

BAYFIELD

COLORADO ♦ *Where Stars Shine Bright*



BROADBAND VISION & PLANNING STUDY

MARCH 27, 2020





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Section 1: Executive Summary

The Bayfield Broadband Project

The Town of Bayfield determined in 2019 that a full exploration of the town's current broadband service, and an exploration of options to provide reliable, cost-effective and fast Internet service was a wise investment for the community. Community leaders were concerned that the speeds, quality and service received by residents, business and industry in and around Bayfield were not adequate to empower the community's desired growth.

Town leaders selected HR Green to complete a Vision and Planning Study designed to gather stakeholder needs, document current infrastructure and provider options, and complete modeling (costs, risks, funding, anticipated revenues) of the different options available to Bayfield (owning and operating, partnerships, leasing, etc.). This study was conducted over nine months and resulted in the delivery of this Study to the town on March 27, 2020.

The Executive Summary provides a high level overview of the key findings of the project, as well as the recommendations that were adopted by the Board of Trustees as a roadmap for the town to resolve the issues identified. Further details of the study are contained in this study, and the models, GIS tools, Standards and other deliverables from the consultant were provided separately to Town leaders.

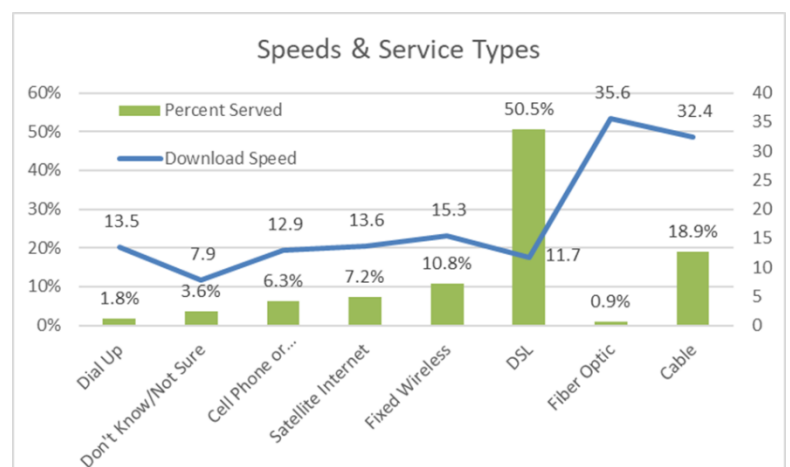
While the study has identified a number of key issues from the community, there is a positive outcome that a solution is feasible by creating a partnership with the private sector. This will entail the creation of both a core network by the Town, last-mile connectivity by private providers and enabling funding from the state of Colorado. The road to this solution is not easy or automatic, as funding must be developed in a competitive environment, but there is a path forward. And dramatic service improvements are within reach.

Findings

FINDING #1: BAYFIELD RESIDENTS ARE UNDERSERVED AND WANT TOWN INVOLVEMENT

Across more than 114 completed surveys of residents and business owners, there were widespread reports of residents reporting speeds below the FCC definition of broadband, a high level of dissatisfaction with current options and a higher-than-anticipated level of service outages.

Beyond service levels, residents also feel it is important for the Town to be involved in finding a solution. Eighty-three percent said they feel internet is an essential utility, while 85 percent indicated they would be very or somewhat likely to purchase services from Bayfield or one of its partners. Beyond services, survey respondents were philosophically aligned to the concept of government sponsored services with 87 percent saying they feel it is appropriate for Bayfield or a partner to compete with the private sector.



FINDING #2: REGIONAL OPPORTUNITIES AND PARTNERSHIPS ARE AVAILABLE

There are 11 providers currently serving the Bayfield market, ranging from the incumbent CenturyLink to Wireless Internet Service Providers (WISPs) to Fiber-based providers. HR Green staff executed a Request for Expression of Interest (EOI) that provided potential partners with a map of the proposed network, an overview of the potential business model options under consideration and asked them to respond with detailed options and alternatives to partner with the Town.

Four providers responded to the EOI indicating their interest in a potential partnership with the Town to extend broadband ubiquitously throughout the Town. The presence of a large contingent of partners and very strong interest in the formal EOI process. Further details surrounding the EOI process and interested partners can be found in Section 10 of this report.

FINDING #3: BROADBAND SERVICE EXPANSION IS FINANCIALLY FEASIBLE IN BAYFIELD

A study of the financial feasibility of the project was conducted to determine if a system could be built and operated that meets the Board's goals for ubiquity, speed and service, while remaining financially self-funding. Three models were created, and two models demonstrated financial viability across 20- and 30-year lifecycles. A publicly-owned and operated model was NOT feasible given the low potential subscriber counts and the need to build and establish staff and infrastructure.

Both models deemed feasible were based on the creation of dark fiber networks and subsequent leasing of dark fibers to provider(s) who would extend service to individual homes and businesses.

The Core Network Lease Model, which was designated as the preferred alternative, was based on a preliminary network design created by HR Green staff featuring the use of current conduit assets and the extension of new fiber and conduit to form a distribution backbone. The model assumes that a private-sector partner will construct and finance individual connections to homes and businesses and will pay lease fees to the Town for the use of the distribution backbone.

Utilizing current area lease rates, the models reflect that a ubiquitous Core and Distribution network could be designed and constructed for \$979,000. After stabilization, operating expenses of \$69,000 were estimated to reflect ongoing (non-capital) expenses as a cost of network maintenance.

The Bayfield Leased Network Model is feasible assuming the acquisition of state grant money through the Department of Local Affairs (DOLA) broadband grant funding at 50 percent of the total cost of capital expenditure. Without state funding assistance, the build would not be economically feasible in the future. The model assumes that the Town would create a 20-year financing vehicle to cover initial CapEx and ongoing operating expenses totaling \$490,000 to \$500,000.

Assuming grant assistance is available, the models reflect a turn to positive net income in year five of the project. Overall cash flow fully covers the principal and interest on the financing vehicle and ongoing operations costs and make the overall implementation achievable with the assumptions provided.

FINDING #4: TRUSTEES AND STAFF FULLY SUPPORT IMPROVED BROADBAND SERVICE

Trustees and staff believe that broadband services need to be improved in the Town. Bayfield, unlike some rural Colorado communities, has a meaningful number of rival providers who are making incremental strides to improve service beyond that available over DSL from CenturyLink. These efforts have been focused on newer residential developments, anchor institutions and businesses who offer higher returns on investment for the ISPs. Unfortunately, while this has improved broadband in certain pockets of town, it has left large pockets of unserved or underserved residential and business locations throughout the Town.

At a July 3, 2019 working session, Town Trustees discussed a number of competing values that must be considered in establishing the direction for a municipal broadband project. As a result of this meeting and as subsequently discussed at a working session in February, 2020, the Trustees are interested in exploring grant funding and moving forward with initial design of an open access network, creation of a formal RFP process to select a provider (or providers).

Recommendations

At the February 18, 2020 meeting of the Board of Trustees, HR Green staff presented several recommendations, which were agreed to by the Board in concept. In order to fully realize the benefits of improved broadband service, a number of recommendations must be executed concurrently, primarily due to the need for state funding as a mechanism to drive an otherwise infeasible project deployment and the complicated nature of the potential Public Private Partnership.

RECOMMENDATION #1: COMPLETE FORMAL REQUEST FOR PROPOSAL (RFP) TO IDENTIFY PARTNER(S)

The EOI process conducted as part of this study was useful to determine interested parties but does not provide the Town with enough details to fully determine a proposed partner nor the form of the partnership. It is recommended that the Town of Bayfield conduct a formal RFP to identify and select its partner(s) for the potential buildout.

RECOMMENDATION #2: PURSUE PHASED GRANT FUNDING

As identified throughout this report, the project cannot move forward without identified and committed grant funding. There are three grant application periods through DOLA which can be used for both engineering and final construction expenses. A formal grant application should be submitted as soon as practical to cover final engineering design of the proposed city-owned network.

A subsequent grant request can be submitted following completion of the final engineering design to fund the network construction.

It is also recommended that the selection of a private partner be timed to allow for coordination of private-sector grant requests to assist with paying for last-mile connectivity. Ideally, a coordinated approach would assure both the private sector and the Town of availability of state funds to complete both the city-owned distribution network and the last-mile connections due to the interdependence of both funding sources to completion of the two-phase project.

Section 2: Community Engagement Results

Introduction

The initial step of the Study was the development and implementation of a community engagement program. This program included surveys of residents and business owners that helped decision makers better understand community needs. Public meetings with policy makers and community members drove visibility into community goals and set the stage for future success.

Outreach Plan

The outreach plan included the delivery of surveys for residents and businesses to determine the community's desire for broadband service; current market conditions and deficiencies, predicted take rate and optimum monthly cost users would be willing to pay for the service; stakeholder needs and what role the government should take in providing the service.

Business and Residential Survey Results

The survey included a detailed list of questions to capture the data needed. Surveys were emailed to citizens and local businesses as well as accessible via a link on the Town website. The survey requested information about phone, television and Internet service; which provider is used; at what costs; what they liked and disliked today or would wish in the future and, even a bit about what they do with Internet services.

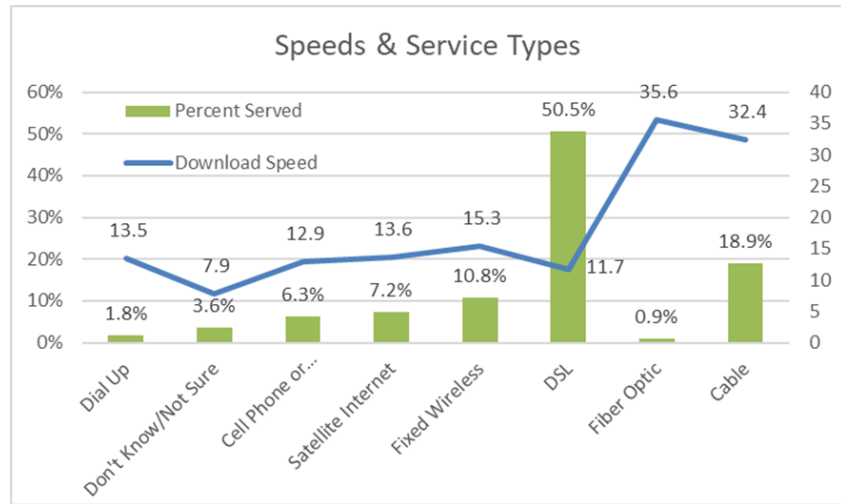
Questions were also asked about the household composition, do they have children; do they work at home, solely or occasionally and the age of the respondent. Some of the questions asked were what is important to them personally, what do they value about communications services, what is important to the community and, most importantly, what they think the Town should do.

For residential service, 112 survey responses were received. This results in a 95 percent confidence level that responses are accurate to within +/-9 percent. While full details are found in the appendix of this report, highlights of the survey findings which guided the Bayfield Board of Trustees' decision making are outlined below. These findings help to illustrate the challenging conditions today and indicate a need for more robust broadband services in the future in the community.

Throughout this document, broadband is defined as internet services that meet the Federal Communications Commission definition of Advanced Telecommunication Services. The FCC defines broadband as the delivery of services to customers at the minimum of 25 Megabits per second (Mbps) download speed and 3 Mbps upload speed.

True Broadband is Rare in Bayfield

When measured against the federal definition of Broadband, the residents of Bayfield report significant gaps. The survey respondents were asked to take a speed test through an online tool and report their actual speeds. While this method is reliant on variables such as the quality of in-home networking equipment, the results are generally accurate to show actual speed of service received, if not precise to the Mbps level.



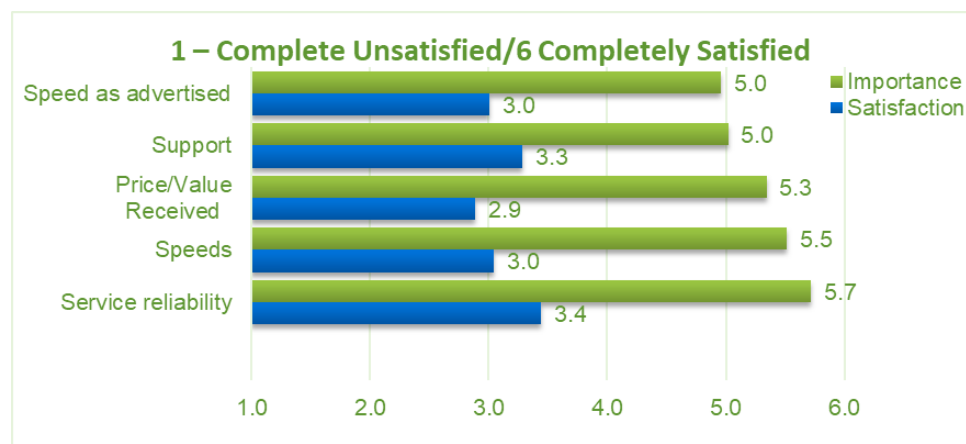
Based on the reported results, just 19.8 percent of the population currently has speeds that meet the federal guidelines for true Broadband service levels. Those residents who have chosen to subscribe to one of the cable franchisee's services and the rare individuals who have direct access to fiber optics (this could be a misreport based on the relatively low reported speed for this type of service), are receiving service that meets the federal definition. However, this leaves more than 4 in 5 residents of Bayfield without service that meets the federal requirements.

