



TOWN BOARD WORK SESSION

**August 6, 2018 // 6:00 p.m. // First floor conference room
301 Walnut Street, Windsor, CO 80550**

GOAL of this Work Session is to have the Town Board receive information on topics of Town business from the Town Manager, Town Attorney and Town staff in order to exchange ideas and opinions regarding these topics.

Members of the Public in attendance are asked to be recognized by the Mayor before participating in any discussions of the Town Board

AGENDA

1. Broadband Study Follow-up
2. Future Meetings Agenda



MEMORANDUM

Date: August 6, 2018
To: Mayor and Town Board
From: Kelly Houghteling, Assistant to the Town Manager
Re: Broadband Study Follow-up
Item #: 1

Background / Discussion

On June 25, 2018 our consultant, NEO Connect, reviewed the initial findings on the Broadband Feasibility Study. The study began in October 2017 and included several activities including, a survey for residents and businesses on current broadband services and pricing, outreach meetings to key community stakeholders, meetings with the incumbent providers, and an assessment of best practices and levels of community investment.

During the work session, Town Board will have the opportunity to discuss the various options for improving the availability, redundancy and affordability of broadband Internet services for residents and businesses. Our consultant will review the financial implications and considerations if the Town wanted to pursue a Gigabit broadband strategy.

Relationship to Strategic Plan

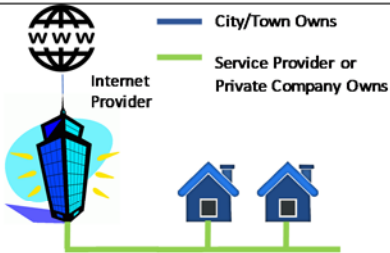
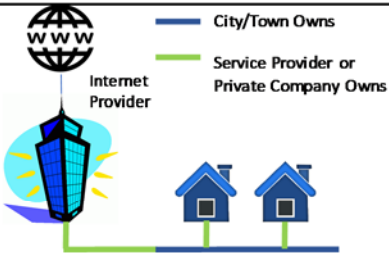
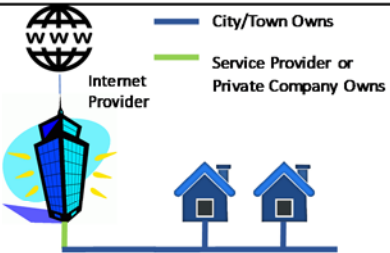
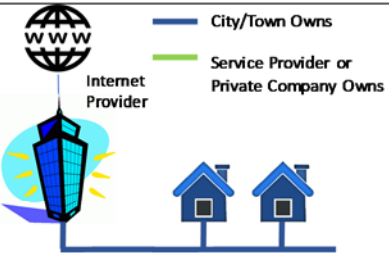
"Complete a study of Windsor's broadband gaps."

Recommendation

Review of feasibility study and provide input on next steps.

Attachments

Summary of Financial Models
Financial Considerations of Broadband Models
PowerPoint
Executive Summary (included in packet on June 25)

				
		PUBLIC PRIVATE PARTNERSHIPS		
	WORK WITH THE EXISTING PHONE/CABLE COMPANIES	WHOLESALE, CITY OWNS FIBER BACKBONE NETWORK	WHOLESALE, CITY OWNS ALL FIBER	RETAIL MODEL, CITY as an ISP
DESCRIPTION	The City/Town would work with the existing incumbent providers or another private company who would develop a broadband network and provide highspeed internet service. The private provider would construct and operate the network with private capital; the City/Town may or may not provide a subsidy.	The City/Town invest in a portion of useful infrastructure (conduit and fiber) to serve as a backbone for a communications network and then would select a private company to partner with to develop a broadband network and provide high speed internet service	The City/Town would finance and build a fiber broadband network, and then lease the network to one or more internet service providers and entities to utilize the infrastructure.	The City/Town would finance and build a fiber broadband network and begin to provide retail internet service through a new service within the City/Town government
INFRASTRUCTURE OWNER	Backbone: Private Distribution: Private Electronics: Private	Backbone: City Distribution: Private Electronics: Private	Backbone: City Distribution: City Electronics: Private Company	Backbone: City Distribution: City Electronics: City
SERVICE PROVIDER	Private Company or the Existing Provider	Private Company	Private Company	City/Town
ORGANIZATIONAL IMPLICATIONS TO CITY/TOWN	Little Risk * No additional staffing or facility implications * Risk if the private partner or incumbent provider does not perform	Low Risk * Minor staffing implications during construction; No facility implications	High Risk * probable staffing implications to manage network and 3	Highest Risk * Staffing implications to run new broadband service and network * Requires facilities for administration and operations
FINANCIAL IMPLICATIONS OR CONSIDERATIONS	Very Low * City would likely negotiate a first right of refusal upon sale	Low * \$76M (Greeley) \$33.5M (Windsor) Capital cost to construct and maintain backbone, City/Town would likely negotiate a first right of refusal upon sale for remainder	Medium * \$95-109M (Greeley) \$40.7-45.2M (Windsor) Capital costs to construct and maintain network	High * \$104-\$127M (Greeley) \$43-49M (Windsor) Capital Costs to design, construct, maintain and operate network and customer service
CONTROL	Almost No Control * Price: Set by private provider * Speed: Set by private provider * Minimal customer service requirements * Coverage may be dependent on market demand	Less Control * Price: Set by private provider * Speed: Set by private provider * Minimal customer service requirements * Coverage may be dependent on market demand	Some Control * Price: May be negotiated with private provider * Speed: May be negotiated with private provider * Negotiated customer service requirements * Universal coverage across City/Town	High Control * Price: Set by City * Speed: Set by City * Customer Service Standards controlled by City * Universal coverage across City
ABILITY TO MEET OBJECTIVES	Does Not Meet * Citywide Access: Not guaranteed * Equitable and Inclusive: Not guaranteed * Future-Oriented: No * Competitive Marketplace: Same as today * Unfettered Access: Not guaranteed * Open Access: No	Modest * Citywide Access: Not guaranteed * Equitable and Inclusive: Not guaranteed * Future-Oriented: Yes * Competitive Marketplace: Better than today * Unfettered Access: Not guaranteed * Open Access: Backbone Yes, Distribution No	Mixed * Citywide Access: Yes * Equitable and Inclusive: Likely * Future-Oriented: Yes * Competitive Marketplace: Likely * Unfettered Access: Likely * Open Access: Possibly	Very High * Citywide Access: Yes * Equitable and Inclusive: Yes * Future-Oriented: Yes * Competitive Marketplace: Yes * Unfettered Access: Yes * Open Access: Not initially
EXAMPLES OF OTHER CITIES/TOWNS	Arvada, CO	Holly Spring, NC (Ting)	Westminster, MD	Longmont, CO
	Westminster, CO	Centennial, CO (Ting)	Huntsville, AL	Ft. Collins, CO
	Kansas City, KS, MO	Boulder, CO		Loveland, CO
	Lincoln, NE	Urbana-Champaign, IL (13)		Wilson, NC
				Salisbury, NC



FINANCIAL CONSIDERATIONS, CITY OF GREELEY AND TOWN OF WINDSOR BROADBAND MODELS

June 2018

Abstract

This white paper is the companion report to “The City of Greeley and Town of Windsor Broadband Roadmap.” This paper dives into the financial implications and considerations for implementation of a Gigabit broadband strategy for the City’s and Town’s constituents. This level of investment is referenced as “Level 4, Connect Homes and Businesses with Fiber through a Public-Private Partnership or through offering Broadband as a Service” in the Roadmap.

**Prepared for the City of Greeley and the Town of Windsor,
by Diane Kruse, NEO Connect**

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FINANCIAL CONSIDERATIONS, CITY OF GREELEY AND TOWN OF WINDSOR BROADBAND MODELS

Introduction

This white paper is the companion report to “The City of Greeley and Town of Windsor Broadband Roadmap,” referenced herein as the “Roadmap,” previously submitted to the City of Greeley and Town of Windsor by NEO Connect. This report includes the capital costs projections and financial implications of the various models for implementing a Gigabit broadband strategy for the City and Town’s citizens.

NEO’s team has put together capital costs estimates for designing and building a Fiber to the Premise network within the City of Greeley and Town of Windsor. Putting together this information does not necessarily imply that the City of Greeley and Town of Windsor should or will be building and owning a Fiber to the Premise network. Rather, this information has been compiled for City/Town staff and council members to be able to understand the models and approaches through the lens of their respective financial implications. This white paper provides the financial framework of the various approaches for Gigabit broadband strategies, including models of public-private partnerships.

What Level of Investment from the Municipality?

As a refresher, there are many levels of investment and strategies that a municipality may consider to improve broadband services within its community. Here are the various levels of investment that were evaluated as part of this study.

Levels of Investment



1) Implement Broadband Friendly Policies and Ordinances and Smart Conduit Construction to Gain Assets and Attract Partners



2) Connect City Government and Smart City Applications



3) Connect other Key Community Anchor Institutions



4) Connect Homes and Businesses with Fiber through a Public-Private Partnership or through offering Broadband as a Service



5) Further Evaluate Working with Existing Providers to Improve their Services (Comcast, CenturyLink)

Based upon the initial findings of the broadband plan, NEO and staff recommended the first three levels of investment be considered for implementation regardless of the approach taken for a Gigabit broadband strategy to connect homes and businesses. The first three recommendations will facilitate and lower the costs for broadband implementation and lay the foundation for improving broadband infrastructure within both communities.

Connecting city government locations (water monitoring systems, public safety and other government buildings), smart city applications (traffic lights and parking meters) and key community anchor institutions (i.e. hospitals, schools, and universities) with fiber will greatly enhance communications and broadband speeds for these locations, while dramatically reducing communications costs. While these key facilities are being connected with fiber, both communities will gain more fiber assets that can be leveraged for building out to neighborhoods to connect homes and businesses with fiber. Implementing a shadow conduit/dig once policy will allow the City/Town to facilitate further broadband development by reducing the costs of broadband expansion, by leveraging existing public works or construction by other entities.

All of these first three levels of investment will improve communications for applications that will be needed regardless of whether or how the City/Town moves forward with a more ubiquitous Gigabit broadband strategy. Additionally, these strategies will lower the overall cost of further expansion and will provide assets (conduit and fiber) for the City/Town to use as leverage to potentially negotiate a public-private partnership for further expansion.

NEO and staff recommended further investigation into how to implement a ubiquitous Gigabit broadband strategy for homes and businesses be further evaluated (item #4 and #5 above under Levels of Investment.) This would include weighing the pros and cons of various public-private partnership models or providing broadband services directly to citizens and businesses or working with the incumbent providers Comcast and CenturyLink to improve their availability of Gigabit broadband services.

The purpose of this report is to provide the financial implications and considerations for implementation of connecting homes and businesses with fiber (i.e. Level 4). Details are still being gathered regarding working with the incumbent or existing service providers to encourage further expansion and development of their services (i.e. Level 5).

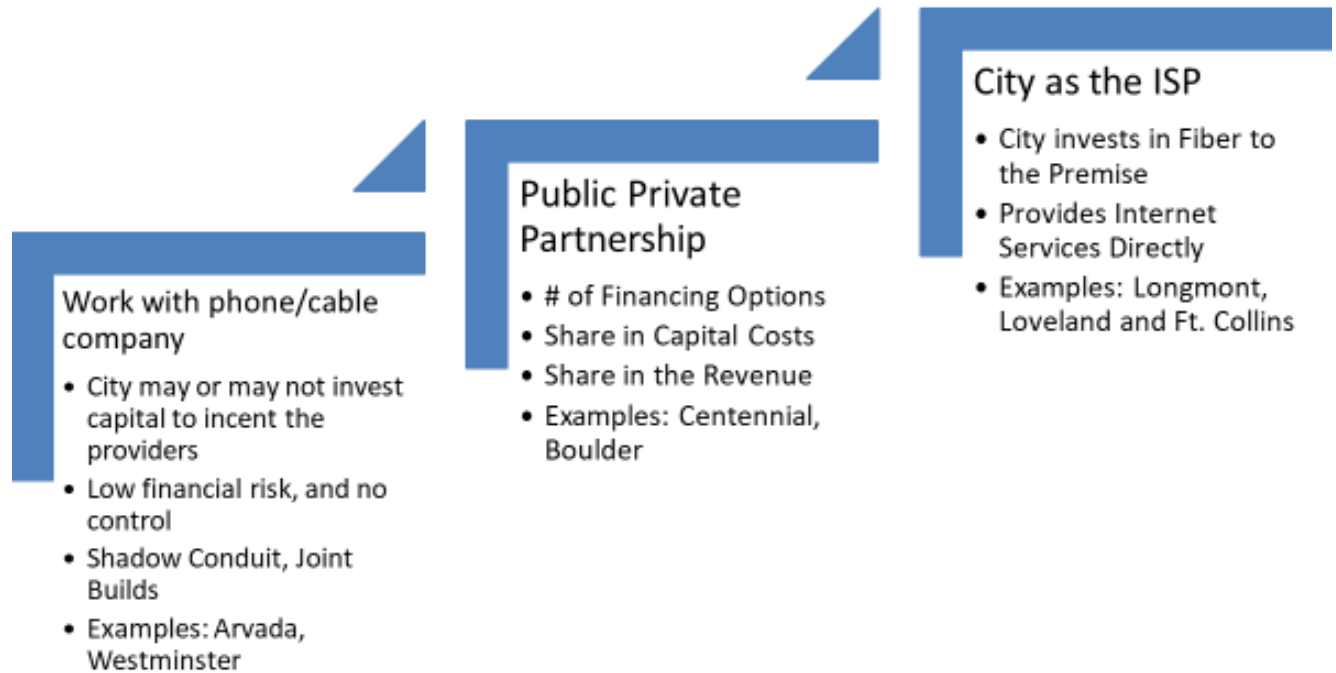
Models Included in this Report

There are a number of things to consider when pursuing a municipal-led Gigabit broadband strategy. The most ambitious strategy is to have the municipality design and build a fiber optic network to every home and business and to offer services directly as an Internet Service Provider (ISP). This is often referred to as a “Retail Model,” whereby the municipality provides services directly to end users, or simply the “City as an ISP.”

The municipality could consider designing and building the fiber infrastructure and entering into an agreement with a private company to use the network to provide services to end users. This approach is sometimes referred to as a “Wholesale Model,” or as a “Public-Private Partnership.” In some cases, the network is available to many private providers to provide services and is available on an “Open Access” basis.

Here is a summary of the various approaches discussed within this report.

MODELS TO CONSIDER



Financial, operational and political risk increases with each “step up”
Control also increases with each “step up”

There are several types of public-private partnerships and there are several variations of having the City as an ISP. This report will discuss the financial framework of these options, but as there are a number of variables that can be negotiated and implemented, this report is meant to provide a number of options to be considered and cannot address all of the options that may be implemented.

As mentioned above, NEO and City/Town staff will continue to work with the existing phone and cable companies that are currently providing services within both communities. Comcast has stated that it offers Gigabit services throughout the community; however, based upon NEO's initial findings and results from speed tests and input from citizens, there appears to be gaps in areas that are served with this speed.

As of the date of this report, neither Comcast or CenturyLink have provided enough detail regarding where their existing networks are located and where within each City/Town they provide various service levels. The City/Town will continue to work with both incumbent providers to better understand how the City/Town could facilitate further expansion of their Gigabit service offerings.

Understanding the Capital Costs of Building a Fiber to the Premise Network

NEO's team put together preliminary design and projected capital cost estimates for building a Fiber to the Premise (FTTP) network that is capable of handling symmetrical Gigabit broadband speeds. Our team separated both communities into sections of approximately 1,000 units each. We assumed there would be a primary network operation center that would house the equipment to "light up" the fiber in each community. Secondary network operation centers would potentially be added for redundancy after each community reached a critical mass of customers.

Most Fiber to the Premise networks use a Gigabit Passive Optical Network (GPON) architecture with active connections to large businesses, mission critical and/or government locations. The terms "active" or "passive" simply refers to whether there are electronics that are powered in the field or between the network operations center and the home or business. With an "active" architecture, electronic equipment that is deployed throughout the community will need to have power. With a "passive" architecture, there are no electronics located between the network operations center and the home or business.

NEO's team provided preliminary capital costs to connect government facilities, smart city applications, SCADA systems and other key anchor institutions. If fiber is built to these locations, much of the backbone fiber optic architecture would be in place. For purposes of this report, the capital costs shown do not reflect the assumption that these key anchor institutions and government locations have had fiber built to them. If the City/Town builds to these locations first, then the capital costs reflected in this report would be lower.

Additionally, NEO mapped existing fiber and conduit facilities currently built within both communities. If the existing fiber and conduit are used, there would be additional capital cost savings that could be realized. This report used the worst-case scenario of needing to build the Fiber to the Premise network without the use of existing fiber or conduit.

Building Fiber to the Businesses Only

Some communities place an emphasis on building fiber to their businesses first or only and decide not to build to all of the homes and residential locations.

Below are the capital cost projections for building fiber to the City/Town's businesses. The estimate below assumes 30% of the businesses will take a service from the network.

Greeley - FTTP Construction Costs						
		Cost per Mile		Extended Cost		Total
		Labor	Material	Labor	Material	
Fiber to the Premise	Rt Miles					
Ring	15.1	\$ 120,718	\$ 24,176	\$ 1,822,842	\$ 365,058	\$ 2,187,899.4
InterConnect between Windsor and Greeley	5.7	\$ 120,718	\$ 24,176	\$ 688,093	\$ 137,803	\$ 825,895.8
FTTP Distribution	510	\$ 120,718	\$ 24,176	\$ 61,566,180	\$ 12,329,760	\$ 73,895,940
Service Entrances						
Residential - 4 Fiber Drop	0	\$ 735.00	\$ 138.00	\$ -	\$ -	\$ -
MDU - 12 Fiber Drop	0	\$ 2,036.00	\$ 237.00	\$ -	\$ -	\$ -
Business						
4 Fiber Drops	1020	\$ 735.00	\$ 138.00	\$ 749,700	\$ 140,760	\$ 890,460
12 Fiber Drop	113	\$ 2,036.00	\$ 237.00	\$ 230,068	\$ 26,781	\$ 256,849
Other - 4 Fiber Drop	0	\$ 735.00	\$ 138.00	\$ -	\$ -	\$ -
Outside Plant Total				\$ 65,056,882	\$ 13,000,162	\$ 78,057,044
Final Design and Engineering						\$ 11,708,557
Total With Engineering						\$ 89,765,601

The above costs do not include costs for equipment. With equipment, the following capital costs would apply to build to all of the businesses with a 30% take rate percentage.

Summary, Greeley Fiber to the Business Capital Costs			
Take Rate Percentages	Total Construction Costs	Total Equipment Costs	Total Capital Costs
30%	\$ 89,765,601	\$ 6,078,049	\$ 95,843,650

Windsor - FTTP Construction Costs						
		Cost per Mile		Extended Cost		Total
		Labor	Material	Labor	Material	
Fiber to the Premise	Rt Miles					
Ring	11.7	\$ 120,718	\$ 24,176	\$ 1,412,401	\$ 282,859	\$ 1,695,260
InterConnect	5.7	\$ 120,718	\$ 24,176	\$ 688,093	\$ 137,803	\$ 825,896
FTTP Distribution	214.1	\$ 120,718	\$ 24,176	\$ 25,845,724	\$ 5,176,082	\$ 31,021,806
Service Entrances						
Residential - 4 Fiber Drop	0	\$ 735.00	\$ 138.00	\$ -	\$ -	\$ -
MDU - 12 Fiber Drop	0	\$ 2,036.00	\$ 237.00	\$ -	\$ -	\$ -
Business						
4 Fiber Drops	170	\$ 735.00	\$ 138.00	\$ 124,950	\$ 23,460	\$ 148,410
12 Fiber Drop	19	\$ 2,036.00	\$ 237.00	\$ 38,684	\$ 4,503	\$ 43,187
Other - 4 Fiber Drop	0	\$ 735.00	\$ 138.00	\$ -	\$ -	\$ -
Project Total				\$ 28,109,851	\$ 5,624,707	\$ 33,734,559
Engineering						\$ 5,060,184
Total With Engineering						\$ 38,794,742

The above costs do not include costs for equipment. With equipment, the following capital costs would apply to build to all of the businesses with a 30% take rate percentage.

