City of Fort Collins

MUNICIPAL RETAIL FIBER-TO-THE-PREMISE (FTTP)

BROADBAND BUSINESS PLAN

Version III; August 31, 2017

Contents

I. Executive Summary

This document offers a high-level business plan for initiating and operating the City of Fort Collins' Retail fiber-to-the-premise (FTTP) broadband network. After extensive research and due diligence, municipal deployment of a FTTP network is a viable alternative to produce meaningful sustainable benefits for the City of Fort Collins. Fiber's a proven technology with a stable history, capable of meeting current performance standards. It is the most promising alternative to meet future needs.

The business plan (Plan) addresses the broadband status quo in the City of Fort Collins, market profile and opportunity, operating plan, proposed network architecture and financial requirements of the retail model. In addition, the competitive environment will be investigated, possible operating scenarios examined, and frequently asked questions answered.

The Plan was written with data provided by Uptown Services in the 2016 Financial Feasibility Analysis and with data available to staff at the date of publication and may not reflect current conditions. The Plan will be updated as new information becomes available.

II. Mission

Status Quo

The City of Fort Collins began exploring the benefits and need for a high speed fiber network in 2010 when Google announced the launch of the "Think big with a gig: Our experimental fiber network" competition. The City was among the estimated 1,100 communities that applied. After Google announced Kansas City as their first Google Fiber community, the City, along with Colorado State University (CSU) joined an effort called GigU. Thirteen communities and their land-grant universities partnered to explore the benefits to the University and City of Fort Collins by creating a future-proof "Connected City."

Why Fiber-to-the-Premise ("FTTP")? Why Now?

The term "future proofing" is used to describe a city that is connected to the internet for commerce and quality of life services. Fort Collins is home to CSU and an outstanding public school system that uses the internet for world-class research and business. Fort Collins has a tech-savvy culture and a strong economic base with diverse employment opportunities that could benefit from enhanced broadband services. High speed broadband is the nervous system of innovation, entrepreneurship, education and quality of life. The ability to connect quickly and reliably (both upload and download) has proven to be a differentiator.

For the next 30-50 years, fiber is the anticipated required infrastructure. With upgrades to the electronics, a fiber network can handle significantly greater speeds in the future. In contrast, existing coax and copper cable systems are at the end of their technological life and will not support speeds that will be needed throughout the next 20 years. Conversation with the two major incumbents providing internet service in the community indicated both believed their existing speeds were adequate to meet existing consumer needs and their business plan was to upgrade the system speed as the consumer needed it. Neither would commit to when a full fiber network system to all premises may be implemented.

Questions frequently arise as to why the City would enter a market that traditionally has been dominated by private companies. According to the Federal Communications Commission (FCC) the real underlying cause of slow, expensive internet in the U.S. is the lack of competition among providers. New broadband entrants into the market have a substantial impact on price reductions, increased customer service and accelerated infrastructure upgrades. Incumbents typically try to maximize use of the existing infrastructure, such as copper, wireless or a hybrid approach. Non-fiber infrastructure can create dependability concerns due to the life and reliability of copper. Fiber, which the City's exploring in its broadband plan, is not susceptible to weather or electromagnetic interferences and can have a lifespan of 25–40 years or beyond. Currently, wireless technology is a complement to wired connections, not a substitute.

The City realized a fiber-connected city created advantages over a disconnected city. With the growing importance of high speed internet within the economy and citizen's daily lives, a plan for securing gigabit-speed internet across the City's growth management area (GMA) is crucial. It was also apparent that the existing networks within the City's GMA would require significant technology upgrades before they were able to offer reliable gigabit speeds to the general public at a reasonable price. It would seem a municipal network was the obvious option. However, Senate Bill 05-152 (SB152) prohibited the City from being engaged in providing internet services; that is until 2015. In November 2015, 83 percent of Fort Collins voters chose to overturn SB152, thus removing the legal barriers to the City of Fort Collins from providing high speed internet.

Staff created this high-level business plan to document the assumptions, data, estimates, challenges and details associated with creating a municipal retail fiber-to-the-premise (FTTP) network that would offer broadband service to the Fort Collins GMA.

City of Fort Collins Retail Broadband Solution

During the Budgeting for Outcomes (BFO) community outreach in 2014, the community prioritized and identified a need to address the lack of reliable, universal and affordable broadband services. The City of Fort Collins addressed the broadband situation by identifying the following strategic objective in the 2015/2016 Strategic Plan.

"Strategic Objective 3.9 – Encourage the development of reliable high speed internet services throughout the community."

The overall objective is to bring reliable, high speed internet to the city of Fort Collins, while making an informed decision through evaluation of risk and opportunities. The FCC formally defines broadband as internet download speed of 25 megabits per second (Mbps) and upload of 3Mbps or faster. However, a popular benchmark of high-speed broadband is commonly known as gigabit speed (Gbps), and is seen in many cities across the country including Longmont, CO.

One possible option for accomplishing Strategic Objective 3.9 is the City of Fort Collins Municipal Retail FTTP Broadband Network in which the City will design, build, own, operate and market internet services to all premises within the City's GMA. Initial build-out of the network would be within existing city limits and service would be added to the GMA as those areas were annexed into the City. In summary, the City would:

- Design a fiber grid network to ensure infrastructure is available on a community-wide basis
- Borrow between $130M and $150M to fund the network construction and systems implementation to all businesses and residences

- Design a fiber grid system to ensure infrastructure is available on a community wide basis
- Manage construction of the fiber network build, provide quality assurance and comprehensive testing to ensure a high quality network
- Design and install fiber drops to each premise when a customer orders internet service from the City
- Provide internet services to all premises requesting service
- Lease Dark Fiber as requested by businesses
- Develop sales and marketing programs to effectively compete in this competitive market
- Develop appropriate back-office systems required to support customer service and maintain and monitor the network
- Target Residential Pricing of $50/month for 50Mbps service, and $70/month for 1Gbps while also offering an “Affordable Internet” tier program

Fort Collins plans symmetrical (same speed for both downloads and uploads) speed offerings of both 50Mbps and 1Gbps residential offerings. Symmetrical service would also be an option for commercial subscribers.

Additional benefits sought by the City include:

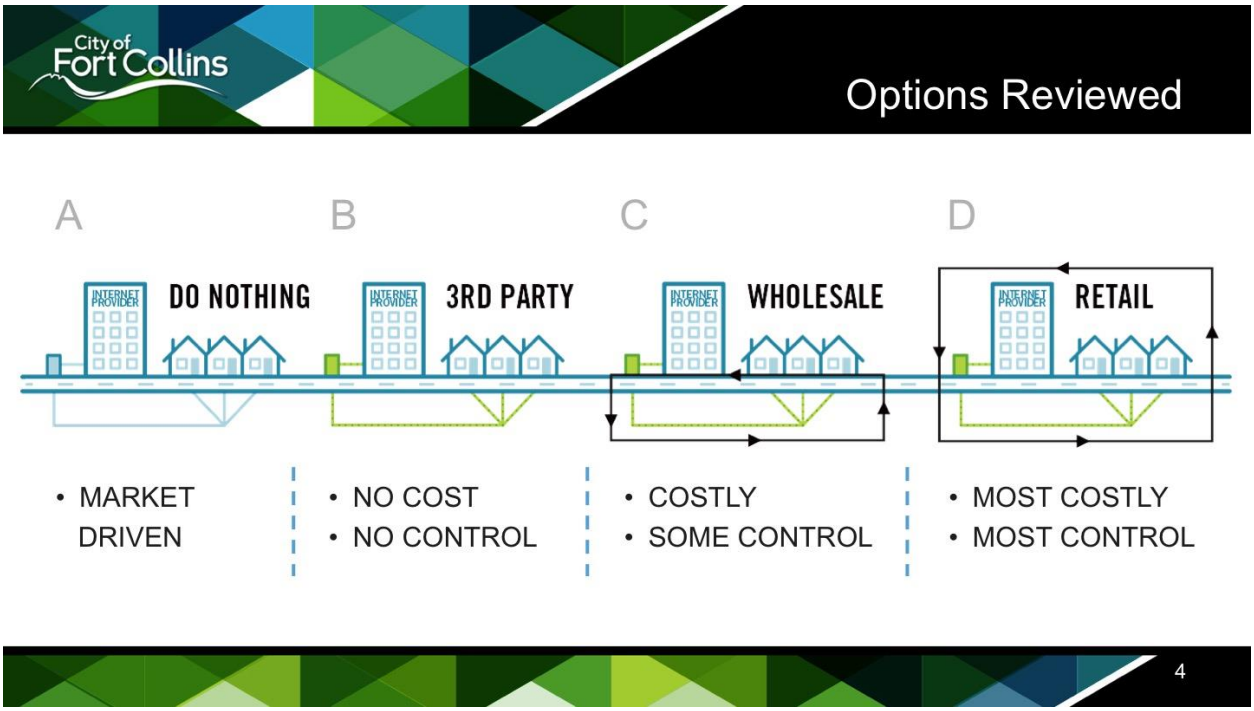
- Competitive pricing
- Universal coverage across the GMA
- Underground service for improved reliability
- Timely implementation to providing services within a reasonable timeframe

History of Investigation

The City held discussions with each of the Fort Collins major incumbents. Each described their strategic commitments and timing to upgrade their existing systems to a high speed fiber-based system. While the incumbents have plans to upgrade their systems over time, no specifics or promises were provided, such as:

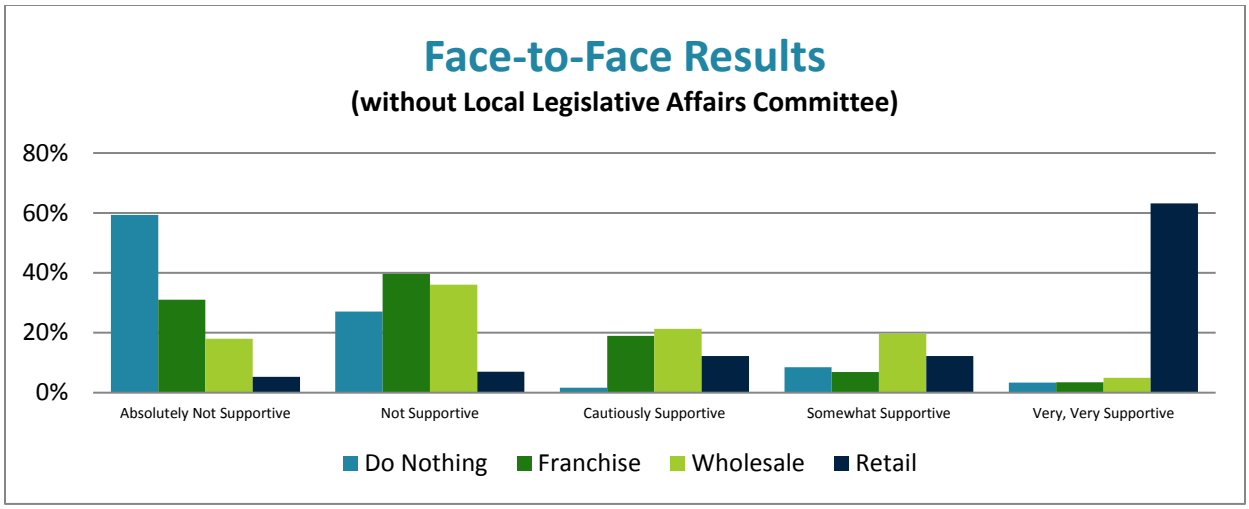
1) What percentage of customers will have FTTP connectivity by year-end 2017/2018?
2) When they will have a network that is fully fiber-based across the entire growth management area?
3) How they will help the City ensure that all neighborhoods benefit from connectivity?

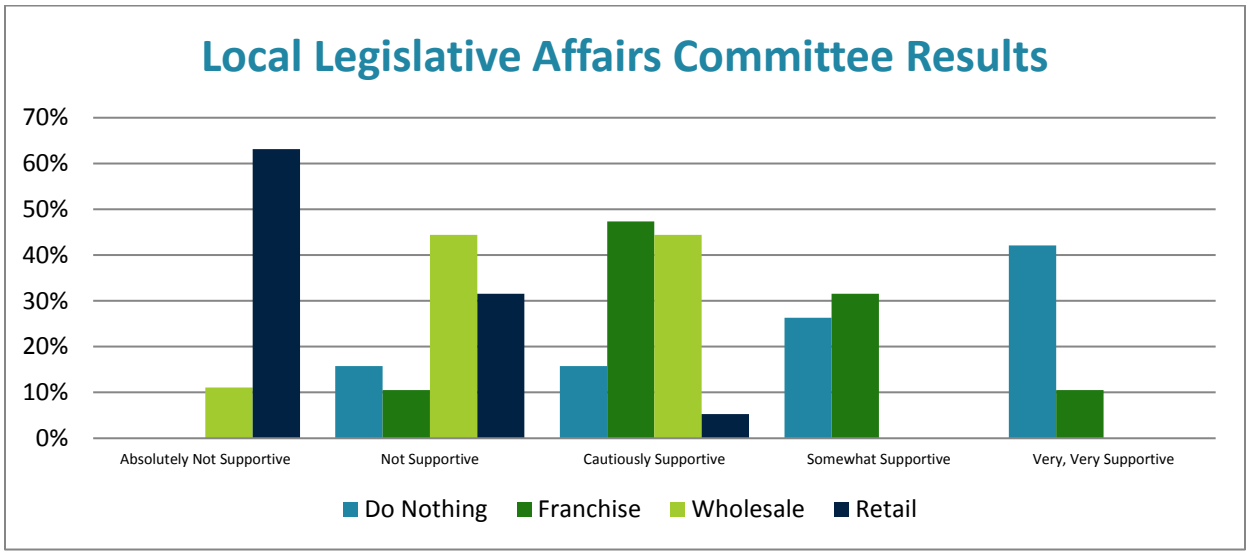
Staff explored a number of solutions in addition to the retail model to achieve the City’s Strategic Objective 3.9 and developed the following four alternatives:

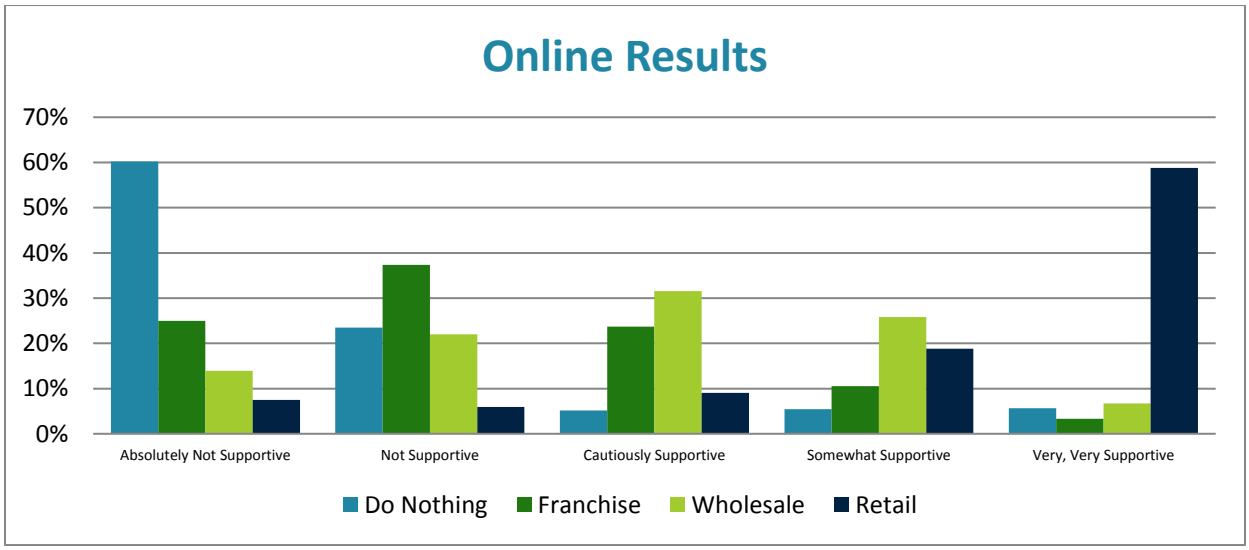


A. **Do Nothing** – Rely on the current incumbents to upgrade their systems and provide improved speed and reliability per their capital improvement plans
B. **3rd Party or Partnership** – Develop a partnership with an existing internet service provider that leverages their expertise and experience combined with the City's brand and reputation to develop and deliver high speed internet within the community
C. **Wholesale Model** – where the City builds out a fiber network and attracts other service providers to market and operate the system
D. **Retail Model** – where the City enters the business of building out, operating and providing internet and other services across a City-owned fiber infrastructure

Extensive community engagement was conducted in 2016 to determine citizen preference among the four options. The graphs below summarize the citizen "in-person" results, Local Legislative Affairs Committee preference and input from the online survey.







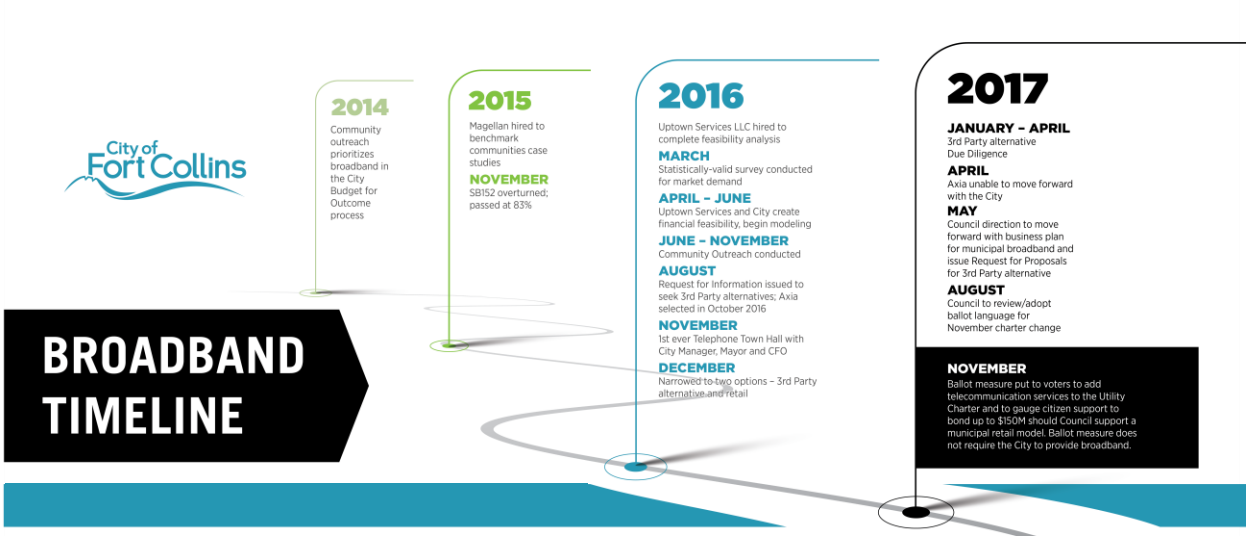
NOTE: At the time of the outreach, the third-party alternative was called "franchise." Colorado statute does not allow telecommunication franchises and therefore is now referred to as third-party.