By contrast, state of Colorado maps show 92 percent of residents in the state have access to Broadband service at 25Mbps or faster. This finding represents a meaningful gap for the residents of Bayfield, despite the presence of multiple providers in the community.

Residents Appear Underwhelmed by Current Options

The survey asked residents to evaluate five key components of customer satisfaction and also to rate the importance of those five components. The five areas rated were Service Reliability; Speed as Advertised; Customer and Technical Support; Relevant Service Offerings and Price or Value for Services Received.

By mapping these two ratings in the figure at the right, we can see that most respondents place a high level of importance on each of the five components, while reporting that they are generally dissatisfied with the actual conditions they experience today from their providers.



On nearly every measure of performance, Bayfield consumers of broadband services were unsatisfied with the performance of their current carriers. The study revealed a significant difference (at least 2

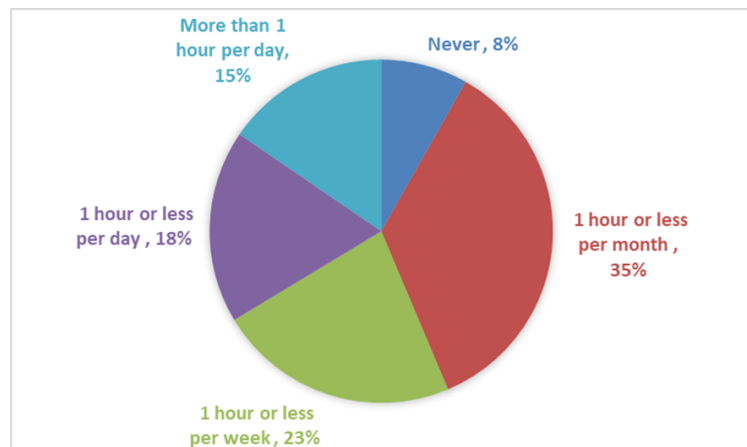
points) between the rated importance of that item and the consumers' level of dissatisfaction. Of particular note is the significant gap between the high importance of Price vs. Value for Services Received (5.3 Rating) to residents and the low level of satisfaction with this component (2.9 Rating). This indicates a significant gap between expectation and reality for Bayfield residents.

Service Interruptions are a Challenge in Bayfield

Survey respondents indicated a high occurrence of internet outages through their current provider when compared to national averages. Fifty-six (56%) percent of respondents indicated that they have an hour-long outage at least once a week. Nearly eighty-seven (87%) percent of respondents indicated they have an hour-long outage at least monthly.

Most internet service providers (ISPs) attempt to attain a 99.999 percent (commonly referred to as "five nines") of network availability. This equates to total service outages of time, meaning a total service outage goal of just five minutes per YEAR of service.

Figure 2-2: Reported Service Outage Frequency



Businesses Were Unsatisfied with Broadband Services Available

Business responses were muted, and there were not enough responses to create a statistically relevant analysis. With only 12 business responses, the discussion of business survey results should be viewed as anecdotal and NOT statistically valid.

Most of the business owners responding to the survey are operating small businesses with less than five employees. The larger businesses responding are paying substantially more for commercial-grade service but are receiving speeds that average 51.6 Mbps, not significantly different than the residential reported download speeds.

Business owners responding to this survey reported an overall level of satisfaction slightly below the unsatisfied level reported by residential respondents. The overall satisfaction level of business owners, largely small businesses, was 2.4 on the same 1-6 scale used for residential respondents.

"I often drive to Durango for internet at coffee shops and use the library here in Bayfield when my internet crashes. It makes working from home difficult, and we've considered moving to Durango to make my work-life easier. Faster internet would be amazing!!!!" – Bayfield Business Owner

There is Widespread Support for Community Involvement

Survey respondents were questioned to determine their support for a potential municipal alternative to privately provided services. Survey results indicated quite strong support for some sort of public involvement to solve the challenges faced in the community.



- 87 percent feel it is appropriate for Bayfield or a Partner to Compete with the Private Sector
- 85 percent are Very or Somewhat Likely to Purchase from Bayfield or its Partners
- 83 percent feel Internet is an Essential Utility

Public Meetings

Finally, a public information session was held to provide stakeholders the opportunity to engage in the creation of the community Vision.

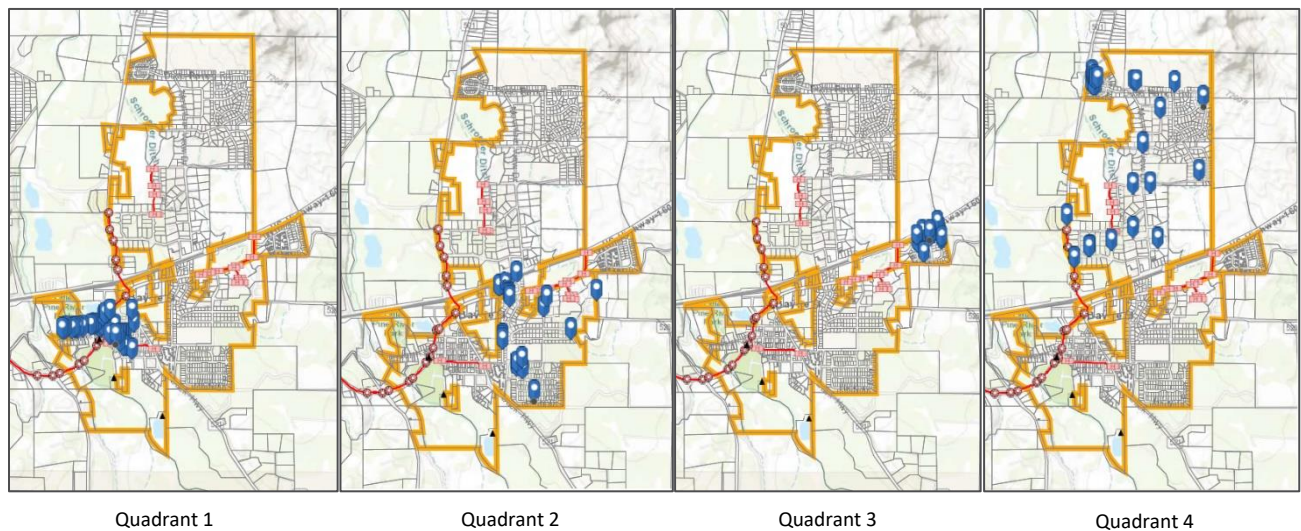
Section 3: Bayfield Internet Service Provider Market Assessment

Introduction

At present, residents and businesses in the Town of Bayfield can obtain internet access services from a variety of ISPs (Internet Service Providers) and WISPs (Wireless Internet Service Providers) via DSL (over copper), cable, fiber, fixed wireless and satellite. The review of available service providers indicates that there are eleven service options from a total of ten providers operating within the Town limits.

- Five wired Internet Service Providers: CenturyLink (DSL/Fiber), USA Communications (Cable), FastTrack (Fiber), Cedar Networks (DSL/Fiber) and Brainstorm Internet (DSL)
- Four Fixed Wireless Internet Service Providers: AlignTec, HiSpeed4U, Visionary Broadband and Brainstorm Internet
- Two Satellite Internet Service Providers: ViaSat and HughesNet

This section describes consumer internet offerings available to residents and businesses from the ten established ISPs and WISPs. Its goal is to draw a representative picture of the internet market in Bayfield and include one or more providers that serve their customers via copper (DSL), cable, fiber, fixed-wireless and satellite. As shown below, selected residential and business addresses in four quadrants of the Town were used for data verification purposes. The address and geospatial data were provided by Bayfield staff.



The following statistics describe internet availability by transport medium (DSL, cable, etc.) in Bayfield with some of the data drawn from the following two dedicated websites.

- BroadbandNow (<https://broadbandnow.com/Colorado/Bayfield#>)
- DecisionData (<https://decisiondata.org/tv-internet-by-city/bayfield-co-internet/>)

Additional data was drawn from the websites of each Internet Service Provider (ISP) and/or from representatives of each ISP via either email or telephone conversations. A complete listing of the websites is shown at the end of this assessment.

Residential Internet Service Providers in Bayfield

There are 10 home internet options in Bayfield from nine home internet providers, and 88 percent of homes can get fixed-line service. The majority of Bayfield residents have up to four options for wired internet service at their homes.

Residential Internet Service Providers (ISPs) in Bayfield:

- 1 Cable provider – USA Communications
- 3 DSL providers – Brainstorm Internet, Cedar Networks, CenturyLink,
- 4 Fixed wireless providers - AlignTec, Brainstorm Internet, HiSpeed4U, Visionary Broadband
- 2 Satellite providers – HughesNet, ViaSat

Business Internet Service Providers in Bayfield

There are six business internet options in Bayfield from 4 business internet providers, and 98 percent of businesses can get fixed-line service. The majority of Bayfield businesses have up to three options for wired internet service at their businesses.

Business Internet service providers (ISPs) in Bayfield:

- 2 DSL providers – Cedar Networks, CenturyLink
- 3 Fiber providers – Cedar Networks, CenturyLink, FastTrack
- 1 Fixed Wireless Provider - Brainstorm Internet

Review of Internet Service Providers in Bayfield

AlignTec

- AlignTec provides residential fixed wireless-based Internet services in Bayfield.
- AlignTec is offering coverage to 94 percent of Bayfield.

The table below shows the cost of AlignTec's plans as of 5/9/2019.

Plan	Download Speed – Up To (Mbps)	Upload Speed – Up To (Mbps)	Cost/Month
3Mbps	3.0	1.0	\$39.95
7Mbps	7.0	2.0	\$59.95
15Mbps	15	3.0	\$79.95
25Mbps	25	5.0	\$99.95
50Mbps	50	10	\$129.95

AlignTec is a locally owned and operated company based in Durango, Colorado. Originally started in Durango as Aligned Technologies in 1996, AlignTec provides IT and technical services to area businesses and homes. They began their first wireless internet broadcast in 2004, northwest of town in Hidden Valley. In 2013 they made the decision to take their services and coverage to a whole new level; and within four years, they went from covering a few select areas around the county to almost the entire county of La Plata.

AlignTec is a wireless provider whose wireless technology is based on line of site to any given location; and because of that, each and every location has to be physically surveyed to see if that line of site exists. They have recently fired up a new tower that covers some of the Bayfield service area to the north and south, and before year end, they will have another broadcast location fired up that will blanket a good portion of the downtown area.

AlignTec says that they are constantly on the move and adding new sites all around La Plata County. While they do cover some portions of the downtown area in Bayfield, the downtown area has never really been their prime service area. Due to the methods and costs involved in getting service in hard-to-reach areas, their pricing structure is not very competitive with other options commonly available in such areas, such as cable, DSL or fiber. Where they do shine, however, are the outlying rural areas of the county where these other infrastructures are sparse to nonexistent.

AlignTec stated that they are moving in the direction of building hybrid fiber/wireless networks; however, it is not fully implemented at this time.

Brainstorm Internet

- DSL and fixed wireless are Brainstorm's options for residential service delivery in Bayfield.
- Brainstorm's DSL service is offering coverage to 12.5 percent of Bayfield.
- Brainstorm's fixed wireless-based service is offering coverage to 61 percent of Bayfield.
- Video streaming is unlimited on internet plans.
- Brainstorm also offers home phone service.

The table below shows the cost of Brainstorm's DSL plans as of 5/9/2019.

Plan	Download Speed – Up To (Mbps)	Upload Speed – Up To (Mbps)	Cost/Month
Internet	.256	.256	\$29.00
Internet	1.5	1.0	\$38.00
Internet	7.0	1.0	\$60.00
Internet	20	1.0	\$76.00

The table below shows the cost of Brainstorm Internet's fixed wireless plans as of 5/25/2019

Plan	Download Speed – Up To (Mbps)	Upload Speed – Up To (Mbps)	Cost/Month
Internet	3.0	1.5	\$57.00
Internet	5.0	1.5	\$70.00
Internet	10	1.5	\$85.00

Brainstorm Internet is a FORETHOUGHT.net company. It is a Colorado Internet provider serving the Four Corners, the Western Slope and the Front Range. Based out of Durango, Colorado, Brainstorm offers business and residential services ranging from DSL, wireless and fiber broadband to cloud hosted PBX,

web hosting and colocation. Founded in 1999, Brainstorm Internet currently serves over 11,000 customers, from Grand Junction, CO to Denver, CO to Farmington, NM.

After several attempts to contact Brainstorm, we were able to connect with them one time via email. They indicated that they were not able to share any of their proprietary information with us. They did not verify the information listed in the tables shown above.

Cedar Networks

- Internet access over DSL or fiber to residential, business and government agencies in Bayfield.
- They also offer phone service.
- While Cedar Networks services are available in Bayfield, their coverage area is unknown.