Summary, Windsor Fiber to the Business Capital Costs			
Take Rate Percentages	Total Construction Costs	Total Equipment Costs	Total Capital Costs
30%	\$ 38,794,742	\$ 2,133,346	\$ 40,928,088

Many municipalities consider building to the businesses first and then after the major fiber backbones are in place, consider building to the neighborhoods, homes and residential locations. As more students need to access cloud-based services for homework, and as more people are telecommuting or starting a business and working from home, most municipalities have determined that building to just the businesses or placing a priority on building to businesses over homes does not serve their constituents. Therefore, this report will focus on the models for including building out to both businesses and to residential locations.

Building Fiber to the Businesses and to the Homes

The most ambitious strategy for a municipality to consider is the opportunity to connect all homes and businesses with fiber. More challenging geographies are sometimes forced to utilize wireless technologies to deliver service with a hybrid fiber/wireless network. NEO did not assume use of wireless technologies in its preliminary design.

Capital costs will increase when the market share or take rate percentage increases. Capital cost expenditures occur to “pass” each parcel with fiber and then occur again when the home or business takes services or the fiber is “lit.” With increased take rate percentages, the additional capital costs to “light” a home or business include building fiber from the street to the building, the electronic that are installed on the outside of the home/business and the splicing, test and turn-up of the services.

Below are the projected capital costs with various take rate percentages for connecting both homes and businesses.

Summary, Greeley Fiber to the Premise Capital Costs			
Take Rate Percentages	Total Construction Costs	Total Equipment Costs	Total Capital Costs
10%	\$ 91,877,838	\$ 7,438,297	\$ 99,316,135
20%	\$ 95,308,477	\$ 9,475,631	\$ 104,784,107
30%	\$ 98,737,505	\$ 11,803,153	\$ 110,540,658
40%	\$ 102,168,144	\$ 14,006,794	\$ 116,174,938
50%	\$ 105,603,404	\$ 16,097,703	\$ 121,701,107
60%	\$ 109,034,043	\$ 18,535,591	\$ 127,569,634

Summary, Windsor Fiber to the Premise Capital Costs			
Take Rate Percentages	Total Construction Costs	Total Equipment Costs	Total Capital Costs
10%	\$ 39,685,019	\$ 2,336,684	\$ 42,021,704
20%	\$ 40,797,243	\$ 2,579,875	\$ 43,377,118
30%	\$ 41,906,853	\$ 2,846,086	\$ 44,752,939
40%	\$ 43,016,463	\$ 3,093,389	\$ 46,109,851
50%	\$ 44,129,690	\$ 3,357,522	\$ 47,487,212
60%	\$ 45,238,296	\$ 3,711,603	\$ 48,949,899

Most of the business models seem to work when the take rate percentage reaches 25 – 40%. Therefore, to provide more detail on the above capital costs, NEO has used the assumption of a take rate of 30%. With a 30% take rate, the following assumptions for the number of residential, business and multi-dwelling units (MDU) apply. The total passed include the total number of parcels within each community. A 30% take rate shows then shows the number of units taking services or lit.

Number of Parcels, Passed and Lit – Greeley

Parcel Types	Total Passed	Take Rate	Total Lit
Residential	28,221	30%	8,467
Business	3,777	30%	1,134
Other	146	30%	44
MDU	7,840	30%	2,352
Total	39,984		11,997

Below are the construction costs of the fiber materials and construction.

Greeley - FTTP Construction Costs						
		Cost per Mile		Extended Cost		Total
		Labor	Material	Labor	Material	
Fiber to the Premise	Rt Miles					
Ring	15.1	\$ 120,718	\$ 24,176	\$ 1,822,842	\$ 365,058	\$ 2,187,899.4
InterConnect between Windsor and Greeley	5.7	\$ 120,718	\$ 24,176	\$ 688,093	\$ 137,803	\$ 825,895.8
FTTP Distribution	510	\$ 120,718	\$ 24,176	\$ 61,566,180	\$ 12,329,760	\$ 73,895,940
Service Entrances						
Residential - 4 Fiber Drop	8463	\$ 735.00	\$ 138.00	\$ 6,220,305	\$ 1,167,894	\$ 7,388,199
MDU - 12 Fiber Drop	165	\$ 2,036.00	\$ 237.00	\$ 335,940	\$ 39,105	\$ 375,045
Business						
4 Fiber Drops	1020	\$ 735.00	\$ 138.00	\$ 749,700	\$ 140,760	\$ 890,460
12 Fiber Drop	113	\$ 2,036.00	\$ 237.00	\$ 230,068	\$ 26,781	\$ 256,849
Other - 4 Fiber Drop	44	\$ 735.00	\$ 138.00	\$ 32,340	\$ 6,072	\$ 38,412
Outside Plant Total				\$ 71,645,467	\$ 14,213,233	\$ 85,858,700
Final Design and Engineering						\$ 12,878,805
Total With Engineering						\$ 98,737,505

Below are the estimates capital costs for the equipment to light the network with a 30% take rate assumption.

Greeley, CO										
Opinion of Cost Summary										
Node	Labor	Material	TOTAL	Residential	Business	Other	Residential	Business	Other	
NOC 1 (V)	\$ 31,430	\$ 415,007	\$ 446,437	243	33	2	807	108	5	
C	\$ 6,000	\$ 136,740	\$ 142,740	243	33	2	807	108	5	
D	\$ 6,000	\$ 136,740	\$ 142,740	243	33	2	807	108	5	
W	\$ 6,000	\$ 136,740	\$ 142,740	243	33	2	807	108	5	
U	\$ 6,000	\$ 136,740	\$ 142,740	243	33	2	807	108	5	
Y	\$ 6,000	\$ 136,740	\$ 142,740	243	33	2	807	108	5	
Z	\$ 6,000	\$ 136,740	\$ 142,740	243	33	2	807	108	5	
NOC 2 (AB)	\$ 31,430	\$ 415,007	\$ 446,437	243	33	2	807	108	5	
11th Ave	\$ 6,000	\$ 136,740	\$ 142,740	243	33	2	807	108	5	
L	\$ 6,000	\$ 136,740	\$ 142,740	243	33	2	807	108	5	
M	\$ 6,000	\$ 136,740	\$ 142,740	243	33	2	807	108	5	
T	\$ 6,000	\$ 136,740	\$ 142,740	243	33	2	807	108	5	
AC	\$ 6,000	\$ 136,740	\$ 142,740	243	33	2	807	108	5	
AE	\$ 6,000	\$ 136,740	\$ 142,740	243	33	2	807	108	5	
			\$ -							
NOC 3 (AF)	\$ 31,430	\$ 390,442	\$ 421,872	189	26	2	628	84	4	
E	\$ 6,000	\$ 112,720	\$ 118,720	189	26	2	628	84	4	
F	\$ 6,000	\$ 112,720	\$ 118,720	189	26	2	628	84	4	
H	\$ 6,000	\$ 112,720	\$ 118,720	189	26	2	628	84	4	
J	\$ 6,000	\$ 112,720	\$ 118,720	189	26	2	628	84	4	
N	\$ 6,000	\$ 112,720	\$ 118,720	189	26	2	628	84	4	
AG	\$ 6,000	\$ 112,720	\$ 118,720	189	26	2	628	84	4	
AH	\$ 6,000	\$ 112,720	\$ 118,720	189	26	2	628	84	4	
AI	\$ 6,000	\$ 112,720	\$ 118,720	189	26	2	628	84	4	
NOC 4 (K)	\$ 31,430	\$ 397,265	\$ 428,695	212	29	2	706	95	4	
G	\$ 6,000	\$ 119,309	\$ 125,309	212	29	2	706	95	4	
O	\$ 6,000	\$ 119,309	\$ 125,309	212	29	2	706	95	4	
P	\$ 6,000	\$ 119,309	\$ 125,309	212	29	2	706	95	4	
Q	\$ 6,000	\$ 119,309	\$ 125,309	212	29	2	706	95	4	
S	\$ 6,000	\$ 119,309	\$ 125,309	212	29	2	706	95	4	
AJ	\$ 6,000	\$ 119,309	\$ 125,309	212	29	2	706	95	4	
AK	\$ 6,000	\$ 119,309	\$ 125,309	212	29	2	706	95	4	
NOC 5 (24th St)	\$ 31,430	\$ 415,007	\$ 446,437	243	33	2	807	108	5	
65th Ave	\$ 6,000	\$ 136,740	\$ 142,740	243	33	2	807	108	5	
Creekview	\$ 6,000	\$ 136,740	\$ 142,740	243	33	2	807	108	5	
74th Ave	\$ 6,000	\$ 136,740	\$ 142,740	243	33	2	807	108	5	
A	\$ 6,000	\$ 136,740	\$ 142,740	243	33	2	807	108	5	
R	\$ 6,000	\$ 136,740	\$ 142,740	243	33	2	807	108	5	
X	\$ 6,000	\$ 136,740	\$ 142,740	243	33	2	807	108	5	
	\$ 355,150	\$ 6,230,969	\$ 6,586,119	8,500	1,159	76				
MDU TOTAL	\$ 1,465,850	\$ 949,549	\$ 2,415,399		2,352			7,840		
				15,299	4,439	138	0	22,598	10,868	138
Spares	\$ -	\$ 123,350	\$ 123,350							
Software Tech. Assistance	\$ 334,306	\$ -	\$ 334,306							
BITS Clock	\$ -	\$ 26,750	\$ 26,750							
Transport	\$ 23,000	\$ 82,439	\$ 105,439							
Subtotal	\$ 2,208,306	\$ 8,055,305	\$ 10,263,611							
Engineering	\$ 331,246	\$ 1,208,296	\$ 1,539,542							
Grand Total	\$ 2,539,552	\$ 9,263,601	\$ 11,803,153							

Therefore, for Greeley, the total construction costs of \$98.7 Million and \$11.803 Million in equipment costs result in a total estimated capital cost of \$110.5 Million for a take rate percentage of 30%.

For the Town of Windsor, the following assumptions were used:

Number of Parcels, Passed and Lit – Windsor

Parcel Types	Total Passed	Take Rate	Total Lit
Residential	10,125	30%	3,038
Business	631	30%	189
Other	49	30%	15
MDU	666	30%	200
Total	11,471		3,441

Below are the construction costs of the fiber materials and construction.

Windsor - FTTP Construction Costs						
		Cost per Mile		Extended Cost		
		Labor	Material	Labor	Material	Total
Fiber to the Premise	Rt Miles					
Ring	11.7	\$ 120,718	\$ 24,176	\$ 1,412,401	\$ 282,859	\$ 1,695,260
InterConnect	5.7	\$ 120,718	\$ 24,176	\$ 688,093	\$ 137,803	\$ 825,896
FTTP Distribution	214.1	\$ 120,718	\$ 24,176	\$ 25,845,724	\$ 5,176,082	\$ 31,021,806
Service Entrances						
Residential - 4 Fiber Drop	3038	\$ 735.00	\$ 138.00	\$ 2,232,930	\$ 419,244	\$ 2,652,174
MDU - 12 Fiber Drop	18	\$ 2,036.00	\$ 237.00	\$ 36,648	\$ 4,266	\$ 40,914
Business						
4 Fiber Drops	170	\$ 735.00	\$ 138.00	\$ 124,950	\$ 23,460	\$ 148,410
12 Fiber Drop	19	\$ 2,036.00	\$ 237.00	\$ 38,684	\$ 4,503	\$ 43,187
Other - 4 Fiber Drop	15	\$ 735.00	\$ 138.00	\$ 11,025	\$ 2,070	\$ 13,095
Project Total				\$ 30,390,454	\$ 6,050,287	\$ 36,440,742
Engineering						\$ 5,466,111
Total With Engineering						\$ 41,906,853

Below are the estimates capital costs for the equipment to light the network with a 30% take rate assumption.

				Windsor, CO						
				Opinion of Cost Summary						
Node	Labor	Material	TOTAL							
				Residential	Business	Other	Residential	Business	Other	
NOC 1 (M)	\$ 31,430.00	\$ 437,047.88	\$ 468,477.88	224	15	1	746	47	3	
H	\$ 6,000.00	\$ 149,717.42	\$ 155,717.42	241	15	1	803	50	3	
I	\$ 6,000.00	\$ 162,762.17	\$ 168,762.17	256	16	2	852	52	4	
J	\$ 6,000.00	\$ 168,388.17	\$ 174,388.17	267	17	2	888	55	4	
K	\$ 6,000.00	\$ 171,172.17	\$ 177,172.17	277	18	2	921	57	4	
L	\$ 6,000.00	\$ 174,470.17	\$ 180,470.17	294	18	2	978	60	5	
N	\$ 6,000.00	\$ 168,388.17	\$ 174,388.17	239	15	2	794	50	4	
P	\$ 6,000.00	\$ 103,471.42	\$ 109,471.42	42	3	1	137	10	2	
NOC 2 (D)	\$ 31,430.00	\$ 410,453.68	\$ 441,883.68	123	8	1	408	25	2	
A	\$ 6,000.00	\$ 164,314.17	\$ 170,314.17	247	16	2	821	51	4	
B	\$ 6,000.00	\$ 165,672.17	\$ 171,672.17	254	16	2	845	52	4	
E	\$ 6,000.00	\$ 140,116.42	\$ 146,116.42	192	13	1	637	41	3	
F	\$ 6,000.00	\$ 125,042.42	\$ 131,042.42	126	8	1	417	26	3	
G	\$ 6,000.00	\$ 167,806.17	\$ 173,806.17	264	17	2	878	55	4	
	61,430	1,173,405	1,234,835	3,046	195	22	10,125	631	49	
MDU TOTAL	\$ 108,500.00	\$ 61,791.00	\$ 170,291.00		200			666		
				4,252	473	31	0	14,131	1,547	69
Spares	\$ -	\$ 123,349.72	\$ 123,349.72							
Software Tech. Assistance	\$ 334,306.00	\$ -	\$ 334,306.00							
BITS Clock	\$ -	\$ 26,750.00	\$ 26,750.00							
Transport	\$ 23,000.00	\$ 82,439.19	\$ 105,439.19							
Subtotal	\$ 545,236.00	\$ 1,929,621.70	\$ 2,474,857.70							
Engineering	\$ 81,785.40	\$ 289,443.26	\$ 371,228.66							
Grand Total	\$ 627,021.40	\$ 2,219,064.96	\$ 2,846,086.36							

For Windsor, the total construction costs of \$41.9 Million and \$2.846 Million in equipment costs result in a total estimated capital cost of \$44.572 Million for a take rate percentage of 30%.

Retail and Wholesale Models - What Capital Costs Apply

As mentioned, there are a number of models to finance, design, construct and operate a Fiber to the Premise network. The Retail Model, or when the City is the ISP, the City is responsible for the design, engineering, and all of the capital costs to build the network and capital costs to operate the network. This model and the financial considerations are discussed in detail below. When the City takes the approach of a Wholesale Model or a Public Private Partnership, the capital costs are shared, as are the revenues. In most cases, the service provider pays for the capital costs of the equipment, and in some cases, the service provider also pays for the capital costs for fiber within neighborhoods or the fiber from the pedestal in front of the home or business to the building. Again, this is discussed in detail below.

For Greeley, here is a summary of the estimated capital costs that would apply for each model.

Summary of Capital Costs, Greeley	
Model	Estimated Capital Costs
Work with the Existing Phone/Cable Companies	Negotiable
Wholesale, PPP, Fiber Backbone Only, No Drops or Equipment	\$76 Million
Wholesale, PPP, Fiber Infrastructure, No Equipment	\$95 - \$109 Million
Retail, City as an ISP	\$104 - \$127 Million

The following estimated capital costs would apply for Windsor:

Summary of Capital Costs, Windsor	
Model	Estimated Capital Costs
Work with the Existing Phone/Cable Companies	Negotiable
Wholesale, PPP, Fiber Backbone Only, No Drops or Equipment	\$33.5 Million
Wholesale, PPP, Fiber Infrastructure, No Equipment	\$40.7 - \$45.2 Million
Retail, City as an ISP	\$43.3 - \$48.9 Million

It should be noted that the capital costs required for the Wholesale, PPP models may be lower than what is shown above. In negotiating various potential partnerships, the City/Town may be able to provide a fiber ring throughout the community in exchange for entering into a PPP. The negotiations may also include the interconnection between Greeley and Windsor to be paid by the City/Town. Or the partnership might be for the City/Town to provide fiber to the potential partner on the network contemplated to further connect City/Town offices and anchor institutions. In order to narrow these options and the potential capital costs, the City/Town may need to do further negotiation and/or exploration with private providers.

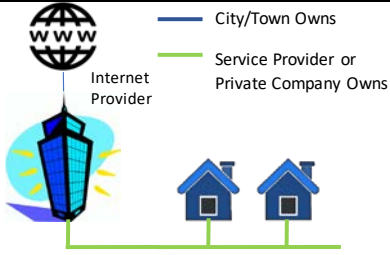
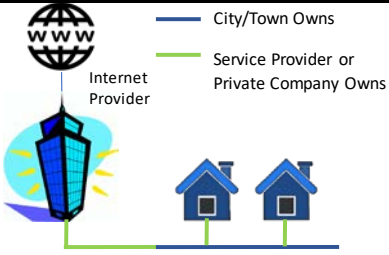
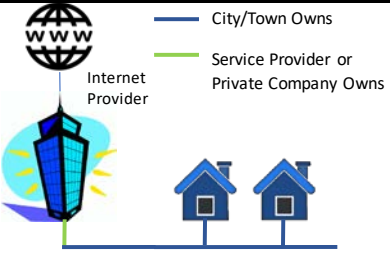
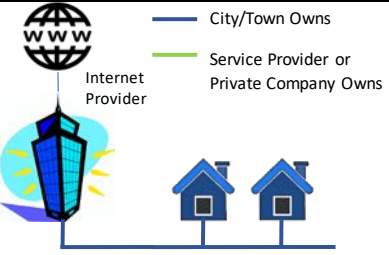
Details and Considerations of Each Model

To aid the reader's understanding of the information below, a few key terms are defined:

- **Backbone** is a redundant network of conduit and fiber rings that supports a citywide FTTP network and could also be used to connect unserved City/Town sites. Its design would be developed with sufficient capacity and distribution throughout the City/Town to support the future Internet of Things, and sensor-based (Smart City) analytic infrastructures in key. The backbone is an essential part of any fiber network and the preliminary design for both communities includes a ring within each City/Town, the interconnection between Greeley and Windsor and the FTTP Distribution – or fiber extended to the neighborhoods.

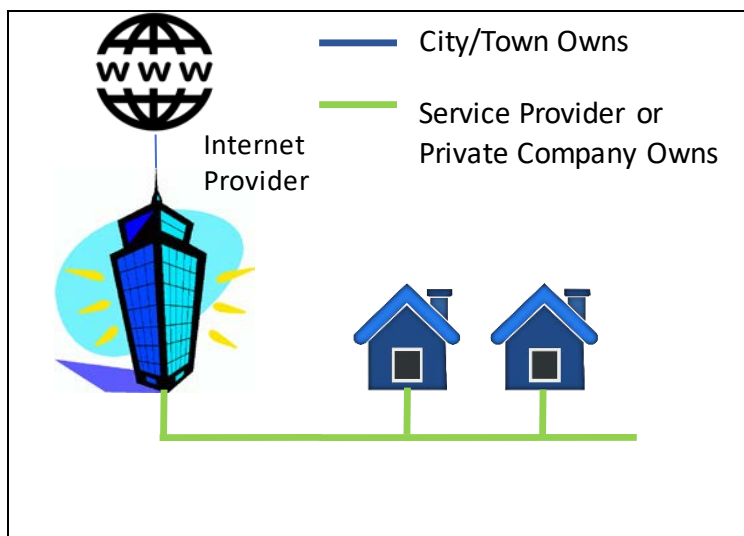
- **Outside plant (OSP)** fiber construction is the cost of installing fiber, including materials and labor.
- **Nodes (Hubs) and NOCs (Core) sites** are physical locations where the network physically interconnects with the wider Internet, and where equipment connects the various parts of the fiber network together. A Node or a Hub site is typically located out near neighborhoods. The Network Operations Center (NOC) or Core sites are primary locations that connect the Nodes and/or Hub sites.
- **Network electronics** are the equipment necessary to control and route the data being transmitted over the network.
- **Service Entrances, or Subscriber Activation Costs** include cost for the physical drop, or fiber connection from the street to the home or business, as well as the equipment necessary to allow a user to connect devices to the Internet.