As part of the investigation, staff has had phone discussions and visited with several communities that have launched a broadband effort. In addition, a consultant, Magellan, was engaged in late 2015 to provide case study analysis of the various business models communities have used. Attachment 1 provides the detail of Magellan's analysis. The City of Fort Collins also evaluated how 25 peer communities are working to stay connected. Twenty out of 25 peer cities have state legislation that restricts municipalities' ability to operate in the telecommunications industry. The appendix summarizes how Fort Collins peer cities are approaching broadband.

In summary, the "Do Nothing" alternative did not achieve Strategic Objective 3.9. The Wholesale model requires the City to make a significant investment in building out the fiber network (approximately $90M) and the success of that network and the City's ability to repay the debt for the build-out is dependent on the success of these external service providers. The risks identified with the Wholesale model are similar to what has occurred in Utah and Tacoma Washington. Staff determined neither of these alternatives met the objectives of the project.

From 2016 through early 2017, staff explored both the 3rd Party/Partnership model and the Retail model. This business plan is specific to the exploration of a City owned and operated FTTP internet service business.

The City hired Uptown Services, consultants who have evaluated broadband service offerings in more than 40 different communities, to support a feasibility evaluation of both retail and wholesale models. Working with staff, Uptown conducted market surveys, evaluated and estimated construction costs, estimated market take rates (the market share the City would have after five years) and developed a financial model for a full build-out of a fiber network in Fort Collins. The resulting business plan relies heavily on the work of Uptown Services.



Platte River Power Authority

Platte River Power Authority (PRPA) maintains the local fiber loops for the Cities of Fort Collins, Loveland and the Town of Estes Park. The backbone fiber ring began in 1998 as an electric substation communication upgrade. It replaced unreliable radio and telephone line connectivity for an important supervisory control and data acquisition (SCADA) network. A quality SCADA system provides utilities (both power and water) with valuable knowledge and capabilities that are key to running a reliable and safe business. PRPA and the City of Fort Collins partnered to connect all of the substations in the community with a 144-fiber backbone cable (12 buffer tubes). PRPA, needing only one buffer tube (12 fibers), offered buffer tubes to City Traffic, Utilities and IT departments. The remaining fibers were presented as leasable to public and private local institutions.

PRPA's role continues to include:

- Managing all fiber splices on the substation backbone
- Providing location services for the substation backbone
- Actively leasing dark fiber not used by the host municipality to public and private lessees (potential additional revenue for the new system)
- Provide solution design services to lessees
- Performing ongoing maintenance, troubleshooting, and customer support for lessees
- Maintaining fiber documentation and fiber management database
- Implementing capital improvement
- Administering billing and collections of fiber lease revenue and returning the collected revenue to the municipalities

The current agreement between the City of Fort Collins and PRPA expires on Dec. 15, 2018. Currently, the City utilizes 36 of the 144 fiber strands for existing City use (fire, police, IT, Utility, Traffic, etc.). Of the 144 strands, only 25 are not being utilized. It is also estimated that the City receives $270k in revenue annually from PRPA due to dark fiber leasing agreements.

Given the limited number of unused strands and the expected future need to utilize the existing PRPA fiber infrastructure to support municipal operations, very limited excess capacity has been identified that could be used for the retail model. As a result, the infrastructure needed to support the retail model will require new fiber installation, and will not be able to leverage the existing PRPA fiber ring.

III. Broadband Market Profile

Residential

Currently, the majority of computers and applications do not require gig speed to operate effectively. Studies indicate speeds of 75Mbps will largely handle the average consumers' requirement. However, the City's goal is to "future-proof" with fiber infrastructure for three reasons:

1) As more and more devices are used within a single household, the simultaneous use will begin to exceed the current speed offerings.
2) As speed becomes more readily available, new applications will be developed that require a higher speed.
3) With the growing use of cloud services, a more symmetrical service will be required.

Residential broadband subscribers are utilizing more online applications that require more bandwidth, quality and reliability out of internet connections. The impact of simultaneous applications and devices accessing a single home broadband connection creates a situation where most residential broadband connections are unable to handle the amount of bandwidth needed to support all applications simultaneously. In addition, the myriad of cloud services is driving the need for more symmetrical broadband services, as real-time applications require additional bandwidth, in terms of both download and upload speed. Many times, these applications synchronize in real time, meaning that they are always consuming bandwidth at a constant rate rather than only when the user is actively engaged through their computers, tablets and smartphones. As more of these applications are deployed, broadband connections will need to accommodate the increased bandwidth load.

The proliferation of devices, commonly referred to as the Internet of Things (IOT), is also driving the need for more bandwidth. As more devices in homes, businesses and public places all access existing broadband connections, these demands also extend to many devices inside the home that are now connecting to the internet using residential broadband connections. Many video/audio systems, thermostats, irrigation and security systems are now connected to the internet, consuming more home broadband bandwidth. The increase in the number of devices using internet-based applications continues to drive additional broadband demand in the home.

Commercial

Accessible, affordable and reliable broadband services are a key productivity and efficiency driver for businesses of varying sizes. In many cases, bandwidth consumption outpaces the broadband speeds local businesses are able to purchase. Upgrading is often times not an option due to the prices businesses are able to afford and service availability, as well as other IT-related factors. When local broadband services cannot "keep up" with business needs, businesses lose productivity and efficiency, which affects their bottom line and makes them less competitive with regions that have more affordable broadband services.

Taken in aggregate, this lack of online access will eventually result in a less competitive business market, from an economic perspective, as growth from the digital economy will be realized by other communities. Solid economic studies have not been completed that support this presumption; however, more and more businesses acknowledge that reliable, high speed internet is a requirement as they look at relocation opportunities. Communities also risk retention issues as businesses that are not able to gain efficiencies with their existing broadband services will, in many cases, move operations to communities that have more availability of these services.

Broadband is a fundamental utility asset that businesses require, as they rely on broadband to maintain connectedness to the electronic world. The majority of these types of businesses rely on online services to maintain their daily operations. Through promotion of a community's leading-edge broadband services, current businesses can be assured that they can remain in the region and have robust access to the rest of the digital world. Accessible and affordable high speed broadband has also gone beyond being a differentiator to being a key part of the "minimum ante" for attracting and retaining desirable businesses and facilities. Cities that realize this take steps to ensure their environments are favorable and the "cost of doing business" is not increased due to expensive broadband services.

City of Fort Collins

Fort Collins is nestled against the foothills of the Rocky Mountains and alongside the banks of the Cache La Poudre River. With an estimated population of 167,500, Fort Collins is among the nation's fastest growing metropolitan areas. The City includes many assets and amenities that provide a competitive advantage including: CSU, abundant natural resources and agricultural land, a highly educated and creative workforce, a historic downtown, and many miles of trails, parks and bike paths. Fort Collins is known as an innovative community and has one of the highest rates of patents per capita in the world with a major research institution – CSU – a cluster of federal laboratories and such high-tech companies as Hewlett-Packard, AMD, Intel and Broadcom.

DEMOGRAPHIC FACTS	FORT COLLINS	COLORADO	UNITED STATES
Est. Population, 2017	167,500	5,540,500	323,127,513*
Persons under 5 years old*	5.7%	6.2%	6.2%
Persons under 18 years old*	19.9%	23%	22.9%
Persons 65 years and over*	8.8%	13%	14.9%
Female persons*	50.1%	49.7%	50.8%
Employment†	74,498	2,181,455	121,079,879
Median Household Income*	$55,647	$60,629	$53,889
Median Age*	29.3	34.3	37.7
Approx. % of Pop. w/ completion of 4+ years of college education*	52.5%	38.1%	29.8%
White person*	89%	87.5%	77.1%
Persons of Hispanic or Latino origin	10.1%	21.3%	17.6%

*Data provided by ACS 2011-2015 †Source: Colorado State Demography Office

Factors that influence local internet adoption include cost, availability and a city's demographics, including income levels. Brookings Institute noted in 2015 that 92.1percent of households earning $75,000 or more annually had a broadband subscription. Using this benchmark to evaluate the Fort Collins market indicates that roughly 36.3 percent of Fort Collins residents earn $75,000 or more per year.

Surveys and market studies performed by Uptown Services LLC, consultants engaged by the City of Fort Collins, found the following issues prevalent:

- The two incumbents have the vast majority of market share for both Internet and voice services in Fort Collins.
- Satisfaction for Internet and voice service benchmarks low; video is average.
- Top residential market needs are: lower prices, increased Internet speed, and improved reliability.
- Top small- to medium-size business market needs are: lower prices and carrier-grade reliability.
- Residential market purchase intent is very high and exceeds Longmont survey metrics.
- Small- to medium-size business market needs are being met, but price levels are high up to 200Mbps.
- Strong provider preference for the City within the residential market.
- Small- to medium-size business market is open to considering the City FTTP network as a provider option.
- The project appeal and purchase intent is strongest among younger households.

IV. Fort Collins Customer Profile

Market Segmentation

Uptown Services LLC were engaged to investigate the Fort Collins market and produce a market demand study based on survey results and expertise.

Uptown segments and methodologies:

Market Segment	Research Methodology	Research Parameters
Residential Consumers	Quantitative Phone Surveys	• Sample size of 400 with 95% Confidence Interval with a ± 4.9 sample error • Weighted by age decile to Fort Collins actual age distribution from 2010 Census data • Screened for telecom/broadband decision maker and employment bias
Small and Medium Sized Businesses		• Sample size of 50 with 95% Confidence Interval with a ± 4.9 sample error • Screened for telecom/broadband decision maker and employment bias • Located within the city limits and not home-based • Has internet
Large Employers and Institutional Partners	Qualitative Depth Interview	• Responses aggregated for confidentiality • Evaluate the current and future demand and need of the commercial and institutional segment • Qualify interest and level of support for the development and implementation of fiber broadband infrastructure

Residential Market

According to Governing.com's "America's Most Connected Cities," 91.4% of Fort Collins residents have at least one wired connection.

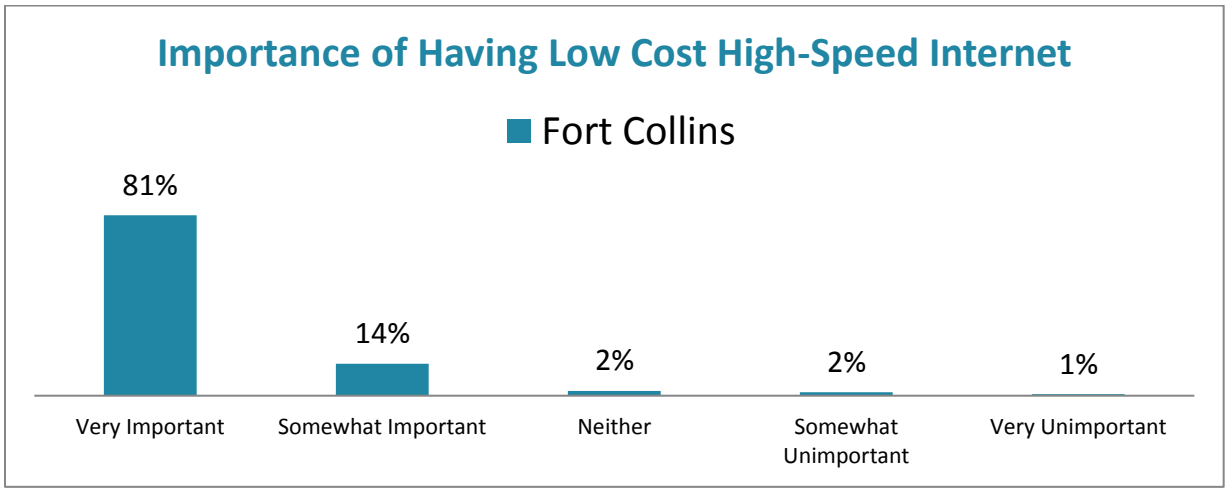
Top 20 cities with the Highest Internet Subscribership Rates per Governing.com 2013:

Ranking	City	Households With Broadband	Households Without Broadband	Population	Median Household Income	College or University?
1	Centennial, CO	96%	1,530	106,000	$96,677	No
2	Cary, NC	95.5%	2,568	151,088	$100,081	Yes
3	Irvine, CA	95.3%	3,944	236,716	$98,923	Yes
4	Frisco, TX	94.7%	2,416	136,791	$108,428	Yes
5	Bellevue, WA	93.6%	3,363	133,992	$48,719	Yes
6	Gilbert, AZ	93.4%	4,733	229,972	$80,121	Yes
7	Boulder, CO	92.7%	3,080	103,166	$57,112	Yes
8	Pearland, TX	92.6%	2,595	100,065	$89,149	Yes
9	Plano, TX	92.3%	8,184	274,409	$79,234	Yes
10	Scottsdale, AZ	92.1%	7,900	226,916	$57,484	Yes
11	College Station, TX	92%	2,785	100,050	$39,479	Yes
12	Coral Springs, FL	92%	3,231	126,604	$69,808	Yes
13	Surprise, AZ	92%	3,835	123,546	$55,857	No
14	Sunnyvale, CA	92%	4,507	147,559	$65,165	Yes
15	Lewisville, TX	91.6%	3,086	101,074	$57,457	Yes
16	Round Rock, TX	91.6%	3,122	109,821	$65,731	Yes
17	Arlington, VA	91.5%	8,452	224,906	$103,010	Yes
18	Fort Collins, CO	91.4%	4,957	152,061	$53,359	Yes
19	Naperville, IL	91.3%	4,329	144,864	$107,306	Yes
20	Torrance, CA	91.2%	5,010	147,478	$76,082	Yes

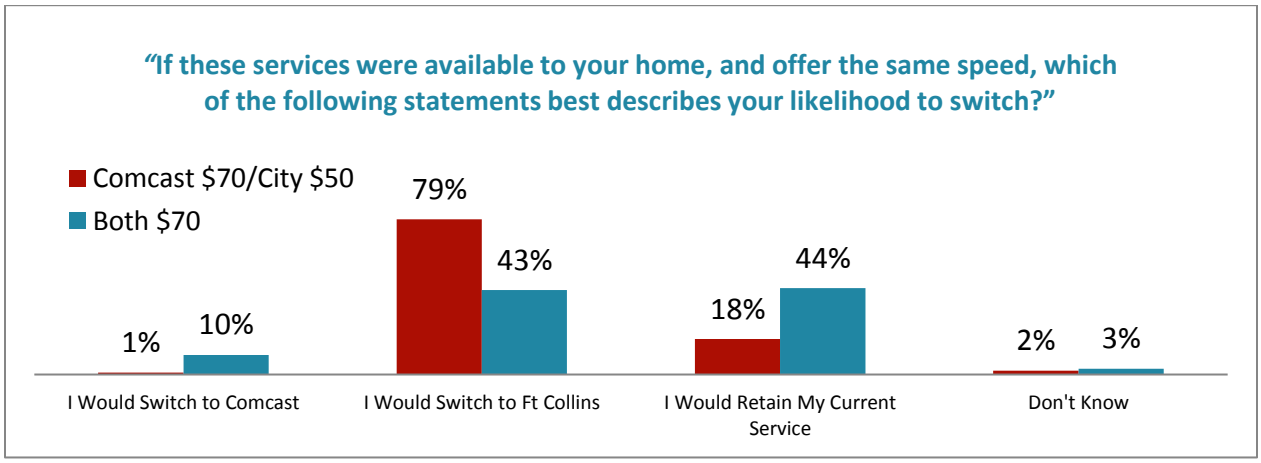
A statistically valid phone residential market demand survey conducted by Uptown Services in March 2016 asked questions around the internet, voice and video services as part of the overall inputs for the financial feasibility analysis. The study focused on high speed internet service, but the appeal of bundling services at a minimal cost was also investigated. The study confirmed that almost all Fort Collins households use the internet. Of Fort Collins households surveyed, 99 percent use the internet at home. Of these connected homes, cable modem and digital subscriber lines (DSL) represent the vast majority of the market share at 94 percent. Additionally, the study indicated that internet usage is prevalent across all income and age groups.

The survey also touched on customer service satisfaction levels, which plays a role in the market demand for alternative broadband services. Respondents were asked to rank customer satisfaction of various services (cable television, satellite television, non-pay television – antenna and basic channels, DSL, cable modem, telephone and electric utility) on a scale of 1-10 (with 10 being "totally satisfied" and 1 being "not at all satisfied"). The average customer satisfaction ranged from a high for electric utility at a mean rating of 8.7, to 6.8 for DSL and 6.6

for cable modem. Sixty-four percent of the respondents rated the City's Utility brand a 9 or 10 rating while other incumbent internet services had significantly lower ratings. Lower prices, increased internet speed, and reliability dominate the wish list of service improvements respondents identified for broadband. Branding and bundling were of secondary importance. Additionally, 81 percent of respondents acknowledged the importance of having low cost, high speed internet.



In addition to questions about current broadband services, market share and customer service satisfaction, the broadband market demand survey asked respondents about their interest and purchase intent (willingness to switch) for broadband services if offered by an alternative fiber network provider. Assuming the competition at a $70 per month price and a City-owned network at $50 per month price, seventy percent of respondents would definitely or probably switch to a City-owned fiber network for internet services. Furthermore, if respondents answered they would 'definitely' or 'probably' switch to the fiber network for internet services, they were asked the reason for the switch. The top three reasons given by respondents for a switch were: need for higher capacity, lower prices and the City as a preferred provider. If both the City and competitive offering were priced at $70 per month, only 45 percent of respondents indicated they would definitely or probably switch to the City-owned network.



Online Residential Broadband Survey

Due to wide-spread community interest, staff made an edited version of the residential market demand phone survey available online to anyone who wanted to participate. This was not intended to be statistically valid, but rather to allow more residents to engage in the conversation. More than 1,800 responses were received and the results were consistent with the original, statistically valid, residential phone survey; the exception being that the online questionnaire saw a higher response from younger demographics.

Top Attributes Relative to Importance Comparable Results

Online Questionnaire Participants	Statistically Valid Phone Survey Participants
Speed	Reliability
Price	Price
Reliability	Speed
Customer Service	Customer Service

Low Income

In October 2015, 33 percent (or ~8,744) of Poudre School District (PSD) students participated in the free or reduced lunch program. This program provides subsidized meals for those households that meet the 185 percent of poverty level qualification. The data provided by PSD was then compared to the census data for Fort Collins to verify that 5.4 percent of all households are eligible for the free meals participation program. The low income, affordable tier program will be available to those households at the 1.3 income: poverty ratio to match the free meal participation requirements, and calculates to be approximately 3,332 households.