The table below shows the cost of Cedar Networks' plans. This information was included in a February 4, 2018, Durango Herald article.

Plan	Download Speed – Up To (Mbps)	Upload Speed – Up To (Mbps)	Cost/Month
Internet	100	Unavailable	\$60.00

Cedar Networks was founded in 2000 in Durango. Cedar Networks is a privately held, multi-state, licensed telecommunications company that builds fiber optic networks. These networks serve residential, business and government agencies in major markets and small communities throughout Colorado and New Mexico.

After several attempts to contact Cedar Networks, we were able to connect with them one time via email. In their email, they confirmed that they have assets in Bayfield and are working on bringing FTTH to a few subdivisions in the near future. They did not verify the information listed in the table shown above.

CenturyLink

- CenturyLink's average download DSL rate for business and residential services in the Bayfield area is 7.70 Mbps.
- DSL is the option from CenturyLink for residential service.
- DSL and fiber are the options from CenturyLink for business service.
- CenturyLink DSL service is offering residential coverage to 88 percent of Bayfield.
- CenturyLink DSL service is offering business coverage to 98 percent of Bayfield businesses.
- CenturyLink fiber service is offering business coverage to 37percent of Bayfield businesses.
- They also offer home and business phone service.

The table below shows the cost of CenturyLink's residential plans as of 6/21/2019. Their plans have data caps in place.

Plan	Download Speed – Up To (Mbps)	Upload Speed – Up To (Mbps)	Cost/Month
Internet	10 (1 TB cap)	1	\$45.00
Internet	20 (1 TB cap)	2	\$45.00
Internet	60 (1 TB cap)	20	\$45.00

The table below shows the cost of CenturyLink’s business plans as of 6/21/2019.

Plan	Download Speed – Up To (Mbps)	Upload Speed – Up To (Mbps)	Cost/Month
DSL Business Essentials	12	1	\$65.00
DSL Business Advanced	20	2	\$65.00
Fiber Business Services	100	10	\$65.00

With its headquarters based out of Monroe, Louisiana, CenturyLink provides Internet and phone services to customers in 36 different states. CenturyLink is the 3rd largest telecommunications business in the United States, providing telecommunication services to the Government, businesses and residents throughout the country. CenturyLink was founded in 1930.

CenturyLink’s download speed ranges from 3 Mbps to 60 Mbps, and their upload speed ranges from .1 Mbps to 20 Mbps to most of the selected addresses in each of the four quadrants. Some of the selected addresses in each of the four quadrants had no CenturyLink services available.

CenturyLink stated that they have plans to improve connectivity to the Bayfield central office from their Durango hub. This will improve speeds throughout Bayfield with plans to offer up to 100 Mbps.

They are interested in partnering to share infrastructure. This could be shared conduit or leasing fiber from a partner.

CenturyLink provides 911 telecommunication services throughout Colorado, so this service is a high priority.

In 2016, they improved their network reliability in Bayfield by adding a redundant path between Durango and Bayfield; however, they are relying upon a 3rd party. They would like additional redundancy.

In the near future, CenturyLink stated they will be exploring the use of both wired and wireless technologies in the Bayfield area. These technologies could include Fiber-to-the-Premises (FTTP) and 5G wireless technologies from the node.

CenturyLink stated that they are running FTTP to new greenfield projects in Bayfield; however, they are using copper to brownfield areas.

FastTrack

- FastTrack covers about 32 percent of Bayfield businesses with its fiber-based internet services.
- FastTrack offers both voice and internet service.
- FastTrack currently does not provide residential service.
- FastTrack provides dedicated, symmetrical internet service to each customer.

The table below shows the cost of FastTrack’s plans as of 6/19/2019. It is important to note that there is a \$350 one-time installation charge for Internet service on a 12-month contract.

Plan	Download Speed – Up To (Mbps)	Upload Speed – Up To (Mbps)	12 Month Contract Cost/Month	36 Month Contract Cost/Month
Internet	10	10	\$82.50	\$75.00
Internet	25	25	\$137.50	\$125.00
Internet	50	50	\$247.50	\$225.00
Internet	100	100	\$440.00	\$400.00
Internet	250	250	\$962.50	\$875.00
Internet	500	500	\$1,650.00	\$1,500.00
Internet	1000 (1 Gbps)	1000 (1 Gbps)	\$2,750.00	\$2,500.00

FastTrack Communications was formed in 2002 by two rural electrical cooperatives—La Plata Electric Association and Empire Electric Association. FastTrack provides fiber-based internet services to local businesses, community institutions, and communications carriers throughout Colorado and New Mexico.

FastTrack’s currently deployed technology platform in Bayfield provides Internet, voice and data transport services to business customers using gigabit and 10-gigabit technology via single mode fiber. They have a capital investment plan that will increase their fiber footprint in business areas.

The FastTrack network is available 99.99 percent, so outages are infrequent on their network. FastTrack Communications can provide backhaul of up to 100 gigabit capacity to carrier hotels in Denver, CO, and Albuquerque, NM. Capacity is available for multiple 100-gigabit links via their network and data transport partners.

HiSpeed4U

- HiSpeed4U fixed wireless-based services are currently not available in Bayfield.
- Presently, they only provide service to the Gem Village area, mostly the Homestead Homes area.
- They have a 99 percent up time with most outages due to electrical outages.
- HiSpeed4U is noted for providing services to areas that have few choices for high speed broadband Internet with good quality, low latency and stable Internet connectivity.

The table below shows the cost of HiSpeed4U’s plans as of 6/20/2019.

Plan	Download Speed – Up To (Mbps)	Upload Speed – Up To (Mbps)	Cost/Month
Tier 1	6	3	\$39.95
Tier 2	10	5	\$49.95
Tier 3	15	7	\$59.95
Tier 4	20	10	\$69.95
Tier 5	25	17	\$79.95

HiSpeed4U has been in existence since 2004. They were the first to provide Internet to the La Plata County/Durango Airport beginning in 2005. They also provided Internet from the Gaslight Theater on Durango Main Street to the La Plata County Fair Grounds, including the Fair Grounds itself.

Within the last year or two, Hi Speed4U stated that the number of inquiries for internet seems to have increased 50-fold in the Bayfield area. They have not started to deliver services to Bayfield because they stated that the area seems to be already well covered by other providers.

They are presently in the process of installing new fully licensed carrier grade backhaul equipment that will provide 1.43 gigabytes down and 1.43 gigabytes up. By the end of 2019, their entire network will be upgraded with this new equipment to all points of their network allowing their customers to have 50 to 100 megs at their rural residences.

FastTrack Communications is their Internet provider and presently provides 1 Gigabyte speeds from their feed on Smelter Mountain. They have already started the gears moving to upgrade to 5GB once their new equipment is up and running. Even though HiSpeed4U has no real presence in Bayfield, HiSpeed4U can tap into FastTrack wherever they have a presence.

HughesNet

- HughesNet satellite-based Internet service is available to 98 percent of Bayfield residents.

The table below shows the cost of HughesNet's plans as of 6/6/2019. Their plans have data caps in place.

Plan	Download Speed – Up To (Mbps)	Upload Speed – Up To (Mbps)	Cost/Month
Internet	25 (10GB cap)	3	\$59.99
Internet	25 (20GB cap)	3	\$69.99
Internet	25 (30GB cap)	3	\$99.99
Internet	25 (50GB cap)	3	\$149.99

Hughes Network Systems, LLC (formerly Hughes Communications) was founded in 1971. It is a wholly owned subsidiary of EchoStar (DirecTV). Hughes Network Systems is headquartered in Germantown, Maryland and provides a high-speed satellite internet service, HughesNet.

USA Communications

- 32.2 percent of residents in Bayfield can get USA Internet services.
- USA's coverage area offers unlimited streaming.
- USA provides cable-based residential services within Bayfield.

The table below shows the cost of USA Communications' plans as of 5/12/2019.

Plan	Download Speed – Up To (Mbps)	Upload Speed – Up To (Mbps)	Cost/Month
Lite	15	Unavailable (UA)	\$42.95
Premier	60	UA	\$42.95
Preferred	30	UA	\$52.95
Extreme	100	UA	\$92.95

USA Communications, offers an array of services, including high-speed Internet access, phone service using digital VOIP and high definition cable TV programming. USA Communications began operations in 1995 in San Diego County in California. Over the years, they expanded their operations and currently operate hardwire cable television systems in five states: Alabama, California, Colorado, Montana and Nebraska. In April 2019, Zito Media, a Potter County, Pennsylvania-based cable operator, purchased the cable systems in California and Colorado from USA Communications.

After several attempts to contact USA Communications, we were unable to connect with them. Therefore, the information listed in the table shown above has not been verified.

ViaSat (formerly Exede)

- ViaSat satellite-based service is available to 96 percent of Bayfield residents.

The table below shows the cost of ViaSat's plans as of 6/10/2019. Their plans have data caps in place.

Plan	Download Speed – Up To (Mbps)	Upload Speed – Up To (Mbps)	Cost/Month
Bronze	12 (40 GB cap)	3	\$70.00
Silver	25 (60 GB cap)	3	\$100.00
Gold	50 (100 GB cap)	3	\$150.00
Platinum	100 (150 GB cap)	3	\$200.00

ViaSat Inc. (formerly Exede) was founded in May 1986. It is based in Carlsbad, California, with additional operations across the United States and worldwide. ViaSat is a provider of high-speed satellite broadband services and secure networking systems covering military and commercial markets.

Visionary Broadband (Mammoth Networks)

- Visionary offers fixed wireless-based residential services to approximately 58 percent of Bayfield.
- Visionary offers fixed wireless-based business services to approximately 29 percent of Bayfield.
- They also offer home phone service.

The table below shows the cost of Visionary Broadband’s residential plans as of 6/20/2019. These plans have no explicit data caps.

Plan	Download Speed – Up To (Mbps)	Upload Speed – Up To (Mbps)	Cost/Month
Internet	5.0	1	\$49.99
Internet	10	2	\$69.95
Internet	25	4	\$89.95

The table below shows the cost of Visionary Broadband’s business plans as of 6/20/2019. These plans have no explicit data caps.

Plan	Download Speed – Up To (Mbps)	Upload Speed – Up To (Mbps)	Cost/Month
Internet	5.0	1	\$59.99
Internet	10	2	\$79.95
Internet	25	4	\$99.99

Visionary was originally an ISP in Wyoming, having started business in December of 1994. Founded in a basement, Visionary has grown to become an ISP in a three-state region, providing more than 20,000 customers with Internet access via dialup, wireless, DSL, T1 and fiber. It delivers services in Colorado, Montana, and Wyoming.

Visionary confirmed that they currently deploy fixed wireless technologies in the Town of Bayfield and their current maximum download speed to all of the selected addresses in each of the four quadrants is 25 Mbps, and their maximum upload speed is 4 Mbps. The costs for their services to all of the selected addresses in each of the four quadrants range from \$89.95 to \$99.99 per month.

Visionary is currently in the process of bringing up a new redundant path along Spring Creek that will further add to Bayfield’s resiliency. Once that redundant path is completed, Visionary is planning to deploy technology that will allow them to offer 100 Mbps packages to residents and businesses. These upgrades are currently programmed as part of a committed capital investment. Due to Visionary’s commitment to resilient paths, they currently experience 99.999 percent or greater uptime. Outages experienced are minimal, if any.

Findings

DSL is the only wired network choice that has substantial availability for residents and businesses of Bayfield. It is available to around 88 percent of the local population. DSL Internet is delivered through telephone lines, which is why it almost always is provided by telephone operators like CenturyLink.

The average location in Bayfield will find 4 Internet providers serving their location. Around 71 percent of the Bayfield population have one or fewer options for Internet service.

There are 10 notable internet providers in Bayfield with 9 of those offering residential services and 4 of those offering business services.

- Five wired Internet Service Providers: CenturyLink (DSL/Fiber), USA Communications (Cable), FastTrack (Fiber), Cedar Networks (DSL/Fiber) and Brainstorm Internet (DSL)
- Four fixed wireless Internet Service Providers: AlignTec, HiSpeed4U, Visionary Broadband and Brainstorm Internet
- Two satellite Internet Service Providers: ViaSat and HughesNet

Overall, Bayfield is the 150th most connected city in Colorado ahead of Hesperus, Pagosa Springs and Aztec but behind Durango and Ignacio.

The following table is a listing of all 10 providers in the Town of Bayfield. It shows the type of service provided and whether it is a business or residential service, as well as the percent of Bayfield covered by the service provider.

Provider	Type of Service	Business / Residential	Coverage
AlignTec	Fixed Wireless	Residential	94%
Brainstorm Internet	DSL	Residential	12.5%
Brainstorm Internet	Fixed Wireless	Residential	61%
Cedar Networks	DSL	Both	UA
Cedar Networks	Fiber	Both	UA
CenturyLink	DSL	Residential	88%
CenturyLink	DSL	Business	98%
CenturyLink	Fiber	Business	37%
FastTrack	Fiber	Business	32%
HiSpeed4U	Fixed Wireless	Residential	NA
HughesNet	Satellite	Residential	98%
USA Communications	Cable	Residential	32%
ViaSat	Satellite	Residential	96%
Visionary Broadband	Fixed Wireless	Residential	58%
Visionary Broadband	Fixed Wireless	Business	29%

The following table is a listing of all 10 providers in the Town of Bayfield. It shows the type of service provided, whether it is a business or residential service, the range of download speeds, the range of upload speeds and the range of monthly costs for each service provider.