Below is a summary of each of the models.

				
		PUBLIC PRIVATE PARTNERSHIPS		
	WORK WITH THE EXISTING PHONE/CABLE COMPANIES	WHOLESALE, CITY OWNS FIBER BACKBONE NETWORK	WHOLESALE, CITY OWNS ALL FIBER	RETAIL MODEL, CITY as an ISP
DESCRIPTION	The City/Town would work with the existing incumbent providers or another private company who would develop a broadband network and provide highspeed internet service. The private provider would construct and operate the network with private capital; the City/Town may or may not provide a subsidy.	The City/Town invest in a portion of useful infrastructure (conduit and fiber) to serve as a backbone for a communications network and then would select a private company to partner with to develop a broadband network and provide high speed internet service	The City/Town would finance and build a fiber broadband network, and then lease the network to one or more internet service providers and entities to utilize the infrastructure.	The City/Town would finance and build a fiber broadband network and begin to provide retail internet service through a new service within the City/Town government
INFRASTRUCTURE OWNER	Backbone: Private Distribution: Private Electronics: Private	Backbone: City Distribution: Private Electronics: Private	Backbone: City Distribution: City Electronics: Private Company	Backbone: City Distribution: City Electronics: City
SERVICE PROVIDER	Private Company or the Existing Provider	Private Company	Private Company	City/Town
ORGANIZATIONAL IMPLICATIONS TO CITY/TOWN	Little Risk	Low Risk	High Risk	Highest Risk
	* No additional staffing or facility implications	* Minor staffing implications during construction; No facility implications	* probable staffing implications to manage network and 3	* Staffing implications to run new broadband service and network
	* Risk if the private partner or incumbent provider does not perform			* Requires facilities for administration and operations
FINANCIAL IMPLICATIONS OR CONSIDERATIONS	Very Low * City would likely negotiate a first right of refusal upon sale	Low * \$76M (Greeley) \$33.5M (Windsor) Capital cost to construct and maintain backbone, City/Town would likely negotiate a first right of refusal upon sale for remainder	Medium * \$95-109M (Greeley) \$40.7-45.2M (Windsor) Capital costs to construct and maintain network	High * \$104-\$127M (Greeley) \$43-49M (Windsor) Capital Costs to design, construct, maintain and operate network and customer service
CONTROL	Almost No Control	Less Control	Some Control	High Control
	* Price: Set by private provider	* Price: Set by private provider	* Price: May be negotiated with private provider	* Price: Set by City
	* Speed: Set by private provider	* Speed: Set by private provider	* Speed: May be negotiated with private provider	* Speed: Set by City
ABILITY TO MEET OBJECTIVES	Does Not Meet	Modest	Mixed	Very High
	* Citywide Access: Not guaranteed	* Citywide Access: Not guaranteed	* Citywide Access: Yes	* Citywide Access: Yes
	* Equitable and Inclusive: Not guaranteed	* Equitable and Inclusive: Not guaranteed	* Equitable and Inclusive: Likely	* Equitable and Inclusive: Yes
EXAMPLES OF OTHER CITIES/TOWNS	Arvada, CO	Holly Spring, NC (Ting)	Westminster, MD	Longmont, CO
	Westminster, CO	Centennial, CO (Ting)	Huntsville, AL	Ft. Collins, CO
	Kansas City, KS, MO	Boulder, CO		Loveland, CO
	Lincoln, NE	Urbana-Champaign, IL (13)		Wilson, NC
				Salisbury, NC

Work with the Existing Phone and Cable Providers or Other Private Providers

At the time this report was written, neither Comcast or CenturyLink have provided enough information to substantially discuss this option. As discussed in the first report, Comcast has indicated that it offers Gigabit services throughout both Greeley and Windsor. This has not yet confirmed, nor has Comcast provided maps of their existing fiber and service availability. CenturyLink states that Gigabit services are available within select areas of both communities. City/Town staff and NEO Connect will continue to meet with the incumbent existing providers to better understand their service offerings and service availability.



In this approach, the City/Town would work with the existing incumbent providers or another private company who would develop a broadband network and provide highspeed internet service. The private provider would construct and operate the network with private capital; the City/Town may or may not provide a subsidy, or may or may not work with the providers to extend their networks, share in the capital costs of various build options or provide City/Town

owned fiber to the service providers as an incentive.

In other communities, the municipality has worked with the existing providers by sharing in the capital costs to build or extend their networks into neighborhoods that do not yet have service. In some cases, the municipality provides access to its dark fiber or conduit to the existing providers and vice versa. In some instances, there are shared or reduced capital costs for infrastructure build out through implementation of broadband friendly policies and ordinances. These have been discussed in detail in the Roadmap report.

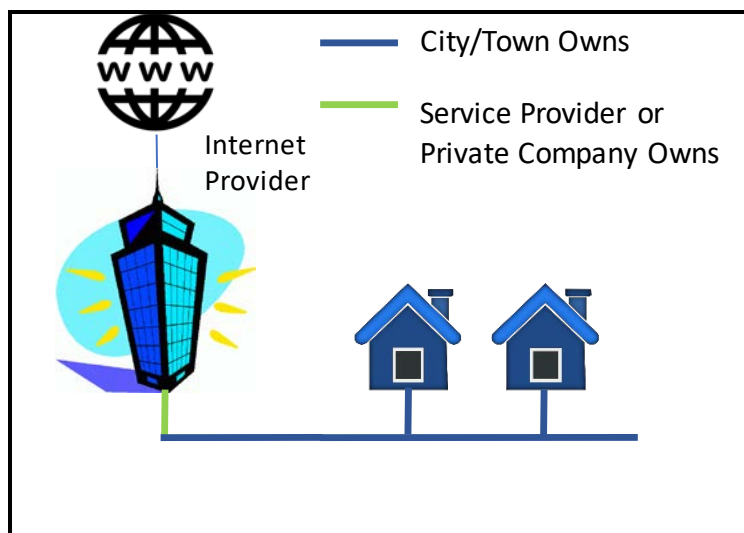
In this model, there is little operational or financial risk to the City/Town and little impact to the City/Town's staffing or use of facilities. The primary executional risk to this model is that the City/Town has little to no control over where network is built, what services are offered and what price is available to the citizens. Pricing, speeds, customer service requirements and coverage or service availability is decided by the private provider, with very little to no input or control from the City/Town.

With this model, the City/Town has little to no control over whether or not Net Neutrality rules are followed.

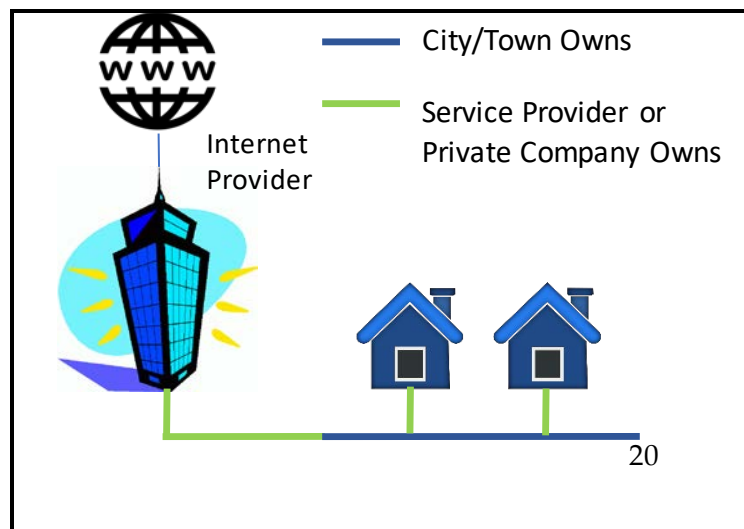
Communities that have used this approach include the City of Arvada and the City of Westminster, CO. Additionally, Kansas City, KS and Kansas City, MO have worked with Google Fiber to roll out Gigabit services to their constituents. Critics of Google Fiber's Kansas City implementation state that Google has selected more affluent neighborhoods to build their FTTP networks and is slow to build out the remaining community. Proponents of this approach highlight the low risk, both operationally and financially, for the municipality.

Wholesale Model or Public Private Partnership, Shared Capital Costs and Shared Revenue

As discussed, there are several flavors of the wholesale model or the public private partnership approach. Municipalities can take several approaches with this model, owning the fiber only or owning the fiber and the equipment it takes for it to run or be "lit." Fiber optic cable that does not have equipment on the ends of it is referred to as "dark" fiber. Fiber optic cable that has equipment in place is referred to as "lit" fiber.



In some of the recent wholesale models or public private partnerships, the municipality absorbs the capital costs to build the fiber distribution network. Sometimes this also includes the municipality paying for the capital costs to build fiber to the neighborhoods, and even for the fiber from the street to the home or business.



In other examples, the City/Town pays for a ring around the community, or potentially the fiber into various neighborhoods. As discussed, the extent to which the City/Town is responsible is based upon what can be negotiated. The capital costs provided within this report include a breakdown of

the costs for the ring, interconnection between Greeley and Windsor, the fiber distribution network and the costs for extending the fiber into the homes/businesses, as well as the equipment costs.

In most cases, the service provider pays for the equipment at the network operations center and the equipment to light the customer.

Whether the municipality provides dark or lit fiber, the wholesale model assumes at least one and possibly multiple service providers are available to provide Internet services. The municipality owns the network, and in some cases, the equipment to light the network, and the service provider(s) pay a lease fee to the municipality in the form of a monthly payment or in the form of a revenue share, a percentage of the gross revenues generated by service fees on the network.

This ownership by a municipality, run by a private entity approach is nothing new; it has been prevalent for decades with toll roads that are managed privately. What is a new and emerging trend, is communities funding a network and turning it over to a traditional carrier to manage and operate the network.

As part of the Northwest Colorado Regional Broadband Strategic Plan effort, Rio Blanco County identified that broadband service in the County was inadequate to sustain 21st century economic development. Rio Blanco County is deploying a wholesale Fiber to the Premise model. In 2014, Rio Blanco County voted to opt out of SB 152 and reclaimed their local telecommunications authority. Shortly after opting out, Rio Blanco received grant funding with the Colorado Department of Local Affairs (DOLA) to build out the network. The County and some of the local community anchor institutions are providing the match funding required by the grant. The County is building fiber infrastructure to the block in Rangely and Meeker and service providers will finish the build-out to each home or business. In the more rural parts of the county, subscribers will be served by wireless infrastructure and technologies.

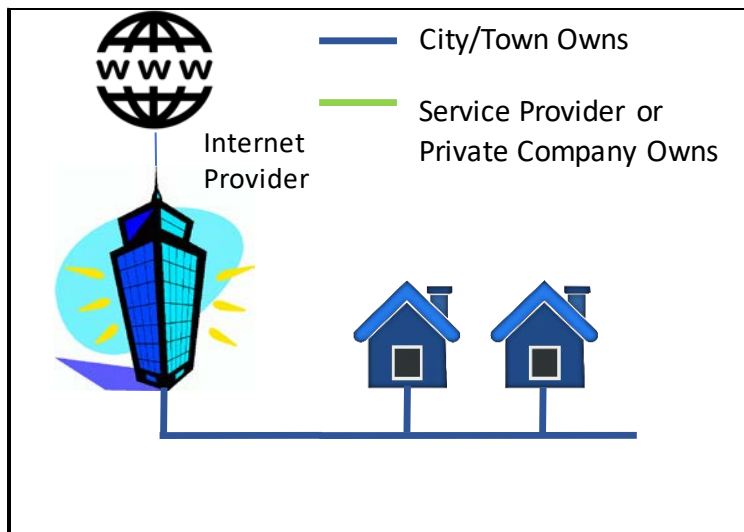
Subscribers have the option to choose between two providers which are offering services on Rio Blanco's network. Local Access Internet (LAI) and Cimarron Telecommunications are offering symmetrical Gigabit Internet access (1,000 Mbps or 1 Gbps) for \$70 per month.

Depending upon the level of investment required by the City/Town to enter into a PPP, the operational and financial risk can be low to medium, resulting in some staffing required and potentially use of City/Town facilities.

Although the City/Town has some control, the City/Town then potentially has leverage to contractually negotiate pricing, availability, customer service requirements, build-out requirements and Net Neutrality provisions.

Retail Model, the City as an ISP

In this model, the municipality designs, builds, owns and operates the network, and essentially becomes the Internet Service Provider.



The City/Town would finance and build a fiber broadband network and begin to provide retail internet service through a new service within the City/Town government.

Most municipalities that have deployed a retail, Fiber to the Premise strategy have been providing electric services to their constituents. Municipal electric utilities have an easier implementation path because they already have the access to utility

poles and other infrastructure, billing processes in place, customer service centers operational, and business relationships with each and every homeowner and business.

Regardless of whether the municipality also provides electric service to their constituents, there is an increasingly prevalent case for investing in building municipal broadband being made by advocates defining the Internet as a “utility” and thus a necessity for the public sector to provide when otherwise unavailable. This implies that the municipality may consider charging a utility fee for this service, whether the home or business contracts for broadband services or not. The “utility” concept also could potentially charge tap fees or installation fees similar to water/sewer hookup charges when a home or business contracts for broadband services.

The City of Longmont’s model was discussed in detail in the Roadmap. Longmont has deployed a Gigabit fiber network and is offering Internet and voice services directly to homes and businesses. The City of Longmont’s project is nationally known as a model of success. Dubbed “NextLight,” this Gigabit fiber network is owned and operated by the City and its power utility, Longmont Power & Communications (LPC). Longmont opted out of Colorado’s SB 152 law in November of 2011 with 60% of the vote. Two years later, Longmont voters approved a \$40.3 million bond issuance to cover the startup costs and network build.

Longmont followed Google Fiber’s marketing strategy by launching a pre-build sign-up campaign. The neighborhood with the most market share or “take rate” would be the first area where Longmont would build. The first neighborhood received a 72% take rate prior to construction. Longmont’s 38,000 homes and businesses now have symmetrical Gigabit service for \$50 per month for those who signed up early. The \$50 per month is guaranteed for the lifetime of the home as well as the owner/tenant of the home if he/she moves within the City

limits. Longmont's business service includes symmetrical 100 Mbps for \$230 per month and symmetrical 250 Mbps service for \$500 per month.

Longmont is experiencing an average take rate percentage of 56%. The initial feasibility study conducted in 2013 predicted a 27% take rate. Late in 2016, the City voted to increase LPC's budget by \$7 million, sourced from the Electric and Broadband Utility Fund balance, to hire staff needed to support take rates twice as high as initially predicted.

Meanwhile NextLight is helping businesses and fostering growth by providing connectivity that's enabling the community to successfully compete with its neighbor to the south, Boulder. Local businesses that were looking to expand outside the city elected to stay and grow in Longmont thanks to the Gigabit network. The network is also attracting regional work-from-home Coloradans looking for an ideal place to work and raise their family.

The operational and financial risks to the City/Town are the highest; however, with this risk, the City/Town has the ability to build to all constituents, set prices and service availability, insure Net Neutrality rules are followed, and ensure the network is future oriented.

Financial Proformas and Results

Wholesale or PPP Models

As the capital costs vary greatly between models, NEO will provide a range of revenue share possibilities or dark fiber leases to ensure this requirement.

City/Town Builds the Fiber Ring, or Anchor Institution Network, and/or Interconnection between the two Communities

This option would most likely result in a dark fiber lease between the City and the Private Provider. Dark fiber leases range in pricing from \$25 - \$75 per month per fiber route mile per fiber count.

Providing a dark fiber lease of 24 counts of fiber on these routes, results in the following time to break even on the initial capital investment for the City/Town.

Greeley Dark Fiber Lease Considerations							
Route	Miles	Fiber Count	Dark Fiber Lease	Monthly Revenue	Capital Costs	Time to Breakeven (Months)	Time to Breakeven (Years)
Ring	15.1	24	\$25	\$9,060	\$ 2,187,899	241	20.12
Interconnection	5.7	24	\$25	\$3,420	\$ 825,896	241	20.12
			50				
Route	Miles	Fiber Count	Dark Fiber Lease	Monthly Revenue	Capital Costs	Time to Breakeven (Months)	Time to Breakeven (Years)
Ring	15.1	24	\$50	\$18,120	\$ 2,187,899	121	10.06
Interconnection	5.7	24	\$50	\$6,840	\$ 825,896	121	10.06
Route	Miles	Fiber Count	Dark Fiber Lease	Monthly Revenue	Capital Costs	Time to Breakeven (Months)	Time to Breakeven (Years)
Ring	15.1	24	\$75	\$27,180	\$ 2,187,899	80	6.71
Interconnection	5.7	24	\$75	\$10,260	\$ 825,896	80	6.71

Windsor Dark Fiber Lease Considerations							
Route	Miles	Fiber Count	Dark Fiber Lease	Monthly Revenue	Capital Costs	Time to Breakeven (Months)	Time to Breakeven (Years)
Ring	11.7	24	\$25	\$7,020	\$ 1,695,260	241	20.12
Interconnection	5.7	24	\$25	\$3,420	\$ 825,896	241	20.12
			50				
Route	Miles	Fiber Count	Dark Fiber Lease	Monthly Revenue	Capital Costs	Time to Breakeven (Months)	Time to Breakeven (Years)
Ring	11.7	24	\$50	\$14,040	\$ 1,695,260	121	10.06
Interconnection	5.7	24	\$50	\$6,840	\$ 825,896	121	10.06
Route	Miles	Fiber Count	Dark Fiber Lease	Monthly Revenue	Capital Costs	Time to Breakeven (Months)	Time to Breakeven (Years)
Ring	11.7	24	\$75	\$21,060	\$ 1,695,260	80	6.71
Interconnection	5.7	24	\$75	\$10,260	\$ 825,896	80	6.71

City/Town builds the Ring, Interconnection and FTTP Distribution, Revenue Share

For this option, a revenue share most likely would be negotiated with the service providers. If the City of Greeley and Town of Windsor pursued this type of strategy, the residential pricing may need to be priced at a rate that is more than \$50 per month for residential services (as with

Longmont's approach). In order for the financial model to work for a revenue approach, for all parties, the pricing for residential services may need to be in the \$90 - \$100 per month range. Pricing for business services could be in the range of \$200 - \$500 per month. One advantage with the wholesale model over the retail model is that the City/Town would not be responsible for customer care. These costs were taken out of the wholesale model as the service provider would be responsible for customer service, billing, and trouble resolution.

Greeley, Wholesale Model, PPP

For purposes of the wholesale model, it was assumed that the network would be built over three years, with three tranches of funding. To mitigate financial risk and to have the most efficient use of capital, NEO recommends spending capital when neighborhoods have a predetermined take rate percentage of pre-sign ups. This ties capital outlay close to when the entity would receive revenue, mitigating debt coverage risk and creating an efficient use of capital.

With Greeley, a minimum revenue share of \$40 per month for residential services and 40% of business revenue would need to be paid to the City of Greeley for use of the fiber network (assuming the end user customer would be charged \$90 - \$100 per month) and pricing similar to Longmont's business services was adopted.