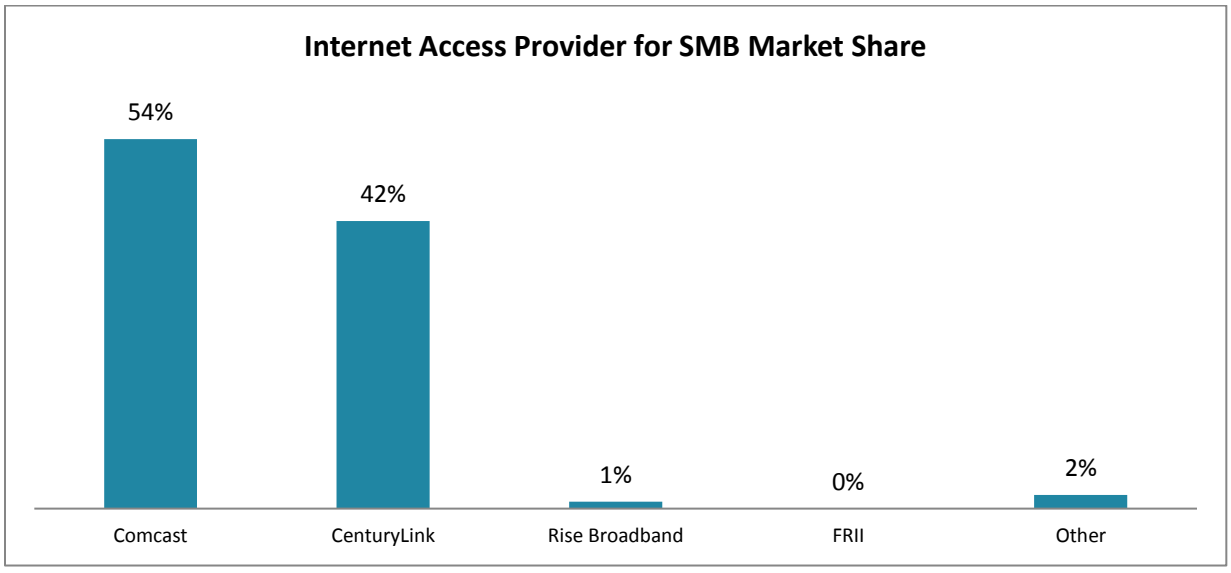
The “Affordable Internet” tier program is not been fully defined. Staff anticipates this will occur during the initial operational planning stage if the retail model is pursued.

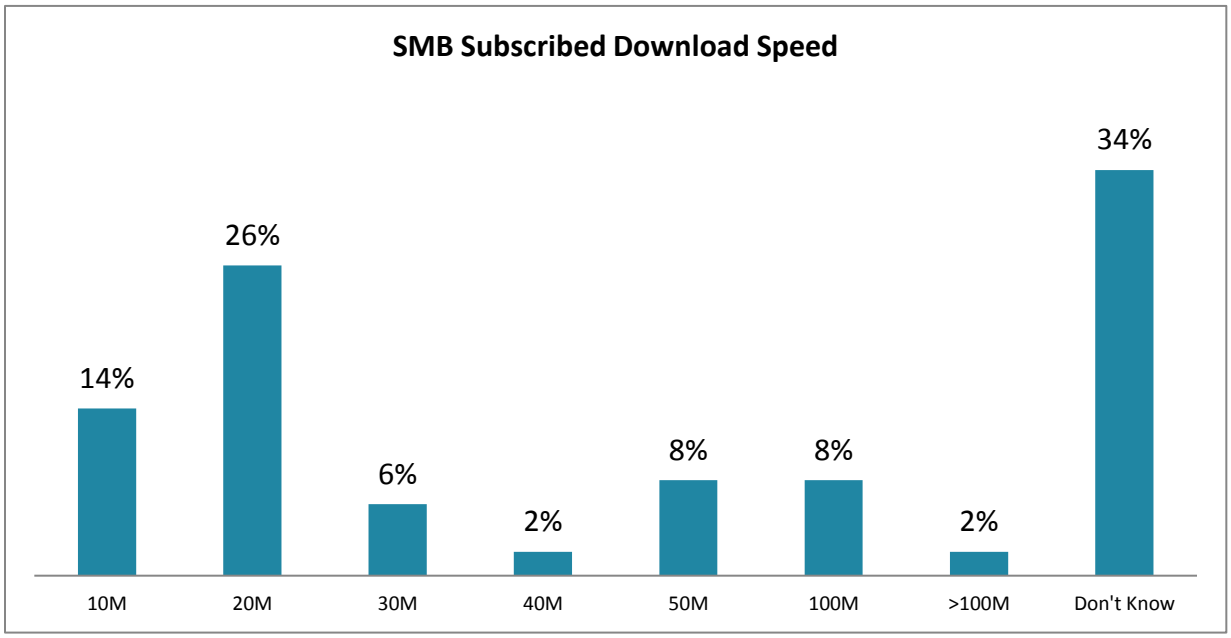
Small- to Mid-Size Business

As of 2016, the City of Fort Collins has approximately 8,000 small- to mid-size businesses (SMB). Eighty-eight percent of all Fort Collins businesses are defined as small businesses (less than 50 employees), which is similar to the national average. Nationally, SMBs are responsible for 64 percent of new jobs and 50 percent of non-farm gross domestic product (GDP).

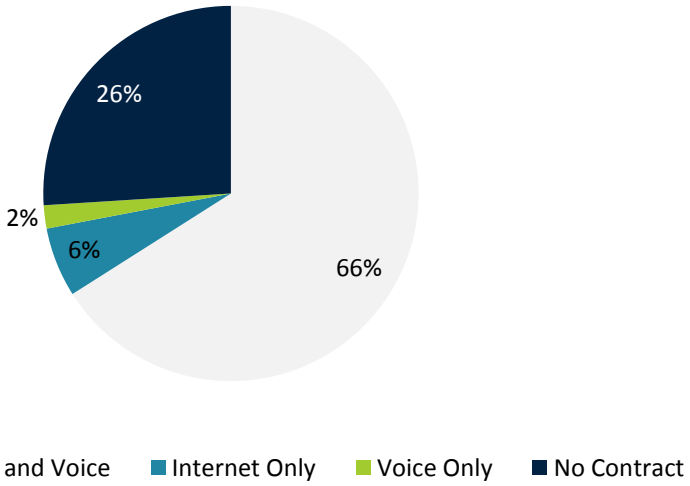
Uptown prepared a separate quantitative, statistically valid phone survey that was deployed to the small- to mid-size business segment in March 2016. The survey found that Comcast and CenturyLink are the only two Internet Service Providers (ISPs) with significant SMB market share in Fort Collins (about 96 percent of respondents). Two-thirds of SMB respondents in Fort Collins are under contract for internet and voice services. Additionally, SMB respondents had

similar responses to the residential respondents in regard to customer satisfaction by service and customer needs. Reliability, increased speed and lower internet prices dominated the wish list for service improvements for SMBs. One item to note is that SMBs put a larger emphasis on the need for improved reliability (48 percent of SMBs identified this on their wish list), due to reliance on technology and the internet for business operations (merchant service transactions, ecommerce, cloud-based storage, etc.).

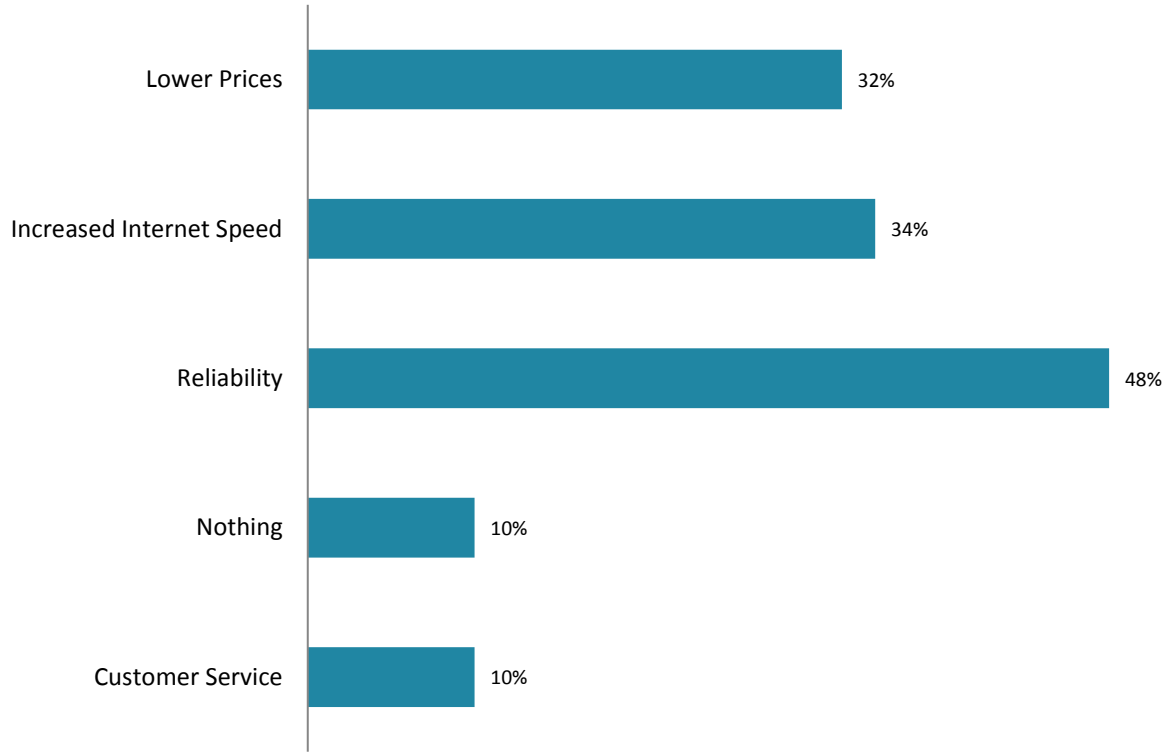


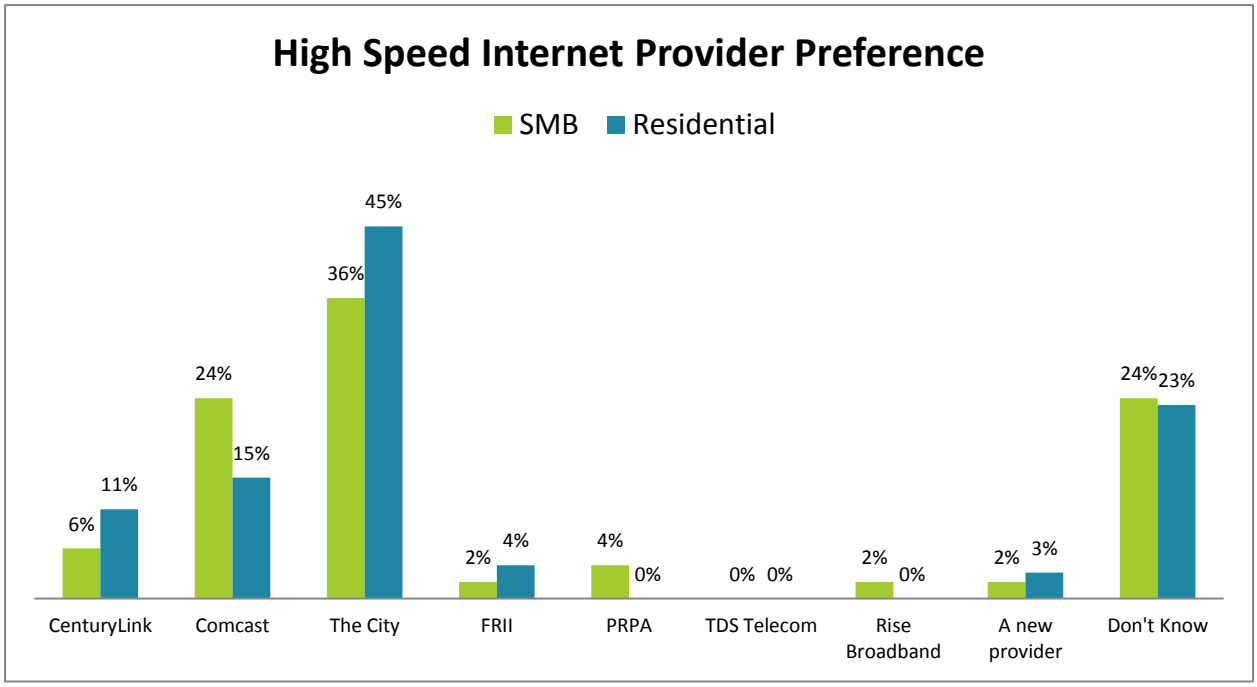


SMB Incidence of Provider Contracts



SMB Wish List for Improved Broadband Services



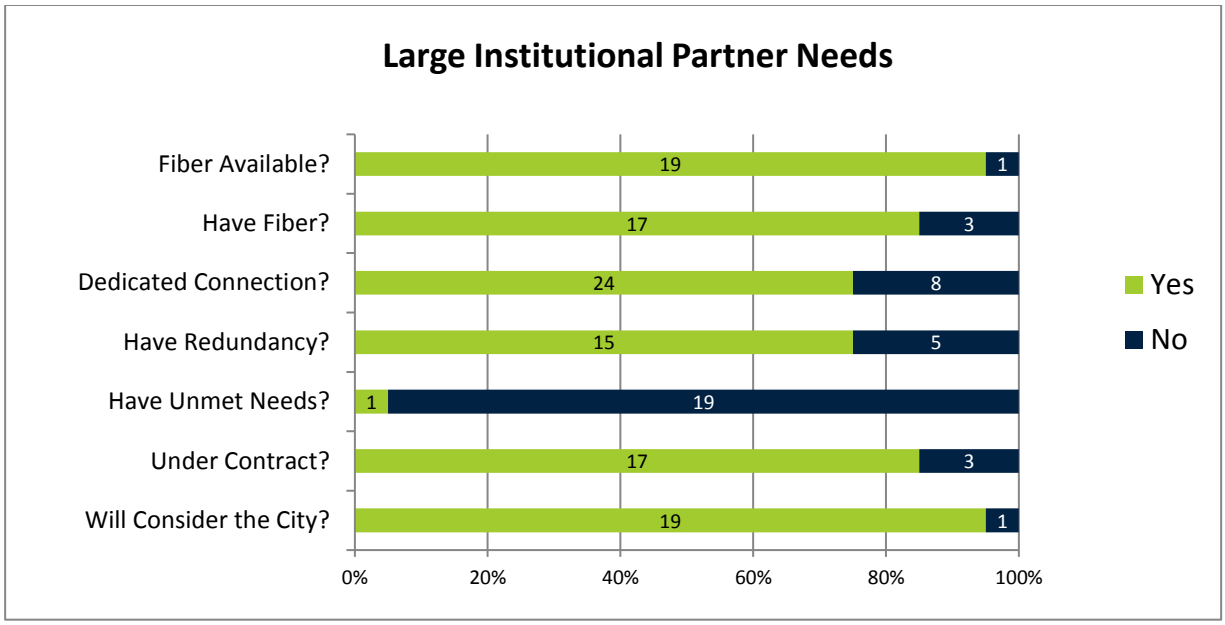


Large Business / Institution

The objective of the large business / institution qualitative survey was to identify the current capacity needs, future capacity needs, unmet needs and level of support for a fiber broadband network. Those interviewed could be major commercial account customers, and/or influencers in the community. A total of 24 interviews were conducted and the responses aggregated for confidentiality.

Findings from large business/institution qualitative surveys:

- Fiber is widely available and there is high incidence of dedicated access via fiber
- The survey found that due to multiple incumbent providers competing in the large business/institution segment
- Advance data needs are being met with dedicated connections for the business/institutions sole usage
- Most firms currently have sufficient bandwidth, but the City FTTP network would be considered as an option for redundancy and potential cost savings



Subscribership ("Take Rate")

Uptown consultants utilized a conservative research technique from the Packaged Goods sector to estimate potential subscribership rate, or take rate. This technique has been utilized for more than 30 years. It was developed as firms realized research respondents, for various reasons, overstate purchase intentions during research as compared to the eventual penetration of a product that was commercially launched. One measure of success for municipal broadband projects is by its "take rate," defined as the number actual number of subscribers divided by the total potential subscribers.

In March of 2016 the Uptown consultants estimated the take rate for City-provided internet service in Fort Collins at 38.8 percent for residential and 45 percent for small business. This assumed no other gig speed internet offering in the City of Fort Collins at the time.

In April 2016 with the potential launch of DOCSIS3.1 by Comcast, a competing internet service that provides 1Gbps down and 30Mbps up, Uptown revised the City's residential take rate to 30.2 percent.

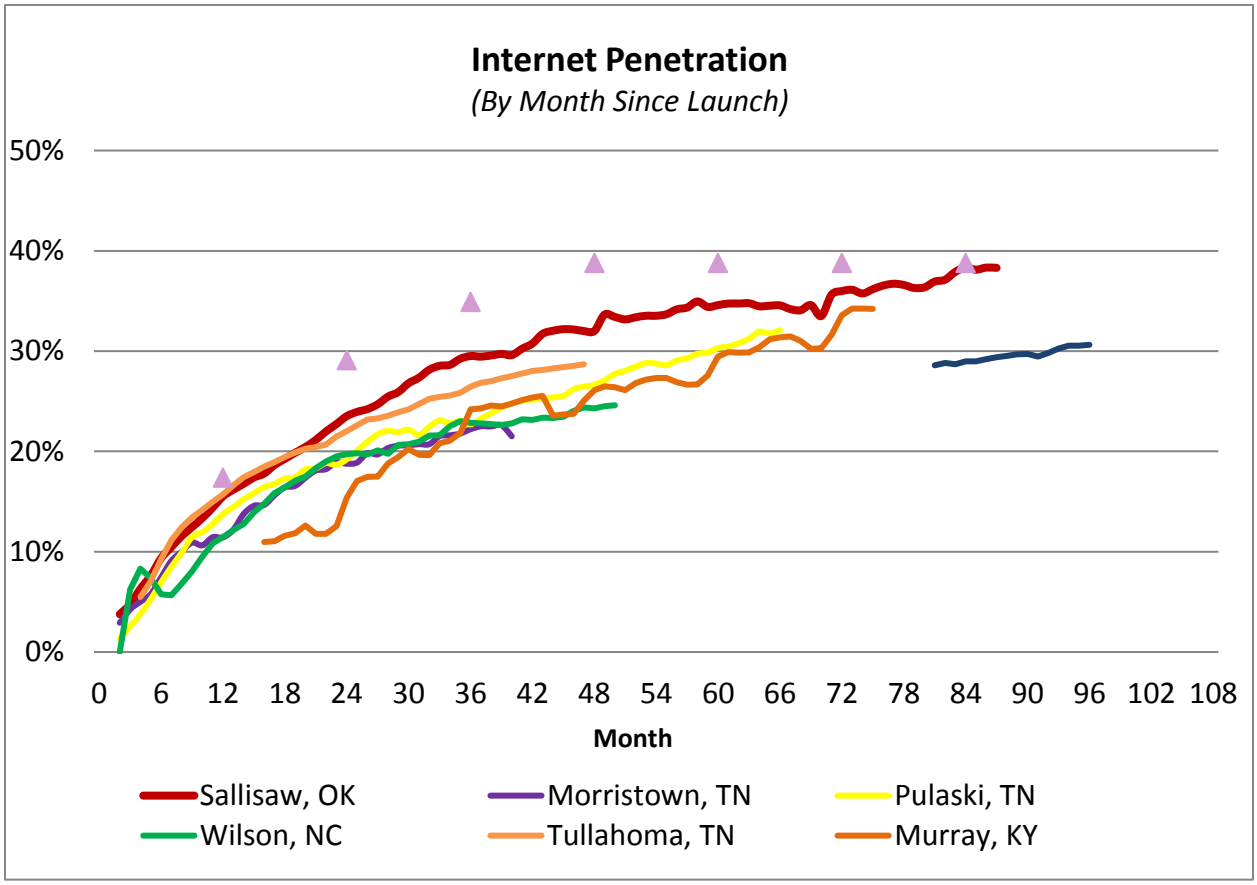
During the recent development of the retail model business plan, staff re-evaluated the pricing model based on industry standards and long-term sustainability. Additionally, during this time of approximately June 2017, Comcast announced the deployment of DOCSIS 3.1 to the Colorado market. This technology utilizes Comcast's existing coaxial cables and can provide 1 Gbps download and 35 Mbps upload speeds.