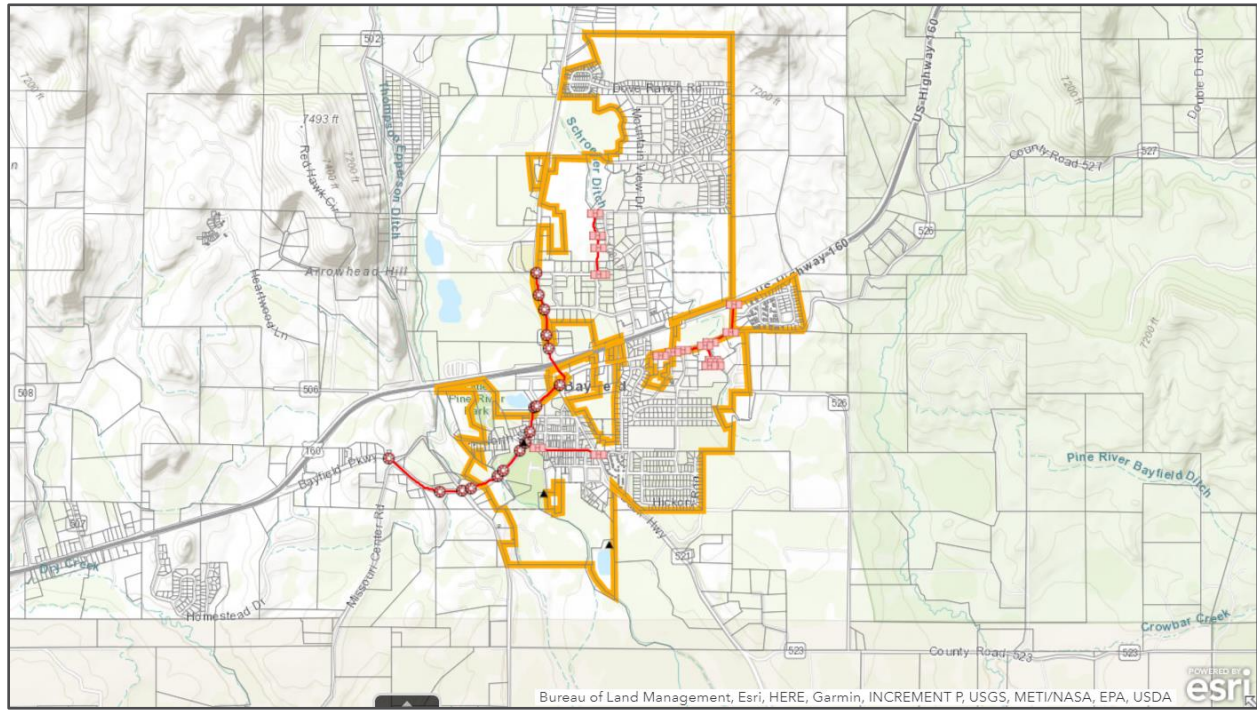
Provider	Type of Service	Business / Residential	Download Speeds Low to High (Mbps)	Upload Speeds Low to High (Mbps)	Cost/Month Low to High
AlignTec	Fixed Wireless	Residential	3.0 to 50	1.0 to 10	\$39.95 to \$129.95
Brainstorm Internet	DSL	Residential	.256 to 20	.256 to 1.0	\$29 to \$76
Brainstorm Internet	Fixed Wireless	Residential	3.0 to 10	1.5	\$57 to \$85
Cedar Networks	DSL	Both	UA	UA	UA
Cedar Networks	Fiber	Both	100	UA	\$60
CenturyLink	DSL	Residential	10 to 60	1.0 to 20	\$45
CenturyLink	DSL	Business	12 to 20	1.0 to 2.0	\$65
CenturyLink	Fiber	Business	100	10	\$65
FastTrack	Fiber	Business	10 to 1000	10 to 1000	\$75 to \$2,500
HiSpeed4U	Fixed Wireless	Residential	6.0 to 25	3.0 to 17	\$39.95 to \$79.95
HughesNet	Satellite	Residential	25 (10GB cap) to 25 (50GB cap)	3.0	\$59.99 to \$149.99
USA Communications	Cable	Residential	15 to 100	UA	\$42.95 to \$92.95
ViaSat	Satellite	Residential	12 to 100	3.0	\$70 to \$200
Visionary Broadband	Fixed Wireless	Residential	5.0 to 25	1.0 to 4.0	\$49.99 to \$89.95
Visionary Broadband	Fixed Wireless	Business	5.0 to 25	1.0 to 4.0	\$59.99 to \$99.99

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Section 4: Bayfield Public Sector Needs Assessment

Introduction



Since it is important to fully understand the needs of key stakeholder groups, HR Green surveyed key Anchor Institutions, Community Influencers, Department Directors and Potential Partners (See results in **Appendix A**). The HR Green Team held individual interviews with key institutions identified by the Town as the largest potential users of the system. The team met individually with these institutions to identify the bandwidth needs, current monthly costs, etc.

This public sector assessment summarized the feedback from the interviews with key public sector stakeholder groups.

Public Sector Stakeholders

The Town of Bayfield staff in partnership with the HG Green team developed a list of public sector institutions or stakeholder groups. The groups can be divided between four stakeholder categories: Anchor Institutions, Department Directors, Community Influencers and Potential Providers/Partners.

Here is the list of the stakeholder groups:

Anchor Institutions

- Bayfield Chamber of Commerce
- Bayfield School District
- Pine River Irrigation District
- Pine River Library District
- Road Runner Transit
- Upper Pine River Fire Protection District

Department Directors

- Marshall
- Parks and Recreation
- Pine River Senior Center
- Public Works

Community Influencers

- Town Mayor
- Town Trustee

Potential Providers/Partners

- City of Durango
- Colorado Department of Transportation – Region 5
- La Plata County
- La Plata Electric Association
- Region 9 Economic Development District of Southwest Colorado
- Southwest Colorado Council of Governments (COG)

Key Findings

The Town of Bayfield understands that an important part of its exploratory process of its options to provide reliable, cost-effective and fast broadband Internet service to the community is to create alignment in stakeholder groups. Interviews were held with these stakeholder groups to identify bandwidth needs, current monthly costs, etc.

One of the most significant findings is the fact that many of the largest anchor institutions are relatively well served by updated technologies, while slower services are more prevalent in smaller businesses. This finding is supportive of a commonly observed phenomenon known in the industry as “cherry picking.” “Cherry picking” is defined by providers deploying expensive fiber optic connections to the highest value customers in a community only.

The following is a list of some of the additional findings from the interviews.

- Since 2010, La Plata County is the fastest growing county in this state and Bayfield is the fastest growing community in the county.
- Broadband plays a major role in economic development for the Town.
- The Town has more home-based businesses than brick and mortar businesses, and those businesses’ concerns were expressed: businesses are negatively impacted due to internet service availability and reliability and that business attraction is negatively affected by the lack of service
- There appears to be support by anchor institutions that the Town must play a role in driving a public/private partnership to jointly provide service.
- In general, there is a concern about having redundant internet connection paths to the Town.

- Respondents expressed concerns (reflected in speed tests through surveys) that DSL service speeds are a problem and that service times are longer than necessary.
- Public sector institutions connected to FastTrack and other fiber optic connections reported general satisfaction with the service provided by FastTrack. They report that the service is very reliable.
- Seniors are on a fixed income so services need to be faster and cheaper.
- Public sector institutions are “all in” with whatever the Town decides to do regarding community broadband. They are supportive and willing to help in any way they can.
- There are other options for Internet services in Bayfield, such as fixed wireless. However, speeds are very slow. Latency is the concern with satellite Internet providers.
- There are a number of regional initiatives underway that could create long-term improvement for Bayfield, but many are focused on backhaul fiber connectivity. A development group with representatives from CDOT, Bayfield, SWCCOG, FastTrack, LPEA and San Luis Valley Rural Electric Cooperative have been discussing fiber optic connectivity. CDOT Region 5 has been awarded an Advanced Technology Deployment for Congestion Mitigation grant from the Federal Highway Association. With the grant, they are planning to bring fiber from the top of Wolf Creek Pass to the east side of Pagosa Springs.
- Region 9 Economic Development District of SW Colorado is interested in helping Bayfield evaluate grants and other funding mechanisms.
- LPEA is trying to figure out what Senate Bill 19-107, which regulates right of way and easements, means for its organization going forward.
- The COG is focusing on the middle-mile infrastructure trying to build from Utah to the top of Wolf Creek Pass and from New Mexico to Silverton and all parts in between.
- The COG will be looking at creating public-public partnerships to build the middle-mile infrastructure.

A summary of the feedback received during each of the interviews can be found in **Appendix A** of the report.

Section 5: Bayfield Community Vision

Introduction

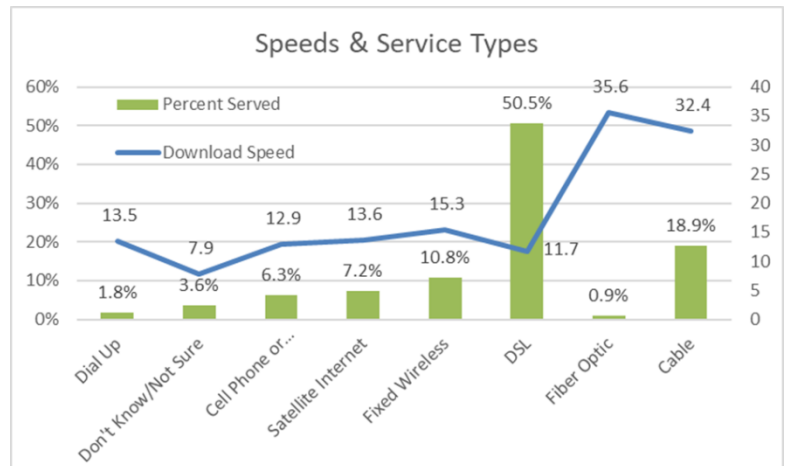
On the evening of July 3rd, 2019, a Vision working session was conducted with the Trustees. During this session, key findings from recently completed residential surveys were reviewed, as well as a review of current providers and findings from interviews with the Town's Anchor Institutions.

Summary of Findings to Date

FINDING #1: BAYFIELD RESIDENTS ARE UNDERSERVED AND WANT TOWN INVOLVEMENT

Across more than 114 completed surveys of residents and business owners, there were widespread reports of residents reporting speeds below the FCC definition of broadband, a high level of dissatisfaction with current options and a higher-than-anticipated level of service outages.

Respondents were asked to report their service type and download speeds. The chart at the right indicates that only 20 percent of respondents have access (primarily over fiber optic or cable connections) to speeds that meet the 25/3 broadband definition. This means that nearly 4 in 5 residents do not have broadband service in the community from their current provider.



Beyond service levels, residents also feel it is important for the Town to be involved in finding a solution. Eighty-three percent said they feel internet is an essential utility, while 85 percent indicated they would be very or somewhat likely to purchase services from Bayfield or one of its partners. Beyond services, survey respondents were philosophically aligned to the concept of government sponsored services with 87 percent saying they feel it is appropriate for Bayfield or a partner to compete with the private sector.

FINDING #2: REGIONAL OPPORTUNITIES ARE PRESENT

There are 11 providers currently serving the Bayfield market, ranging from the incumbent CenturyLink, to Wireless Internet Service Providers (WISPs) to Fiber Based Providers. HR Green staff interacted with most providers and believes that there is an interest in engaging with the Town to evaluate potential opportunities for P3 solutions. Such opportunities could include FTTP service, backhaul services or other opportunities. La Plata Electric is currently evaluating strategic options for its fiber deployment, offering further interesting alternatives.

As a path toward a defined ownership and operating model emerges, these discussions will become more focused on the potential forms of a P3 structure with providers, carriers and partners.

FINDING #3: REDUNDANT BACKHAUL IS A PROBLEM

Research was conducted of the region's fiber assets in a search for a physically redundant fiber optic network path. While fiber optic paths exist to connect to carrier internet centers to the west of Bayfield, a similar path is not available to the East. This means that a single fiber cut could create a significant

outage for any Town services. Residential customers reported frequent outages that can be attributed, at least in part, to risks associated with lack of backhaul redundancy.

FINDING #4: TRUSTEES AND STAFF FULLY SUPPORT IMPROVED BROADBAND SERVICE

Trustees and staff believe that broadband services need to be improved in the Town. More than 80 percent of residential survey respondents reported speeds below the FCC's definition of high-speed broadband. Additionally, significant issues with service reliability were reported, including relatively frequent outages.

