and its taxpayers remain responsible for more than $27 million in loans.
- The GON's financial struggles caused the city to default on its bond obligations, prompting a lawsuit.
- Significant and ongoing losses and revenue shortfalls resulted in missed debt payments, which in turn led to lawsuits by bondholders for repayment. The city initially offered to settle by paying $0.22 on the dollar. Bondholders rejected and litigation continues
- The city's credit rating was downgraded in 2012.

Experiences with Government Owned Networks

- **Cedar Falls, Iowa**
- **Year of Network Launch:** Mid-1990s
- **Current Status:** Partially Built
- Significant GON-related debt prompted Moody's to downgrade Cedar Falls Utilities' bond rating; now the city plans a property tax increase.

- In its push to modernize and join the ranks of other "gig cities," Cedar Falls assumed a significant amount of debt with limited evidence that consumers wanted ultra-fast Internet connections.
- As a result, the system has experienced some financial volatility, leading to a credit downgrade.

  Over the last few years, while total operating revenues have exceeded total operating expenses, operating expenses continue to grow at a fast pace.

- **WILSON, NC**
- **Year of Network Launch:** 2008
- **Current Status:** Built **Number of subscribers:** 6,000 **Revenues:** $11.42 million **Operating Expenses:** $11.42 million
- Initial funding came from a City Council authorization of issuance of $28M in debt in 2006.
- That was followed in 2008 by a City Council approval of the issuance of $33,710,000 worth of Certificates of Participation (COPs), typically used in lieu of bonds in an effort to circumvent debt limits. The COP agreement states that if revenue derived from the network is not enough to make payments, the City will use taxpayer money from the City's General Fund to cover the obligations.
- The City borrowed an additional $4.75M in 2010.
- In 2013, the total cost of operations was approximately $11.4M, with an operating loss of $220,956.
- Cost of continued construction is approximately $1.2M annually.
- As of 2012, approximately 6000 customers, representing about 30% of the Wilson market, were on the network.

Experiences with Government Owned Networks

- PHILADELPHIA, PA

- In 2005, Philadelphia was the first major city to announce plans to deploy a citywide Wi-Fi network. After several years of negotiating over rights-of-way access and experimentation with business models, the project collapsed under the weight of soaring budgets and tepid demand.
- The mesh networking technology was incapable of covering the city's 135 square miles with reliable service.
- The initial budget of $10M eventually tripled. As a result, project viability depended on a large number of residential subscriptions, but that did not materialize. Due primarily to low quality of service and significantly better and cheaper service options offered by incumbent ISPs, the system had fewer than 6,000 total subscriptions; fewer than 1,000 were new Internet users.

Perceived "Successes"

- BRISTOL, VA
- **Year of Network Launch:** 2002
- **Current Status:** Built
- Despite nearly $60 million in federal and state funding, its GON remains $70 million in debt.
- This system was built by a city-owned utility, and initially was deployed for municipal-only purposes. In 2002, deployment began to expand the system's offering to include commercial communications services. By the end of 2013, about 13,400 subscribers were on the system.
- About half of this system's total costs were paid for with grants from federal and state government, including $24M in federal grants since 2003, an additional $28.4M via the federal stimulus program in 2010, and approximately $30M in grants from the state's Tobacco Commission, which administers funds stemming from a major tobacco settlement.
- Even with this infusion of funding, the GON remains more than $70 million in debt.

Perceived "Success"

- CHATTANOOGA, TN
- **Year of Network Launch:** 2010
- **Current Status:** Built **Number of subscribers:** 55,000 **Revenues:** $80.7 million **Operating Expenses:** $26.1 million
- Launched in 2010, this system has about 60,000 subscribers and a positive cash flow.
- **However,** a one-time infusion of more than $110M in federal stimulus funding covered a portion of the build out cost, and an already existing electrical smart grid was used as part of its network infrastructure.
- Even with the substantial federal funding and existing infrastructure, the system remains $200+ M in debt; repayment is not expected until at least 2020.
- The utility running the system had its bond rating downgraded in 2012 for a number of reasons, including the debt it had amassed and the volatility associated with recouping its investments.