Due to these changes (listed below), Uptown Services recommended re-surveying the community to confirm the take rate:

1. City of Fort Collins revised the Tier 1 (50 Mbps) internet price from $40 to $50 per month
2. City of Fort Collins revised the Tier 2 (1 Gbps) internet price from $50 to $70 per month
3. Comcast's DOCSIS 3.1 pricing is $159.95 per month without a contract, and $110 per month with a one-year contract.
4. Comcast is testing a $70 per month promotional offer in Longmont, where NextLight 1 Gbps is offered.

Based on the survey responses, Uptown Services has estimated the City's retail model take rate to be 28.2 percent.

The following data shows that the estimated take rate is comparable to similar municipal benchmarks at the 5-year milestone. Five years signifies the completion of the construction period.



Estimated take rates based on the statistically valid phone surveys conducted March 2016, April 2016 and June 2017. The following graph depicts take rates in the 3 distinctly different environments in which the surveys were conducted.

	Pre-DOCSIS 3.1	Post-DOCSIS 3.1 Estimates	Post-DOCSIS 3.1 Announcement*
Residential Internet	38.8%	30.2%	28.2%
SMB Internet	45%		
Residential Voice	28.6%	8.4%	
SMB Voice	41%		

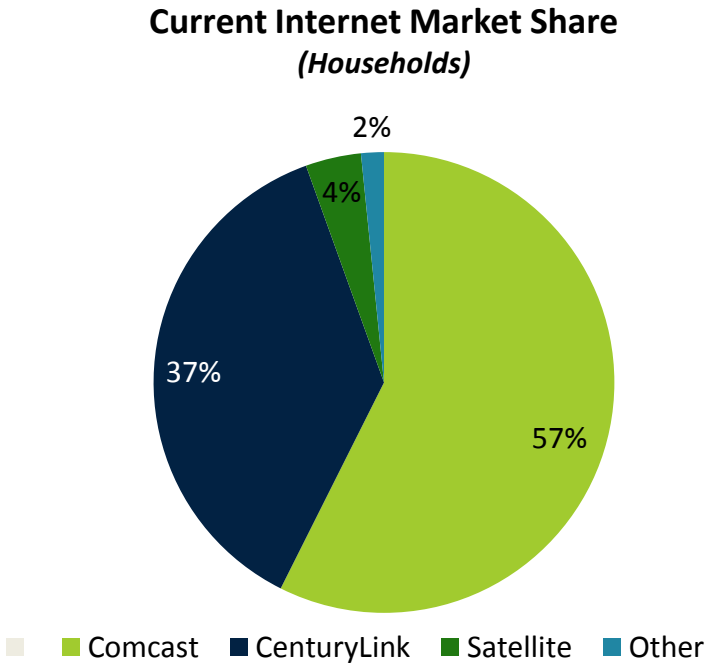
*assuming $70 gig pricing for incumbents and City retail

Residential subscribed premises would reach approximately 18,000 in year 5 and grow with the population at 0.4 percent thereafter. Commercial subscribed premises would reach 3700 premises in year 5 and grow at 1.5 percent while staying at a constant take rate of 45 percent. Voice services take rate would erode throughout time from a high of 8.4 percent in year 4, to 4.7 percent in year 15, as this technology reaches end-of-life and citizens transition from land lines to cellular service.

V. Competitive Environment

Incumbents

The Fort Collins market is dominated by two major incumbents, Comcast and Century Link.



Each of these incumbents operated within the City for several decades and provides all three services generally included in a bundled offering – internet, phone and video content.

Century Link™ (CL) has a significant fiber presence within the community to support their existing network with plans to extend further into new construction neighborhoods at some time in the future. The majority of new residential construction supported by CL is FTTP. CL stated the current average consumer does not need 1 Gbps service. CL shared data with City staff that indicates the maximum consumer need, accounting for multiple devices, is estimated at 75 Mbps with today's applications. CL's not committed to when, or if, they will serve all Fort Collins premises with a fiber connection. CL also shared they face a challenge of meeting their ROI requirements if they were to build out to the entire City with a fiber network.

Comcast also has an extensive fiber presence within the community that primarily extends to the node within a neighborhood. Newly constructed neighborhoods are served by a combination of fiber and/or coax. Comcast also has not committed to a timeline for servicing all Fort Collins households with fiber.

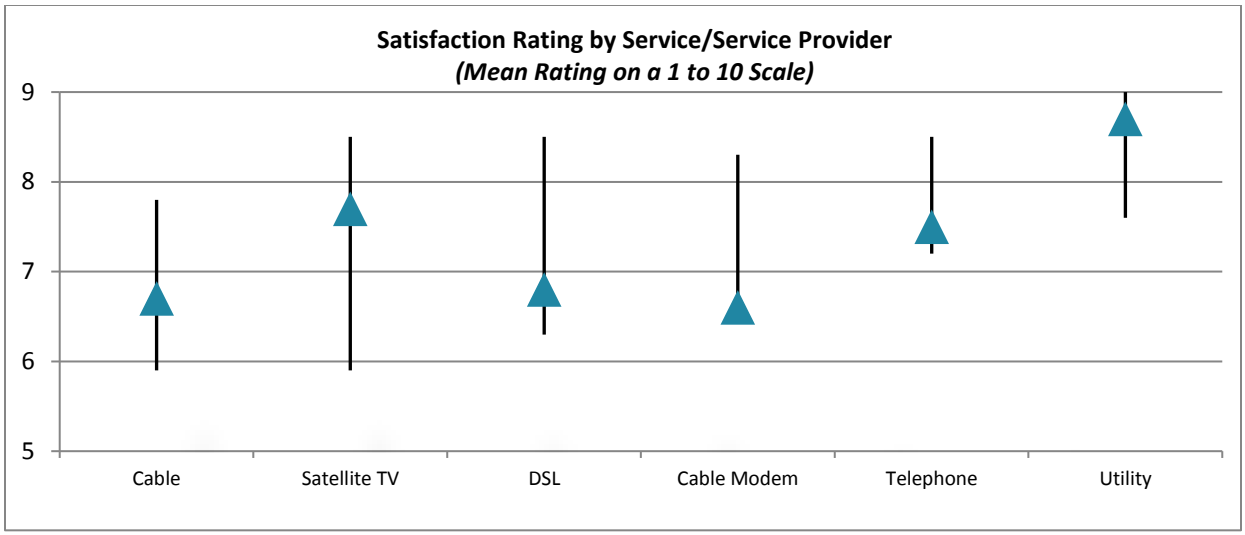
During the community engagement visits, many communities communicated significant challenges from their local incumbents, which illustrate the highly competitive market the City would enter with a retail model offering. The City's anticipated 28.2 percent take rate would largely come from the market share of the two incumbents.

INCUMBENT RESIDENTIAL INTERNET PRICING

	Download	Upload	Price	Technology
Comcast	10M 25M 75M 150M* 250M*	2M 5M 5M 10M 25M	$49.95 $59.95 $74.95 $89.95 $149.95	Cable Modem (DOCSIS 3.0)
	2G* (limited availability within 1/3 mile of fiber network)	2G	MRC: $299.95 NRC: $1,000 (2 Year Term Contract w/ Penalty)	Fiber
	1G	1G	Monthly: $140 3 Year Term: $70	Cable Modem (DOCSIS 3.1)
CenturyLink	1.5M 7M 12M 20M 40M*	896k 896k 896k 896k 5M	$44.00 $49.00 $54.00 $64.00 $74.00	DSL

Prices reflect subscription to Internet service at non-promotional rate as of March 2016.
*Not available in all areas of Fort Collins

The pricing above reflects published prices as of March 2016. Pricing is very dynamic within the market and can change frequently. Bundled services that include video and phone and additional charges are also utilized, making it difficult to develop price-to-price comparisons. Furthermore, citizen satisfaction with their DSL and cable modem broadband service is among the lowest of the 24 markets surveyed by the broadband consultant group Uptown Services.



Competitive Response

Both incumbents have extensive resources, marketing teams and advertising budgets that can create a significant competitive issue for a retail model offering by the City. Comcast is a corporation that had $8B of after-tax profits in 2016, and CL is in the process of acquiring Level3 for approximately $34B. In addition, each incumbent also has legislative lobbyists that can influence future legislation and could impair the City's ability to fund and launch a retail model. Wilson, NC spent approximately two years with legal and legislative hurdles before being able to launch their internet service. UTOPIA, a consortium of sixteen towns in Utah, started out as a retail model before legislation changed, which prevented municipalities from providing retail service. The network was in construction and had to switch to a wholesale or open access model. Various factors influenced the lack of success of UTOPIA, but they were ultimately unable to attract sufficient service providers to make the network economically viable. iProvo, Provo, UT's municipal network also faced the same challenge as UTOPIA sold a $40M network to Google for $1, and UTOPIA is in conversation with a third party who is asking each premise within the service area pay an $18 per month utility fee to support the debt service and network operations. This scenario is intended to illustrate the potential risks and influence large incumbents can have within a local market.

Comcast recently announced the DOCSIS 3.1 technology roll out that utilizes their existing coaxial network infrastructure. DOCSIS 3.1 offers 1 Gbps download speeds and 35 Mbps upload speeds. The retail price of Comcast's 1Gbps service with no contract would be $159.95 per month. A promotional price of $109.99 per month with a one-year agreement will be offered in Fort Collins and Larimer County. The technology upgrade does require customers to perform a cable modem and router replacement, and a firmware upgrade. Comcast believes this new technology will meet the near-term needs of the community, and with future upgrades the existing copper cable is capable of multi-gigabit speeds.

Municipal Retail Implications

Recently, the City Manager, Deputy City Manager and Chief Financial Officer visited several municipal-run broadband providers. The communities visited included: Wilson, NC; Chattanooga, TN; Cedar Falls, IA and Longmont, CO. The site visits allowed the attendees to openly discuss the challenges and opportunities that a municipal-owned retail ISP can have on the local community. Particular emphasis was placed on the governance of their municipal-owned broadband.

	Cedar Falls, IA	Wilson, NC	Chattanooga, TN
Start Date	1995/2013	2008	2013
Market Share	85%	40%	55%
Price – 50/100 Mbps	$58/mth	$35/mth	$60/mth
Price – 1G	$117/mth	$100/mth	$70/Mth
Households Served	12,000	8,300	84,000
1G Customers	36	100	5,000
Governance	Board of Trustees	Council Self-Executing Memo	Board of Trustees L&P CEO decision

Additional lessons learned from the site visits include:

- Broadband is complex and very different from Light & Power – business mindset, market, etc.
- Broadband is a part of the community brand and sense of place
- Broadband creates economic advantage over those without connectivity
- Each of the communities would do it again

The recent market demand study conducted by Uptown Services indicates that given a choice, the majority of respondents prefer to receive high-speed internet from the City (see graph in section IV). In addition, 78 percent of those surveyed ranked Fort Collins Utilities a 9 or 10 out of 10 in terms of satisfaction. The citizens of Fort Collins have trust and brand recognition in the City organization. There's a strong preference for the City within the mass market, both residential and SMBs.

VI. Operating Plan

The following sections highlight the basic operating components needed to successfully conduct the retail model. However, it should be noted these same components would need to be addressed regardless of the operating model.

Retail Model Summary

The retail model assumes the City builds out a fiber network across the entire city limits and ultimately across the entire GMA. The City also operates the network, provides internet and possibly offers other services to subscribers. Marketing, customer acquisition, repair and maintenance to the network, customer service representatives inside of call centers, and administrative and management oversight functions will also need to be created and managed by the City.

The City needs to issue bonds in the range of $130M to $150M to support the construction and infrastructure needed to provide these services. Critical success factors within the financial model include: 1) cost of network build, 2) take rate of the services from Fort Collins premises and 3) the price for the service. Critical operational success factors include: 1) successfully operating within a competitive environment vs. a traditional monopolistic utility environment, 2) gaining expertise and experience within a fast-changing technology business and 3) establishing appropriate governance and oversight structures that allow the broadband business to operate in a competitive market.

Critical Operational Success Factors

The City is focused on service. That will be a strong asset within a broadband launch. Staff's commitment to serving the community and reputation for providing outstanding customer service will be a considerable asset. A shift from an order-taking mindset, current utility operations don't require marketing and selling as they are the only source for citizens to acquire these services, to customer acquisition through marketing and selling will be required. Agility, nimbleness, market analysis, and closing-the-sale are essential attributes.

While the City has experience installing fiber in the ground and utilizing that fiber to monitor and maintain various systems around the city, operating and marketing a network providing retail service in competition with large corporations will require a different expertise and focus from management and staff. Technology will shift, consumer preferences will change, and the organization will need to be adaptable and responsive to these changes.

A governance structure different from the current Utility Enterprise governance will need to be established; one that provides the ability to have private discussion with City Council on matters of strategy, pricing, implementation, service plan changes, etc. All communities visited stressed

the need for a governance model that is different from the traditional municipal utility given the competitive nature of the broadband market.

Operations management will be required to make timely business decisions. In order for a retail business to succeed, operational decisions must be made as needed to compete in a time-sensitive, competitive environment. These decisions may have significant material, financial, operational, or personnel impact. Higher level discussions that are less time-sensitive and more focused on overall strategy, vision, or mission can be driven by a council or a board of directors.

Capital Requirement

Capital requirements will be in the range of $130M-$150M depending on the final architecture and subscriber adoption. Capital expenses include: network construction, network start-up costs, issuance fees, capitalized bond interest, debt service, working capital, early installations, etc. The estimated range of investment accommodates some possible contingencies which could include construction cost overruns, higher than anticipated demand, and market competition factors. Other currently unplanned cost implications such as Active Ethernet installation or additional annexations thus increasing Fort Collins GMA, are not included.

The largest cost component of the capital requirement will be the network construction, currently estimated at more than $80M. Network construction amount estimates rest largely on the "passing cost" (explained below). The final passing cost used in the retail model includes a contingency to assist in managing total required capital.

Other significant network start-up related expenses of approximately $30M include: facility equipment and systems, vehicles, engineering design, working capital, and electronic equipment within the network. Bond issuance fees, capitalized interest and working capital also account for an estimated $22-$23M.

Capital Requirements	Amount
Network Construction	$80M
Bond Issuance Fees, Capitalized interest, Financing Misc	$13M
Contract Installation	$7M
Facility & Vehicles	$6M
Fiber Drop, Powering, ONTs	$6M
Fixed Equipment	$5M
Engineering, Design, Inspection	$4M
Back Office Systems and Capital	$1M
Subtotal	**$122M**
Working Capital	$10M
Contingency	$18M
Total	**$150M**

Passing Cost

Fort Collins will require more than 800 miles of fiber to reach the 62,000 premises and 8,000 commercial meters within the GMA. “Passing Cost” is a key variable in modeling the construction cost of the network and conveys the cost of installing fiber to pass each premise.

A key characteristic of Fort Collins that increases the passing cost is the fact that all fiber will need to be installed underground. Ninety-nine percent of all Fort Collins utilities are underground and, per City Code, all new installations are required to be underground as well. Compared to aerial network installations, this dramatically increases the cost of installation but would also increase reliability and reduce maintenance costs overall.

To estimate the cost of installing fiber throughout the Fort Collins network, sample neighborhoods were analyzed. Density, described as number of premises passed per mile, is a key driving variable determining the cost of network installation. Initially, seven sample design representative neighborhoods were analyzed (listed below). The “passing per mile” metric was calculated along with material and labor costs to arrive at a “Total per Passing” cost for each neighborhood. The neighborhood was then given a weight that describes the percentage of Fort Collins GMA that particular neighborhood represented. Multi-Development Units (MDU), such as apartment complexes, were analyzed separately due to their unique characteristics. MDUs were estimated at 50 percent of the average cost of a single-family home installation. The final weighted average cost per passing for Fort Collins was estimated at $855. Due to the varying nature of Fort Collins neighborhoods, the uncertainty of conduit availability, and potential issues with underground installation, a 15 percent contingency factor was added. The final modeled passing cost equated to $984/premise.

NEIGHBORHOOD SAMPLE DESIGN

Sample Design Area	UG Miles	Passings	Passings per Mile	Weight	Matl per Passing	Labor per Passing	Total per Passing
Quail Hollow	3.2	243	75	30.1%	$140	$980	$1,120
English Ranch	2.5	243	96	22.6%	$132	$781	$913
Alta Vista	0.7	63	95	6.4%	$128	$792	$920
Old Town	2.2	235	98	5.7%	$126	$699	$825
Hearthfire	2.6	174	66	2.1%	$165	$1,097	$1,262
Taft Canyon	3.8	235	62	1.8%	$170	$1,187	$1,356
Willow Brook	0.6	81	143	0.0%	$98	$530	$628
MDUs*	0.0	0	0	31.3%	$73	$424	$497
Weighted Average / Total	15.6	1,274	82	100%	$116	$739	$855
15% Contingency							$984

Outside Plant Costs	Weighted Average Per Passing
Materials	$116
Labor	$739
Total	$855
Contingency @ 15%*	$128
Total	$984

Drop Cost

Included in the total capital requirement is the “drop cost.” Passing a premise does not connect the premise to the network or enable internet access; it simply means the fiber is in close proximity to the premise. The fiber connection must still go through the “drop” phase before a premise is actually connected to the network. The “drop cost” is the expense incurred to connect the fiber in the street to the premise.

There are two components to the drop cost: pre-install and premise installation. Pre-install includes trenching and installing the fiber underground on the premise property. Premise installation costs primarily consists of the equipment (ONT, power cable, connectors, etc.) needed at the premise to connect the fiber.

Total cost of a drop to a premise will average approximately $591 per premise with the highest cost variable being the contract labor component. During the five years of construction, contract labor is used to avoid the need to hire full-time employees on a long-term basis. Contract labor is needed temporarily during construction to subsidize employee labor capacity to complete pre-installs in a timely manner, and occasionally needed for premise installs during high activity periods.