Bayfield, unlike some rural Colorado communities, has a meaningful number of rival providers who are making incremental strides to improve service beyond that available over DSL from CenturyLink. These efforts have been focused on newer residential developments, anchor institutions and businesses who offer higher returns on investment for the ISPs. Unfortunately, while this has improved broadband in certain pockets of town, it has left large pockets of unserved or underserved residential and business locations throughout the Town.

At the July 3 working session, Town Trustees discussed a number of competing values that must be considered in establishing the direction for a municipal broadband project. As a result of this meeting, the Town Council has determined that the following objectives should guide the further work and future phases of this project.

- **Ubiquity:** Trustees desire a solution that improves service to all residents and businesses of the Town. There is an openness to the concept of unequal service levels (aka, some served by gigabit-capable fiber while others see improved wireless connectivity) based on the focus on objective 2, below.
- **Ensure Financial Viability:** Trustees believe that the Town may need to provide seed funding (either in financial equity investment or in the form of in-kind currency such as conduit or other communication assets), but that the ongoing operation of the network must be financially self-sustaining.
- **Mitigate Risk and Minimize Complexity:** There are concerns that the operation of a new technology platform could pose financial and operating risks if the Town were to take on full financial deployment and operating models. Trustees are very interested in the creation of Public Private Partnerships (P3s) with the private sector as a means to facilitate ubiquitous expansion while minimizing financial and operating risks.

The following table was presented and discussed with the Board members as a tool to help them weigh Ubiquity and Financial Viability and Risk and Complexity. As shown on the table, one objective may have no impact on another (NI), objectives may align (A) or they may conflict (C).

	Ubiquity	Choice	Competition	Ownership	Performance	Affordability	Risk Aversion	Cash Flow
Ubiquity		A	A	A	NI	C	C	C
Choice	A		A	A	A	A	C	NI
Competition	A	A		A	A	A	C	NI
Ownership	A	A	A		A	A	A	C
Performance	NI	A	A	A		NI	A	A
Affordability	C	A	A	A	NI		C	C
Risk Aversion	C	C	C	A	A	C		A
Cash Flow	C	NI	NI	C	A	C	A	

Bayfield Trustee Vision Session

During the session, Trustees explored various ownership and operating models in order to better understand these risks and potential rewards of the often-challenging and sometimes conflicting values inherent in community broadband. This exercise helped to develop a shared Vision of the Town's goals related to fiber and broadband services, particularly fiber to the premise (FTTP). FTTP is the installation and use of optical fiber from a central point directly to individual buildings such as residences, apartment buildings and businesses to provide unprecedented high-speed Internet access.

A broadband roadmap that stresses the importance of the creation of a Vision for projects was used during the session. This Vision must be grounded by a thorough understanding of the intended goals of the project, an appreciation of the risks/rewards of various ownership and operational models and buy in from governing bodies that the path forward represents the best use of scarce community resources (time, energy, financial capital).

During meetings with Town staff and Trustees to identify key issues, staff and Trustees were asked to review a document outlining the most common, and often competing, objectives of a municipal broadband build out and then were asked to complete a survey outlining their strategic alignment around competing objectives and list their primary goals and concerns with this project.

The table below shows where Trustees rated each of the six competing objectives. For example, Ubiquity was paired with System Profitability and Trustees and staff were asked to identify a preference, if a choice were required.

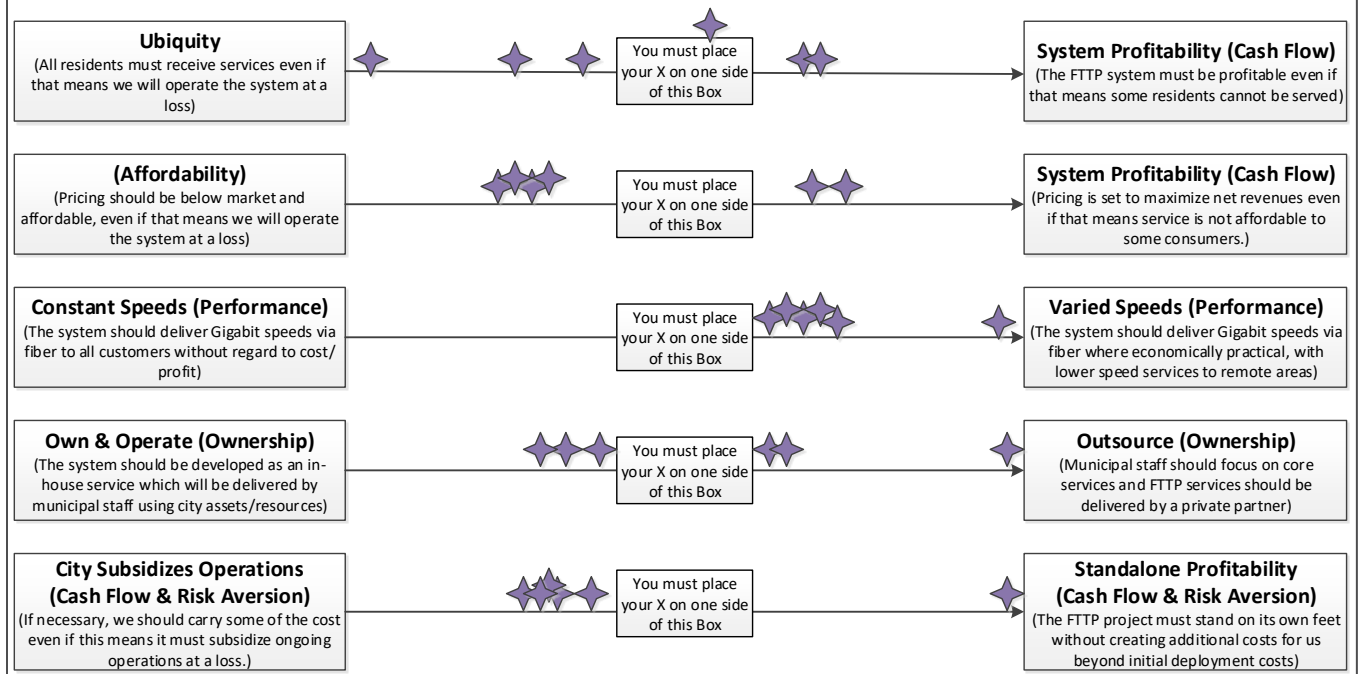
During the July 3rd, 2019, Work Session, Trustees reviewed and discussed the competing objectives and various ownership and operational models for a FTTP deployment. The Board agreed that there was

meaningful alignment on goals, concerns and competing values. The discussion concluded with these key findings, which will drive the next steps of the process.

Competing Values Framework for Fiber To The Premises (FTTP) Networks

During the study of a Fiber to the Premises network, governing bodies are sometimes confronted with difficult choices regarding competing values. In order to better understand staff and elected official's feelings on these topics, we will be discussing a number of common competing values which **may** surface in the course of this first phase.

For each paired value below, please place an X on the arrow between the two competing priorities at the point at which it most closely matches your personal beliefs of best course for the possible deployment. An X on or near the terminal arrow indicates a strong preference for one competing value over its pair, while an X near the middle represents a preference but still considering aspects of the competing value.



The conclusions from this meeting are listed below:

- **Ubiquity:** Council and staff are highly aligned that the primary objective of an FTTP project in Bayfield must serve all potential customers. Trustees are pleased at the presence of improving connectivity but feel all should benefit from community investment.
- **Financial Viability:** Trustees feel that any proposed model must be capable of standing on its own financially and are willing to trade system performance speeds to create a financially sustainable business model for the town.
- **Mitigate Risk and Minimize Complexity:** There are concerns that the operation of a new technology platform could pose financial and operating risks if the Town were to take on full financial deployment and operating models. Trustees are very interested in the creation of Public Private Partnerships (P3s) with the private sector as a means to facilitate ubiquitous expansion while minimizing financial and operating risks.

Primary concerns voiced by Council included:

- **Cost & Risk:** Trustees want to better understand the cost of a potential community broadband project and understand how it can mitigate the size of investment from the Town. Planning phase work will focus on the evaluation of potential P3 solutions that may achieve this goal.
- **Affordability:** Trustees discussed Longmont's current network, where gigabit service is available over a town-owned network to residents at \$50/month for charter members. There is a desire for affordability and concern that any solution must keep price within reach of constituents in order to attract necessary signups to make a service feasible.
- **Carrying the Cost of Investment:** Trustees are concerned about the Town's ability to make the potentially significant up-front investments necessary to build an FTTP network. It is interested in understanding how Bayfield may be able to pursue grant and other funding assistance to help meet its needs. While HR Green's approach to project costing and feasibility is built on a model that begins with an assumption of standalone cash flow and profitability, we will evaluate funding sources as part of the Planning Phase of the project.

Planning Phase – Next Steps

Now that a Vision has been established and key outcomes determined by Trustee policymakers, the Study moved more fully into the Planning Phase by focusing on creating preliminary designs and capital expense projects, quantifying the financial sustainability of proposed service and ownership models, evaluating funding alternatives and identifying potential partnerships with the private sector.

Three model alternatives were explored.

- **Model 1 – Public Private Partnership (CORE Network Owned).** In this model, the Town will build a CORE network consisting of a fiber loop and central service center. Partner(s) will be identified to provide last mile service and paying the Town for access to the core network installed.
- **Model 2 – Public Private Partnership (Partner Owned and Operated Network).** In this model, the town will support the implementation of private networks through broadband enabling public policy and open access to existing broadband currency/assets.
- **Model 3 – Publicly Owned & Operated.** While not identified as the primary model preferred by Trustees, we believe it is important to analyze the cost and feasibility of this model in case a private partner cannot be identified who is willing to provide ubiquitous coverage and the right cost.

Section 6: Evaluate Capabilities & Create Conceptual Design

Introduction

The initial step of the Planning Phase of the Study focused on evaluating the Town's existing network capabilities. Next, the focus shifted to developing a high-level conceptual network design including costs estimates to deploy the design.

Evaluate Capabilities

A technical evaluation of the Town's existing fiber-optic networks was performed, based on available data, and the ability to expand to provide broadband services to users identified in the Public Needs Assessment. The existing Town-owned network is a meaningful asset as the Town began to chart its path. A full understanding of its capabilities and conditions allowed the Town to understand how this asset could be leveraged in the future.

According to this Study's Market Assessment and Public Sector Needs Assessment, there are four sources of fiber-optic network resources within the Town of Bayfield. Three of the sources are Internet Service Providers (ISP): CenturyLink, FastTrack and Cedar Networks. The fourth source is a public sector resource, the Southwest Colorado Council of Governments (SWCCOG) or the COG. Bayfield is a member jurisdiction of the SWCCOG.

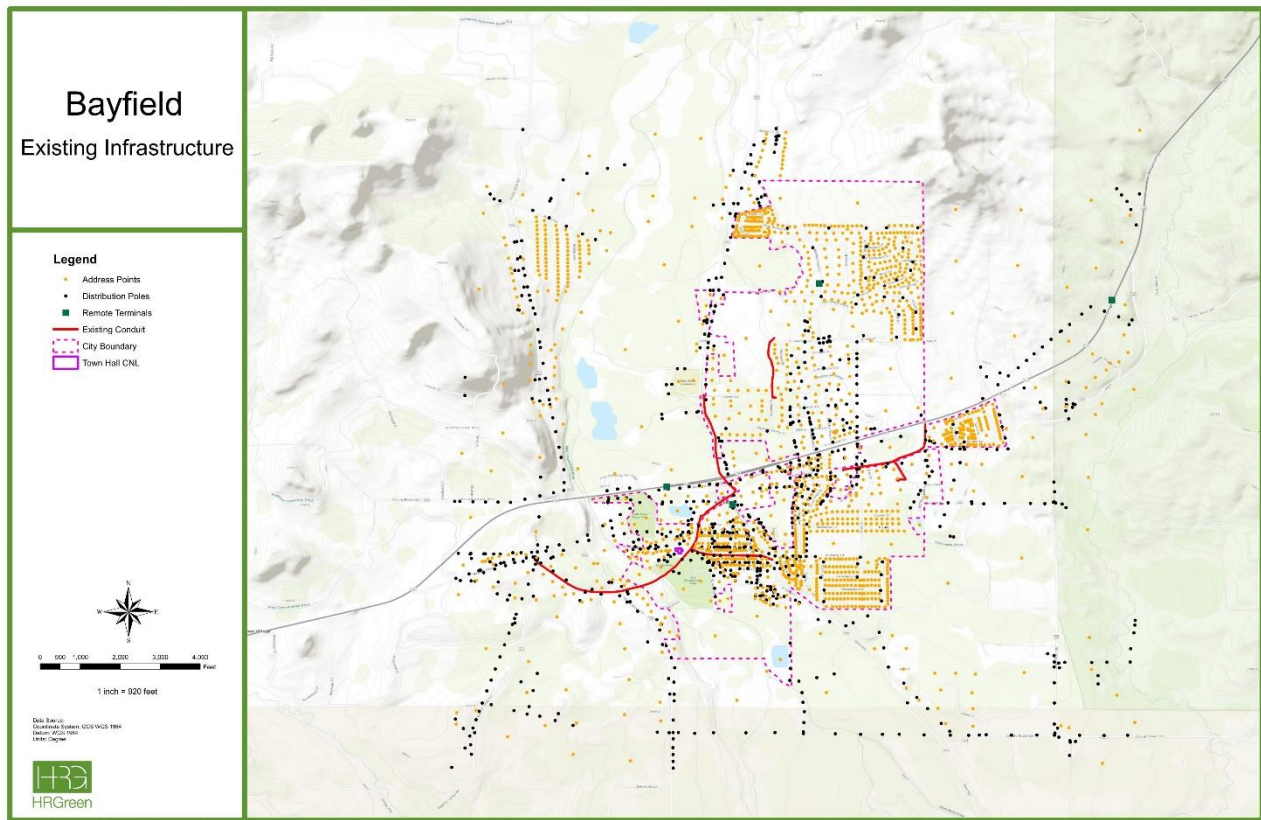
The COG's goals are: aging, environment, housing, telecommunications, transportation and tourism. They work on a variety of projects and programs under each of those goals. Telecommunications is one of the goals that the COG has focused on the most; because, it is the area where there is the most need among its members.