This approach is barely feasible if the network generates a take rate percentage of 25% in the first year. It was assumed that an additional 10% of the homes/businesses passed would be added in each of the second and third year.

Using the assumed capital cost of \$95-\$98 Million, with (3) Tranches of \$31.6 Million. With the initial assumption of 25% take rate in the first year, an additional 10% in the second and in the third years, the following financial results would be realized.

Income Statement	City of Greeley, FTTP Wholesale Model				
	2019	2020	2021	2022	2023
	Forecast Project Period				
	Year 1	Year 2	Year 3	Year 4	Year 5
Revenues					
Service Revenues					
Residential	\$ 2,115,800	\$ 4,231,700	\$ 5,585,800	\$ 6,093,600	\$ 6,093,600
MDUs	\$ 588,000	\$ 1,176,000	\$ 1,552,300	\$ 1,693,600	\$ 1,693,600
Small Businesses	\$ 255,000	\$ 510,000	\$ 673,000	\$ 734,000	\$ 734,000
Other	\$ 11,000	\$ 21,900	\$ 28,900	\$ 31,600	\$ 31,600
Total Revenues	\$ 4,168,450	\$ 6,738,040	\$ 8,765,540	\$ 9,126,000	\$ 9,126,000
Expenses					
Internet Access	\$ -	\$ -	\$ -	\$ -	\$ -
Additional Internet Access Costs per Customer	\$ -	\$ -	\$ -	\$ -	\$ -
Annual Growth/Reduction of Internet Access	\$ -	\$ -	\$ -	\$ -	\$ -
Software Maintenance	\$ -	\$ -	\$ -	\$ -	\$ -
Utilities, Power & Environmental	\$ -	\$ -	\$ -	\$ -	\$ -
Salaries, Technicians	\$ 960,916	\$ 693,100	\$ 790,537	\$ 519,879	\$ 519,879
Salaries, Managerial Staff	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
Payroll Taxes and Benefits	\$ 371,321	\$ 277,585	\$ 311,688	\$ 216,958	\$ 216,958
Sales Churn, percent of Total Revenue	\$ 83,369	\$ 134,761	\$ 175,311	\$ 182,520	\$ 182,520
Marketing and Sales, percent of Total Revenue	\$ -	\$ -	\$ -	\$ -	\$ -
Residential Customer Care, Operations	\$ -	\$ -	\$ -	\$ -	\$ -
Business Customer Care, Operations	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenses	\$ 1,515,606	\$ 1,205,446	\$ 1,377,535	\$ 1,019,357	\$ 1,019,357
EBITDA	\$ 2,652,844	\$ 5,532,594	\$ 7,388,005	\$ 8,106,643	\$ 8,106,643
	2019	2020	2021	2022	2023
	Forecast Project Period				
	Year 1	Year 2	Year 3	Year 4	Year 5
Interest Expense	\$ 1,353,639	\$ 2,684,149	\$ 3,990,508	\$ 3,918,011	\$ 3,842,312
Principal Payments	\$ 523,640	\$ 1,070,409	\$ 1,641,328	\$ 1,713,825	\$ 1,641,328
Net Income	\$ 775,565	\$ 1,778,036	\$ 1,756,168	\$ 2,474,806	\$ 2,623,003

Looking at Financial Feasibility Objectives

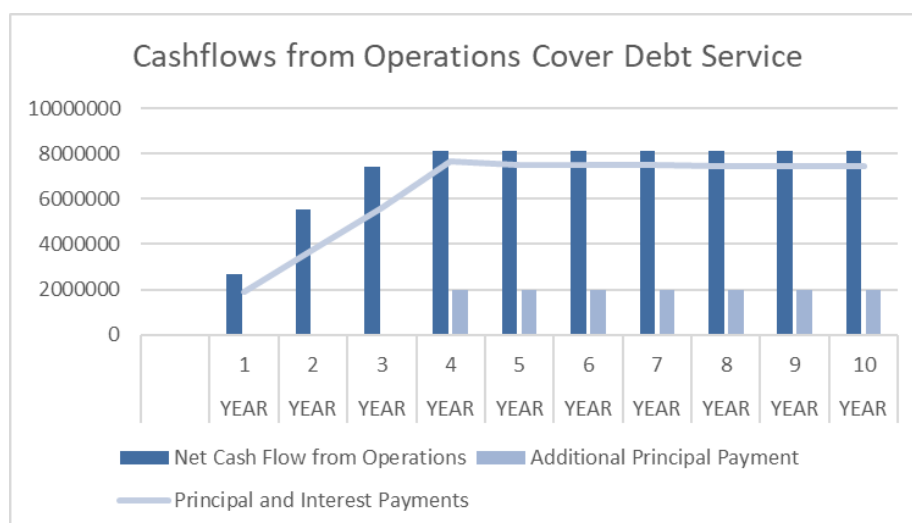
Covering debt is one of the most important financial risks that needs to be examined in detail before embarking upon a Fiber to the Premise strategy. NEO recommends examination of several financial feasibility objectives to mitigate debt coverage risks.

The first feasibility objective is the debt coverage ratio on each tranche of funding. This ratio provides an indication of whether or not the project can be financed.

Coverage Ratio of each Tranche						
		2019	2020	2021	2022	2023
		YEAR	YEAR	YEAR	YEAR	YEAR
		1	2	3	4	5
OPERATIONS						
Net Cash Flow from Operations		\$ 2,652,844	\$ 5,532,594	\$ 7,388,005	\$ 8,106,643	\$ 8,106,643
Debt Service		\$ -	\$ -	\$ -	\$ -	\$ -
Interest, Phase 1		\$ 1,353,639	\$ 1,330,510	\$ 1,306,359	\$ 1,281,142	\$ 1,254,811
Principal, Phase 1		\$ 523,640	\$ 546,769	\$ 570,919	\$ 596,137	\$ 622,468
Total Principal and Interest for Phase 1		\$ 1,877,279	\$ 1,877,279	\$ 1,877,279	\$ 1,877,279	\$ 1,877,279
Coverage Ratio		141%	295%	394%	432%	432%
Interest, Phase 2		\$ -	\$ 1,353,639	\$ 1,330,510	\$ 1,306,359	\$ 1,281,142
Principal, Phase 2		\$ -	\$ 523,640	\$ 546,769	\$ 570,919	\$ 596,137
Total Principal and Interest for Phase 2		\$ -	\$ 1,877,279	\$ 1,877,279	\$ 1,877,279	\$ 1,877,279
Coverage Ratio			147%	197%	216%	216%
Interest, Phase 3		\$ -	\$ -	\$ 1,353,639	\$ 1,330,510	\$ 1,306,359
Principal, Phase 3		\$ -	\$ -	\$ 523,640	\$ 546,769	\$ 570,919
Total Principal and Interest for Phase 3		\$ -	\$ -	\$ 1,877,279	\$ 1,877,279	\$ 1,877,279
Coverage Ratio				131%	144%	144%

The targeted coverage ratio needed is typically 125%. As the above chart indicates, the financial estimates meet the coverage ratio target.

The City of Greeley would be able to make additional principal payments of \$2 Million starting in year four.

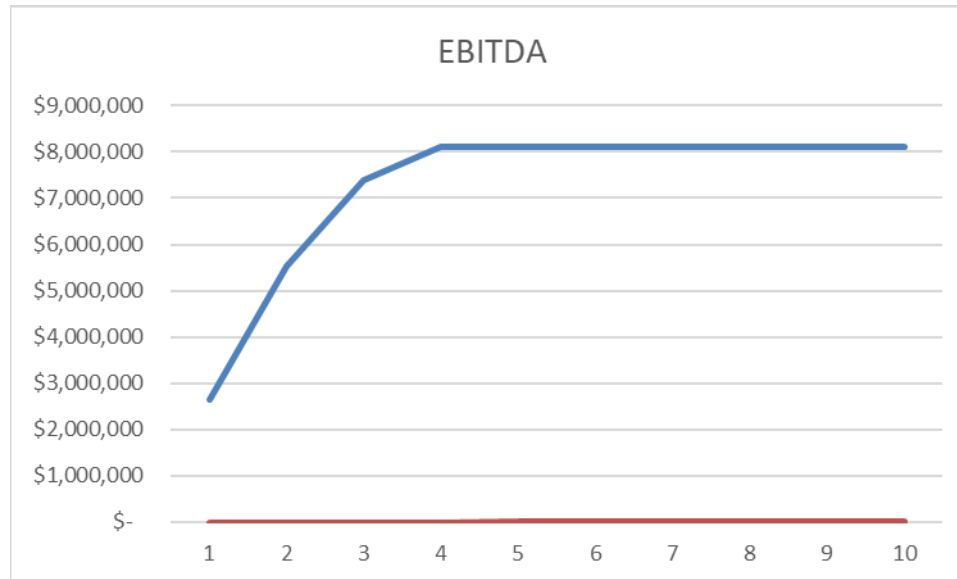


The second feasibility objective is to have net cumulative cashflow from operations over ten years be greater than the outstanding debt in year ten.

The cumulative cash flows for ten years are forecasted at over \$72.3 Million; while the outstanding debt in year ten is \$64.5 Million.

Cumulative cash flows over 10 years greater than the debt service											
		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
		YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR
		1	2	3	4	5	6	7	8	9	10
OPERATIONS											
Net Cash Flow from Operations		\$ 2,652,844	\$ 5,532,594	\$ 7,388,005	\$ 8,106,643	\$ 8,106,643	\$ 8,107,427	\$ 8,107,427	\$ 8,107,427	\$ 8,107,427	\$ 8,107,427
Cumulative Cash Flow from Operations		\$ 2,652,844	\$ 8,185,438	\$ 15,573,443	\$ 23,680,085	\$ 31,786,728	\$ 39,894,155	\$ 48,001,582	\$ 56,109,008	\$ 64,216,435	\$ 72,323,862
CAPITAL EXPENDITURES											
Capital Expenditures		\$ 31,500,000	\$ 31,500,000	\$ 31,500,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
EQUITY	100%	\$ 31,500,000	\$ 31,500,000	\$ 31,500,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Debt Service											
Required Draws		\$ -	\$ -	\$ -	\$ (2,000,000)	\$ (2,000,000)	\$ (2,000,000)	\$ (2,000,000)	\$ (2,000,000)	\$ (2,000,000)	\$ (2,000,000)
Principal Payments		\$ 523,640	\$ 1,070,409	\$ 1,641,328	\$ 1,713,825	\$ 1,641,328	\$ 1,713,825	\$ 1,789,524	\$ 1,868,567	\$ 1,951,101	\$ 2,037,281
Total Outstanding Debt		\$ 30,976,360	\$ 61,405,952	\$ 91,264,624	\$ 87,550,799	\$ 83,909,471	\$ 80,195,646	\$ 76,406,122	\$ 72,537,555	\$ 68,586,453	\$ 64,549,173
Interest		\$ 1,353,639	\$ 2,684,149	\$ 3,990,508	\$ 3,918,011	\$ 3,842,312	\$ 3,763,269	\$ 3,680,735	\$ 3,594,556	\$ 3,504,569	\$ 3,410,609

The third feasibility objective is to have positive EBITDA (Earnings before Interest, Taxes, Depreciation and Amortization). In this model, EBITDA is forecasted to be \$8.1 Million after the network is built, starting in year 4.



And finally, in order to be feasible, there needs to be excess cashflow to cover principal and interest payments. There is sufficient cashflow to cover principal and interest payments starting in year 1.

Positive EBITDA?							
	2019	2020	2021	2022	2023	2024	
	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	
	1	2	3	4	5	6	
EBITDA	\$ 2,652,844	\$ 5,532,594	\$ 7,388,005	\$ 8,106,643	\$ 8,106,643	\$ 8,107,427	
Less Interest Expense	\$ 1,353,639	\$ 2,684,149	\$ 3,990,508	\$ 3,918,011	\$ 3,842,312	\$ 3,763,269	
Less Principal Payment	\$ 523,640	\$ 1,070,409	\$ 1,641,328	\$ 1,713,825	\$ 1,641,328	\$ 1,713,825	
Earnings after Interest and Principal Payments	\$ 775,565	\$ 1,778,036	\$ 1,756,168	\$ 2,474,806	\$ 2,623,003	\$ 2,630,332	

Windsor, Wholesale Model, PPP

The same assumptions were applied for Windsor. It was assumed that the network would be built over three years, with three tranches of funding. A minimum revenue share of \$40 per month for residential services and 40% of business revenue would need to be paid to the City of Greeley for use of the fiber network (assuming the end user customer would be charged \$90 - \$100 per month) and pricing similar to Longmont's business services was adopted.

The assumed capital cost of \$42 Million, with (3) Tranches of \$14 Million each was used. The assumption of 25% take rate in the first year, an additional 10% in the second and in the third years was used.

This approach is not feasible for Windsor on its own. The network does not generate enough cashflow from operations to cover its debt obligations.

Income Statement	City of Windsor, FTTN Wholesale Model				
	2019	2020	2021	2022	2023
	Forecast Project Period				
	Year 1	Year 2	Year 3	Year 4	Year 5
Revenues					
Service Revenues					
Residential	\$ 759,400	\$ 1,518,800	\$ 2,004,800	\$ 2,187,200	\$ 2,187,200
MDUs	\$ 4,600	\$ 9,000	\$ 11,900	\$ 12,800	\$ 12,800
Small Businesses	\$ 42,600	\$ 85,200	\$ 112,600	\$ 122,800	\$ 122,800
Other	\$ 3,700	\$ 7,400	\$ 9,700	\$ 10,400	\$ 10,400
Total Revenues	\$ 1,115,225	\$ 1,795,650	\$ 2,335,350	\$ 2,428,800	\$ 2,428,800
Expenses					
Internet Access	\$ -	\$ -	\$ -	\$ -	\$ -
Additional Internet Access Costs per Customer	\$ -	\$ -	\$ -	\$ -	\$ -
Annual Growth/Reduction of Internet Access	\$ -	\$ -	\$ -	\$ -	\$ -
Software Maintenance	\$ -	\$ -	\$ -	\$ -	\$ -
Utilities, Power & Environmental	\$ -	\$ -	\$ -	\$ -	\$ -
Salaries, Technicians	\$ 290,803	\$ 247,672	\$ 274,155	\$ 200,590	\$ 200,590
Salaries, Managerial Staff	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
Payroll Taxes and Benefits	\$ 136,781	\$ 121,685	\$ 130,954	\$ 105,207	\$ 105,207
Sales Churn, percent of Total Revenue	\$ 22,305	\$ 35,913	\$ 46,707	\$ 48,576	\$ 48,576
Marketing and Sales, percent of Total Revenue	\$ -	\$ -	\$ -	\$ -	\$ -
Residential Customer Care, Operations	\$ -	\$ -	\$ -	\$ -	\$ -
Business Customer Care, Operations	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenses	\$ 549,888	\$ 505,270	\$ 551,817	\$ 454,373	\$ 454,373
EBITDA	\$ 565,337	\$ 1,290,380	\$ 1,783,533	\$ 1,974,427	\$ 1,974,427
	2019	2020	2021	2022	2023
	Forecast Project Period				
	Year 1	Year 2	Year 3	Year 4	Year 5
Interest Expense	\$ 601,617	\$ 1,192,955	\$ 1,773,559	\$ 1,741,338	\$ 1,707,694
Principal Payments	\$ 232,729	\$ 475,737	\$ 729,479	\$ 761,700	\$ 729,479
Net Income	\$ (269,009)	\$ (378,312)	\$ (719,505)	\$ (528,611)	\$ (462,746)

Looking at Financial Feasibility Objectives

For Windsor, it would take longer than three years to be able to build out the network. The network would be able to take its second tranche of funding for the second tranche of funding; however, it would not be able to take its third tranche of funding to build the final phase because a coverage ratio of 125% is not achieved with the second or the third phases.

Coverage Ratio of each Tranch						
		2019	2020	2021	2022	2023
		YEAR	YEAR	YEAR	YEAR	YEAR
		1	2	3	4	5
OPERATIONS						
Net Cash Flow from Operations		\$ 565,337	\$ 1,290,380	\$ 1,783,533	\$ 1,974,427	\$ 1,974,427
Debt Service		\$ -	\$ -	\$ -	\$ -	\$ -
Interest, Phase 1		\$ 601,617	\$ 591,338	\$ 580,604	\$ 569,396	\$ 557,694
Principal, Phase 1		\$ 232,729	\$ 243,008	\$ 253,742	\$ 264,950	\$ 276,652
Total Principal and Interest for Phase 1		\$ 834,346	\$ 834,346	\$ 834,346	\$ 834,346	\$ 834,346
Coverage Ratio		68%	155%	214%	237%	237%
Interest, Phase 2		\$ -	\$ 601,617	\$ 591,338	\$ 580,604	\$ 569,396
Principal, Phase 2		\$ -	\$ 232,729	\$ 243,008	\$ 253,742	\$ 264,950
Total Principal and Interest for Phase 2		\$ -	\$ 834,346	\$ 834,346	\$ 834,346	\$ 834,346
Coverage Ratio			77%	107%	118%	118%
Interest, Phase 3		\$ -	\$ -	\$ 601,617	\$ 591,338	\$ 580,604
Principal, Phase 3		\$ -	\$ -	\$ 232,729	\$ 243,008	\$ 253,742
Total Principal and Interest for Phase 3		\$ -	\$ -	\$ 834,346	\$ 834,346	\$ 834,346
Coverage Ratio				71%	79%	79%

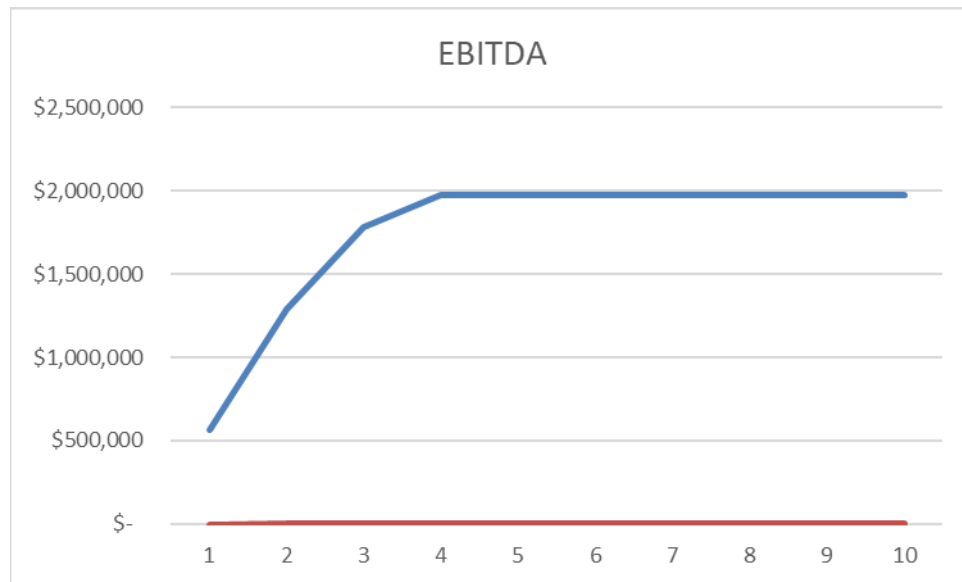
Net cashflows from operations does not cover principal and interest payments.

Net cumulative cashflow from operations over ten years is not greater than the outstanding debt in year ten. In fact, cumulative cashflows are much smaller than the debt in year 10.

The cumulative cash flows for ten years are forecasted at \$17.4 Million; while the outstanding debt in year ten is \$37.9 Million. This is not feasible.