Drop Components	Average Cost
Contract Labor	$295.79
ONT Expenditures	$172.57
Fiber cable, UPS, Power	$123.42
Total	$591.78

Pricing Assumptions

City retail residential pricing has been determined to be $70/month for gig service, $50/month for 50Mbps service, and $25/mo for voice (phone) service.

City Retail Model	Residential Pricing
Affordable Internet	TBD
50 Mbps Symmetrical	$50/month
1 Gbps Symmetrical	$70/month
Voice	$25/month

This pricing compares favorably to other municipal offerings around the country, as well as incumbent offerings, and accomplishes the additional benefit sought by the City, namely competitive pricing.

Comparative Municipal Offerings around the Country

Area	30 Mbps	50 Mbps	60 Mbps	100 Mbps	1 Gbps
RS Fiber - Minnesota		$50		$70	$130
Arrowhead Electric - MN	$60	$70		$100	
Reedsburg, WI				$45	$75
Sandy, Oregon					$60
Sebewaing, MI	$35	$55		$105	$160
Chatanooga, TN				$58	$70
Lafayette, LA			$53	$63	$110
Longmont, CO	$40				$50
Cedar Rapids, IA				$46	$105
Co-Mo Connect - MO					$100
Ozarks Electric - AR				$50	$80
Average	$45	$58	$53	$67	$94

Commercial service will have a full range of possibilities that includes various speeds and symmetrical options. Residential service is symmetrical by default. The range of the commercial data offering would be:

- Standard Internet Access
  - Shared capacity connection over GPON
  - No contract requirement and no Service Level Agreement (SLA) guarantees
  - Can upgrade to symmetrical bandwidth and add premium BGP Routing (some tiers)
- Dedicated Internet Access
  - Dedicated capacity via Active E connection (same ONT)
  - Requires dedicated fiber strand; practical option for pure commercial service areas
  - Contract agreement with SLA and term requirement
- High Capacity Direct Fiber Access

    - Multiple connection options:
        - Direct routed connection
        - Customer CPE connection (either non-protected media converter or protected)
    - Protected connection is optional
    - Contract agreement with SLA and term requirement
    - Resale rights may be included
- Point-to-Point (Transport Circuit): Dedicated pathway of defined capacity without access
- MAN: Customized access and transport solution for multi-site business or institution

City Commercial Download/Upload	City Commercial Price
25 Mbps/5 Mbps Add Symmetrical	$59.95/month + $10
50 Mbps/10 Mbps Add Symmetrical	$69.95/month + $30
100 Mbps/20 Mbps Add Symmetrical	$89.95/month + $50
1 Gbps/500 Mbps Add Symmetrical	$599.95/month $200

Given the wide range of commercial possibilities, the practicality of modeling each option is not feasible and produces diminishing returns with false precision. The retail model therefore focuses on the three lowest material revenue streams shown above and accounts for the majority of commercial revenue streams.

City Commercial Retail Model	City Commercial Price
25Mbps / 5Mbps	$59.95/month
50Mbps / 10Mbps	$69.95/month
100Mbps / 20Mbps	$89.95/month

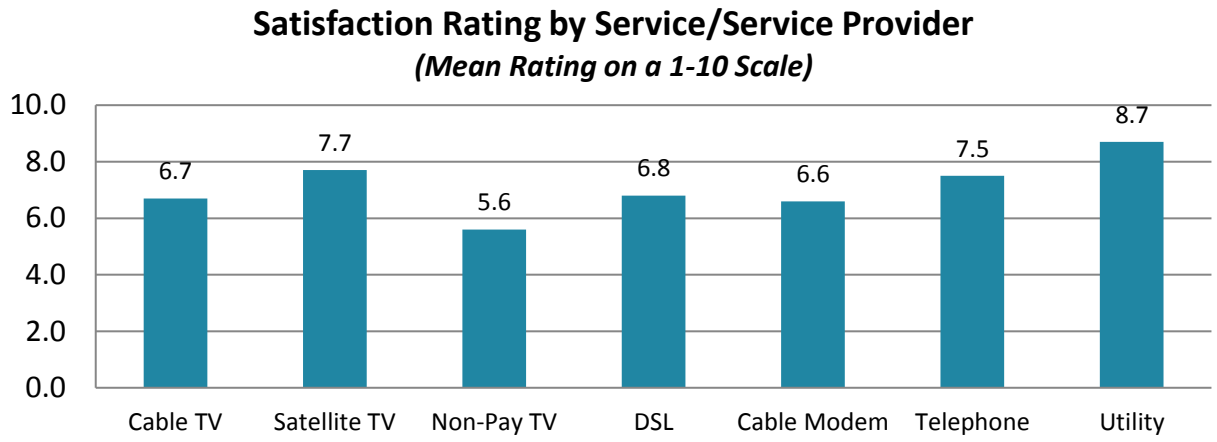
High capacity options refer to dedicated bandwidth. This type of installation requires a custom quote for both the recurring and non-recurring fees ($4,500/month for transport and access on average) and term contract (typically 3 years). Commercial custom install fee to cover unique costs per individual installation. Unlike the standard internet service offerings, the high capacity installs should be reviewed on a case-by-case basis to establish pricing.

Marketing Plan

Objectives

The objectives of the marketing and customer service strategy are to secure and maintain a minimum of 30 percent market share of all premises passed by installing one or more services per premise. The long-term goal will be to secure and maintain a 45 percent to 50 percent market share. Three distinct principles guide the product design, promotion, delivery and support:

- Provide excellent service with high quality technology
- Educate customers on how an FTTP product improves their quality of life
- Capitalize on the strengths and stability of City of Fort Collins brand and high quality customer service



The survey completed by Uptown highlighted that Fort Collins Utilities has the highest customer service satisfaction ratings among service providers. A cornerstone to the marketing and customer service strategy is positioning the image of Fort Collins Utilities as stable, reliable and efficient.

An equally important point to be communicated in the marketing message and reinforced by customer service is the strength of the fiber technology platform. It offers customers increased bandwidth, content and speed, along with more options for interactive services. Fiber has no bandwidth limitation. The fiber network architecture will provide symmetric bandwidth or equal speed for information uploads and downloads. That message will be translated by educating customers about the ways this technology will improve their daily lives. Additionally, fiber can be a platform to other technologies that could create additional opportunities for the City to provide additional services such as wireless, Smart Cities capabilities, etc.

Budget

Marketing budget (not including Marketing Coordinator) in year 1 is $150,000 or one half of a full year's budget due to operations still being in startup mode without a full-year of activity. The budget in year 2-5 budget is $300,000/annually. Year 6+ with on-going operations has a budget of 1 percent of revenue, which equates to an average of approximately $250,000 per year.

Promotion & Advertising

Brand Positioning: Fort Collins Utilities has built a solid reputation for customer service. Additionally, creating excitement as one of the first FTTP communities reinforces that the City of Fort Collins is an innovative and progressive community. For the FTTP project, it will be key to capitalize on this image and reinforce favorable brand reputation by extending its performance in offering broadband services.

Awareness Advertising: The City will implement local ads and promotions. These include print advertising, social media, sponsorships and event marketing (booths at local events).

Direct Marketing and Promotion: The direct marketing program will benefit from a community-level scale of the Utilities brand. These tactics involve targeted marketing as the network is rolled out within specific areas with specific messages and promotional offers. The objective is to get the recipient to respond with information or purchase inquiry (either online or over the phone). The most important direct marketing tactic is direct mail and door hangers, as well as other viable tactics such as bill inserts and marketing events.

Customer Service Plan

Customer Service Strategy

A key component to gaining customers, and more importantly, retaining customers is the service and support they receive. The overriding goals of customer service are to resolve customer issues with the initial call and remain accessible to customers at all times. An important marketing message can focus on the legacy of excellent customer service already provided by the City of Fort Collins.

In an effort to achieve those goals, customers will enjoy multiple points of entry to the customer service department. Representatives will be available to handle both call-in and walk-in inquires.

Additionally, the Utilities website will offer options to review product and service availability, order services, view billing statements and process bill payments.

Option 1: Customer service associates will be managed and integrated as part of the existing Utilities Customer Connection Department ("Customer Connections").

Option 2: Outsource first tier customer call center to a third party provider that runs 24-hours a day. A local presence will be a priority.

Customer Service Planning

The customer service teams' primary focus is customer satisfaction, to maintain customer trust and loyalty, to sell the customer products based on their needs and interests, and to ensure each customer values our products and services. Important performance metrics and indicators include:

- Availability – monthly availability of 99.925 percent
- Mean Time to Repair – monthly average not to exceed two hours Monday - Friday
- Customer Call Wait Time –will not exceed a monthly average of two minutes

Customer Service Staff

Customer Connections success relies on the ability to recruit, hire, train, motivate and retain a team of talented and knowledgeable professionals. Commitment to provide superior customer service is implicit in all job descriptions and it is important that all customer service representatives (CSR) share our commitment to make each customer experience value added and build a lasting customer relationship.

The team of training CSRs will respond to incoming customer calls, handle customer contact in retail locations, up-sell customers (when additional products are available), and make outbound calls to customers for follow-up. They will consider every call taken as a sales opportunity to respond to customer orders to:

- Process new sales and up-sell orders (when additional products are available)
- Process transfer service and move orders
- Process downgrade and disconnect order
- Process equipment-related orders
- Categorize and process order types
- Ask open-ended questions to determine which product offerings best suit the customer's household needs

Uptown estimated that Fort Collins Utilities would need to add four CSRs in year two of the network development and an additional two full-time equivalents (FTE) by year five.

Additionally, Customer Connections will need to hire two FTEs dedicated to Commercial Accounts.

Personnel Requirements

Position Title	Base Salary	Year 1	Year 2	Year 3	Year 4	Year 5
General Manager (GM)	$135,000	1	1	1	1	1
Data Technician	$105,000	1	2	2	2	2
Commercial Account Representative	$80,000	1	2	2	2	2
Sales Engineer	$80,000	1	1	1	1	1
Field Operations Supervisor	$80,000			1	1	1
Marketing Coordinator	$75,000	0.5	1	1	1	1
MDU Account Manager	$75,000	1	2	2	2	2
Contingency	$70,000	5	5	5	5	5
Maintenance Technicians	$65,000		1	1	2	2
Technical Service Representatives (TSR)	$60,000		4	4	5	6
Service Technicians	$60,000		1	3	4	4
Installation Technicians	$55,000		3	7	6	5
Customer Service Representatives (CSR)	$50,000		4	4	5	6
Total		10.5	27	34	37	38

The model assumes the base salary and headcount reported above plus 30 percent for benefits and 2.5 percent annual increase. Management including the General Manager, Data Technician, Commercial Account Representative, Sales Engineer, Marketing Coordinator and Multi-dwelling Unit (MDU) Account Manager will be hired in year one with growths through year three to reach steady state. Front-line hiring will start in year two. Headcount will vary during the five year build out to align with start-up activity with the following numbers representing steady state. Five contingency headcount have been added to the model to account for unforeseen issues or productivity concerns.

- 6 Customer Service Representatives - inbound/office sales, order entry and first tier support
- 6 Technical Service Representatives - second tier customer support, dispatch and service provisioning
- CSR/TSR staffed at 1 FTE per 2,000 accounts growing to 4,000 by Year 5, but with a minimum of 3 FTE for CSR/TSR to ensure phone coverage.
- 5 Install Technicians

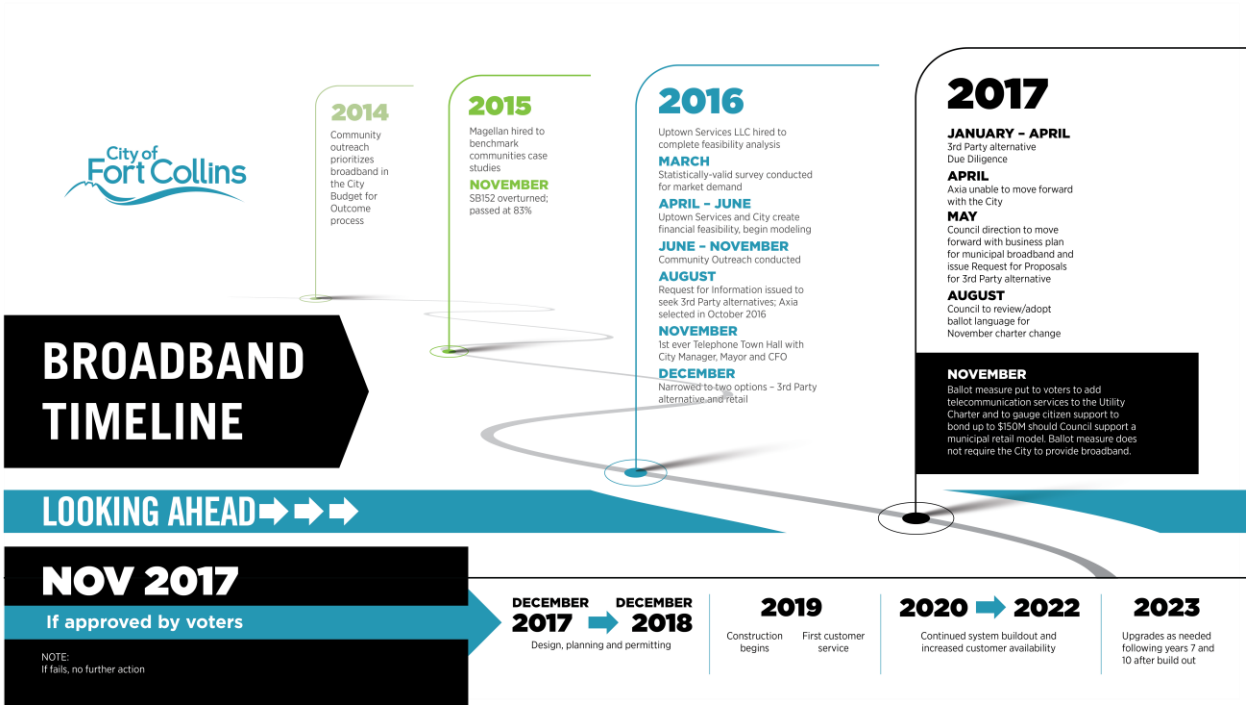
    - Installs are two-phases, with a pre-install followed by a separate premise install. All pre-installs are completed by a contractor at a fixed rate ($200) for Years 1-5, and then insourced. Premise installs are completed by internal FTE, except in Year 4 (25%) and Year 5 (50%) by a contractor at a fixed rate ($250) to maintain Install Tech headcount at long-term levels. Each Install Tech can complete three installs per day, growing to four per day by Year 5.
- 2 Maintenance Technicians – maintain fiber system from backbone to network access point, 1 per 1,000 plant miles of fiber
- 4 Service Technicians – fix subscriber problems
    - Service call volume equals 50 percent of all subscribers/year dropping to 25 percent by Year 5. Each Service Tech can complete four per day growing to 6 per day by Year 5

Compensation is based on the City's wage scale with 30% benefits assumed and 2.5 percent annual salary increases. Annual salary increases may need to be evaluated due to industry standards.

Facilities

A Broadband Office and Shop Facility will be required with approximately 17,000 square feet of both office and shop space. Financial assumptions assume a facility would be built on existing City-owned land and 2017 cost estimates are $5.6M. Leased space will be evaluated during detailed business planning. From the start of design, the time to build appropriate facilities is estimated to take 19 months, and will require interim facilities for operations during the first 1.5 years.

Milestone Timeline



VII. Network Architecture

Network Technologies Overview

Cisco's latest Virtual Networking Index shows the average North American home has seven Internet-capable devices and by the year 2020, that number will swell more than 12 devices per person in a household. This has significant implications for our broadband networks. While our appetite for bandwidth is increasing, new and evolving applications will stimulate this demand even more. A few examples are:

- 4K and 8K High Definition televisions
- Automated homes, where consumers control appliances through phones or tablets
- Fully-integrated security systems, where consumers can protect their homes through sensors and video
- Smart thermostats to reduce energy usage
- eHealth applications and other video or data intensive services
- Smart City and other Internet of Things (IOT) applications

The demand for widespread deployments of high speed broadband is accelerating. Existing service providers are at a crossroad on how to best meet this demand while leveraging existing investments and maximizing limited capital resources.

Existing service providers face different situations based on the type network they manage today and on whether they serve urban areas or more rural communities. Given fiber optic cable has virtually unlimited capacity, it forms the backbone of the Internet, cable TV networks, telephone (including cellular) networks, private business networks and even data center networks. As customers, we expect wireless access be available for convenience. Wireless access is primarily available via Wi-Fi and supplemented with cellular data plans.

The communications community generally agrees that fiber will meet the world's needs today and into the foreseeable future. The only debates involve the speed of the transition. The reason for this is simple: FTTP offers far more bandwidth, reliability, flexibility and security and a longer economic life than alternative technologies, even though its deployment price is comparable. It's less expensive to operate and maintain than copper.

Networks are composed of two parts – the transport medium and the technology that provides services or bandwidth. Copper, fiber and wireless are examples of transport mediums. Various technologies are used to provide services over these medium. Networks today are composed of at least two transport mediums and many use all three. The technology employed for services is discussed later.

Transport medium configurations:

1) Fiber to the Node/Curb (FTTN) – used by Telephone Companies (telcos)
    a) Fiber is deployed to the neighborhood outdoor telco cabinets housing VDSL2 Terminals

b) Leverages copper telephone twisted pair lines using VDSL2 and ,in the future, G.fast

2) Hybrid Fiber Coax (HFC) – Used by cable companies
   a) Fiber is deployed to a node in a neighborhood
   b) Coax (copper) cable is used from the node to the home or business.
   c) The number of amplifiers and other devices required is dependent on distance and condition of the copper
   d) Uses Data Over Cable Service Interface Specification, or DOCSIS
   e) Bandwidth is shared at the node

3) Fiber to the Premise (FTTP) – Used by all types of service providers, mostly in greenfield applications. Fiber is deployed all the way to the premise

4) Wireless - almost a customer expectation
   a) Uses radio frequencies to carry data
   b) Limited by distance, electrical and radio interference
   c) There is an inverse relationship between the radio frequency used and the ability to penetrate physical objects (including leaves and moisture in the air) and the amount of data-carrying capacity

Fiber optic cable is made up of strands of hair-thin glass that carry information by transmitting pulses of light. The pulses are turned on and off very quickly. A single fiber can carry multiple streams of information at the same time over different wavelengths, or colors of light. Fiber has many advantages over copper wire or coaxial cable. It can transmit high bandwidth over long distances, it is rugged and weather proof, resistant to electrical and radio interference, and requires lower operating expenditures.

Copper cable, by contrast, carries low voltage electrical signals. Distance and state of the physical plant greatly impact copper's ability to transmit data. It can support high bandwidth for short distances. The longer a signal travels on copper, the lower the bandwidth. Distance isn't the only constraint for copper. Copper plants are subject to interference from electrical and radio sources. This interference can quickly degrade the Signal to Noise ratio. These limitations as well as the active nature require a very skilled technical staff and power to run the devices through the power distribution. These are just a few of the factors that drive a higher operating expense as compared to fiber.