The COG's telecommunication function was originally created to receive and manage a \$3 million grant from Colorado's Department of Local Affairs (DOLA) to develop the Southwest Colorado Access Network (SCAN), which is a fiber-optic based network. The DOLA grant was matched with \$1.5 million, so the total funding to design and build SCAN was \$4.5 million.

The Town of Bayfield did not have a fiber-optic network, so SCAN was the Town's first opportunity to build a fiber network. The fiber is still being used today. As a matter of fact, Bayfield, Durango and Cortez are all still using it.

SCAN was initially used to interconnect anchor institutions due to the limitations of the Senate Bill 152. Within the last few years, several communities, including Bayfield, have opted out of the Senate Bill 152. This has allowed the Town to use the fiber in a variety of ways including for dark fiber leases, which generates revenues for Bayfield.

The COG installed the SCAN community-based fiber-optic network in the locations specified by the Town of Bayfield. The SCAN fiber network diagram for the Town is shown in the following diagram, with the redlines showing the three paths of the SCAN fiber-optic network within the Town.



Bayfield's existing fiber / conduit infrastructure

Conceptual Design

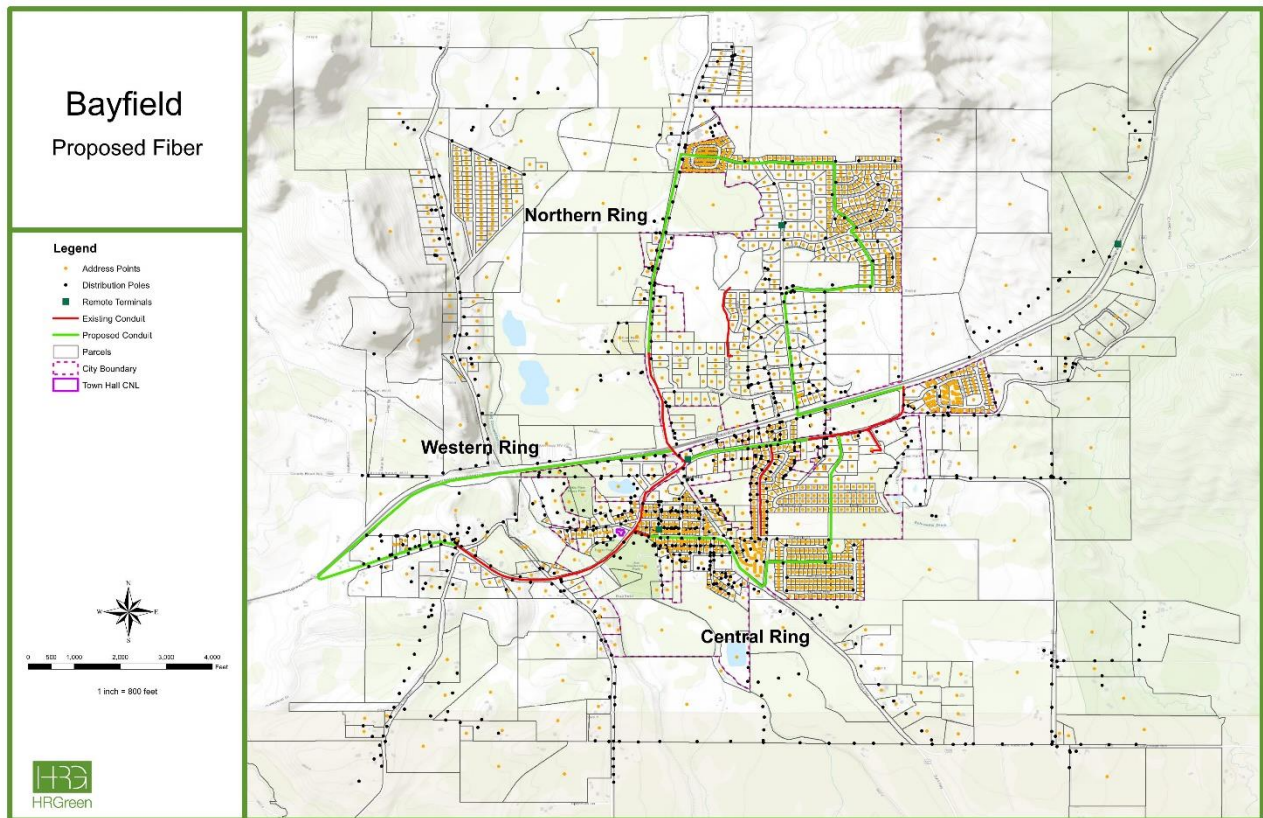
Drawing on field and desk surveys and the Town's GIS maps, a system level design and cost estimate was prepared for developing a next generation network.

In developing this potential technical solution, a wide range of technologies and approaches were considered. The focus was on creating a robust, reliable and cost-effective approach to meeting the Town's networking needs. To that end, for example, the design included excess dark fiber designed to enable the implementation of smart parking and smart lighting solutions across the community.

Based on the analysis of the existing infrastructure, a conceptual design of high-level maps and routing, candidate specifications and a system-level overview of the potential infrastructure was provided, which in turn became a roadmap for financial analysis and business modeling and for future decisions (potentially including detailed engineering, construction and operations).

The conceptual design is for the development and deployment of a fiber to the home network. It envisions the city constructing a municipal fiber to the curb network (ring design) that will create ubiquitous fiber to the home connectivity throughout the Town of Bayfield.

The following diagram shows the conceptual design of the fiber network for the Town of Bayfield. The network is composed of three network rings: a northern ring, a central ring and a western ring. The green lines in the diagram show the paths of each of the rings.



Conceptual design of Bayfield's proposed fiber network

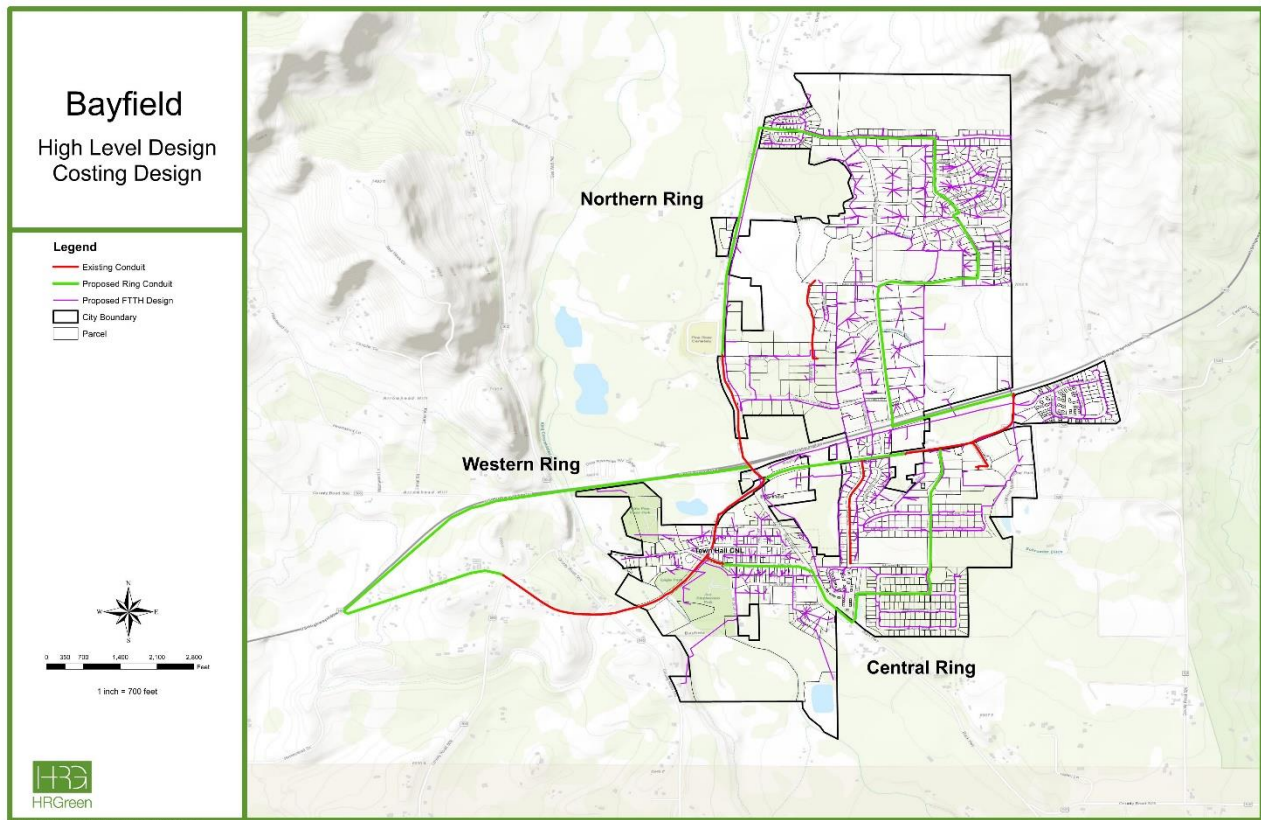
Cost Estimates

A cost estimate and supporting documentation for network deployment and interconnection, inclusive of anticipated construction labor, materials, engineering, permitting, quality control and testing was prepared. These estimates were provided in the form of a cost range, with the lower-end estimates representing most likely costs and the higher-end representing budgetary estimates with suitable contingencies included.

All supporting data, spreadsheets and assumptions were shared with Town officials. A written narrative explained key construction characteristics that will impact the cost estimates.

The analysis provided guidance regarding ongoing costs, medium and long-term needs to refresh and replace equipment and potential revenue sources to support network operations.

The following diagram was used to generate the costs estimates for the deployment of the proposed fiber network. It includes redlines that indicate the existing network, green lines that indicate the proposed fiber network rings and purple lines that indicate the paths of the fiber-to-the home (FTTH) interconnections.



Bayfield's high-level conceptual FTTH network design used for cost estimating

Various data points were taken into consideration during the cost estimating process. These included: the estimated underground footage of existing and proposed fiber conduits, total number of splice points, total number of fibers, material costs breakout and labor costs.

The following table shows the **estimated length of underground conduits**, both existing and proposed conduits for each of the three network rings that make up the backbone of the network.

Network Ring	Existing Conduit Length (Feet)	Proposed Conduit Length (Feet)	Total Length (Feet)
Northern	6,639	18,357	24,996
Central	293	6,996	7,289
Western	3,739	9,678	13,417
Totals:	10,671	35,031	45,702

The following tables shows the **estimated backbone construction costs** for each of the three fiber network rings based on the **fiber count within each sheath** and using the **estimated length of underground conduits** shown in the previous table. Each sheath requires: 37 handholds and 7 splice

points for the Northern ring; 14 handholds and 3 splice points for the Central ring; and 19 handholds and 4 splice points for the Western ring. The **Estimated Installation Costs** does not include the cost for splicing; however, the **Estimated Total Costs** does include the cost of splicing.