To Consider

Initial Costs - Planning, Design, Development, Construction, Roll Out, Obsolescence

Ongoing Costs - Debt Retirement, Maintenance, Repair, Pole Attachments, External Costs, Upgrades

- **Look Deeper.** Failed and failing GONs highlight the complexities and challenges associated with building and deploying advanced communications networks.
- **Protect Constituents.** GONs, especially those deployed by municipal utilities, raise fundamental concerns regarding sustainability, fair competition, and consumer welfare.
- **Focus on Real Demand.** Consumer demand, not arbitrary speed benchmarks, should drive deployment.
- **Be Wary of Economic Panaceas.** The data do not indicate that GONs catalyze significant economic activity, especially regarding job creation, where they have been deployed.
- **Keep Pace with Change.** Municipal governments generally do not have strong records of keeping pace with technological advances or in responding to rapidly evolving consumer

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Jeffrey Nevins holds over 20 years of experience in corporate communications, public relations and governmental affairs. He has worked in the communications and government affairs department at FairPoint Communications since November 2008. Jeffrey returned to Maine after spending three years in Louisiana working for the communications company CenturyTel, now known as CenturyLink.

Jeffrey is a Maine native and graduate of the University of Maine and holds an MBA from Thomas College. Jeffrey has held key positions at Mead Paper/Boise Cascade in Rumford; Allied Signal Corporation in Hopewell, Virginia; the Maine Municipal Association; and the Maine Better Transportation Association. Jeffrey has two grown daughters and lives in Augusta with his wife Barbara.

Sarah Davis is Senior Director of Government Affairs and Wholesale Strategies at FairPoint Communications. Sarah has a law degree from the University of Maine School of Law. For the past 8 years Sarah has been involved in most regulatory matters involving FairPoint. Sarah's expertise centers on wholesale issues including interconnection and pole attachments across 16 states. In Maine specifically, Sarah focuses on legislative issues regarding provider of last resort service and broadband. Sarah is a lifelong resident of Cumberland County; Sarah grew up in Bridgton and currently resides in Raymond.

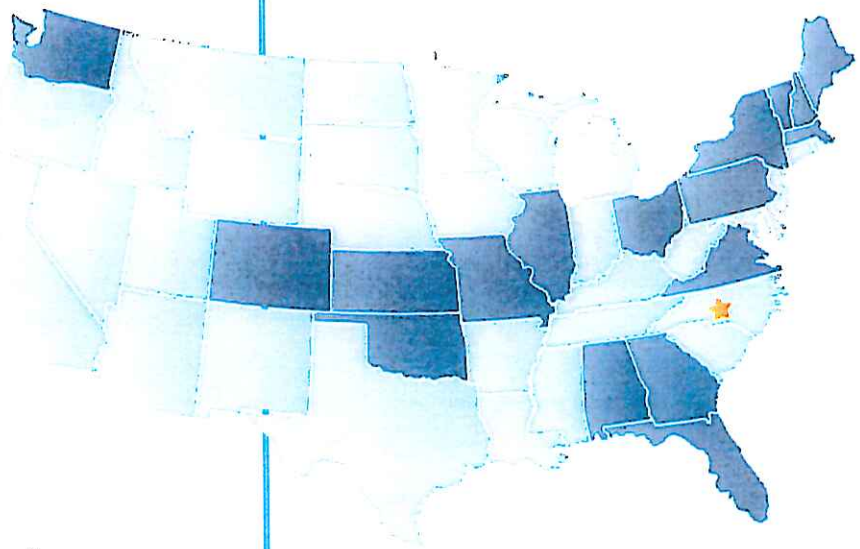
A Collaborative Approach to Ensure Your Broadband Development Project Succeeds

Welcome!