Cumulative cash flows over 10 years greater than the debt service											
		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
		YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR
		1	2	3	4	5	6	7	8	9	10
OPERATIONS											
Net Cash Flow from Operations		\$ 565,337	\$ 1,290,380	\$ 1,783,533	\$ 1,974,427	\$ 1,974,427	\$ 1,974,525	\$ 1,974,525	\$ 1,974,525	\$ 1,974,525	\$ 1,974,525
Cumulative Cash Flow from Operations		\$ 565,337	\$ 1,855,717	\$ 3,639,250	\$ 5,613,678	\$ 7,588,105	\$ 9,562,630	\$ 11,537,156	\$ 13,511,681	\$ 15,486,206	\$ 17,460,732
CAPITAL EXPENDITURES											
Capital Expenditures		\$ 15,000,000	\$ 15,000,000	\$ 15,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
EQUITY	100%	\$ 15,000,000	\$ 15,000,000	\$ 15,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Debt Service											
Required Draws		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Principal Payments		\$ 232,729	\$ 475,737	\$ 729,479	\$ 761,700	\$ 729,479	\$ 761,700	\$ 795,344	\$ 830,474	\$ 867,156	\$ 905,458
Total Outstanding Debt		\$ 14,767,271	\$ 29,291,534	\$ 43,562,055	\$ 42,800,355	\$ 42,070,876	\$ 41,309,176	\$ 40,513,832	\$ 39,683,358	\$ 38,816,201	\$ 37,910,743
Interest		\$ 601,617	\$ 1,192,955	\$ 1,773,559	\$ 1,741,338	\$ 1,707,694	\$ 1,672,564	\$ 1,635,882	\$ 1,597,580	\$ 1,557,586	\$ 1,515,826

Although EBITDA (Earnings before Interest, Taxes, Depreciation and Amortization) is positive, there is not enough excess cash to cover principal and interest payments.



Positive EBITDA?							
		2019	2020	2021	2022	2023	2024
		YEAR	YEAR	YEAR	YEAR	YEAR	YEAR
		1	2	3	4	5	6
EBITDA		\$ 565,337	\$ 1,290,380	\$ 1,783,533	\$ 1,974,427	\$ 1,974,427	\$ 1,974,525
Less Interest Expense		\$ 601,617	\$ 1,192,955	\$ 1,773,559	\$ 1,741,338	\$ 1,707,694	\$ 1,672,564
Less Principal Payment		\$ 232,729	\$ 475,737	\$ 729,479	\$ 761,700	\$ 729,479	\$ 761,700
Earnings after Interest and Principal Payments		\$ (269,009)	\$ (378,312)	\$ (719,505)	\$ (528,611)	\$ (462,746)	\$ (459,739)

Another approach must be pursued for Windsor as a stand-alone network.

Take-aways on the Wholesale or PPP Approach

Assuming an initial take rate percentage of 25% in the first year is risky. However, the model needs this to meet the principal and interest payments needed. In order to mitigate this risk, the following strategies could be sought:

- Negotiate lowering the capital costs assumed by the City/Town. Negotiate sharing in the capital costs with the private provider
- Negotiate having the private provider pay or share in the debt obligations until a minimum take rate percentage is achieved.
- Negotiate a higher rate per residential and/or business customer
- Begin construction of the network only when a minimum take rate of 25% is achieved. Implement a pre-sign up process and begin when take rate risk is mitigated.

- Investigate a two-city or regional approach; with the combined number of homes and businesses, the business plan may be more solid if Greeley and Windsor embarked upon this together or if a regional network is implemented.

Retail Model, City as an ISP

With the retail model, revenues are not shared. Therefore, the take rate ramp-up can be more conservative. For both Greeley and Windsor, we initially assumed a take rate percentage of 5% in the first year, an additional 10% in the second year and an additional 15% in the third year for each phase of construction, adding up to the forecasted 30% take rate percentage. We conservatively assumed no additional customers were added after year 3.

Take Rate or Market Share Assumptions	%
Take rate after year 1	15%
Additional Take Rate, Year 2	10%
Additional Take Rate, Year 3	5%
Additional Take Rate, Year 4	0%
Additional Take Rate, Year 5	0%
Additional Take Rate, Year 6	0%

For pricing, we assumed \$80 per month for residential and small business Gigabit services and \$30 per month for voice services. We assumed 10% of the customers that have signed up for service would subscribe to voice services. NEO used a pricing model for large businesses that would be similar to Longmont's pricing for business services.

Large Business Services	Pricing	% of Customers Taking Service
100/20 Mbps	\$ 179.95	20%
Add Symmetrical Upstream (100 Mbps)	\$ 50.00	5%
Voice services	\$ 30.00	40%
500/250 Mbps	\$ 599.95	30%
Add Symmetrical Upstream (500 Mbps)	\$ 150.00	15%
1000/500 Mbps	\$ 799.95	50%
Add Symmetrical Upstream (1000 Mbps)	\$ 200.00	20%
Add BGP Routing	\$ 100.00	10%

Greeley, Retail Model, City as an ISP
 These assumptions produced the following results.

Income Statement	City of Greeley, FTTP Retail Model				
	2019	2020	2021	2022	2023
	Forecast Project Period				
	Year 1	Year 2	Year 3	Year 4	Year 5
Revenues					
Service Revenues					
Residential	\$ 2,684,600	\$ 6,085,300	\$ 8,053,900	\$ 8,590,800	\$ 8,590,800
MDUs	\$ 746,100	\$ 1,690,700	\$ 2,238,300	\$ 2,387,600	\$ 2,387,600
Small Businesses	\$ 323,800	\$ 733,200	\$ 970,300	\$ 1,034,800	\$ 1,034,800
Other	\$ 13,500	\$ 31,200	\$ 42,100	\$ 44,800	\$ 44,800
Total Revenues	\$ 4,759,738	\$ 9,810,095	\$ 12,649,193	\$ 13,275,096	\$ 13,275,096
Expenses					
Internet Access	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000
Additional Internet Access Costs per Customer	\$ 71,953	\$ 119,922	\$ 143,906	\$ 143,906	\$ 143,906
Annual Growth/Reduction of Internet Access	\$ -	\$ (17,992)	\$ (20,391)	\$ (20,391)	\$ (20,391)
Software Maintenance	\$ 35,977	\$ 59,961	\$ 71,953	\$ 71,953	\$ 71,953
Utilities, Power & Environmental	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000
Salaries, Technicians	\$ 424,724	\$ 484,743	\$ 418,119	\$ 314,020	\$ 314,020
Salaries, Managerial Staff	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000
Payroll Taxes and Benefits	\$ 176,653	\$ 197,660	\$ 174,342	\$ 137,907	\$ 137,907
Sales Churn, percent of Total Revenue	\$ 93,328	\$ 192,355	\$ 248,023	\$ 260,296	\$ 260,296
Marketing and Sales, percent of Total Revenue	\$ 233,321	\$ 480,887	\$ 620,059	\$ 650,740	\$ 650,740
Residential Customer Care, Operations	\$ 4,820	\$ 8,034	\$ 9,640	\$ 9,640	\$ 9,640
Business Customer Care, Operations	\$ 1,176	\$ 1,960	\$ 2,352	\$ 2,352	\$ 2,352
Total Expenses	\$ 1,251,699	\$ 1,784,139	\$ 1,951,746	\$ 1,861,566	\$ 1,861,566
EBITDA	\$ 3,508,039	\$ 8,025,956	\$ 10,697,448	\$ 11,413,530	\$ 11,413,530
	2019	2020	2021	2022	2023
	Forecast Project Period				
	Year 1	Year 2	Year 3	Year 4	Year 5
Interest Expense	\$ 1,589,989	\$ 3,152,810	\$ 4,687,264	\$ 4,602,109	\$ 4,513,192
Principal Payments	\$ 615,069	\$ 1,257,305	\$ 1,927,909	\$ 2,013,064	\$ 1,927,909
Net Income	\$ 1,302,982	\$ 3,615,840	\$ 4,082,275	\$ 4,798,357	\$ 4,972,429

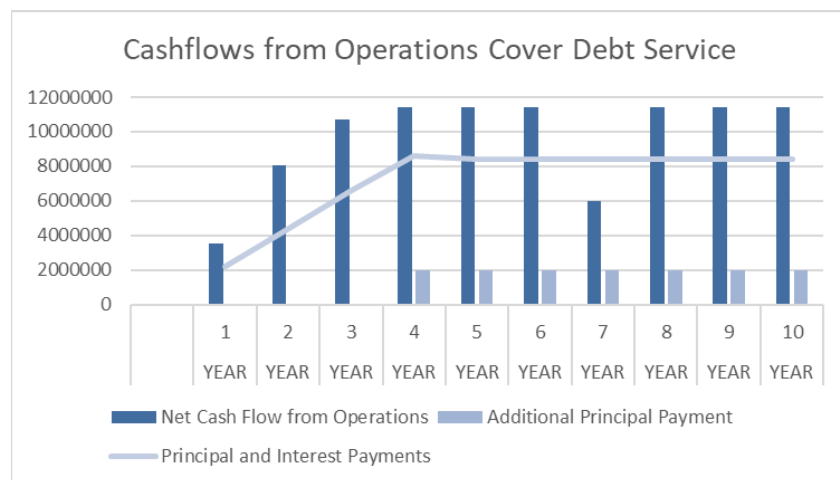
Looking at Financial Feasibility Objectives

As discussed, covering debt is one of the most important financial risks that needs to be examined in detail before embarking upon a Fiber to the Premise strategy.

The first feasibility objective is the debt coverage ratio on each tranche of funding. This ratio provides an indication of whether or not the project can be financed.

Coverage Ratio of each Tranch						
		2019	2020	2021	2022	2023
		YEAR	YEAR	YEAR	YEAR	YEAR
		1	2	3	4	5
OPERATIONS						
Net Cash Flow from Operations	\$	3,508,039	\$ 8,025,956	\$ 10,697,448	\$ 11,413,530	\$ 11,413,530
Debt Service	\$	-	\$ -	\$ -	\$ -	\$ -
Interest, Phase 1	\$	1,589,989	\$ 1,562,821	\$ 1,534,454	\$ 1,504,833	\$ 1,473,905
Principal, Phase 1	\$	615,069	\$ 642,236	\$ 670,604	\$ 700,224	\$ 731,153
Total Principal and Interest for Phase 1	\$	2,205,058	\$ 2,205,058	\$ 2,205,058	\$ 2,205,058	\$ 2,205,058
Coverage Ratio		159%	364%	485%	518%	518%
Interest, Phase 2	\$	-	\$ 1,589,989	\$ 1,562,821	\$ 1,534,454	\$ 1,504,833
Principal, Phase 2	\$	-	\$ 615,069	\$ 642,236	\$ 670,604	\$ 700,224
Total Principal and Interest for Phase 2	\$	-	\$ 2,205,058	\$ 2,205,058	\$ 2,205,058	\$ 2,205,058
Coverage Ratio			182%	243%	259%	259%
Interest, Phase 3	\$	-	\$ -	\$ 1,589,989	\$ 1,562,821	\$ 1,534,454
Principal, Phase 3	\$	-	\$ -	\$ 615,069	\$ 642,236	\$ 670,604
Total Principal and Interest for Phase 3	\$	-	\$ -	\$ 2,205,058	\$ 2,205,058	\$ 2,205,058
Coverage Ratio				162%	173%	173%

Generally, additional tranches of funding may be obtained when the debt coverage ratio of 125% is achieved. As the above chart indicates, if the targeted coverage ratio needed is 125%, the project can be funded within three years or for each of the three phases.



According to the model, the City of Greeley would be able to make additional principal payments of \$2 Million or greater, starting in year four.

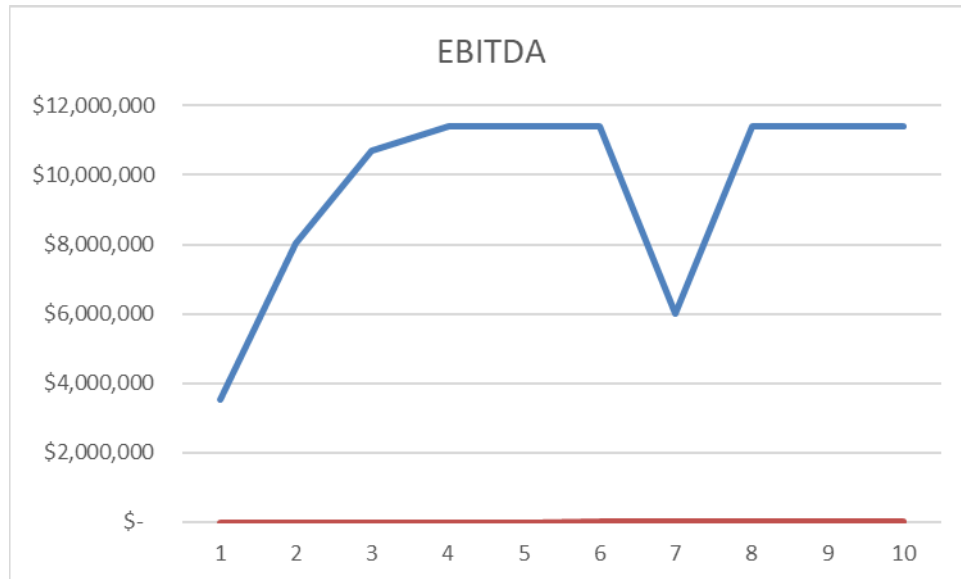
The forecast below shows capital expenditures of \$37 Million in years 1, 2 and 3, representing the three tranches of funding for the network build out. The forecast shows the ability to make an additional \$2 Million in principal payments starting in year 4.

After ten years, the cumulative cash flows are forecasted at over \$96.7 Million; while the outstanding debt in year ten is \$78.5 Million.

		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
		YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR
		1	2	3	4	5	6	7	8	9	10
OPERATIONS											
Net Cash Flow from Operations		\$ 3,508,039	\$ 8,025,956	\$ 10,697,448	\$ 11,413,530	\$ 11,413,530	\$ 11,413,245	\$ 6,016,755	\$ 11,413,245	\$ 11,413,245	\$ 11,413,245
Cumulative Cash Flow from Operations		\$ 3,508,039	\$ 11,533,995	\$ 22,231,443	\$ 33,644,973	\$ 45,058,503	\$ 56,471,748	\$ 62,488,504	\$ 73,901,749	\$ 85,314,994	\$ 96,728,239
CAPITAL EXPENDITURES											
Capital Expenditures		\$ 37,000,000	\$ 37,250,000	\$ 37,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
EQUITY	100%	\$ 37,000,000	\$ 37,250,000	\$ 37,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Debt Service											
Required Draws		\$ -	\$ -	\$ -	\$ (2,000,000)	\$ (2,000,000)	\$ (2,000,000)	\$ (2,000,000)	\$ (2,000,000)	\$ (2,000,000)	\$ (2,000,000)
Principal Payments		\$ 615,069	\$ 1,257,305	\$ 1,927,909	\$ 2,013,064	\$ 1,927,909	\$ 2,013,064	\$ 2,101,981	\$ 2,194,825	\$ 2,291,770	\$ 2,392,997
Total Outstanding Debt		\$ 36,384,931	\$ 72,377,626	\$ 107,449,717	\$ 103,436,652	\$ 99,508,743	\$ 95,495,679	\$ 91,393,698	\$ 87,198,874	\$ 82,907,104	\$ 78,514,107
Interest		\$ 1,589,989	\$ 3,152,810	\$ 4,687,264	\$ 4,602,109	\$ 4,513,192	\$ 4,420,348	\$ 4,323,403	\$ 4,222,176	\$ 4,116,478	\$ 4,006,112

A cash reserve for equipment refreshes could be considered as well. Typically, Customer Premise Equipment is refreshed every 5-7 years after the first build-out and every five years after that. A network refresh for equipment is shown under year 7 above. This is why the net cash flow from operations dips in year 7.

EBITDA (Earnings before Interest, Taxes, Depreciation and Amortization) is forecasted to be \$11.4 Million after the network is built. Again, the dip in earnings in year 7 show the equipment refresh.



There is sufficient cashflow to cover principal and interest payments.

Positive EBITDA?

	2019 YEAR 1	2020 YEAR 2	2021 YEAR 3	2022 YEAR 4	2023 YEAR 5
EBITDA	\$ 3,508,039	\$ 8,025,956	\$ 10,697,448	\$ 11,413,530	\$ 11,413,530
Less Interest Expense	\$ 1,589,989	\$ 3,152,810	\$ 4,687,264	\$ 4,602,109	\$ 4,513,192
Less Principal Payment	\$ 615,069	\$ 1,257,305	\$ 1,927,909	\$ 2,013,064	\$ 1,927,909
Earnings after Interest and Principal Payments	\$ 1,302,982	\$ 3,615,840	\$ 4,082,275	\$ 4,798,357	\$ 4,972,429

Windsor, Retail Model, City as an ISP

Using the same assumptions, NEO ran the financial model for the Town of Windsor. Because Windsor does not have a large number of businesses, in order for the model to work, the take rate percentage would need to be 35% (versus 30% for Greeley). We assumed a take rate of 15% in the first year, an additional 15% in year 2 and another 5% in year 3. These assumptions produced the following results.

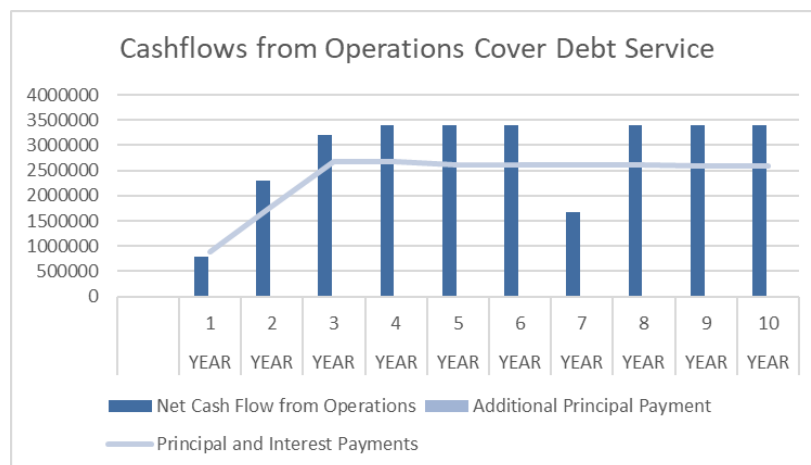
Income Statement	Town of Windsor, FFTP Retail Model				
	2019	2020	2021	2022	2023
	Forecast Project Period				
	Year 1	Year 2	Year 3	Year 4	Year 5
Revenues					
Service Revenues					
Residential	\$ 963,700	\$ 2,505,100	\$ 3,404,600	\$ 3,597,600	\$ 3,597,600
MDUs	\$ 5,600	\$ 14,500	\$ 19,900	\$ 20,800	\$ 20,800
Small Businesses	\$ 53,900	\$ 140,800	\$ 191,400	\$ 202,000	\$ 202,000
Other	\$ 4,500	\$ 11,800	\$ 16,100	\$ 17,200	\$ 17,200
Total Revenues	\$ 1,265,489	\$ 3,024,071	\$ 3,939,776	\$ 4,104,480	\$ 4,104,480
Expenses					
Internet Access	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000
Additional Internet Access Costs per Customer	\$ 19,557	\$ 39,114	\$ 45,633	\$ 45,633	\$ 45,633
Annual Growth/Reduction of Internet Access	\$ -	\$ (9,911)	\$ (10,563)	\$ (10,563)	\$ (10,563)
Software Maintenance	\$ 9,779	\$ 19,557	\$ 22,817	\$ 22,817	\$ 22,817
Utilities, Power & Environmental	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000
Salaries, Technicians	\$ 115,441	\$ 184,582	\$ 138,179	\$ 109,885	\$ 109,885
Salaries, Managerial Staff	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000
Payroll Taxes and Benefits	\$ 68,404	\$ 92,604	\$ 76,363	\$ 66,460	\$ 66,460
Sales Churn, percent of Total Revenue	\$ 24,814	\$ 59,296	\$ 77,251	\$ 80,480	\$ 80,480
Marketing and Sales, percent of Total Revenue	\$ 62,034	\$ 148,239	\$ 193,126	\$ 201,200	\$ 201,200
Residential Customer Care, Operations	\$ 1,621	\$ 3,242	\$ 3,782	\$ 3,782	\$ 3,782
Business Customer Care, Operations	\$ 9	\$ 18	\$ 21	\$ 21	\$ 21
Total Expenses	\$ 469,181	\$ 720,180	\$ 739,334	\$ 714,430	\$ 714,430
EBITDA	\$ 796,308	\$ 2,303,890	\$ 3,200,441	\$ 3,390,050	\$ 3,390,050
	2019	2020	2021	2022	2023
	Forecast Project Period				
	Year 1	Year 2	Year 3	Year 4	Year 5
Interest Expense	\$ 644,590	\$ 1,278,166	\$ 1,900,242	\$ 1,865,720	\$ 1,829,672
Principal Payments	\$ 249,352	\$ 509,718	\$ 781,585	\$ 816,107	\$ 781,585
Net Income	\$ (97,635)	\$ 516,006	\$ 518,614	\$ 708,223	\$ 778,793

Looking at Financial Feasibility Objectives

The first feasibility objective is the debt coverage ratio on each tranche of funding. This ratio provides an indication of whether or not the project can be financed.