96 count fiber sheath

Network Ring	Estimated Material Costs	Estimated Installation Costs	Estimated Labor Costs	Estimated Total Costs
Northern	\$42,788	\$308,606	\$30,861	\$434,323
Central	\$12,968	\$90,790	\$9,079	\$129,654
Western	\$22,915	\$165,672	\$16,567	\$234,078
Totals:	\$78,670	\$565,068	\$56,507	\$798,054

144 count fiber sheath

Network Ring	Estimated Material Costs	Estimated Installation Costs	Estimated Labor Costs	Estimated Total Costs
Northern	\$53,314	\$308,606	\$30,861	\$452,824
Central	\$16,158	\$90,790	\$9,079	\$135,930
Western	\$28,552	\$165,672	\$16,567	\$244,483
Totals:	\$98,025	\$565,068	\$56,507	\$833,237

288 count fiber sheath

Network Ring	Estimated Material Costs	Estimated Installation Costs	Estimated Labor Costs	Estimated Total Costs
Northern	\$79,910	\$308,606	\$30,861	\$502,844
Central	\$24,218	\$90,790	\$9,079	\$153,095
Western	\$42,795	\$165,672	\$16,567	\$272,764
Totals:	\$146,923	\$565,068	\$56,507	\$928,704

The following table shows the **estimated total costs of building out the FTTH network without using any of the existing conduit and handholds**. Here is some information regarding the following table:

- a. Used \$12/lb average for construction
- b. There is a 30% contingency on the OSP material and construction – that is a high number, but it includes engineering, permitting, other material, slack, etc.)
- c. The addresses came to 2,447
- d. Drop numbers range from \$700 - \$1300 Drop Material - \$300
- e. Network equipment and shelter are in at \$500K
- f. Total Build Cost (adding up the section totals) and construction based on a 40% take rate (reduces the drops and in premise equip by 40%)

Description	Total Cost
Total OSP Material, Labor and Other Costs	\$4,936,635.59
Total Drop Costs (2447 addresses)	\$2,925,700.00
Total In Premise Equipment Costs	\$822,677.99
Network Equipment and Shelter Costs	\$500,000.00
Total Build Costs	\$9,185,013.58
40% Take Rate (Drops & Premise Equip. at 40%)	\$6,935,986.78
Cost range per Subscriber (40% Take Rate = 979)	\$3,754 to \$7,086

The following table shows the **estimated total costs of building out the FTTH network using the existing conduit and handholds**. Here is some information regarding the following table:

- a. Used \$12/lb average for construction
- b. There is a 30% contingency on the OSP material and construction – that is a high number, but it includes engineering, permitting, other material, slack, etc.)
- c. The addresses came to 2,447
- d. Drop numbers range from \$700 - \$1300 Drop Material - \$300
- e. Network equipment and shelter are in at \$500K
- f. Total Build Cost (adding up the section totals) and construction based on a 40% take rate (reduces the drops and in premise equip by 40%)
- g. Calculated 18 handholds and 14,550' of conduit, so that is what is reduced in this BOM (conduit material and construction cost and handhold material).
- h. Using existing conduit and handholds - savings of \$240,000 to \$245,000.

Description	Total Cost
Total OSP Material, Labor and Other Costs	\$4,693,848.89
Total Drop Costs (2447 addresses)	\$2,925,700.00
Total In Premise Equipment Costs	\$822,677.99
Network Equipment and Shelter Costs	\$500,000.00
Total Build Costs	\$9,185,013.58
40% Take Rate (Drops & Premise Equip. at 40%)	\$6,693,200.08
Cost range per Subscriber (40% Take Rate = 979)	\$3,654 to \$6,838

The following table shows the **estimated total costs of building out the FTTH network using the existing and proposed conduit and handholds**. Here is some information regarding the following table:

- Used \$12/lb average for construction
- There is a 30% contingency on the OSP material and construction – that is a high number, but it includes engineering, permitting, other material, slack, etc.)
- The addresses came to 2,447
- Drop numbers range from \$700 - \$1300 Drop Material - \$300
- Network equipment and shelter are in at \$500K
- Total Build Cost (adding up the section totals) and construction based on a 40% take rate (reduces the drops and in premise equip by 40%)
- Calculated 18 handholds and 14,550' of conduit, so that is what is reduced in this BOM (conduit material and construction cost and handhold material).
- Using existing conduit and handholds - savings of \$240,000 to \$245,000.

Description	Total Cost
Total OSP Material, Labor and Other Costs	\$1,271,072.10
Total Drop Costs (2447 addresses)	\$3,127,700.00
Total In Premise Equipment Costs	\$1,252,199.17
Network Equipment and Shelter Costs	\$500,000.00
Total Build Costs	\$6,150,971.27
40% Take Rate (Drops & Premise Equip. at 40%)	\$3,523,031.77
Cost range per Subscriber (40% Take Rate = 979)	\$2,514 to \$3,599

The following table shows the **estimated total costs of building out the P3 network using the existing and proposed conduit and handholds**. Here is some information regarding the following table:

- Used \$12/lb average for construction
- There is a 30% contingency on the OSP material and construction – that is a high number, but it includes engineering, permitting, other material, slack, etc.)
- The addresses came to 2,447
- Total Drop Costs are covered by the provider



- e. Total In Premise Equipment are covered by the provider
- f. Network equipment are covered by the provider
- g. Total Build Cost for the Town equals the Total OSP Material, Labor and Other Costs

Description	Total Cost
Total OSP Material, Labor and Other Costs	\$1,271,072.10
Total Drop Costs (2447 addresses)	Provider Cost
Total In Premise Equipment Costs	Provider Cost
Network Equipment and Shelter Costs	Provider Cost
Total Build Costs	\$1,271,072.10

Section 7: Public Policies

Introduction

The Town of Bayfield has the ability to make key public policy decisions that can make the Town more “fiber friendly” to incumbents and other service providers. As a starting point toward that end, Bayfield’s current policy issues were evaluated. This evaluation helped to determine how to accomplish two key policy outcomes:

1. Creating a cost-neutral method to create revenues from “cost causers”.
2. Funding the creation of a fiber-ready infrastructure inside the Town.

There are a number of different types of programs, which are inter-related, that should be developed concurrently to support broadband. These include:

- Joint-Build initiatives with the private sector
- Piggybacking and dig-once ordinances
- Consideration of reduced incentives for utility open trenching
- Required Co-locations for installers
- Exploring street cut and pavement degradation fee exemptions and other complementary initiatives

The Town of Bayfield is frequently asked to leverage staff, equipment and time in order to support contractors who are implementing projects for private providers. In most cases, support for these “cost causers” is provided without recovering the costs being incurred by the community. The revenue recovery package that was developed for Bayfield, includes policies and supporting processes related to these projects, and it integrates these policies into existing Town codes and ordinances in order to create new revenue streams.

Additionally, as a community that seeks to develop advanced communications infrastructure, Bayfield has a unique opportunity to deploy assets at a fraction of the cost of overbuilding individually. By developing a colocation policy and fiber construction standards, the Town can require builders with open trenches and boring projects to deploy conduit and/or fiber on behalf of the community. The colocation package included the development of policies and supporting processes to implement these programs in order to create long-term value for Bayfield.

The policies developed as part of the revenue recovery and colocation packages include: A Pavement Degradation Policy, A Street Cut Fee Policy, A Traffic Control Policy, A Conduit/Fiber Colocation Policy and Conduit/Fiber Construction Specifications.

Background

Public policy developments to control pavement utility cuts in highways and streets and to minimize damage to public infrastructure, evolved from requirements outlined in states and local government codes for rules to control the rights-of-way access demands of telecommunication companies. The rush of telecommunications companies requesting access magnified the need for better control of utility street cuts and improved standards for how cuts are repaired. ^[1]

Government agencies began to realize that excessive utility cuts in pavements under their responsibility were causing premature deterioration of the pavement structures. They also realized that additional money was required to maintain these pavement structures at acceptable levels of serviceability. One method of recovering the cost of damaged pavements is to require the telecommunications companies

or their contractors that are performing the work to pay a fee commensurate with the damage done to the pavement. ^[1]

Many states and local governments have seen the effects of excessive pavement utility cuts in their highways and streets. Potential problems that can arise from uncontrolled and frequent utility cuts include, but are not limited to: ^[1]

- Excessive delays to the traveling public due to closed traffic lanes.
- Increased traffic congestion and related air quality issues.
- Damage to vehicles due to excessive road roughness.
- Rapidly deteriorating pavement structures in the vicinity of the cuts.
- Accelerated funding requirements to maintain, rehabilitate and reconstruct prematurely failed pavement structures.

Some of the other potential impacts of pavement include the perception of the public, which often is of the opinion that the state or local government is always working on the roads, and that road construction never ends. Additional impacts include other indirect costs, or those that cannot be directly quantified, localized air quality and the financial impact to local businesses whose access is impeded due to construction work zones. ^[1]

As demand for access to the public ROW increases, these impacts will become more prevalent as long as traditional trenching remains the predominant form of utility construction. The effect on pavement deterioration is likely to become more pronounced as states and local governments continue to struggle with diminishing budgets and increasing pavement deterioration. Without means of repairing prematurely deteriorated pavements in a timely manner, these agencies expect greater backlogs in maintenance and rehabilitation requirements. ^[1]

1996 Telecommunications Act

On February 8, 1996, President Clinton signed the Telecommunications Act of 1996 (the Act) into law. Overall, the intent of the bill was the development of competition in the telecommunications marketplace by allowing local telephone exchange carriers to provide long distance telephone service, as well as cable television, audio services, video programming services, interactive telecommunications and Internet access. Similarly, long distance providers, cable operators and utilities are now permitted to offer local exchange telephone service. The legislation represents the first major rewrite of the Telecommunications Act of 1934. It is complex and the rules and regulations adopted to implement the Act have a significant impact on a state and/or local government's authority to manage access to, and use of, the ROW under its authority. ^[1]

Nationally, state legislatures have passed legislation that limit the basis for which ROW rental fees can be charged. In some cases, state and local governments' rental and franchise fees have been limited to the actual cost for regulating access to ROW. Around the United States, state and local governments are taking steps to re-examine current ROW management policies subject to the 1996 Act. The proliferation of new technologies has resulted in additional demands being placed on the allocation of public property. As both the trustee and the landlord of the public ROW, state and local governments have an obligation to develop a framework that provides for efficient and cost effective management of the rights-of-way, protection of public safety and maximizes revenue and recovers costs associated with the regulation and management of rights-of-way access. ^[1]

Moreover, the framework adopted by state and local governments must establish a level playing field that will allow qualified providers within each classification of service to enter the market on a competitively neutral basis. Thus, jurisdictions need to examine existing rights-of-way access policies,

fees and compensation methods to assure the proposed policies and fee structures are implemented on a fair and competitively neutral basis.^[1]

Some of the effects of the Act include the following:^[1]

- Affects every provider of telecommunications services.
- Has numerous implications for local governments.
- Encourages new entrants into the marketplace to compete with incumbent providers in all aspects of telecommunications.
- Removes regulatory barriers to entry and allows existing providers to enter into new arenas to compete with each other.
- Encourages the proliferation of new technologies.
- Addresses the convergence in technology in the cable and telecommunications industries.
- Has resulted in additional demands being placed on the public rights-of-way and roadways.

Implementation of Policies

Local governments today are implementing public policy initiatives that are designed to improve the quality of street cut repairs as well as encourage joint use of facilities. Strategies used by these agencies generally fall into three categories: incentives, fees and regulations. Examples of incentive-based policies include providing financial incentives for:^[1]

- Using trenchless technology where technically suitable (and requiring justification for not using trenchless technology when the agency deems it suitable).
- Performing higher quality pavement cut repairs or for making smaller or less-damaging cuts.
- Coordinating with other utility companies to share trenches or underground resources.

Examples of fee-based policies include:^[1]

- Assessing appropriate fees for pavement degradation.
- Assessing appropriate permit fees.
- Implementing a lane rental fee to encourage utility companies to restore traffic as quickly as possible.
- Requiring a deposit prior to beginning work to protect against poor repairs.
- Assessing penalties for non-compliance or for failed repairs within a specified period.

Examples of regulation-based policies include those that do not require fees nor provide incentives but place requirements on the contractor regarding quality of work and restrictions on when and where trenching can be done. Examples of this type include:^[1]

- Establishing moratorium periods that restrict trenching in new and newly resurfaced pavements for a specified time.
- Requiring the pavement repair to encompass a larger area than simply the area of the trench.
- Enhancing inspections and enforcement of specification requirements.
- Requiring agency-owned utilities to meet repair quality standards and all other policies established for private utility companies.

Evaluate Current Policies

The Town of Bayfield's current policies regarding its rights-of-way can be found in Town Code as well as in application forms and construction specification documents. The following is some general information regarding each of the applications and construction specification documents. More specific

and detailed information about the Town Code, applications and documents is available via the Town's website: <https://www.colorado.gov/townofbayfield>

Rights-of-Way and Public Easement Use Permit Application

The guidelines described in Exhibit A of this multipage Permit application form include the following requirements:

1. No construction shall be undertaken without an approved Rights-of-Way or Public Easement Use Permit.
2. Rights-of-Way or Public Easement Use Permits expire sixty (60) calendar days from date of issue (unless otherwise noted on the front of the permit).
3. Applicant shall be responsible for notifying the Public Works Director sixty (60) days prior to the completion of the two-year warranty period.
4. Any Street Cuts must meet various other requirements including: Subgrade backfill and compaction;-, Asphalt patchback, Concrete patchback and Landscape replacement.
5. A traffic control plan shall be submitted for all work within the Public Rights-of-Way. All traffic control shall be in accordance with the Manual on Uniform Traffic Control Devices, latest edition.
6. Fee Schedule.
7. Security Requirement.
8. Inspection Procedures

Road Cut Permit Application

This single page Permit application form includes the following requirements:

- Curb excavation fee is \$15.00 per linear foot [BTC Sec. 13-49(d)].
- Road cut fee is \$5.00 per square foot [Ord. 278].
- Sidewalk excavation fee is \$3.00 per square foot [BTC Sec. 13-49(c)].
- Evidence of liability insurance.