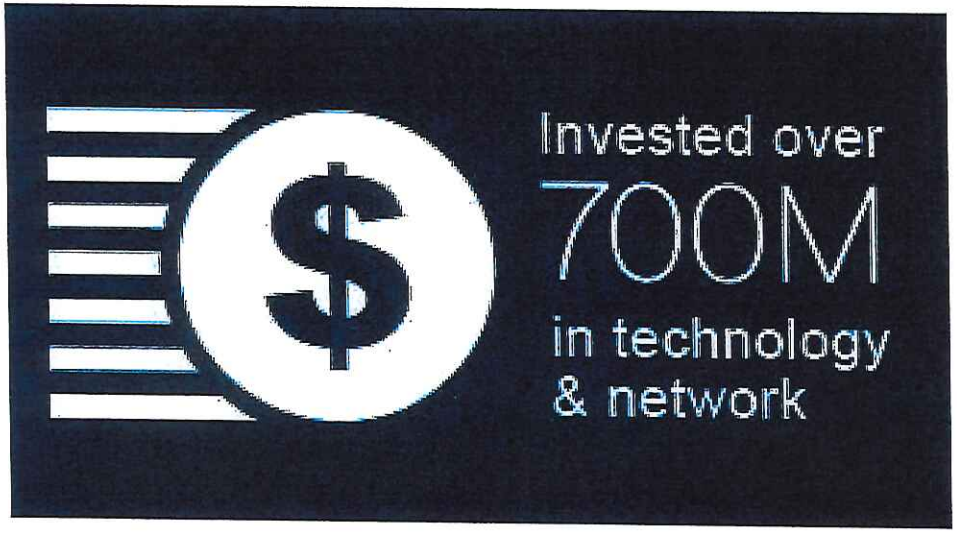
About FairPoint Communications

Corporate Quick Facts

- 20+ years of as a communications company in the region
- $939M annual revenue
- 1.2M+ access line equivalents
- ~2,900 employees
- ~90% broadband availability
- Operations in 17 states
- Local presence and workforce
- Incumbent communications provider in ME, NH & VT



Investment in our Communities



- $1M/week average investment
- 1,000+ local service and support technicians
- 26 in-network field service centers

FairPoint in Maine

- Increased broadband availability from **67% to 90%** in our service area
- Expanded broadband to more than **300 communities and 70,000 homes and businesses**
- More than **1,100 employees in 238+ communities**

Municipal Broadband Challenge

Meeting the needs of your community

- Know what you have in your community
- Getting it right – innovation & creativity
  - A comprehensive approach – residential and business
- Finding the right solution for your community
- Utilize accurate and current information – RFP/RFI
- Economic development challenges
- The dilemma of stranded investment

"FairPoint wants to partner to find solutions"

FairPoint's Network

- Our **next-generation Ethernet network** is ubiquitous across Maine, NH and Vermont.
- FairPoint's network has more than **16,000 total miles of fiber**.
- It's the region's **largest fully-owned and managed fiber-based network**.
- Our **24/7/365 Network Operations Center** ensures our network stays connected around the clock.
- We deliver **99.999% core network availability**.