Coverage Ratio of each Tranch						
		2019	2020	2021	2022	2023
		YEAR	YEAR	YEAR	YEAR	YEAR
		1	2	3	4	5
OPERATIONS						
Net Cash Flow from Operations	\$	796,308	\$ 2,303,890	\$ 3,200,441	\$ 3,390,050	\$ 3,390,050
Debt Service	\$	-	\$ -	\$ -	\$ -	\$ -
Interest, Phase 1	\$	644,590	\$ 633,576	\$ 622,076	\$ 610,068	\$ 597,529
Principal, Phase 1	\$	249,352	\$ 260,366	\$ 271,866	\$ 283,875	\$ 296,413
Total Principal and Interest for Phase 1	\$	893,942	\$ 893,942	\$ 893,942	\$ 893,942	\$ 893,942
Coverage Ratio		89%	258%	358%	379%	379%
Interest, Phase 2	\$	-	\$ 644,590	\$ 633,576	\$ 622,076	\$ 610,068
Principal, Phase 2	\$	-	\$ 249,352	\$ 260,366	\$ 271,866	\$ 283,875
Total Principal and Interest for Phase 2	\$	-	\$ 893,942	\$ 893,942	\$ 893,942	\$ 893,942
Coverage Ratio			129%	179%	190%	190%
Interest, Phase 3	\$	-	\$ -	\$ 644,590	\$ 633,576	\$ 622,076
Principal, Phase 3	\$	-	\$ -	\$ 249,352	\$ 260,366	\$ 271,866
Total Principal and Interest for Phase 3	\$	-	\$ -	\$ 893,942	\$ 893,942	\$ 893,942
Coverage Ratio				119%	126%	126%

As mentioned, generally, additional tranches of funding may be obtained when the debt coverage ratio of 125% is achieved. As the above chart indicates, if the targeted coverage ratio needed is 125%, the project can be funded within three years or for each of the three phases.



Unlike Greeley, the Town of Windsor would not be able to make additional principal payments, but would rather, keep a cash reserve to pay for equipment refreshes. There is a Customer Premise Equipment refresh in year 7, thus the dip in revenue.

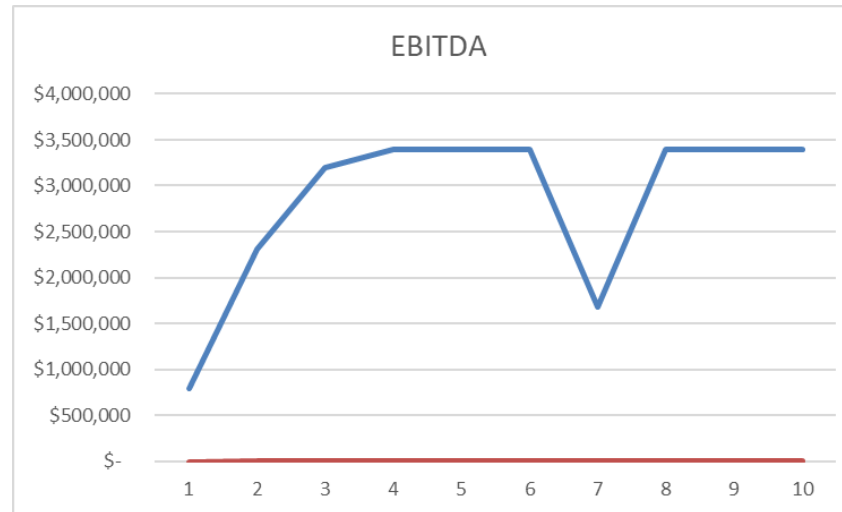
The forecast below shows capital expenditures of \$15 Million in years 1, 2 and 3, representing the three tranches of funding for the network build out.

After ten years, the cumulative cash flows are forecasted at over \$28.3 Million; while the outstanding debt in year ten is \$37.6 Million. The Town of Windsor's model does not meet this feasibility objective, and therefore, should carefully examine this approach and further refine the model and assumptions.

Cumulative cash flows over 10 years greater than the debt service											
		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
		YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR	YEAR
		1	2	3	4	5	6	7	8	9	10
OPERATIONS											
Net Cash Flow from Operations		\$ 796,308	\$ 2,303,890	\$ 3,200,441	\$ 3,390,050	\$ 3,390,050	\$ 3,389,765	\$ 1,678,528	\$ 3,389,765	\$ 3,389,765	\$ 3,389,765
Cumulative Cash Flow from Operations		\$ 796,308	\$ 3,100,198	\$ 6,300,639	\$ 9,690,689	\$ 13,080,739	\$ 16,470,504	\$ 18,149,032	\$ 21,538,797	\$ 24,928,562	\$ 28,318,327
CAPITAL EXPENDITURES											
Capital Expenditures		\$ 15,000,000	\$ 15,250,000	\$ 15,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
EQUITY	100%	\$ 15,000,000	\$ 15,250,000	\$ 15,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Debt Service											
Required Draws		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Principal Payments		\$ 249,352	\$ 509,718	\$ 781,585	\$ 816,107	\$ 781,585	\$ 816,107	\$ 852,154	\$ 889,794	\$ 929,096	\$ 970,134
Total Outstanding Debt		\$ 14,750,648	\$ 29,490,929	\$ 43,709,345	\$ 42,893,237	\$ 42,111,653	\$ 41,295,546	\$ 40,443,391	\$ 39,553,597	\$ 38,624,502	\$ 37,654,368
Interest		\$ 644,590	\$ 1,278,166	\$ 1,900,242	\$ 1,865,720	\$ 1,829,672	\$ 1,792,033	\$ 1,752,731	\$ 1,711,693	\$ 1,668,843	\$ 1,624,099

Again, a potential strategy to mitigate the financial risk for the Town of Windsor may be to look at a two-city approach with the City of Greeley and/or a regional network with neighboring communities.

EBITDA (Earnings before Interest, Taxes, Depreciation and Amortization) is forecasted to be \$3.3 Million after the network is built. Again, the dip in earnings in year 7 show the equipment refresh.



There is sufficient cashflow to cover principal and interest payments, starting in year 2.

Positive EBITDA?						
		2019	2020	2021	2022	2023
		YEAR	YEAR	YEAR	YEAR	YEAR
		1	2	3	4	5
EBITDA		\$ 796,308	\$ 2,303,890	\$ 3,200,441	\$ 3,390,050	\$ 3,390,050
Less Interest Expense		\$ 644,590	\$ 1,278,166	\$ 1,900,242	\$ 1,865,720	\$ 1,829,672
Less Principal Payment		\$ 249,352	\$ 509,718	\$ 781,585	\$ 816,107	\$ 781,585
Earnings after Interest and Principal Payments		\$ (97,635)	\$ 516,006	\$ 518,614	\$ 708,223	\$ 778,793

Take-aways on the Retail Model, the City/Town as an ISP

The take rate percentages assumed are conservative. Longmont's first neighborhood reached a take rate percentage of 72% of pre-sign ups prior to the build even starting. Longmont's average take rate percentage is 56%. The City of Loveland, after two rounds of citizen surveys, is predicting an overall take rate percent of 42%, with a take rate percentage range of 32%-53%.

The financial model was run using a number of various assumptions and pricing. Both Greeley and Windsor receive similar results to above if the pricing for residential services is set at \$50 per month with a take rate percentage of 56%. The financial model improves with a utility fee of \$5-10 per month attributed to each home/business passed.

There still are significant financial risks to be considered. The following strategies can mitigate financial risk:

- Begin construction of the network only when a minimum take rate percentage is achieved within each neighborhood or build-out zone. Further final engineering could be completed to verify the capital costs by neighborhood. Implement a pre-sign-up process and begin when take rate risk is mitigated.
- Investigate a two-city or regional approach; with the combined number of homes and businesses, the business plan may be more solid if Greeley and Windsor embarked upon this together or if a regional network is implemented.

Possible next steps may include:

- Further citizen engagement to determine take rate percentages and pricing.
- Detailed design and engineering services to validate and refine the capital costs required.
- Examination of a regional approach
- Detailed financial modeling with each assumption verified

Understanding the financial model is important for the City/Town, not only from the viewpoint of whether the City pursued a strategy to own and operate the network, but also, to understand what the implications may be for a potential public-private partnership.

The primary take-away from this is that building a Fiber to the Premise network in the City of Greeley and Town of Windsor is feasible, whether the City does it or whether another entity or public-private partnership does it.

In Conclusion

The purpose of this report is to showcase the various approaches, taking a deeper dive into the financial implications of these models for the City of Greeley and Town of Windsor to consider. The conclusion of this exercise should be that if the City of Greeley and Town of Windsor were to pursue a Fiber to the Premise strategy and either deploy the network on its own, or partner with another company or many companies, the opportunity exists for those strategies. This paper provides the framework for such discussions.



CITY OF GREELEY, TOWN OF WINDSOR BROADBAND PLANNING

AUGUST, 2018

AGENDA

- ❖ Models for Gigabit Strategy
- ❖ Capital Cost Estimates for Fiber to the Premise
- ❖ Financial Models for:
 - Town as the Internet Service Provider (ISP)
 - Utility Fees and Models
 - Public Private Partnership Models
- ❖ Feedback and Possible Next Steps

WHAT OTHER CITIES ARE DOING

BEST PRACTICES

FIBER TO THE PREMISE, GIGABIT BROADBAND

- ❖ NOCO Cities include Longmont, Loveland, Ft. Collins, Estes Park
- ❖ Symmetrical gigabit services
- ❖ \$60 to \$100 pricing for residential customers and
- ❖ \$500 to \$750 pricing for business customers are being offered in cities and towns across the country Options to enter into PPP, variety of models
- ❖ Models are driven mostly to mitigate debt coverage risk – driven by take rate – driven by pricing
- ❖ City involvement, capital, and ownership are negotiable

MODELS TO CONSIDER

FIBER TO THE PREMISE, GIGABIT BROADBAND

Work with phone/cable company

- City may or may not invest capital to incent the providers
- Low financial risk, and no control
- Shadow Conduit, Joint Builds
- Examples: Arvada, Westminster

Public Private Partnership

- # of Financing Options
- Share in Capital Costs
- Share in the Revenue
- Examples: Centennial, Boulder

City/Town as the ISP

- City/Town invests in Fiber to the Premise
- Provides Internet Services Directly
- Examples: Longmont, Loveland and Ft. Collins

Financial, operational and political risk increases with each “step up”
Control also increases with each “step up”

CAPITAL COSTS, FIBER TO THE PREMISE

Summary, Windsor Fiber to the Premise Capital Costs

Take Rate Percentages	Total Construction Costs	Total Equipment Costs	Total Capital Costs
10%	\$ 39,685,019	\$ 2,336,684	\$ 42,021,704
20%	\$ 40,797,243	\$ 2,579,875	\$ 43,377,118
30%	\$ 41,906,853	\$ 2,846,086	\$ 44,752,939
40%	\$ 43,016,463	\$ 3,093,389	\$ 46,109,851
50%	\$ 44,129,690	\$ 3,357,522	\$ 47,487,212
60%	\$ 45,238,296	\$ 3,711,603	\$ 48,949,899

Best Practices:

- Build in Tranches and Phases
- Build to Demand (i.e. Neighborhood Competition, “Champions”)
- Consider Building to Businesses, Industrial Parks
- Consider Building to 500-1000 feet of distribution fiber first

CAPITAL COSTS DETAIL

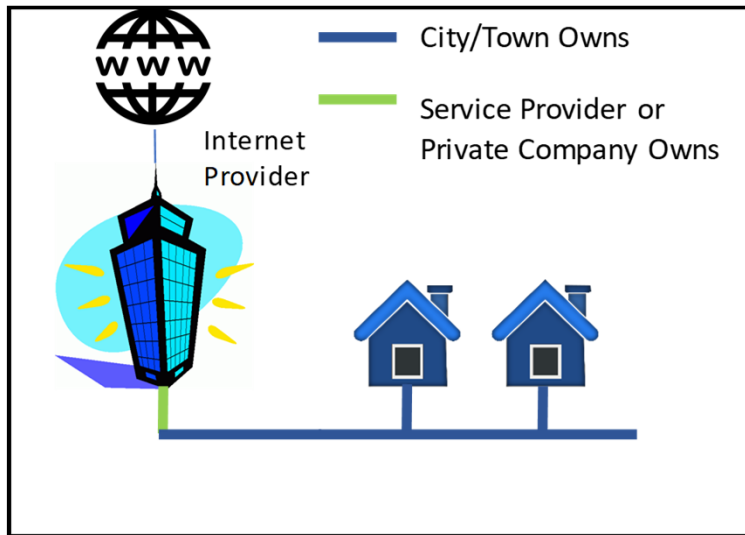
Windsor - FTTTP Construction Costs						
		Cost per Mile		Extended Cost		
		Labor	Material	Labor	Material	Total
Fiber to the Premise	Rt Miles					
Ring	11.7	\$ 120,718	\$ 24,176	\$ 1,412,401	\$ 282,859	\$ 1,695,260
InterConnect	5.7	\$ 120,718	\$ 24,176	\$ 688,093	\$ 137,803	\$ 825,896
FTTP Distribution	214.1	\$ 120,718	\$ 24,176	\$ 25,845,724	\$ 5,176,082	\$ 31,021,806
Service Entrances						
Residential - 4 Fiber Drop	3038	\$ 735.00	\$ 138.00	\$ 2,232,930	\$ 419,244	\$ 2,652,174
MDU - 12 Fiber Drop	18	\$ 2,036.00	\$ 237.00	\$ 36,648	\$ 4,266	\$ 40,914
Business						
4 Fiber Drops	170	\$ 735.00	\$ 138.00	\$ 124,950	\$ 23,460	\$ 148,410
12 Fiber Drop	19	\$ 2,036.00	\$ 237.00	\$ 38,684	\$ 4,503	\$ 43,187
Other - 4 Fiber Drop	15	\$ 735.00	\$ 138.00	\$ 11,025	\$ 2,070	\$ 13,095
Project Total				\$ 30,390,454	\$ 6,050,287	\$ 36,440,742
Engineering						\$ 5,466,111
Total With Engineering						\$ 41,906,853

\$2.846 Million in equipment costs

Total estimated capital cost of \$44.572 Million with Construction and Equipment

Assumption of take rate percentage of 30%

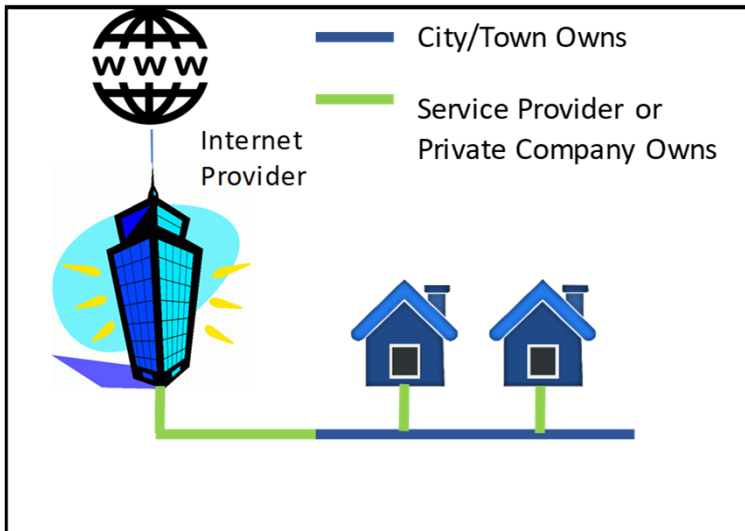
PUBLIC PRIVATE PARTNERSHIP MODELS



Shared Capital Costs and Revenue

In some cases, the Town builds and provides capital for all of the fiber.

In other cases, the Town builds and provides capital for fiber to the Neighborhoods.



Depending upon the agreement, capital costs would range from \$33 – 42 Million

WITH A \$42 MILLION INVESTMENT, PPP

Key Assumptions

- ❖ 3 Tranches of \$14 Million each
- ❖ \$90 - \$100 per month in residential services
- ❖ Business pricing the same as Longmont's
- ❖ \$40 per customer revenue share
- ❖ 25% take rate in first year, additional 10% in second and in third year

Results

- ❖ Not feasible with Windsor on its own.
- ❖ Not enough cashflow from operations to cover debt
- ❖ Doesn't hit 125% coverage ratio to build out next phases

Income Statement	City of Windsor, FTTP Wholesale Model				
	2019	2020	2021	2022	2023
	Forecast Project Period				
	Year 1	Year 2	Year 3	Year 4	Year 5
Revenues					
Service Revenues					
Residential	\$ 759,400	\$ 1,518,800	\$ 2,004,800	\$ 2,187,200	\$ 2,187,200
MDUs	\$ 4,600	\$ 9,000	\$ 11,900	\$ 12,800	\$ 12,800
Small Businesses	\$ 42,600	\$ 85,200	\$ 112,600	\$ 122,800	\$ 122,800
Other	\$ 3,700	\$ 7,400	\$ 9,700	\$ 10,400	\$ 10,400
Total Revenues	\$ 1,115,225	\$ 1,795,650	\$ 2,335,350	\$ 2,428,800	\$ 2,428,800
Expenses					
Internet Access	\$ -	\$ -	\$ -	\$ -	\$ -
Additional Internet Access Costs per Customer	\$ -	\$ -	\$ -	\$ -	\$ -
Annual Growth/Reduction of Internet Access	\$ -	\$ -	\$ -	\$ -	\$ -
Software Maintenance	\$ -	\$ -	\$ -	\$ -	\$ -
Utilities, Power & Environmental	\$ -	\$ -	\$ -	\$ -	\$ -
Salaries, Technicians	\$ 290,803	\$ 247,672	\$ 274,155	\$ 200,590	\$ 200,590
Salaries, Managerial Staff	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
Payroll Taxes and Benefits	\$ 136,781	\$ 121,685	\$ 130,954	\$ 105,207	\$ 105,207
Sales Churn, percent of Total Revenue	\$ 22,305	\$ 35,913	\$ 46,707	\$ 48,576	\$ 48,576
Marketing and Sales, percent of Total Revenue	\$ -	\$ -	\$ -	\$ -	\$ -
Residential Customer Care, Operations	\$ -	\$ -	\$ -	\$ -	\$ -
Business Customer Care, Operations	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenses	\$ 549,888	\$ 505,270	\$ 551,817	\$ 454,373	\$ 454,373
EBITDA	\$ 565,337	\$ 1,290,380	\$ 1,783,533	\$ 1,974,427	\$ 1,974,427
	2019	2020	2021	2022	2023
	Forecast Project Period				
	Year 1	Year 2	Year 3	Year 4	Year 5
Interest Expense	\$ 601,617	\$ 1,192,955	\$ 1,773,559	\$ 1,741,338	\$ 1,707,694
Principal Payments	\$ 232,729	\$ 475,737	\$ 729,479	\$ 761,700	\$ 729,479
Net Income	\$ (269,009)	\$ (378,312)	\$ (719,505)	\$ (528,611)	\$ (462,746)