The above is also true for wireless networks. Tweaking more bandwidth from either wireless or copper plants becomes increasingly difficult and expensive as time goes on. This isn't true of optical fiber, whose capacity is effectively unlimited.

As mentioned above, there are different technologies used to deliver services to bandwidth over the communications networks.

Fiber Technologies

Fiber technologies used for a Fiber-to-the-Premise (FTTP) deployment are lumped into one of two categories: Active or Passive. The primary differences are whether active devices are used in the distribution network and effective distance to a customer. Active systems have powered devices in the field and can drive a signal for longer distances. The power requirements and operating expense is less for an active system than a copper plant. Active systems are used primarily in more dense applications such as corporate networks, campus environments or data centers.

Most operators are deploying passive systems known as Passive Optical Networks (PON). A PON system has an Optical Line Terminal (OLT) as an originating point, usually in a central office. The terminating point is an Optical Network Terminal (ONT), which is located at the customers premise. Passive splitters, based on customer density, are placed in the network between the OTL and ONT. The passive splitter is usually a 1:32 split and reduces fiber required in the networks.

Most of us have heard of the Verizon FIOS and Google Fiber networks, but all of the large telcos and cable operators have deployed PON networks for some of their footprint. Cable operators are leaning toward an Ethernet PON (EPON) system as it is has a migration path that uses the existing DOCSIS element management systems. Gigabit PON (GPON) is being deployed by most other providers. Currently GPON provides higher bandwidth options but EPON is moving quickly toward higher bandwidth options.

GPON is an ITU standard (G.984) that delivers 2.5 gigabits downstream and 1.25 gigabits upstream using multiple Layer 2 networks giving the ability to separately transport services. Standard distance is 20 km with an option to use long range optics extending the reach to 40 or 60 km, and can use a split ratio of up to 128 customers. Most deployments use a 1:32 customer split. Lower splits can increase range.

NG-PON2 is ITU standard and the next evolutionary phase of GPON. It provides for 10 gigabits symmetrical with fixed optics and allows for 40 gigabits using tunable optics. It is currently being deployed primarily with fixed optics. Most equipment sold today is available with an option to upgrade to the new standard.

EPON is an IEEE standard (IEEE802.ah) that delivers 1 gigabit symmetrical bandwidth using a single Layer 2 network to transport all services. An amendment, IEEE 802.3av, provides for 10 gigabits down and 1 gigabit up. Most deployments use a 1:32 split. No upper range is defined.

Copper Technologies

As mentioned earlier, copper and wireless transport medium are subject to many of the same limitations: distance, electric and radio interface, signal cross talk, etc. As such, the technical solutions leverage many of the same features including vectoring, Forward Error Correction, Signal to Noise improvements, etc. They are pulling out every trick in the book to wring out as much bandwidth as possible from these networks. This requires the physical plants be well maintained and continually swept, and requires a very accomplished technical staff to run, thus driving higher operating cost.

Cable plants or HFC plants use DOCSIS for providing bandwidth or services. The most widely deployed generation of DOCSIS technology, known as 3.0, is capable of providing a gigabit per second (Gbps) of broadband capacity downstream and 100 Megabit per second (Mbps) upstream. The newest generation of DOCSIS broadband, known as 3.1, provides a near-term path toward continued improvement of cable broadband performance, with network capacity up to 10 gigabits per second downstream and 1 Gbps upstream. These are asymmetrical products and share this bandwidth across a node. Bandwidth available is determined by number of free channels available for bonding. Each channel can provide roughly 38 Mbps of throughput for DOCSIS 3.0 and between 50 Mbps and 63 Mbps for DOCSIS 3.1.

CableLabs is working on a technology that will enable fully symmetrical speeds, bringing upstream capacity on par with the 10 gigabit per second downstream capacity of DOCSIS 3.1 broadband. This is known as Full Duplex DOCSIS 3.1.

One of the main changes to DOCSIS 3.1 is orthogonal frequency domain multiplexing (OFDM). OFDM makes quantum leaps in the amount of data capacity and speed available – sometimes as much as 50 percent more capacity over the same spectrum. Where DOCSIS 3.0 was able to achieve 6.3 max bits/Hz, DOCSIS 3.1 is able to achieve 10.5 max bit/Hz at 4096 QAM. In a more typical situation where multiple QAMs are being used at the same time, DOCSIS 3.1 is still able to achieve 8.5 bits/Hz, making it 35 percent more efficient.

Most cable plants run over 870 MHz of available spectrum. This is broken down into 6 MHz channels. Several of these are reserved leaving about 132 useable channels. These channels provide both video and data. Different channels must be dedicated for upstream and downstream bandwidth. This is one reason for the asymmetrical nature of DOCSIS. Due to new video compression technologies, you can get about three High Definition video channels per 6 MHz channel. Given cable companies are deploying hundreds of channels, you can see why they are struggling to provide the high speeds customer are expecting. With DOCSIS 3.0, 1 gig of bandwidth uses roughly 27 channels of capacity for the downstream path alone. That is why most systems provide speeds significantly less than 1 Gbps. DOCSIS 3.1 provides for 35 to 50 percent higher data throughput per channel, but even this isn't enough to meet future needs. Therefore, DOCSIS 3.1 also does away with the 6 MHz channel size and allows for sub-carrier bonding to more efficiently use of the available spectrum. But in order to maximize bandwidth

throughput, the coax loops must be shortened, with amplifiers and other devices removed. This helps mitigate two of the limitations of a copper plant: distance and interference.

For fiber-to-the-node (FTTN) deployments, the most prevalent technology is a version of DSL – VDSL2. This is ITU standard G.933.2. As this is a copper technology, it is subject to the same issues as coax and wireless. The bandwidth provided is very limited to between 50 and 100 Mbps. To maximize the bandwidth available, the distance sweet spot is between 500 and 1000 feet.

A new standard, G.fast, under ideal conditions and with vectoring (crosstalk cancellation) and bonding (simultaneous use of more than one pair of copper wires), can provide 500 Mbps symmetrical bandwidth up to 300 feet from a fiber node. G.fast may prove to be an excellent solution for retrofitting apartment buildings with fiber to the basement (as long as those buildings already have good internal copper wiring), but it requires bringing fiber very close to customer premises and is still limited in comparison with true fiber to the home. Using the 2.4 spectrum provides lower bandwidth but a greater distance. Conversely the 5GHz spectrum provides higher data throughput with limited distances.

Wireless Technologies

The two most widely deployed wireless technologies are Wi-Fi and 4G cellular. Wi-Fi is an IEEE standard- 802.11. The most current version is 802.11a wave 2. It uses both the 2.4 and 5 GHz unlicensed spectrum. This is the technology that most of us have in our home and are very familiar with the user experience obstacles such as: distances are very limited, cross talk is rampant and internal walls and other obstructions are a real problem. The primary methodology to drive higher bandwidth is through the utilization of more antennas and bonding the antennas. Unfortunately, while routers are making good progress on this front, very few end devices (PCs, laptops, tablets, etc.) are leveraging the multiple antenna bond feature.

The cellular industry has deployed its fourth generation network known as 4G or LTE. The original specification was for 100 Mbps, with the latest versions supporting up to 1Gbps shared across the entire cell site which is the potential bandwidth shared by all users connected to a cellular antenna. Therefore, a wireless user might get high speeds for a moment or two, if no one else is around. Cell sites vary in size generally covering around five or six miles. Unfortunately, bandwidth drops off very quickly. To illustrate, if you move a quarter of the way from the cell tower to the edge of the cell service area, you can see a 50 percent drop off in bandwidth. Most cell sites utilize fiber backhaul with a target of 300 Mbps of backhaul capacity.

Large companies and the media are already hyping “5G,” despite the fact that we are years away from a 5G standard and nobody actually knows how fast 5G will be. Today, 5G is primarily a marketing term, and often a misleading one. When the average person hears “5G,” they most likely assume it means that gigabit cell phones are around the corner. “5G” today is being used to describe not only the upcoming 5G standard but also for small cell 4G technology being used

to fill gaps or relieve congestion, in existing 4G cell sites. It also often confused with wireless connections using millimeter wave spectrum for point-to-point connections.

5G technology will utilize spectrum bands that are higher in frequency than has been typical for mobile services to date. Higher-range frequencies offer the potential of greater bandwidth for improved network capacity, but they do so while limiting effective distance. These characteristics lead to a fiber deep, small cell approach, as the most likely deployment for 5G. These 5G sites will cover hundreds of feet, instead of miles, as in today's 4G deployments. This makes for an excellent urban deployment, but in rural areas where customer concentration is less, this can be an issue. Thus it is highly unlikely 5G will replace 4G for coverage "out of town," and thus will not be a solution for the "digital divide" affecting those areas.

To be clear, in the short run, there may be situations in which the use of 5G connections with fixed wireless backhaul may enable service to certain locations. These locations may be so remote that they are unlikely to ever receive wireline service, and therefore 5G may make sense.

When compared to a 5G network that can deliver significant bandwidth using very high, very short-haul frequencies, FTTP is often less expensive and will have lower operational costs. This is particularly true when one considers how much fiber deployment will be needed to enable 5G.

Implications

All broadband providers today, wired and wireless alike, realize the way to increase broadband capability is to increase the amount of fiber in their network. Landline providers are replacing their copper cable with fiber, cable operators are replacing their coax cable with fiber, and even wireless providers are actually replacing their wireless networks with fiber by placing their towers, or small cells, closer to the customer.

On the other hand, point-to-point wireless links, typically using so-called "millimeter wave" antennas, can be very useful to extend a fiber network to serve a specific neighborhood or building. This type of wireless is not cellular as each user gets much of the total bandwidth potential of the transmission link. Once bandwidth needs require an upgrade to fiber, the wireless link can often remain in place as a backup.

Wireless services are important public amenities, but they are not substitutes or replacements for FTTP. Rather, they complement and extend existing fixed-fiber networks. Many wireless access points and cell sites are already fiber-connected, and the majority of them will be soon. Wireless service can thus be considered an application on a fiber network rather than a separate type of network.

For a cost comparison consider a standard city block. A rule of thumb for the cost of a fiber drop is typically $5 per foot (for buried or aerial). If you use an average fiber drop length in a town

environment of 160 feet, the cost is typically $800 per customer. Therefore, the cost to install fiber drops to all 8-12 customers on a city block would range from $6,000 to $10,000. A small tower and 5G cell site would cost $30,000-$50,000. The cell site would also require commercial power and batteries if the wireless network were expected to work during a power outage. For 5G wireless, it appears that the customer premise electronics are at least as much as the FTTP electronics, and likely more expensive. The drop cost for the FTTP network is likely 25 percent of the cost of the 5G wireless drop. Also, considering that the FTTP network can deliver more than 100 times the speed and capacity of the 5G wireless network, it appears that the FTTP is a considerably better value if fixed broadband is the goal with the assumptions above.

As mentioned earlier, the communications community generally agrees that fiber will meet the world's needs today and into the foreseeable future with the only debate involving the speed of the transition.

Net Neutrality

Net Neutrality or Open Internet means there are no restrictions of any kind on access to content on the Web, no limit on downloads and uploads, or no restrictions on delivery methods or providers(email, Video, Skype, Netflix, Chat, etc.). The key principle is access to the internet is not blocked, slowed down, or sped up depending on who or where that access occurs. In essence, Net Neutrality means the internet is open to everyone. Internet providers should not be allowed to charge different companies more or less for their data or to slow down, or block, access to Web sites and services they do not like.

Advocates for an Open Internet believe neutrality has been a core democratizing principle of the Internet since the day it was born. They also believe the Internet is similar to subways, buses, telephone companies, etc., which cannot discriminate, restrict, or differentiate access. Many Fiber providers are embracing Net Neutrality as a market differentiator. Their premise is the fiber networks are not bandwidth constrained as many competitors' networks are so why limit usage. This is a potential market differentiator for the City.

Privacy

The City is fully committed to protecting Personally Identifiable Information (PII) and Customer Privacy (CP) in accordance with applicable law. PII is information about a person that is readily identifiable to that specific individual. Personal information includes such things as an individual's name, address, phone number or email address. Some activities related to CP are website browsing, specific Internet usage history, email, phone records, video viewing habits or other electronic data generated using broadband and other communication services.

As a provider of utility services, the City is sensitive to customers concern for the protection of PII and Customer Privacy. As such, there are policies and procedures are in place that restrict

the access and use of utility customers' information. The City will review existing policies and laws related to broadband services to find the appropriate balance between customer's expectation for privacy and applicable state and federal laws. Protecting customer's privacy can be a market differentiator for the City.

A few of the laws or regulation related to PII and CP communications companies are required to include:

1. Colorado Open Records Act (CORA)
2. Electronic Communications Privacy Act
3. The Communications Assistance for Law Enforcement Act (CALEA)
4. Cable Act 1984
5. Consumer Protection Act 1992
6. Telecommunications Act 1996

The City will provide the protection of PII and CP while complying with lawful request, warrants or subpoenas routed to the appropriate, designated city office.

The level of Fort Collin's access and control of Personally Identifiable Information and Customer Privacy will be determined by the business model deployed. The city will work with potential third party vendors to preserve customer's privacy.

Security

Establishing and maintaining a secure computing environment is challenging as networks are increasingly interconnected and data flows ever more freely. Therefore, it is critical the design, implementation and day-to-day practices of the entire operating environment integrate appropriate security measures. Detailed security measures are dependent on the business model, core network equipment, access network equipment, operating systems and services provided.

Developing security strategies that can protect all parts of a complicated network while having a limited effect on ease of use and performance is one of the most important and difficult tasks related to network design. The City will work with third parties and vendors to achieve a reliable and secure network. For each part of the network, the security mechanisms required will focus on but not be limited to the following:

1. Access control
2. Authentication
3. Network Flows/Firewalls
4. Service Design
5. Denial of service controls (Anti-Spoofing Filters)
6. Privacy for users (Split Horizon)

7. Physical security
8. Auditing and monitoring

The design philosophy is to block everything and then allow access as warranted. Firewalls will protect security zones/regions. Up to date, documented network flows and Access Control List (ACL) are required. Service design will segment and restrict the potential for cross talk. Services will be removed when no longer needed. Required during implementation is network validation and testing against the network design.

The system will be monitored to ensure proper operation and to verify the functioning of applicable security features. This includes monitoring access, insuring all security patches are applied, verifying required services are configured securely and no passwords are left set to the factory defaults. All failed login attempts and ACL violations will be alerted. The monitoring and removal of inactive services is required. Denial of Service (DDOS) attacks are increasing. The design will address this risk and at a minimum provide monitoring and the ability to black hole the offending traffic

While the network architecture is a key component of a secure network, physical security of the network equipment maybe the biggest risk. To mitigate this risk, facility security and access to the equipment will be addressed. Best practices for secured, hardened sites include monitored access controls, monitored environmental controls, diverse, redundant power and internet access. Equipment in the field must be also be secured and monitored.

Assessing the risk to the network is ongoing effort and not just limited to deployment. Building a team that can identify common vulnerabilities and threats, and develop mitigation strategies in a responsive manner is a key success factor.

Other security related topics such as anti-virus, parental controls, privacy, encryption and data integrity are not discussed here, as these are primarily associated with applications and end users or customer systems. These security risks are a market opportunity to provide additional services to customers.

City of Fort Collins Assets

Fiber Inventory Assessment

- Fiber Network Characteristics
  - 144 fiber cable routed throughout the City in conduit
  - 112 fibers in use; 32 fibers “available”
- Network Users
  - City Departments – Traffic, IT, Utilities (electric and water)
  - Third-party governmental entities – CSU, Larimer County, Schools
  - Private sector dark fiber leases – Level 3, FRII, i-cubed, “Yipes”
- Fiber capacity

    - 32 fibers are likely not available throughout the network
    - City should reserve at least one spare buffer tube for maintenance
    - Capacity could be characterized as “scarce”
- Applicability to Future Broadband Efforts
    - Backbone – could be used to connect network hub sites
    - Feeder – not sufficient capacity to provide capacity beyond hub sites

Underground Infrastructure

- Significant Fiber Conduit in place
    - Available maps show pervasive deployment of two-inch conduit
    - Feeder – not sufficient capacity to provide capacity beyond hub sites
- Applicability to broadband effort
    - Additional microducts can be blown in with existing fiber cable
    - Spare conduit could support multiple fiber and/or microducts
    - Reduces feeder network construction requirements
    - Limits costly hard surface construction and new railroad crossings
    - Not appropriate for distribution network
- Implications of joint use with Electric Utility
    - Electric staff desires to route around structures with energized facilities
    - Would require creating path around manholes
    - Would avoid safety issues with non-qualified personnel
    - Would limit fiber damage in case of fire or explosion in manhole
    - Budget affected with creation of alternate paths

Other Assets

- Substations
    - Substation not equipped to handle telecom equipment
    - Most substations do have space for new telecom hut (~8’ x 12’)
    - Fiber conduit would need to be routed to new hut
- Existing Fiber Network Equipment
    - Existing City network does not appear useful for FTTP
    - IT Department would prefer to be a customer of network
    - CSU Manages the Fort Collins network
    - No overlap beyond the use of 12-24 fibers for backbone systems
- Tropos Wireless Network
    - System currently used for meter reading only – not wi-fi
    - Sized for collection of meter reading data – 10 routers per square mile
    - Consumer broadband would require 5x – 7x number of routers (>$5M)
    - Tropos 7320 routers do not support 802.11ac (limited to 802.11n)
    - Expanding Tropos system for broadband = expensive distraction that cannot perform at the same level as FTTP

GPON in Model

Gigabit Passive Optical Network (GPON)

- 2 backbone providers
- 2.4G downstream, 1.2G upstream
- Single fiber delivery to subscriber optical network terminal (ONT)
- Majority of FTTP deployments have been GPON
- In GPON 1:32 @ 50%, utilization is 10-15% of 2.4Gbps available
- Consumption tied to subscriber behavior not their provisioned bandwidth on fiber (high breakage on 1Gig service)

Network Electronics
GPON cards and ports = $50 per subscriber

Outside Plant Materials
GPON splitters = $15 more per passing

Technical Services
GPON splitters require four splices / eight passings = $20 per passing

Outside World – Content
Two physically diverse Internet backbone connections desired

GPON and Active Ethernet Summary

GPON – Low Cost and Flexible

- 2.5G of shared downstream bandwidth
- Flexible splitter placement and less demand for fiber strands
- High port density – 5210 subs in one chassis (10 rank units)
- Consumes less space in rack and 33 percent as much power required
- Supports path to 10G GPON