Leveraging Fiber Assets

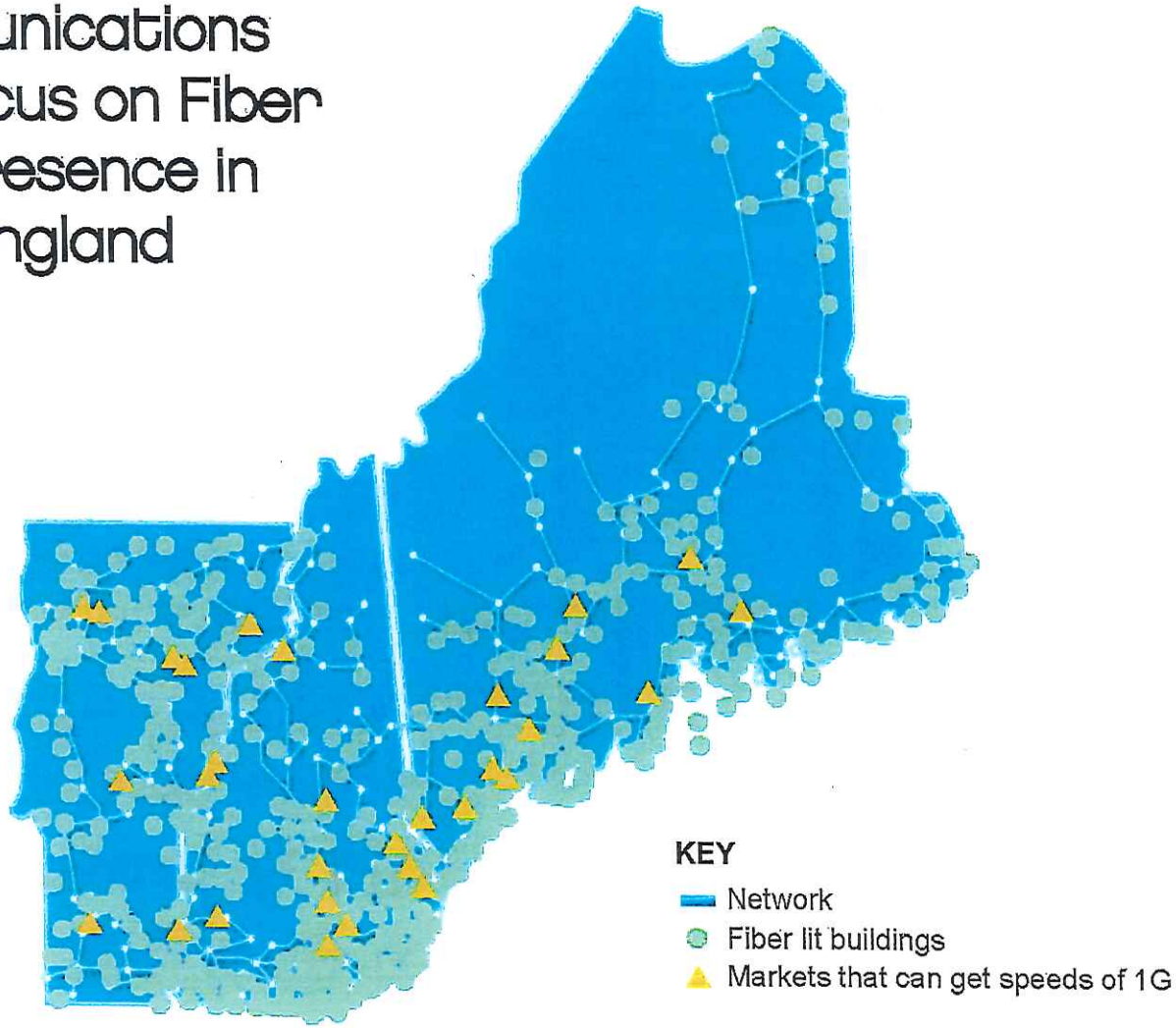
FairPoint Communications Continues to Focus on Fiber and Ethernet Presence in Northern New England

$700 million invested since 2008

16,000 fiber route miles

3,000 fiber lit buildings

32 markets with Ethernet access up to 1 Gbps



"Nobody can match the extensive northern New England fiber footprint that FairPoint has," - Brian Washburn, Current Analysis

Since 2008, FairPoint has invested more than $700 million in its infrastructure and technology to reach new customers, upgrade its network and enable the next-generation of communications technology. With nearly 16,000 fiber route miles and counting, FairPoint offers the largest fully-owned and managed fiber-based network in the region, including direct fiber connections to nearly 3,000 buildings, meaning that businesses in those buildings can quickly and easily access FairPoint's Ethernet network without construction. In addition, businesses located in 32 markets have access to FairPoint's Ethernet connections capable of symmetrical, dedicated data transport speeds of up to 1 Gbps.

Fiber Statewide

FairPoint knows how to build, manage and maintain networks for the long term:

- **Maine School & Library Network**
  - 600 Locations across the State of Maine
- **New England Telehealth Consortium**
  - 300 locations across NNE with speeds up to 1Gbps
- **Maine NG 911**
  - Maine is the first completely IP-based NG911 system in the nation. Serving 26 PSAPs
- **Fiber to the Wireless Tower**
  - More than 1,100 towers connected with fiber in NNE serving all major wireless carriers

The ABCs of Muni Broadband Planning

A – Awareness: Know what facilities and capabilities exist

B – Big Picture: Look for solutions that addresses the whole community

C – Collaboration: Work with incumbent providers in the planning effort

Awareness

Know what facilities and capabilities exist

- Fiber routes through the community and out of the community
- Broadband speed and availability coverage
- Ethernet availability: symmetrical resilient Ethernet up to 1 Gbps
- Estimated bandwidth usage: Community-wide usage information based on actual data and penetration rates

Don't Count Out Copper while looking for a fiber future

- In most cases, it is much less expensive to incrementally upgrade an existing copper infrastructure and still achieve necessary speeds

Big Picture

Look for solutions that addresses the whole community

- Not just Main street - but all the other streets as well
- What areas need availability or greater speeds?
- Are there new build neighborhoods?

<u>Build-out</u> to new areas rather than <u>overbuild</u> existing facilities

- This makes the most use of new investments

Thank you.

Contact Us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