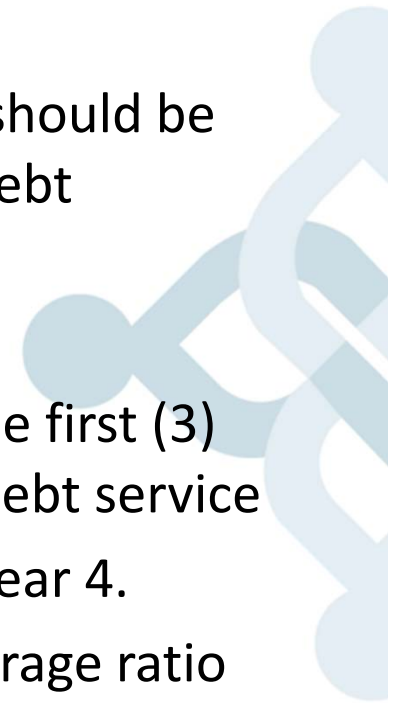
WITH A \$33 MILLION INVESTMENT, PPP

Key Assumptions

- ❖ 3 Tranches of **\$11 Million** each
- ❖ \$90 - \$100 per month in residential services
- ❖ Business pricing the same as Longmont's
- ❖ \$40 per customer revenue share
- ❖ 25% take rate in first year, additional 10% in second and in third year

Results

- ❖ Feasible, but work should be done to minimize debt exposure
- ❖ EBITDA positive
- ❖ Short on cash for the first (3) years after paying debt service
- ❖ Cash is positive in year 4.
- ❖ Does hit 125% coverage ratio to build out next phases



Income Statement	City of Windsor, FTTP Wholesale Model, \$33 Million Capital Investment				
	2019	2020	2021	2022	2023
	Forecast Project Period				
	Year 1	Year 2	Year 3	Year 4	Year 5
Revenues					
Service Revenues					
Residential	\$ 759,400	\$ 1,518,800	\$ 2,004,800	\$ 2,187,200	\$ 2,187,200
MDUs	\$ 4,600	\$ 9,000	\$ 11,900	\$ 12,800	\$ 12,800
Small Businesses	\$ 42,600	\$ 85,200	\$ 112,600	\$ 122,800	\$ 122,800
Other	\$ 3,700	\$ 7,400	\$ 9,700	\$ 10,400	\$ 10,400
Total Revenues	\$ 1,115,225	\$ 1,795,650	\$ 2,335,350	\$ 2,428,800	\$ 2,428,800
Expenses					
Internet Access	\$ -	\$ -	\$ -	\$ -	\$ -
Additional Internet Access Costs per Customer	\$ -	\$ -	\$ -	\$ -	\$ -
Annual Growth/Reduction of Internet Access	\$ -	\$ -	\$ -	\$ -	\$ -
Software Maintenance	\$ -	\$ -	\$ -	\$ -	\$ -
Utilities, Power & Environmental	\$ -	\$ -	\$ -	\$ -	\$ -
Salaries, Technicians	\$ 290,803	\$ 247,672	\$ 274,155	\$ 200,590	\$ 200,590
Salaries, Managerial Staff	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
Payroll Taxes and Benefits	\$ 136,781	\$ 121,685	\$ 130,954	\$ 105,207	\$ 105,207
Sales Churn, percent of Total Revenue	\$ 22,305	\$ 35,913	\$ 46,707	\$ 48,576	\$ 48,576
Marketing and Sales, percent of Total Revenue	\$ -	\$ -	\$ -	\$ -	\$ -
Residential Customer Care, Operations	\$ -	\$ -	\$ -	\$ -	\$ -
Business Customer Care, Operations	\$ -	\$ -	\$ -	\$ -	\$ -
Total Expenses	\$ 549,888	\$ 505,270	\$ 551,817	\$ 454,373	\$ 454,373
EBITDA	\$ 565,337	\$ 1,290,380	\$ 1,783,533	\$ 1,974,427	\$ 1,974,427
	2019	2020	2021	2022	2023
	Forecast Project Period				
	Year 1	Year 2	Year 3	Year 4	Year 5
Interest Expense	\$ 472,699	\$ 937,322	\$ 1,393,511	\$ 1,368,194	\$ 1,341,760
Principal Payments	\$ 182,858	\$ 373,793	\$ 573,162	\$ 598,479	\$ 573,162
Net Income	\$ (90,221)	\$ (20,735)	\$ (183,140)	\$ 7,754	\$ 59,505

CONSIDERATIONS, PPP MODEL

- ❖ Results and Risks improve with potential partnership with other communities (Greeley and others)
- ❖ Can this attract a partner?
- ❖ Do the assumptions work for the partner?
- ❖ Willing to give up some of the control by not owning all of the fiber?
- ❖ With greater take rate percentages, financial results improve
- ❖ With a utility fee, financial results dramatically improve; typical fee may be \$5-10 per month

RETAIL MODEL, TOWN AS THE ISP

Key Assumptions

- ❖ 3 Tranches of \$15 Million each
- ❖ \$80 per month in residential internet; \$20 per month for voice services (10% taking voice services)
- ❖ Business pricing the same as Longmont's
- ❖ 15% take rate in first year, additional 15% in second and 5% in third year

Results

- ❖ Feasible, but again, look for ways to mitigate debt risk
- ❖ EBITDA positive
- ❖ Short on cash for the first year after paying debt service
- ❖ Cash is positive in year 2.
- ❖ Does hit 125% coverage ratio to build out next phases
- ❖ Reserve excess cash for equipment refresh

Income Statement	Town of Windsor, FTTN Retail Model				
	2019	2020	2021	2022	2023
	Forecast Project Period				
	Year 1	Year 2	Year 3	Year 4	Year 5
Revenues					
Service Revenues					
Residential	\$ 963,700	\$ 2,505,100	\$ 3,404,600	\$ 3,597,600	\$ 3,597,600
MDUs	\$ 5,600	\$ 14,500	\$ 19,900	\$ 20,800	\$ 20,800
Small Businesses	\$ 53,900	\$ 140,800	\$ 191,400	\$ 202,000	\$ 202,000
Other	\$ 4,500	\$ 11,800	\$ 16,100	\$ 17,200	\$ 17,200
Total Revenues	\$ 1,265,489	\$ 3,024,071	\$ 3,939,776	\$ 4,104,480	\$ 4,104,480
Expenses					
Internet Access	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000
Additional Internet Access Costs per Customer	\$ 19,557	\$ 39,114	\$ 45,633	\$ 45,633	\$ 45,633
Annual Growth/Reduction of Internet Access	\$ -	\$ (9,911)	\$ (10,563)	\$ (10,563)	\$ (10,563)
Software Maintenance	\$ 9,779	\$ 19,557	\$ 22,817	\$ 22,817	\$ 22,817
Utilities, Power & Environmental	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000
Salaries, Technicians	\$ 115,441	\$ 184,582	\$ 138,179	\$ 109,885	\$ 109,885
Salaries, Managerial Staff	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000
Payroll Taxes and Benefits	\$ 68,404	\$ 92,604	\$ 76,363	\$ 66,460	\$ 66,460
Sales Churn, percent of Total Revenue	\$ 24,814	\$ 59,296	\$ 77,251	\$ 80,480	\$ 80,480
Marketing and Sales, percent of Total Revenue	\$ 62,034	\$ 148,239	\$ 193,126	\$ 201,200	\$ 201,200
Residential Customer Care, Operations	\$ 1,621	\$ 3,242	\$ 3,782	\$ 3,782	\$ 3,782
Business Customer Care, Operations	\$ 9	\$ 18	\$ 21	\$ 21	\$ 21
Total Expenses	\$ 469,181	\$ 720,180	\$ 739,334	\$ 714,430	\$ 714,430
EBITDA	\$ 796,308	\$ 2,303,890	\$ 3,200,441	\$ 3,390,050	\$ 3,390,050
	2019	2020	2021	2022	2023
	Forecast Project Period				
	Year 1	Year 2	Year 3	Year 4	Year 5
Interest Expense	\$ 644,590	\$ 1,278,166	\$ 1,900,242	\$ 1,865,720	\$ 1,829,672
Principal Payments	\$ 249,352	\$ 509,718	\$ 781,585	\$ 816,107	\$ 781,585
Net Income	\$ (97,635)	\$ 516,006	\$ 518,614	\$ 708,223	\$ 778,793

CONSIDERATIONS, RETAIL MODEL

- ❖ Results and Risks improve with potential partnership with other communities (Greeley and others)
- ❖ With greater take rate percentages, financial results improve; can potentially reduce monthly pricing to increase take rate. (Recommend surveys and follow up with citizens; may not need to do this)
- ❖ Utility fee of \$5-10 improves the model

Income Statement	Town of Windsor, FTTP Retail Model, \$7 Utility Fee				
	2019	2020	2021	2022	2023
	Forecast Project Period				
	Year 1	Year 2	Year 3	Year 4	Year 5
Revenues					
Service Revenues					
Residential	\$ 963,700	\$ 2,505,100	\$ 3,404,600	\$ 3,597,600	\$ 3,597,600
MDUs	\$ 5,600	\$ 14,500	\$ 19,900	\$ 20,800	\$ 20,800
Small Businesses	\$ 53,900	\$ 140,800	\$ 191,400	\$ 202,000	\$ 202,000
Other	\$ 4,500	\$ 11,800	\$ 16,100	\$ 17,200	\$ 17,200
Tap Fee or Installation Fee - Residential (one time)	\$ 162,240	\$ 162,240	\$ 54,080	\$ -	\$ -
Tap Fee or Installation Fee - Business (one time)	\$ 735	\$ 735	\$ 245	\$ -	\$ -
Per premise passed fee	\$ 190,138	\$ 304,220	\$ 304,220	\$ 304,220	\$ 304,220
Total Revenues	\$ 1,430,813	\$ 3,268,995	\$ 4,166,745	\$ 4,328,220	\$ 4,328,220
Revenue Inflation	\$ 28,616	\$ 65,380	\$ 83,335	\$ 86,564	\$ 86,564
Total Revenues	\$ 1,459,429	\$ 3,334,375	\$ 4,250,080	\$ 4,414,784	\$ 4,414,784
Expenses					
Internet Access	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000
Additional Internet Access Costs per Customer	\$ 19,557	\$ 39,114	\$ 45,633	\$ 45,633	\$ 45,633
Annual Growth/Reduction of Internet Access	\$ -	\$ (9,911)	\$ (10,563)	\$ (10,563)	\$ (10,563)
Software Maintenance	\$ 9,779	\$ 19,557	\$ 22,817	\$ 22,817	\$ 22,817
Utilities, Power & Environmental	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000
Salaries, Technicians	\$ 115,441	\$ 184,582	\$ 138,179	\$ 109,885	\$ 109,885
Salaries, Managerial Staff	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000
Payroll Taxes and Benefits	\$ 68,404	\$ 92,604	\$ 76,363	\$ 66,460	\$ 66,460
Sales Churn, percent of Total Revenue	\$ 24,814	\$ 59,296	\$ 77,251	\$ 80,480	\$ 80,480
Marketing and Sales, percent of Total Revenue	\$ 62,034	\$ 148,239	\$ 193,126	\$ 201,200	\$ 201,200
Residential Customer Care, Operations	\$ 1,621	\$ 3,242	\$ 3,782	\$ 3,782	\$ 3,782
Business Customer Care, Operations	\$ 9	\$ 18	\$ 21	\$ 21	\$ 21
Total Expenses	\$ 469,181	\$ 720,180	\$ 739,334	\$ 714,430	\$ 714,430
EBITDA	\$ 990,248	\$ 2,614,195	\$ 3,510,746	\$ 3,700,354	\$ 3,700,354
	2019	2020	2021	2022	2023
	Forecast Project Period				
	Year 1	Year 2	Year 3	Year 4	Year 5
Interest Expense	\$ 644,590	\$ 1,278,166	\$ 1,900,242	\$ 1,865,720	\$ 1,829,672
Principal Payments	\$ 249,352	\$ 509,718	\$ 781,585	\$ 816,107	\$ 781,585
Net Income	\$ 96,306	\$ 826,310	\$ 828,919	\$ 1,018,528	\$ 1,089,097

FEEDBACK AND POSSIBLE NEXT STEPS

- ❖ Look into Further Regional Collaboration
- ❖ Citizen feedback, pricing and take rates
- ❖ Deeper dive into Assumptions and Outcomes
- ❖ Further refine Capital Costs with Final Design
- ❖ Feedback from the Council



QUESTIONS?

THANK YOU



EXECUTIVE SUMMARY

CITY OF GREELEY AND TOWN OF WINDSOR, BROADBAND ROADMAP

May 2018

Abstract

Municipalities are taking a more active role in ensuring their communities have reliable, abundant and affordable broadband services for their citizens. Additionally, smart city applications are requiring local governments to plan for robust infrastructure to support these emerging technologies. This white paper discusses models and approaches for the City of Greeley and the Town of Windsor to consider and provides a platform to evaluate financial implications, levels of investment, models and strategies, and options for implementation.

Prepared for the City of Greeley and the Town of Windsor,
by Diane Kruse, NEO Connect

Introduction and Initial Recommendations

Background Information

The City of Greeley and the Town of Windsor have hired NEO Connect to provide strategic planning for facilitation of better broadband services for the communities. In parallel with NEO's engagement, the City of Greeley and the Town of Windsor staff have conducted high-level surveys from citizens regarding their thoughts on current broadband services, what is important and their opinion regarding the role of government in solving broadband gaps.

Additionally, NEO and City staff have conducted community engagement meetings with the public for feedback. NEO's team provided a current assessment of the broadband landscape in Greeley and Windsor. NEO researched the existing services, pricing and availability of broadband service within both communities and identified gaps in service availability provided by the incumbent providers.

There are many levels of investment that may be considered by a local government to improve broadband services. The first level of investment may be to implement policies and ordinances that reduce the cost of broadband deployment. Another level of investment may be to connect various government and anchor institutions within each community. These strategies lay the foundation for connecting important facilities and help create a broadband distribution system that can further be expanded. Another level of investment may be to extend the broadband distribution system into neighborhoods to connect homes and businesses with fiber.

To identify the costs of various levels of investment, NEO's team gathered information regarding the City of Greeley's and the Town of Windsor's smart city, traffic management, capital improvement projects, and other government communication needs. NEO identified and mapped existing assets that could potentially be leveraged to improve broadband services and identified key community anchor institutions that could benefit from having fiber built directly to their locations. We then provided a high-level design and capital cost projection for several levels of broadband infrastructure development and investment.

In addition to the above set of tasks, NEO's scope of work included providing models for public-private partnerships and best practices regarding what other municipalities are doing or have done to improve broadband services.

Why this is Important and Why Municipalities are Investing in Broadband

Having access to very high-speed broadband and Internet services has become one of the most critical components for education, government services, economic development, healthcare, utility operations, first responders and business operations. The demand for more bandwidth

continues to grow. By 2021, there will be over 30 billion devices connected by the Internet of Things (IoT). Each person will have over 13 connected devices on average, including their cell phones, tablets, clothing, and their cars. The global Internet traffic continues to explode. In 1992, global Internet traffic per *day* was 100 Gigabits. In 2016, the global Internet traffic per *second* was 26,600 Gigabits. It is projected that global Internet use will continue to expand dramatically.

Global Internet Traffic	
1992	100 GB per DAY
1997	100 GB per HOUR
2002	100 GB per SECOND
2007	2,000 GB per SECOND
2016	26,600 GB per SECOND
2021	105,800 GB per SECOND

Internet, data and cellular growth will continue to double in bandwidth every one to two years. Although some of the existing Internet Service Providers (ISP) have invested in their networks to keep up with demand, the majority of networks built by cable and phone companies are maxed out. As the Internet drives all things regarding economic development and vitality, simply put, connectivity is essential.

Coupled with the ever-growing importance of the Internet, the convergence of new smart city applications, traffic management needs, the growth of and application for small cellular site installation and the soon-coming implementation of self-driving vehicles, municipalities are seeking strategies to facilitate and coordinate investment.

Recently, the FCC overturned Net Neutrality rules that govern the availability and access to content and bandwidth. These rules prevented ISP's from blocking certain types of content or placing specific websites or applications in preferential "fast lanes." The FCC's overturning these rules could help the large or incumbent providers stifle the ability of smaller internet companies to compete. Some critics of FCC's decision worry that the large ISPs will begin prioritizing certain websites, applications, content and services over others, either by charging customers to access that content or charging Internet companies to access customers. Internet websites could be "packaged" or "channelized" similar to the way cable companies provide a roster of channels and programming.

The Cities of Longmont, Boulder, Loveland and Ft. Collins are implementing locally-run Internet services as a way of ensuring their citizens and businesses are not impacted by the overturning of Net Neutrality rules. These cities are stating that the Internet would remain open and equitable, serving as a countermeasure to corporations potentially taking over the Internet.

Another reason why local governments invest in broadband infrastructure is to address the availability of advanced broadband services throughout the entire city or town boundary. In

many instances, the incumbent cable and phone companies have invested in some part of the municipality, but much of the community does not have adequate services. Municipalities invest to ensure that all citizens and businesses have access to advanced broadband services at affordable prices and that no one is left out of participating in the digital economy.

Municipal facilitation can take the form of implementing broadband friendly policies and ordinances to reduce the cost of implementation by the private sector, to investing and implementing fiber for government applications and to key anchor institutions, to entering into a public-private partnership to promote a ubiquitous Gigabit strategy, to a full-blown implementation and operations of a municipally-owned Internet Service Provider.

Considerations that impact a local government's broadband strategy and involvement include the level or amount of municipal investment, examination of models and approaches implemented by other communities, exploration of how networks are typically implemented, constructed and operated, as well as exploration of public-private partnership models that are emerging in the industry and possible financing strategies for implementation.

Summary of the Survey Results

Below is a summary of the residential survey results that were facilitated by the Town of Windsor and the City of Greeley staff.

643 residential surveys responses were received. The surveys were posted on the City of Greeley's and the Town of Windsor's websites and social media sites. Although the survey was filled out most likely from residences that care about Internet services, or potentially have an issue with their current Internet services, the survey results strongly suggest the following:

- Reliability is the most important factor for the community, followed by speed and price.
- The community wants to see more reliable, faster, and more abundant broadband services. 81-82% of the respondents stated that the download and upload speeds are too slow either sometimes, most of the time or always. Speeds vary throughout the day as more users are on the Internet and there are times when respondents cannot get on the Internet.
- 54% of the residential respondents telecommute, having either one or more people working from home, providing insight into the broadband needs of homes within the communities.
- 62% of the respondents were Comcast customers using cable modem service; followed by 21% of the respondents using CenturyLink's DSL services.
- When asked to rank the local government's role with respect to broadband access, 57% of the respondents ranked "to build network for the public: homes, businesses and government locations" as the primary role of government, with 16% stating the government's role should be to "partner with current providers" as the primary role.

- 66% of the respondents stated they would support a small monthly utility fee to pay for broadband infrastructure build out.
- The survey stated that the City of Longmont recently became Colorado's first "Gig City," building a fiber network that provides residents with reasonably priced Gigabit service to the home. The survey asked "Would you support the City of Greeley and the Town of Windsor offering Gigabit service to the home." 73% answered "Yes" and 19% answered that more information would be needed. Only 8% replied "No."
- 21% of the respondents said they would potentially move if adequate broadband was not available and 5% said they would definitely move.

Although Comcast has stated that Gigabit speeds (1000 Megabit per second (Mbps)) are available throughout Greeley and Windsor, of the respondents that indicated that they are Comcast customers, none of the speed tests conducted were at Gigabit speeds. The highest speed test result was 350 Mbps in download speeds. The average speed test results for Comcast customers were 71.45 Mbps in download speeds and 8.99 Mbps in upload speeds.