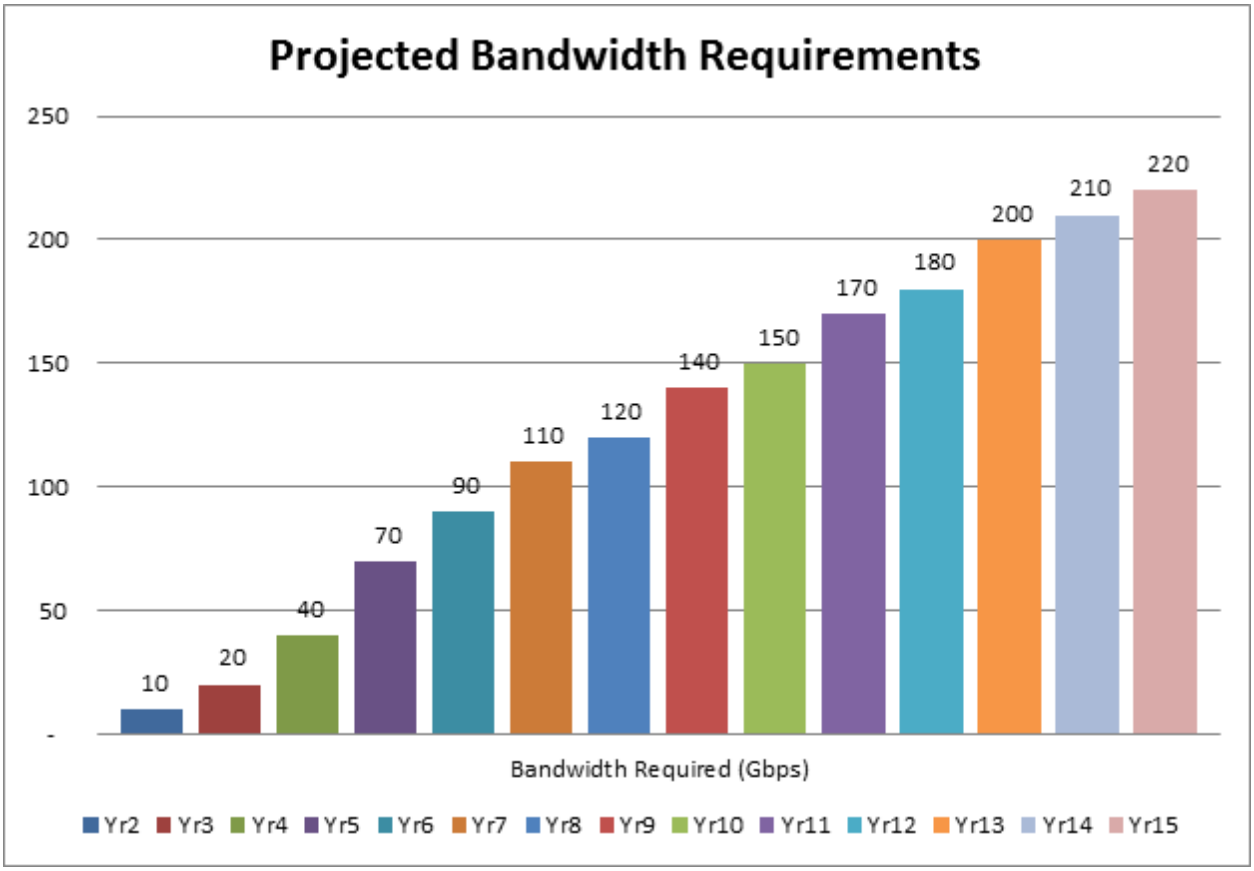
Active Ethernet – Futureproof

- Dedicated GigE from serving switch to each subscriber
- One strand from subscriber to serving switch location
- Better suited for high capacity transport services
- Longer reach – 60 km
- Extreme fiber strand counts required without active field cabinets
- Requires more fiber, space, power, cabinets, electronics and capital

VIII. Financial Model

Base Case Assumptions

- Majority of network will be GPON deployment
- Costs based on similar municipal FTTP deployments
    - Headcount
    - Contractor costs
    - Equipment
    - Construction labor bids
    - Software proposals
    - CLEC partner terms
- Assumes Comcast deployment of DOCSIS3.1 at $70 price point for gig services and resulting impact on take rate
- Capital budget is based on sample design calculated “passing cost” plus 15 percent contingency $984/premise (see section VI Passing Cost)
- Debt interest rates 4 percent Series A and 5 percent Series B include 75 basis point contingency
- Total Premises Assumed:
    - Residential: 62,000
    - Commercial: 8,000
    - High Capacity: 400
- Take Rate: (see section IV Subscribership)
    - Residential Internet: 28.2 percent
    - Commercial Internet: 45 percent
    - Voice: 8.4% high point in year 4 (0.3 percent erosion assumed yearly post year 4)
- Pricing (see section VI Pricing Assumptions)
    - Residential $70/month for 1Gbps, $50/month for 50Mbps
    - Affordable Internet tier to be determined
    - Commercial & High Capacity various options starting at $59.95/month for 25Mbps/5Mbps asymmetrical, up to custom dedicated symmetrical gig speed bandwidth
- Personnel at 38 headcount in year 5 with 30% benefits and 2.5 percent annual increase (see section VI Personnel Requirements)
- Total bandwidth requirements are a function of take rate and data demand. Total demand grows with subscribership and bandwidth usage per subscriber. – please see following graph



Construction Phase Years 1-5

Funding

Base case modeling shows $130-150M will be needed (exact amount depends on contingency) to fund the operations, construction costs of the new network, capitalized interest, issuance costs, and other expenses associated with the new start up. A substantial portion of the funding will be in the form of bonds. The bonds will be issued in the form of an A Series and B Series at the beginning of the project. Series A is anticipated to be tax exempt at 4 percent and Series B non-tax exempt at 5 percent.

	Amount	Interest Rate	Issuance	Tax
Series A	$64M	4%	Year 1	Tax Exempt
Series B	$58M	5%	Year 1	Taxable

Due to interest rate risk and possible delay in timing, the Series A is estimated at 4 percent (per guidance from finance council which includes 75 basis pts contingency) with Series B estimated at 1 percent more than the Series A to account for the taxability of the bond. Series A will be primarily used in the first 3 years to fund construction costs. Due to taxability of Series B, it can be used to fund working capital and operational needs, and additional construction beyond the 3

year time window. Total bond amount also includes issuance fees of 2 percent and 2 years of capitalized interest.

Debt Service	Year1	Year2	Year3	Year4	Year5	Year10	Year15
Bond Issuance Cost	($2,439,533)	$0	$0	$0	$0	$0	$0
Bond Series 1 Interest	($2,566,000)	($2,566,000)	($2,566,000)	($2,395,227)	($2,217,624)	($1,217,186)	$0
Bond Series 2 Interest	($2,891,332)	($2,891,332)	($2,891,332)	($2,891,332)	($2,709,683)	($1,655,770)	($310,682)
Short Term Interest	$0	$0	$0	$0	$0	($107,650)	($2,557)
Short Term Loan Principal Payment	$0	$0	$0	$0	$0	($2,012,310)	$0
Bond Principal Payment - Series 1	$0	$0	$0	($4,269,322)	($4,440,095)	($5,402,055)	($6,572,426)
Bond Principal Payment - Series 2	$0	$0	$0	$0	($3,632,982)	($4,636,708)	($5,917,745)
Total	**($7,896,865)**	**($5,457,332)**	**($5,457,332)**	**($9,555,882)**	**($13,000,384)**	**($15,031,679)**	**($12,803,410)**

Short term debt of approximately $10M (without contingency) is also assumed to be needed for non-capital expenditures and working capital provided that the City does not fund via other sources. The assumed short term interest rate is 5.0 percent and withdrawals are estimated to be taken as needed in the first 5 years. Short term debt will be paid back by fiber utility cash flows starting in year 6.

Total debt amounts in excess of the $122M in bonds and $10M in short term debt have been discussed to account for unforeseen risk, possible construction overruns, higher than anticipated demand, and general uncertainty. The contingency amount is estimated at approximately 10%-15% for a total of $130M-$150M.

Expenses Year 1

Capital Expenditures	Year1	Year2	Year3	Year4	Year5
Network Construction	$0	$19,857,262	$20,254,819	$20,661,335	$19,211,856
Contract Installation	$0	$438,171	$1,137,085	$1,971,454	$3,085,613
Facility & Vehicles	$5,600,000	$335,400	$360,908	$95,509	$0
Fiber Drop, Powering, ONTs	$0	$601,550	$1,495,156	$1,872,583	$2,307,130
Fixed Equipment	$967,500	$878,663	$896,246	$914,225	$932,612
Engineering, Design, Inspection	$2,713,442	$250,217	$251,233	$252,273	$278,337
Back Office Systems and Capital	$790,000	$240,000	$24,000	$24,000	$24,000
Total	**$10,070,942**	**$22,601,263**	**$24,419,448**	**$25,791,379**	**$25,839,547**
				Cumulative Total	**$108,722,580**

Construction expense will focus on priority start-up costs such as:

1) $5.6M Facility – 17,300 square-feet (sf) building with 8,800 sf office space and 9,500 sf shop

2) $2.7M Engineering - Network Design, backbone services and GPS mapping

3) $968K Fixed Network Equipment – Backbone electronics, core head end switch/router, test equipment, internet services back office platforms

4) $790K Back Office Systems, Other Capital – Broadband billing system, network and fiber management systems

Expenses Year 2 - 5

1) Construction begins on the network in year two and finishes in year five with a total cost of $80M. Cost is a combination of plant miles installed (200 miles per year x $4000 per mile) and passing cost of $984 per meter and passing approximately 18,000 meters per year.

2) Network related fixed equipment and capital of approximately $9.9M total in years 2-5 includes ONTs and fiber drop materials.

3) Contract installation costs of $6.6M. Third party installers are hired on a temporary basis to assist with the surge of installs in years 2-5. Estimated at a flat rate of $200 per pre-install, and $250 per premise install.

4) $800K installation and service vehicles purchased include; service vans, bucket trucks and heavy service install rigs. Vehicles are replaced on a 6 year cycle and purchases begin in year two with ramp up costs continuing in years three and four.

Revenue

	Year1	Year2	Year3	Year4	Year5
Active Residential Premises	0	1,982	6,655	12,069	18,014
Total Revenue	**$0**	**$916,653**	**$4,879,311**	**$10,888,757**	**$18,211,765**

Year two is the first year of subscriber revenue. Although by the end of year 2 roughly 25 percent of the network has been installed, not all of those initial subscribers have received service for the full year, and therefore cannot account for a full year of revenue. Network installation will continue at 25 percent per year through year 5, and estimated number of subscribers will increase by approximately 5000 per year through year 4 and another 6000 in year five.

	Year1	Year2	Year3	Year4	Year5
Residential Internet	$0	$609,243	$3,193,006	$6,938,680	$11,176,790
Commercial Internet	$0	$69,093	$426,334	$1,091,238	$2,228,246
High Capacity Services	$0	$78,629	$435,359	$1,094,400	$2,099,183
Total	**$0**	**$756,966**	**$4,054,699**	**$9,124,318**	**$15,504,219**

Approximately 55 percent of revenue will be generated by active residential internet premises. The number of homes passed per year increases by approximately 15,000/year from years 2-5. Subscriber take rate is estimated at 28.2 percent with the number of eligible premise passings growing conservatively at 0.8 percent in years 2-5 and then 0.4 percent in years 6-15. It is estimated 56 percent of residential subscribers will choose the 50Mbps option at $50 per month and roughly 44 percent the 1Gbps option at $70 per month.

Approximately 30 percent of revenue will come from commercial and high-capacity internet services split evenly between the two groups. Ramp up will be delayed in comparison to the residential segment per survey data and Uptown experience. It is generally known that commercial business tends to adopt slower, but ultimately the take rate will be higher. Commercial revenue derived from 45 percent take rate of approximately 8,000 premises assumed. Uptown experience has shown that the bulk of commercial subscribers take advantage of the lowest two tiers of service. The high-capacity market is highly varied and conservatively modeled at five percent of commercial premises.

The remaining 15 percent of revenue is provided by residential and commercial phone service penetration of 8.4 percent. Phone revenue decreases both in amount and in proportion to the internet services revenue over time. Residential phone pricing is $25 per month. Commercial phone pricing is $14 per line per month.

Operations Phase Years 6+

	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Revenue										
Total	$22,783,408	$23,777,179	$24,703,513	$25,202,613	$25,383,653	$25,548,804	$25,697,621	$25,848,046	$26,000,098	$26,153,798
Operating Expenses										
Total Operating Expense	$4,826,271	$4,874,048	$5,217,769	$5,431,482	$5,305,943	$5,617,558	$5,817,263	$5,695,110	$5,977,152	$6,165,445
SG&A										
Total SG&A	$1,055,856	$1,084,269	$1,112,355	$1,136,518	$1,157,853	$1,177,155	$1,196,501	$1,216,064	$1,235,838	$1,255,816
Total Expense	$5,882,128	$5,958,318	$6,330,124	$6,567,999	$6,463,795	$6,794,714	$7,013,765	$6,911,174	$7,212,990	$7,421,261
Operating Income	$16,901,280	$17,818,862	$18,373,390	$18,634,613	$18,919,857	$18,754,090	$18,683,857	$18,936,872	$18,787,108	$18,732,537
Operating Margin	74%	75%	74%	74%	75%	73%	73%	73%	72%	72%

Total revenue past year five will range between $23M to $26M per year with conservative growth estimated to level out at 0.6 percent for total revenue. All revenue streams are expected to experience moderate population growth impacts except voice service which will erode over the same time period.

Expenses during operations will range from $6M in year 5 to $7.4M in year 15. Three main drivers of the operational expense are; overhead staffing at approximately 50 percent of expenses, internet backbone expenses at 22 percent of expense, and marketing/customer service at 18 percent of expenses.

Operating margin fluctuates between 70 to 75 percent in years 5-15, but remains healthy. Operating income is therefore between $17 to 19M per year and is capable of servicing the debt payments that are expected to reach a maximum of $15M.

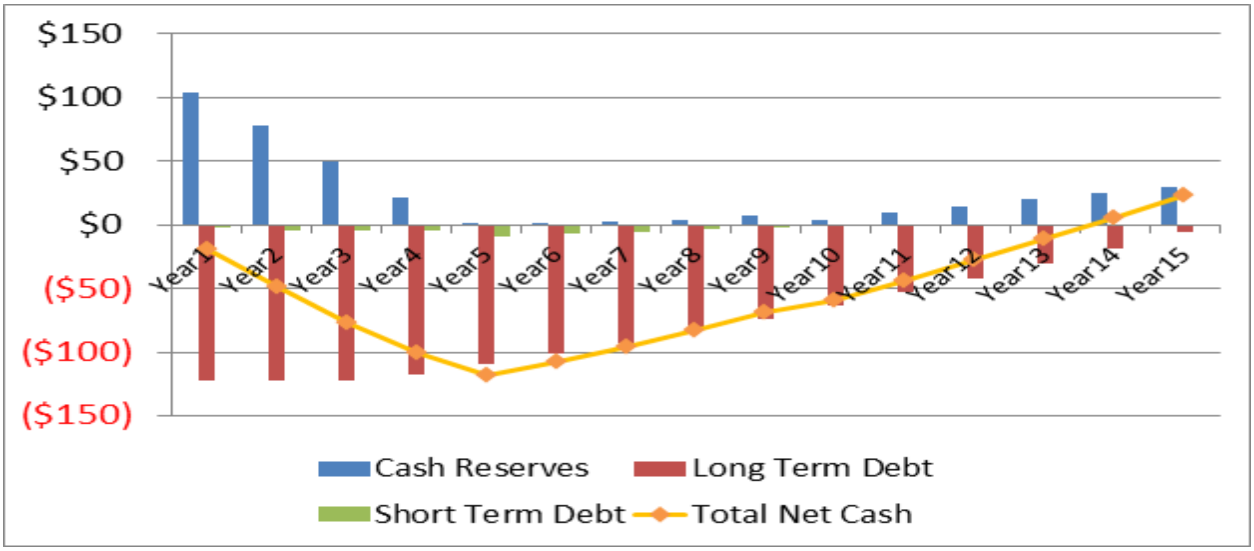
	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Total Capital	$644,553	$1,521,603	$941,828	$937,307	$6,294,844	$611,662	$608,719	$605,751	$952,031	$955,997

Capital expenditures will continue past the construction phase. Subscriber churn will force continued investment in drop fiber, power and install equipment. Gradual growth and changes in GMA will also require marginal continued construction cost in the operational phase years. While most revenue and expense items are conservatively forecasted with moderate growth assumptions and fairly steady estimates in years 6-15, capital refresh is the exception with periodic vehicle replacement needed, a $1M ONT technology upgrade anticipated in year 7, and an electronics refresh of $6M expected in year 10.

Net Cash

	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Total Net Cash	**($109,078,481)**	**($97,606,777)**	**($84,492,360)**	**($70,550,920)**	**($61,084,938)**	**($45,684,709)**	**($29,766,588)**	**($12,984,210)**	**$3,941,006**	**$21,463,362**

Net Cash is the metric by which Uptown evaluates success of broadband initiatives. It is a form of payback metric that expresses the year that operations of the network has generated enough funds to pay off all the debt (although the network may choose not to pay off the debt at that time for any number of reasons). The general rule to follow is a network is successful if it is able to pay off all debt incurred by year 15, with the earlier payoff the better. The City retail model currently is expected to hit this milestone in year 14 with $3.9M net positive cash flow. This is not to be confused with operational cash flow as the network generates positive operational cash flow (operations revenue exceeds expenses) as early as year 3, however, that excess cash is mostly consumed by debt service until the bond balance has been paid.