The reasons for the discrepancy between Comcast's speed test results and their stated available speeds are varied. Either customers are signing up for a lower service speed through Comcast, Comcast is not delivering Gigabit speeds, the devices do not support these high bandwidths, Comcast's network was constrained as more users were on the Internet, or Gigabit services are not offered by Comcast in their neighborhoods. There is not an easy way to determine why higher speeds were not achieved by the speed tests.

The FCC definition for broadband is 25 Mbps in download speeds and 3 Mbps in upload speeds. The average speed test for CenturyLink customers was 11.88 Mbps in download speeds and 2.04 Mbps in upload speeds. None of the CenturyLink customers that participated in the survey and speed test met the FCC's definition of broadband service.

Most of the survey respondents also provided comments – All of the comments that were received are included within the Appendix A of this report. Results of the survey are provided within a separate document.

To summarize, most of the comments received were in support of the City of Greeley and the Town of Windsor to invest in a ubiquitous Gigabit fiber initiative. There were a handful of comments that discouraged the government from getting into the broadband business. Many of the responses discussed concern over the existing services not being available, fast enough, or providing the level of services that were subscribed. Many comments discussed the lack of customer care or service available from the incumbent providers. Some responses discussed how no broadband service is available within their neighborhoods and that Comcast does not serve their home with cable TV or broadband service. A good portion of the comments encouraged the City/Town to follow what the City of Longmont has done and what the Cities of Boulder, Loveland and Fort Collins are considering.

Current Assessment, Existing Services and Gaps

Based upon information gathered by the FCC, the Broadband USA Mapping Tool, Broadband Now and the State of Colorado, the following provides information regarding current services and gaps of service within Windsor and Greeley.

Windsor Market

The incumbent cable company in Windsor is Comcast, serving approximately 77% of Windsor; 12.1% of Windsor receive TDS cable services. The incumbent phone company is CenturyLink, with 98.2% of the community having access to DSL services. Rise Broadband is a fixed wireless provider in Windsor and satellite services are available through HughesNet and Viasat. Business Internet providers include CenturyLink, Comcast, Rise Broadband, as well as MHO, another fixed wireless provider in Windsor and Electric Lightwave, Birch Communications and GTT Communications.

According to BroadbandNow, the average download speed in Windsor is 26.82 Mbps. Speed test data is based upon 6,072 speed tests from IP verified users who took speeds test in Windsor between April 2017 and March 2018. Windsor's average download speed is 24.7% slower than the average in Colorado and 17.5% slower than the national average.

12.6% of the Windsor homes have one or fewer wired Internet providers available to them. In other words, these homes have only 1 choice or no options for Internet services.

Greeley Market

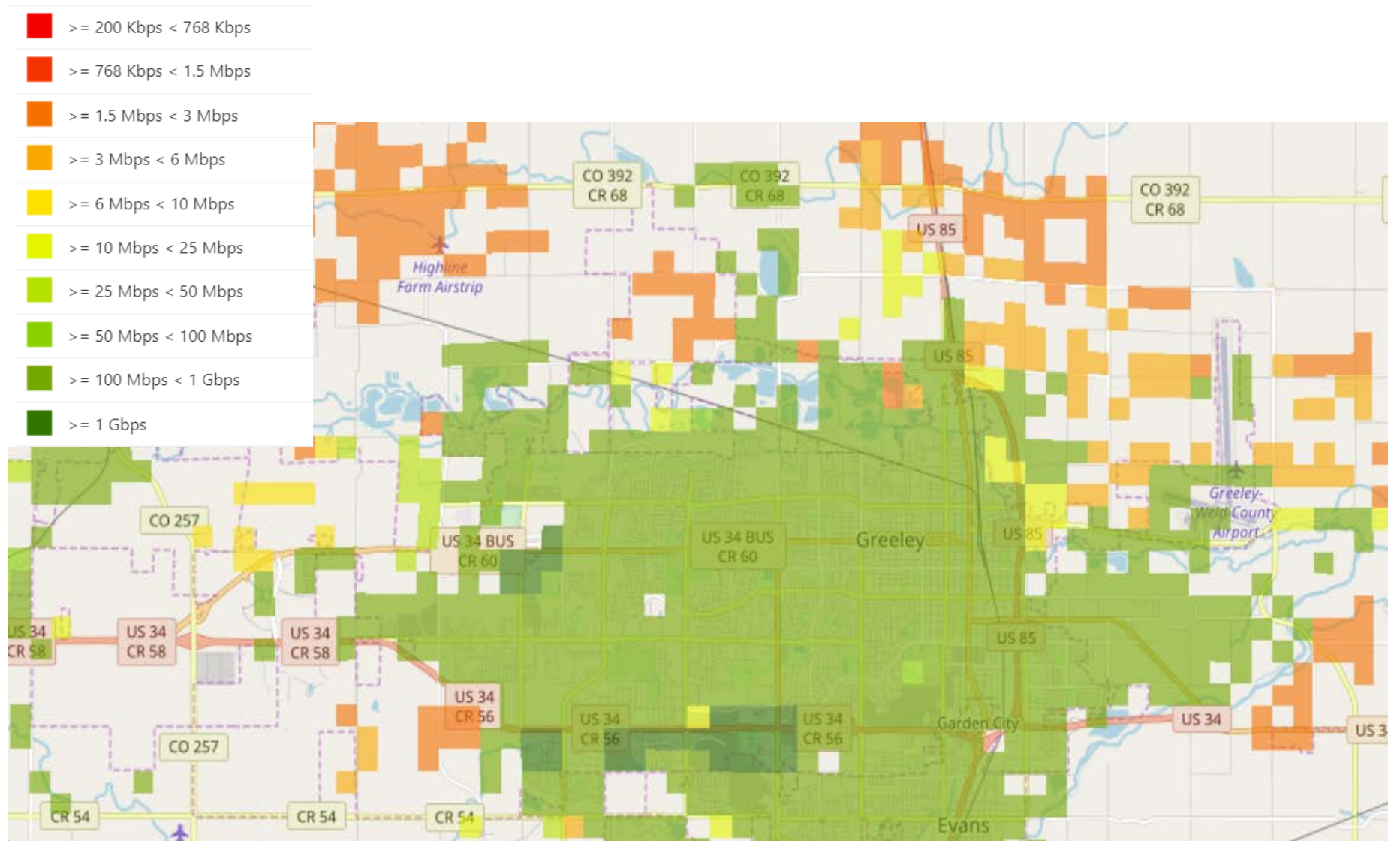
Residential providers in Greeley include Comcast, CenturyLink, Rise Broadband and Windstream. Satellite providers are HughesNet and Exede Internet. Blue Lightning provides fiber services to 1.1% of the residential community. Business Internet providers include all of the providers listed in Windsor, as well as Level 3 Communications, NewCloud and MegaPath.

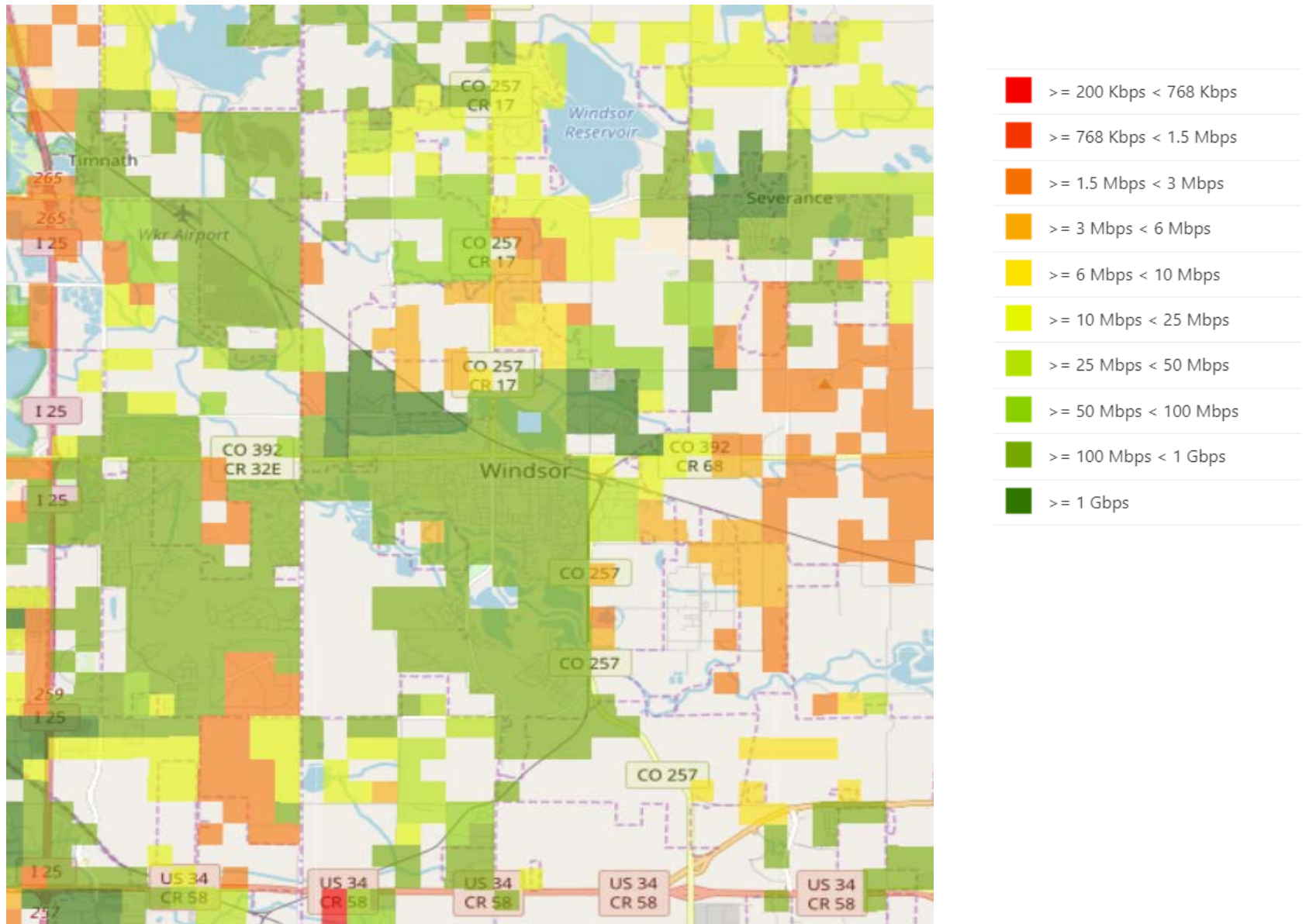
As in Windsor, 12.1% of the consumers in Greeley have access to one or fewer providers. Based upon 26,262 speed tests from April 2017 to March 2018, the average download speed in Greeley is 35.73 Mbps. This is 6.4% faster than the average in Colorado and 11.8% faster than the national average.

Current Speeds and Availability

Comcast states that it offers Gigabit broadband services within Greeley and Windsor, but Gigabit services are not currently available ubiquitously throughout both communities. For this study, Comcast has committed to providing coverage maps of their Gigabit service offerings.

According to the State of Colorado's OIT broadband map, the following maps shows what services are available throughout both communities. Areas shown in dark green have access to up to 1 Gigabit of service.





Initial Recommendations

As discussed, there are several levels of investment that may facilitate better broadband services within a City/Town. Here are the various levels of investment that were evaluated as part of this study.

Levels of Investment

-  1) Implement Broadband Friendly Policies and Ordinances and Smart Conduit Construction to Gain Assets and Attract Partners
-  2) Connect City Government and Smart City Applications
-  3) Connect other Key Community Anchor Institutions
-  4) Connect Homes and Businesses with Fiber through a Public-Private Partnership or through offering Broadband as a Service
-  5) Further Evaluate Working with Existing Providers to Improve their Services (Comcast, CenturyLink)

Based upon the initial findings of the broadband plan, NEO and staff recommend the first three levels of investment be considered. The first three recommendations will facilitate and lower the costs for broadband implementation and lay the foundation for improving broadband infrastructure within both communities, regardless of whether the City/Town decides to move forward with a Gigabit broadband strategy to connecting homes and businesses, or not.

Connecting city government locations (water monitoring systems, public safety and other government buildings), smart city applications (traffic lights and parking meters) and key community anchor institutions (i.e. hospitals, schools, and universities) with fiber will greatly enhance communications and broadband speeds for these locations, while dramatically reducing communications costs. While these key facilities are being connected with fiber, both communities will gain more fiber assets that can be leveraged for building out to neighborhoods to connect homes and businesses with fiber. Implementing a shadow conduit/dig once policy will allow the City/Town to facilitate further broadband development

by reducing the costs of broadband expansion, by leveraging existing public works or construction by other entities.

All of these first three levels of investment will improve communications for applications that will be needed regardless of whether or how the City/Town moves forward with a more ubiquitous Gigabit broadband strategy. Additionally, these strategies will lower the overall cost of further expansion and will provide assets (conduit and fiber) for the City/Town to use as leverage to potentially negotiate a public-private partnership for further expansion.

NEO and staff recommend that investigation into how to implement a ubiquitous Gigabit broadband strategy for homes and businesses be further evaluated (item #4 and #5 above under Levels of Investment.) This would include weighing the pros and cons of various public-private partnership models or providing broadband services directly to citizens and businesses or working with the incumbent providers Comcast and CenturyLink to improve their availability of Gigabit broadband services.

Summary of Capital Costs for the Various Levels of Investment

Below is a summary of the capital costs for implementation of the various levels of investment.

The projected capital costs for the City of Greeley's build for items #2 and #3 is shown below.

With the Use of Existing Fiber				
Description	Eng. & Construction Management	Labor	Materials	Project Total
Traffic Lights, Public Safety, Water Meters, Parking Meters - "Smart City"	\$ 270,043	\$ 1,161,935	\$ 260,223	\$ 1,692,201
Water Meter Locations outside City Limits	\$ 41,358	\$ 183,964	\$ 50,488	\$ 275,810
Adding on All Other Anchor Institutions	\$ 230,184	\$ 1,166,545	\$ 351,754	\$ 1,748,483
Total	\$ 541,585	\$ 2,512,444	\$ 662,465	\$ 3,716,493

As a New Build				
Description	Eng. & Construction Management	Labor	Materials	Project Total
Traffic Lights, Public Safety, Water Meters, Parking Meters - "Smart City"	\$ 624,146	\$ 3,260,450	\$ 758,316	\$ 4,642,912
Water Meter Locations outside City Limits	\$ 41,358	\$ 183,964	\$ 50,488	\$ 275,810
Adding on All Other Anchor Institutions	\$ 473,049	\$ 2,095,045	\$ 516,856	\$ 3,084,950
Total	\$ 1,138,553	\$ 5,539,459	\$ 1,325,660	\$ 8,003,673

A summary of the projected capital costs for the Town of Windsor's build for #2 and #3 is shown below.

With the Use of Existing Fiber				
	Eng. & Construction Management	Labor	Materials	Total
Public Safety, SCADA, Smart City	\$ 11,532	\$ 72,844	\$ 27,709	\$ 112,085
Adding on All Other Anchor Institutions	\$ 11,160	\$ 93,390	\$ 43,481	\$ 148,031
Total	\$ 22,692	\$ 166,234	\$ 71,190	\$ 260,116

As a New Build				
	Eng. & Construction Management	Labor	Materials	Total
Public Safety, SCADA, Smart City	\$ 150,660	\$ 604,032	\$ 131,811	\$ 886,503
Adding on All Other Anchor Institutions	\$ 139,965	\$ 588,167	\$ 132,224	\$ 860,356
Total	\$ 290,625	\$ 1,192,199	\$ 264,035	\$ 1,746,859

Most Fiber-to-the-Premise network use a Gigabit Passive Optical Network (GPON) architecture with active connections to large businesses, mission critical or government locations. Active or passive simply refers to powered electronics in the field. In other words, with a passive architecture, there are no electronics located between the network operations center and the home.

Capital costs will increase when the market share or take rate percentage increases. Below are the projected capital costs with various take rate percentages.

Summary, Windsor Fiber to the Premise Capital Costs			
Take Rate Percentages	Total Construction Costs	Total Equipment Costs	Total Capital Costs
10%	\$ 39,685,019	\$ 2,336,684	\$ 42,021,704
20%	\$ 40,797,243	\$ 2,579,875	\$ 43,377,118
30%	\$ 41,906,853	\$ 2,846,086	\$ 44,752,939
40%	\$ 43,016,463	\$ 3,093,389	\$ 46,109,851
50%	\$ 44,129,690	\$ 3,357,522	\$ 47,487,212
60%	\$ 45,238,296	\$ 3,711,603	\$ 48,949,899

Summary, Greeley Fiber to the Premise Capital Costs			
Take Rate Percentages	Total Construction Costs	Total Equipment Costs	Total Capital Costs
10%	\$ 91,877,838	\$ 7,438,297	\$ 99,316,135
20%	\$ 95,308,477	\$ 9,475,631	\$ 104,784,107
30%	\$ 98,737,505	\$ 11,803,153	\$ 110,540,658
40%	\$ 102,168,144	\$ 14,006,794	\$ 116,174,938
50%	\$ 105,603,404	\$ 16,097,703	\$ 121,701,107
60%	\$ 109,034,043	\$ 18,535,591	\$ 127,569,634

As the capital costs and financial risk is high for building fiber to homes and businesses, NEO and City/Town staff recommending further investigation into various strategies and models for implementing this approach.

Following this report, a companion report will be provided that will discuss the financial considerations and implications of various Gigabit strategies. Financial projections, staffing considerations and financing strategies will be discussed for each model. Additionally, the companion report will address funding and financing options for consideration.



FUTURE TOWN BOARD MEETINGS

August 7, 2018	National Night Out
August 13, 2018 5: 30 p.m.	Board/Manager/Attorney Monthly Meeting Broe—R.O. Plant Update (10 minutes) Code Updates: General Commercial Service and Storage Areas; and Multifamily Residential Parking Requirements - Planning
August 13, 2018 7:00 p.m.	Town Board Meeting
August 20, 2018 5:30 p.m.	Town Board Work Session Strategic Plan Follow-up – Sheryl Trent Capital Improvement Project Update
August 27, 2018 6:00 p.m.	Town Board Work Session Discuss Enforcement Options for Municipal Court- Kim Emil
August 27, 2018 7:00 p.m.	Town Board Meeting
August 29, 2018 5:30pm	Joint Board Meeting—Library, Fire Department, Town of Severance, School District Windsor-Severance Library
September 3, 2018	Town Hall Closed- Labor Day
September 10, 2018 5:30 p.m.	Board/Manager/Attorney Monthly Meeting Landscape Code Update
September 10, 2018 7:00 p.m.	Town Board Meeting
September 17, 2018 6:00 p.m.	Town Board Work Session
September 24, 2018 6:00 p.m.	Town Board Work Session
September 24, 2018 7:00 p.m.	Town Board Meeting
October 1, 2018 6:00 p.m.	Town Board Work Session Budget Meeting
October 8, 2018 5:30 p.m.	Board/Manager/Attorney Monthly Meeting Budget Meeting

October 8, 2018 Town Board Regular Meeting
7:00 p.m.

October 15, 2018 Town Board Work Session
6:00 p.m. Budget Meeting

October 22, 2018 Town Board Work Session
6:00 p.m. Budget Meeting

October 22, 2018 Town Board Regular Meeting
7:00 p.m.

Additional Events

October 2, 2018 Joint Dinner with Weld County - Pelican Lakes Grillhouse
November 17, 2018 Civic Service Day @ CSU Football Game

Future Work Session Topics

- Sign Code Update meeting with Planning Commission (next code section in series) – Planning
- Residential buildout at 60,000 population
- Economic development/retail needs at 60,000 population
- Water needs at 60,000 population
- Transportation—20 year projection
- Contractor licensing