$150
$100
$50
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($50)
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Year1
Year2
Year3
Year4
Year5
Year6
Year7
Year8
Year9
Year10
Year11
Year12
Year13
Year14
Year15
Cash Reserves
Long Term Debt
Short Term Debt
Total Net Cash

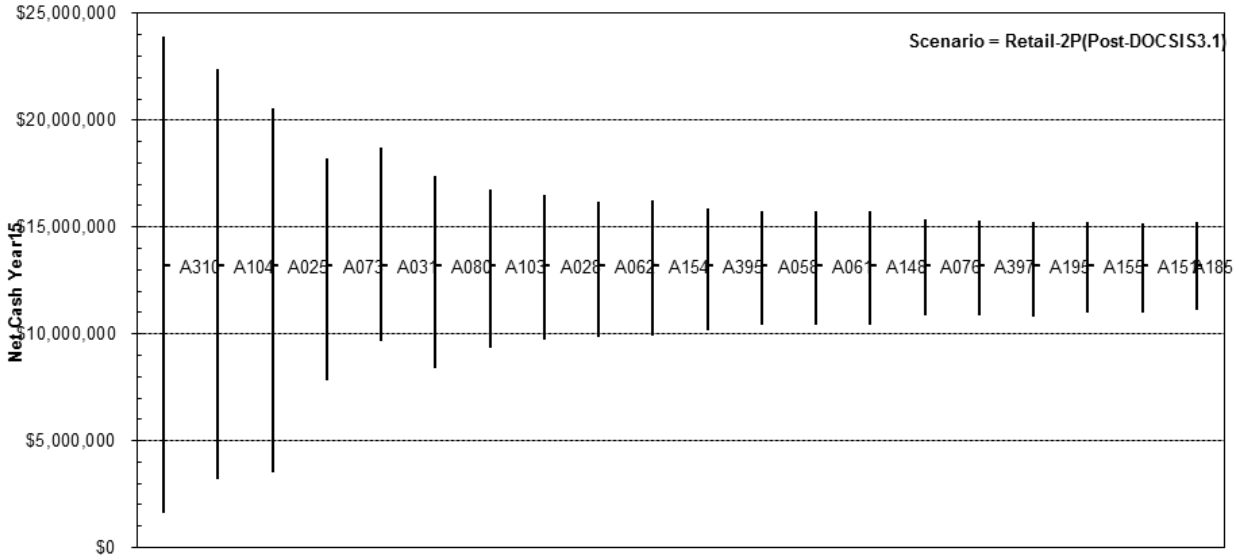
Financial Statements

	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue					
Residential Phone	$0	$109,504	$517,542	$986,360	$1,346,796
Commercial Phone	$0	$50,183	$307,070	$778,079	$1,360,749
Residential Internet	$0	$609,243	$3,193,006	$6,938,680	$11,176,790
Commercial Internet	$0	$69,093	$426,334	$1,091,238	$2,228,246
High Capacity Services	$0	$78,629	$435,359	$1,094,400	$2,099,183
Other Retail Revenue	$0	$0	$0	$0	$0
Total	$0	$916,653	$4,879,311	$10,888,757	$18,211,765
Operating Expenses					
Internet Backbone/IPAddres	$0	$203,238	$400,342	$611,490	$914,321
Professional Services	$30,000	$10,000	$10,000	$10,000	$10,000
Locates & Right of Way Fee	$482,619	$266,269	$266,269	$266,269	$266,269
Staffing Expenses	$968,500	$1,938,788	$2,560,898	$2,638,920	$2,884,263
Vehicle maintenance	$0	$57,656	$130,015	$145,380	$149,015
Vendor Maintenance	$0	$55,000	$55,000	$55,000	$55,000
Rents and Utilities	$20,000	$20,000	$20,000	$20,000	$20,000
Total Operating Expense	$1,501,119	$2,550,951	$3,442,524	$3,747,059	$4,298,867
SG&A					
Marketing Expenses	$198,750	$399,938	$402,436	$404,997	$407,622
Customer Service Expenses	$104,000	$479,700	$491,693	$503,985	$660,080
Billing Expenses	$0	$4,365	$14,823	$27,078	$42,188
Total SG&A	$302,750	$884,003	$908,951	$936,060	$1,109,890
Total Expense	$1,803,869	$3,434,953	$4,351,475	$4,683,120	$5,408,758
Operating Income	-$1,803,869	-$2,518,301	$527,836	$6,205,637	$12,803,007
Operating Margin	NM	-275%	11%	57%	70%

	Year 6	Year 7	Year 8	Year 9	Year 10
Revenue					
Residential Phone	$1,465,971	$1,411,407	$1,356,412	$1,300,985	$1,245,123
Commercial Phone	$1,771,873	$1,999,637	$2,124,870	$2,145,539	$2,166,350
Residential Internet	$13,436,728	$13,510,268	$13,584,171	$13,658,437	$13,733,070
Commercial Internet	$2,982,146	$3,047,076	$3,113,284	$3,180,792	$3,249,625
High Capacity Services	$3,027,550	$3,709,280	$4,410,780	$4,802,276	$4,874,310
Other Retail Revenue	$99,139	$99,511	$113,997	$114,584	$115,174
Total	$22,783,408	$23,777,179	$24,703,513	$25,202,613	$25,383,653
Operating Expenses					
Internet Backbone/IPAddres	$1,365,893	$1,335,942	$1,599,992	$1,732,042	$1,612,092
Professional Services	$10,000	$10,000	$10,000	$10,000	$10,000
Locates & Right of Way Fee	$266,269	$266,269	$266,269	$266,269	$266,269
Staffing Expenses	$2,956,370	$3,030,279	$3,106,036	$3,183,687	$3,173,985
Vehicle maintenance	$152,740	$156,559	$160,473	$164,484	$168,597
Vendor Maintenance	$55,000	$55,000	$55,000	$55,000	$55,000
Rents and Utilities	$20,000	$20,000	$20,000	$20,000	$20,000
Total Operating Expense	$4,826,271	$4,874,048	$5,217,769	$5,431,482	$5,305,943
SG&A					
Marketing Expenses	$338,146	$350,842	$362,932	$370,820	$375,601
Customer Service Expenses	$676,582	$693,497	$710,834	$728,605	$746,820
Billing Expenses	$41,128	$39,931	$38,589	$37,092	$35,432
Total SG&A	$1,055,856	$1,084,269	$1,112,355	$1,136,518	$1,157,853
Total Expense	$5,882,128	$5,958,318	$6,330,124	$6,567,999	$6,463,795
Operating Income	$16,901,280	$17,818,862	$18,373,390	$18,634,613	$18,919,857
Operating Margin	74%	75%	74%	74%	75%

	Year 11	Year 12	Year 13	Year 14	Year 15
Revenue					
Residential Phone	$1,188,824	$1,132,085	$1,074,904	$1,017,278	$959,205
Commercial Phone	$2,181,488	$2,190,778	$2,199,857	$2,208,715	$2,217,344
Residential Internet	$13,805,086	$13,874,464	$13,944,168	$14,014,200	$14,084,562
Commercial Internet	$3,310,211	$3,362,287	$3,415,181	$3,468,905	$3,523,472
High Capacity Services	$4,947,425	$5,021,636	$5,096,961	$5,173,415	$5,251,016
Other Retail Revenue	$115,770	$116,370	$116,975	$117,585	$118,199
Total	$25,548,804	$25,697,621	$25,848,046	$26,000,098	$26,153,798
Operating Expenses					
Internet Backbone/IPAddres	$1,840,143	$1,954,195	$1,744,247	$1,936,299	$2,032,352
Professional Services	$10,000	$10,000	$10,000	$10,000	$10,000
Locates & Right of Way Fee	$266,269	$266,269	$266,269	$266,269	$266,269
Staffing Expenses	$3,253,335	$3,334,668	$3,418,035	$3,503,486	$3,591,073
Vehicle maintenance	$172,811	$177,132	$181,560	$186,099	$190,751
Vendor Maintenance	$55,000	$55,000	$55,000	$55,000	$55,000
Rents and Utilities	$20,000	$20,000	$20,000	$20,000	$20,000
Total Operating Expense	$5,617,558	$5,817,263	$5,695,110	$5,977,152	$6,165,445
SG&A					
Marketing Expenses	$380,296	$384,905	$389,607	$394,406	$399,303
Customer Service Expenses	$765,491	$784,628	$804,244	$824,350	$844,958
Billing Expenses	$31,369	$26,969	$22,213	$17,082	$11,555
Total SG&A	$1,177,155	$1,196,501	$1,216,064	$1,235,838	$1,255,816
Total Expense	$6,794,714	$7,013,765	$6,911,174	$7,212,990	$7,421,261
Operating Income	$18,754,090	$18,683,857	$18,936,872	$18,787,108	$18,732,537
Operating Margin	73%	73%	73%	72%	72%

Sensitivity



ID	Title	Best	Worst	ID	Title	Best	Worst
A31	Blended Cost per Meter Passed - During Build	$1,082	$885	A39	Bond Rate - Series 1	4.1%	3.4%
A10	Residential Internet Tier 2 - Year 1	$54.95	$44.96	A05	Business Package 1	110.0%	90.0%
A02	Residential Internet Access Penetration	33.2%	27.2%	A06	Lines per Business Package	4.2	3.4
A07	High Capacity Services Penetration of Med-Large	49.5%	40.5%	A14	Business Package 1 Per Line - Year 1	$15.40	$12.60
A03	Tier 2 Year 10 - Res	66.0%	54.0%	A07	DIA Year 10 - Bus	82.5%	67.5%
A08	Percentage of all Businesses	5.5%	4.5%	A39	Bond Rate - Series 2	5.2%	4.3%
A10	Residential Internet Tier 1 - Year 1	$43.95	$35.96	A19	Bandwidth Minimum Capcity Trigger	88.0%	72.0%
A02	Tier 1 Year 10 - Res	33.0%	27.0%	A15	Direct Fiber High Cap ARPU	$3,300	$2,700
A06	Commercial Internet Access Penetration	49.5%	40.5%	A15	Tier 1 Bus Price	$65.95	$53.96
A15	DIA ARPU	$1,650	$1,350	A18	Residential Average Bandwidth - Year 1	1,650	1,350

The Uptown model utilizes over 450 variables to mimic the City fiber network and generate 15 years of proforma financial activity. While all variables are important and can affect the City broadband simulation, not all variables are within the City's control, some variables are dictated by market factors, or still other variables may have very little significant impact on total results. In the end, only a few material variables drive the model results, and even fewer may be within the City management's control. The example tornado graph above indicates that three core variables in particular heavily influence the model's results:

1) Passing cost
2) Residential internet pricing
3) Take rate

While other factors will influence the end result, it would take a combination of other issues to affect the model as much as any one of these 3 core variables.

Scenarios

A number of scenarios (adjusted variables, or combination or variables) were tested to determine impact of possible future states.

Base Case scenario:

- Penetration take rate 28.2 percent
- Passing cost $984
- Revenue during operations phase $23M - $26M/yr
- Construction phase capital cost $109M
- Estimated bond and short term debt total $132M
- Net Cash turns positive in year 14

Active Ethernet installation scenario:

- Penetration take rate 28.2 percent
- Passing cost $1135
- Revenue during operations phase $23M - $26M/yr
- Construction phase capital cost $129M
- Estimated bond need of $145M, short term not available
- Net Cash estimated to turn positive in year 17

Take Rate reduction scenario:

- Penetration take rate 22.5 percent
- Passing cost $984
- Revenue during operations phase $20M - $23M/yr
- Construction phase capital cost $106M
- Estimated bond and short term debt total $134M
- Net Cash estimated to turn positive in year 16

Take Rate increase scenario:

- Penetration take rate 45 percent
- Passing cost $984
- Revenue during operations phase $31M - $35M/yr
- Construction phase capital cost $115M
- Estimated bond and short term debt total $135M
- Net Cash estimated to turn positive in year 12

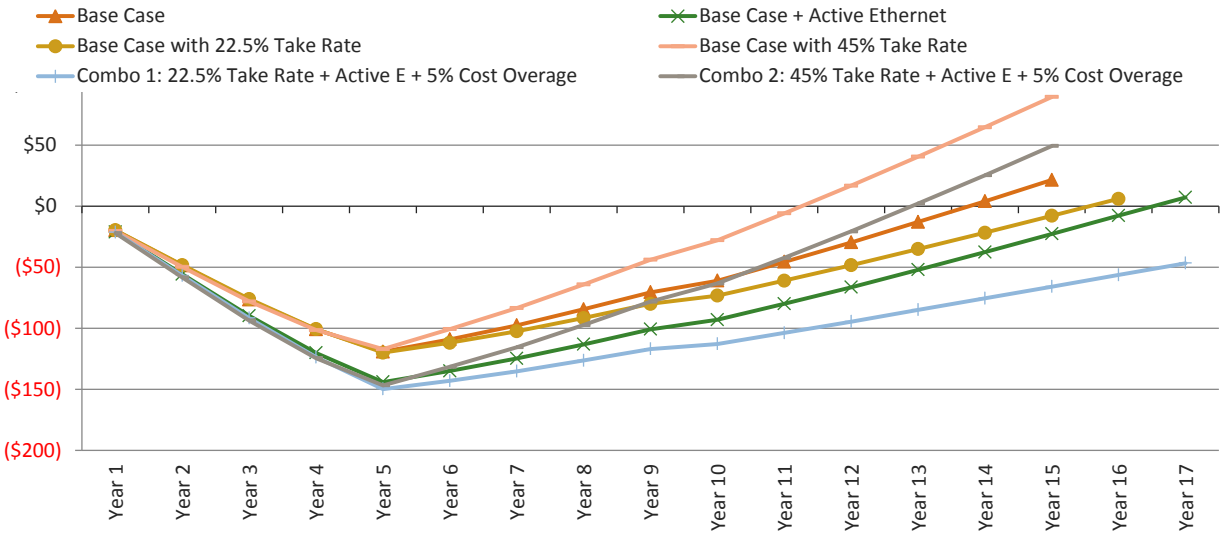
Combination 1 Scenario:
22.5 percent take rate, Active Ethernet installation, 5 percent cost overrun

- Penetration take rate 22.5 percent
- Passing cost $1192
- Revenue during operations phase $20M - $23M/yr
- Construction phase capital cost $131M

- Estimated bond need $147M, short term not available
- Net Cash does not turn positive in first 20 years

Combination 2 Scenario:
45 percent take rate, Active Ethernet installation, 5 percent cost overrun

- Penetration take rate 45 percent
- Passing cost $1192
- Revenue during operations phase $31M - $35M/yr
- Construction phase capital cost $131M
- Estimated bond and short term debt total $162M
- Net Cash estimated to turn positive in year 13



Mitigation

Scenario planning is useful to give management insight into potential outcomes; however, risk mitigation should be built into the business operations of the network to properly mitigate the potential for heavy losses. It must be acknowledged that these strategies have varying levels of success, and some may not be feasible in a network situation:

1) Pilot testing and sequential spending – move forward with large expenses only after smaller tests have proved successful

2) Timing – extension of construction timing may help financials as the network generates sufficient cash to fund growth, if given enough time

3) Variable vs. Fixed cost structure – variable cost structure can be a safer business model in which expenses are only incurred after revenue is assured, but it usually employs outsourced activities, longer lead time for customers, and potential loss of margin

4) Construction roll-out only after securing tenant anchors and stable revenue stream in strategic locations

Risk and Worst Case

As currently envisioned, the broadband service would be provided through the City's Light & Power utility. To fund the network construction, the City would issue Light & Power revenue bonds, which would be repaid by the network's users. These bonds would be backed by the revenues and rate payers of the Light & Power Utility. All business startups incur risk and not all risks can be mitigated. Risks associated with the municipal retail business plan include, but are not limited to: competition, startup, governance, technology and financial risk. If the City Retail FTTP network is successful, only households that subscribe for the service will pay for the network.

As modeled for this analysis, in the event insufficient revenue was generated by network subscribers, Light & Power rate payers would be responsible for covering any shortfall revenue necessary to cover debt service and operating expenditures. Staff also identified a worst case scenario (all of the debt is spent, the network fails and no revenue is realized from the network) to cover the $130 of debt to build the City Retail FTTP network. In the worst case scenario, a monthly fee estimated at $17 per month would be charged to each Light & Power account. The $17 per month is equivalent to $2,420 per premise over the life of the debt but would be reduced the later in time such a worst case scenario occurred.

IX. Opportunities and Threats

A number of potential opportunities and threats exist within this type of venture. The following highlight some of the possibilities.

Opportunities:

1) Possible additional revenue streams
    a. Lease of dark fiber
    b. Over the top internet service provider if open access

2) Market share greater than assumed
    a. Additional capital costs required but additional cash flow could payback debt faster
    b. Higher satisfaction, confidence in City brand and citizen confidence

Threats:

1) Marketing reaction of large incumbents
    a. Aggressive pricing
    b. Signing up multiple dwelling units with multi-year revenue sharing agreements with property owners
    c. Locking up customers during planning year with multi-year contracts at discounted prices

2) Possible legislative/political changes sponsored by large incumbents
    a. Restrict municipality's ability to add telecom into L&P Utility forcing need to create 5th utility
    b. Impact on financing could force General Obligation debt vs. lower interest revenue bonds
    c. Change in municipality's ability to provide retail internet service as occurred in Utah this forced a Wholesale model alternative that ultimately failed to generate enough revenue to support debt service

3) Governance
    a. City's ability to modify governance and run a municipal broadband utility as a private enterprise would be run.
        i. Private executive sessions to discuss strategy, pricing, marketing competitive reactions
        ii. Maintain a level playing field with competition by not adding social costs to the cost structure – i.e. low income rate subsidies should be borne by the municipality and not by the broadband utility

4) Business Risk
    a. Take rate of less than assumed by year five will impact ability of the broadband utility to support debt requirements (see Scenarios section VIII.G)
    b. Construction cost greater than expected (see Scenarios section VIII.G)
    c. Price reductions if needed to meet competition given price elasticity identified in survey results
    d. Rate risk in financing
    e. Municipal organization needs to develop expertise and experience in staff and culture to successfully compete with incumbents – business plan and execution management

X. Appendix

Peer Cities

PEER CITIES UPDATE

ATTACHMENT 1

State	City	State with Restriction	Next Century Cities Member	Model Exploring	Other
California		California Government Code 61100(af)			Community service districts may provide broadband services if a private person or entity is unwilling to deploy broadband services. If a city builds its own network and then a private company shows up "ready, willing, and able to acquire, construct, improve, maintain, and or operate broadband," the city has to turn it over or lease it to the company at FMV.
	Santa Rosa		No	-	Residential fiber service is only available to 2% of people living in Santa Rosa.
	Santa Barbara		No	-	Cox, Frontier and Windstream Communications provide wired services, but does not offer 1G.
	Anaheim		No	-	For $44.99/month, Time Warner provides 100 Mbps upload, 10 Mbps download service.
	Palo Alto		Yes	P3	Leases Dark Fiber Optic Backbone Network; Developed a FTTP Master Plan and Wireless Network Plan.
	Burbank		Yes	N/A	ONE Burbank offers business services - dark fiber leasing, dedicated internet access (DIA), Virtual Private LAN services, Wave Lambda Services, Communication Transport Services. Offers free Wi-Fi throughout the city using a "best efforts/as-is" basis utilizing existing network from smart meters.
Florida		FL.Stat.350-81, FL.Stat.166.047			Municipalities must hold public meetings that allow providers to comment on served and unserved areas. Florida requires a feasibility study or proof of profitability within four years or shut down, merge with a private company or seek an extension from municipal council or authority to continue providing services. State statute prohibits the use of taxpayer dollars to fund the network build
	Gainesville		Yes		Gainesville Regional Utilities built an Innovation Zone Network that serves businesses, multi-dwelling units (MDUs) and greenfield development.
	Coral Springs		No		AT&T GigaPower Network serves the Coral Springs area.
Michigan		MI Laws Ann.484.2252			A public entity may provide telecommunication services within its boundaries if the following requirements are met: a request for competitive bids to provide telecommunication services is issued, less than three bids are received, and 60-days pass from the date the request for bids was issued. The Michigan Broadband Development Authority (MBDA) is a state agency that assist in attracting private sector investments in Internet infrastructure.
	Ann Arbor		No		AT&T GigaPower Network serves the Ann Arbor area with FTTP 1G service at $80/month symmetrical.
Nebraska		Neb.Rev.Stat 86-575, Neb.Rev.Stat 86-594			Statutory language prohibits retail municipal broadband, telecom, or cable services.
	Lincoln/Lancaster County		Yes	3rd Party	Partner with Allo, 3rd Party, by leasing conduit. 1G service is $80/month symmetrical.