Excavation Permit Application

This two-page Permit application form includes the following requirements:

- A sketch documenting the general detail of the work to be done.
- All work shall have a utility locate performed prior to construction.
- Applicant agrees to comply with all provisions of the excavation permit system [BTC Sec. 13-40].

Construction Specifications Manual

The *Scope* of this manual states:

These Construction Specifications and submittal requirements are applicable to all Town of Bayfield public infrastructure improvement projects and all aspects of private development projects that impact public property or infrastructure or adjacent properties. Specific private development improvements that shall meet these Construction Specifications and submittal requirements include, at a minimum: roadway infrastructure, driveway access, water and sewer services and grading and storm water infrastructure. In addition, all public infrastructure and private development projects shall meet all other applicable Town of Bayfield Municipal and Land Use Code requirements, Town of Bayfield Infrastructure Design Standards, all building and fire codes adopted by the Town of Bayfield,

all applicable State, Federal and County requirements. Where any of these requirements may conflict, the more restrictive requirement shall apply. Construction specifications not addressed in these Construction Specifications shall be reviewed and resolved on a case-by-case basis when brought to the Town's attention. Projects that are unable to meet one or more of the construction specifications shall also be reviewed and resolved on a case-by-case basis when brought to the Town's attention. Requests for exceptions to these requirements shall be in writing, shall include reference to the specific section of the standards and shall provide detailed explanations, necessary engineering data and plans and proposed alternative to the specification.

This manual includes the following sections:

1. General
2. Site Preparation and Earthwork
3. General Utility Line Installation
4. Water Distribution Systems
5. Sanitary Sewer Collection Systems
6. Storm Drainage Facilities
7. Streets and Roads
8. Concrete Curb, Gutter and Sidewalk
9. Concrete Formwork
10. Concrete Reinforcement
11. Joints in Concrete
12. Cast-In-Place Concrete
13. Reinforced Concrete Masonry Units
14. Structural Metal
15. Landscaping
16. Fiber Optic Cable and Interconnect

Infrastructure Design Standards Manual

The Scope of this manual states:

These Infrastructure Design Standards and submittal requirements are applicable to all Town of Bayfield public infrastructure improvement projects and all aspects of private development projects that impact public property or infrastructure or adjacent properties. Specific private development improvements that shall meet these design standards and submittal requirements include, at a minimum: roadway infrastructure, driveway accesses, water and sewer services and grading and storm water infrastructure. In addition, all public infrastructure and private development projects shall meet all other applicable Town of Bayfield Land Use Code requirements, Town of Bayfield Construction Specifications, all building and fire codes adopted by the Town of Bayfield, all applicable State, Federal and County regulations and requirements, all other utility provider requirements and all irrigation company requirements. Where any of these requirements may conflict, the more restrictive requirement shall apply.

Design issues not addressed in these Design Standards shall be reviewed and resolved on a case-by-case basis when brought to the Town's attention. Projects that are unable to meet one or more design standards shall also be reviewed and resolved on a case-by-case basis when brought to the Town's attention. Requests for exceptions to these requirements shall be in writing; shall include reference to the specific section of the standards and shall provide detailed explanations, necessary engineering data and plans and proposed alternative to the standard(s).

This manual includes the following sections:

1. General Requirements
2. Streets
3. Domestic Water System
4. Sanitary Sewer System
5. Storm Drainage System

Other Policy Research

A review was performed of existing Pavement Degradation Policies, Street Cut Fee Policies and Traffic Control Policies from other in-state and out-of-state communities, including downloading several as starting points for Bayfield's policies. As background information, some documents were downloaded and reviewed from the Federal Highway Authority that specifically addresses each of the policies being considered for development for Bayfield.

Additionally, a review was performed of exiting Conduit/Fiber Colocation Policies or Dig Once policies from other in-state and out-of-state communities, including downloading several as starting points for Bayfield's policy. As background information, some industry white papers regarding Dig Once policies were downloaded and reviewed.

Right-of-Way Regulations

The policies developed for the Town of Bayfield include: A Pavement Degradation Policy, a Street Cut Fee Policy, a Traffic Control Policy and a Conduit/Fiber Colocation Policies, as well as Conduit/Fiber Construction Specifications. After a thorough review of the Town's existing policies and specifications documents, as well as additional research, it was decided to incorporate these policies into a single *Right-of-Way Regulations* manual. This is similar to the approach taken by other communities. The development of the *Right-of-Way Regulations* manual was completed in October of 2019.

The *Authority and Purpose* section of the *Right-of-Way Regulations* manual states:

These Regulations are promulgated as an exercise of the Town's police power and under the authority of the Bayfield Municipal Code, Chapter 13 and Article III for the purpose of:

- *Establishing standards and procedures to ensure that persons who engage in Construction Activities or Rehabilitation and Repair Activities within the public rights-of-way, which are under the jurisdiction of the Town of Bayfield, perform such work in a competent, safe and orderly fashion;*
- *Issuing Right-of-Way Permits to protect the public's investment and prevent or address the premature degradation of public streets and other infrastructure;*
- *Ensuring that persons working in the public rights-of-way have the knowledge, competence and resources needed to properly perform the work for which they are permitted.*

All permit applications and all permits issued under policies and procedures predating the adoption of these Regulations shall be processed and managed in accordance with such policies and procedures until such time that the work authorized by such permit(s) is completed, all warranty periods have expired and the permit is deemed closed by the Public Works Department. All applications for new permits shall be processed and managed in accordance with these Regulations. It is the intent of these Regulations that all previously issued policies and procedures dealing with street cuts and traffic control are to be repealed and replaced by these Regulations.

The Public Works Director is authorized to promulgate administrative regulations and directives that are not inconsistent with these Regulations and deemed necessary to implement these Regulations. Such regulations and directives may include, but not be limited to, the most current edition of the Town of Bayfield Infrastructure Design Standards Manual and the Bayfield Construction Specifications Manual.

The policies developed for the Town of Bayfield are mentioned throughout the manual. The following are descriptions of each of the policies.

Pavement Degradation Policy

Specifics about the Pavement Degradation Policy are included in *Section 6.0 Pavement Restoration of Bayfield's Right-of-Way Regulations* manual. *Section 6.0* can be found in **Appendix B** of this report.

The Pavement Degradation Policy states that pavement restoration fees are charged in order to offset a portion of cost directly incurred by the Town due to the Permit Holder electing not to construct a two (2) inch mill and overlay for the length of the cut and full width of the lane, as required. Excavations result in the need to reconstruct the surface and/or subsurface structure of the street earlier than would be required if the excavation or disturbance did not occur. A portion of the Permit fee relates to restoration costs. The cost to substantially restore the pavement to its original condition shall be calculated as the cost to construct a two (2) inch mill and overlay for the length of the cut and the full width of the lane and the Pavement Condition Index (PCI) of the pavement.

In addition, the Policy says that pavement restoration fees will be assessed based on the PCI of the existing pavement surface. PCI information for a specific street segment can be requested through the Town. However, the Permit Holder or contractor may elect to mill and overlay for the length of the cut and the full width of the lane to a depth of two (2) inches instead of paying the restoration fee.

Lastly, the Policy states that the Town shall have the authority to waive any of the right-of-way use fees set forth in the Fee Schedule for any Construction Activities or Rehabilitation and Repair Activities associated with a Permit issued to another governmental entity, which may include municipalities, towns, water and sanitation districts, metropolitan districts and intergovernmental authorities.

As previously presented, local government policies generally fall into three categories: incentives, fees and regulations. Bayfield's Pavement Degradation Policy includes regulations that fall into all three categories.

For example, the Policy states that if other governmental entities are involved in the project then the Town has the authority to waive fees, which is an incentive policy strategy. It also states that the contractor may elect to mill and overlay for the length of the cut and the full width of the lane to a depth of two (2) inches instead of paying the restoration fee, which is also an incentive-based policy strategy.

Some of the Policy's regulations fit into the fee-based policy category. For example, it assesses appropriate fees for pavement restoration and it describes how those fees are tabulated.

The Policy also includes requirements that fall into the category of regulation-based policies. For example, the Policy states that pavement restoration fees are charged in order to offset a portion of cost directly incurred by the Town due to the Permit Holder electing not to construct a two (2) inch mill and overlay for the length of the cut and full width of the lane. In other words, if the contractor elects not to do the mill and overlay, then the contractor is required to pay a pavement restoration fee based on the PCI of the street where the construction activity is take place.

Street Cut Fee Policy

The Street Cut Fee Policy is mentioned several times throughout the *Right-of-Way Regulations* manual. The Street Cut Fee is included in *Appendix A* of the *Right-of-Way Regulations* manual, which is the Right-of-Way Fee Schedule. The Fee Schedule (*Appendix A*) can be found in **Appendix B** of this report

This Policy is a fee based policy, in that it accesses appropriate street cut fees based on the square-footage of the cut and establishes a minimum fee amount.

Traffic Control Policy

The Traffic Control Policy is included in *Section 5.3 Traffic Control* of Bayfield's *Right-of-Way Regulations* manual. *Section 5.3* can be found in **Appendix B** of this report.

The Policy states that generally, construction activities or rehabilitation and repair activities that involve vehicles, materials or equipment that interfere with the movement of vehicular or pedestrian traffic on any public street must have appropriate traffic control during the activity. Traffic control devices and standards shall be in accordance with the most recent version of the Manual of Uniform Traffic Control Devices (MUTCD), as supplemented by the Colorado Department of Transportation. Traffic control plans shall be provided when applying for a right-of-way permit for construction activities. Traffic control for rehabilitation and repair activities shall be provided. When required by the Town, the contractor shall modify the traffic control plan in the field in order to improve traffic flow or safety. Improper installation of traffic control may be cause for a Notice of Violation.

This Policy is a regulatory policy, in that it places specific requirements on contractors. This is due to the impact on the safety of drivers and others using the public right-of-way.

Conduit/Fiber Colocation Policy

The Conduit/Fiber Colocation Policy is mentioned throughout the *Right-of-Way Regulations* document; however, specific information about the Policy is located in *Subsection 4.2.1 Colocation of Town Infrastructure with Permit Holder's Infrastructure* of *Section 4.2 Terms and Conditions*, which can be found in **Appendix B** of this report.

This Policy starts by clarifying that the Town's policy is to efficiently use it's public rights-of-way for a variety of infrastructure and utilities in order to provide public services; advance the Town's goal of increasing opportunities for access to traffic control, communication and broadband services; limit the frequency of street closures and cutting of public streets and reduce road degradation caused by repeated boring and trenching of public rights-of-way.

The Town's Conduit/Fiber Colocation Policy requires all permit holders proposing construction activities that involve directional boring or open trenching within a public right-of-way that extend for more than 1000 feet in length to collocate and install Town conduit simultaneously with the permit holder's construction activity.

The Policy goes on to state that the Town will bear all costs associated with the colocation, including the Town conduit, pull boxes and all other materials and infrastructure to be installed, including the incremental labor and equipment cost incurred by the permit holder (or its contractor or subcontractor) that are reasonably and directly attributable to the required colocation of Town conduit, materials and infrastructure.

As previously mentioned, policy strategies used by state and local government agencies generally fall into three categories: incentives, fees and regulations. Bayfield's Conduit/Fiber Colocation Policy is a

regulation type policy because it requires all permit holders to collocate and install Town conduit simultaneously with the permit holder's. The policy does not offer the permit holder any incentives and does not access any additional fees.

Conduit/Fiber Construction Specifications

Section 16, which is labeled *Fiber Optic Cable and Interconnect*, of Bayfield's *Construction Specifications* manual includes conduit/fiber construction specifications. After a thorough review of this section, an update was required to *Subsection 2.2 Performance Requirements of Section 16* to bring it up to current industry standards. Specifically, *Subsection 2.2* did not reference all the current industry standard fiber optic cable connector types and connector polishing methods. The updated version of *Subsection 2.2* can be found in **Appendix B** of this report.

The original version of *Subsection 2.2* included references to "ST" type fiber optic cable connectors several times, while connector types "SC", "LC", and "FC" were not mentioned. The manual was changed so that all connector types were included in any part of *Subsection 2.2* that addressed connector types.

Additionally, fiber optic cable connector polishing methods were not mentioned in *Subsection 2.2 of Section 16* of the *Construction Specifications* manual. The three methods are PC (Physical Contact), UPC (Ultra Physical Contact), and APC (Angled Physical Contact). *Subsection 2.2* was changed, where appropriate, to include references to "Ultra-Physical Contact or Angled Physical Contact, depending upon the type of application".

Bayfield's *Construction Specifications* manual is not a policy document, so the Town's conduit/fiber construction specifications do not fit into any of the three policy strategies. These conduit/fiber construction specifications focus on what the acceptable standards are in Bayfield regarding the type of fiber optic cable that should be used and the acceptable standard methods for installing it.

References

[1] "Pavement Utility Cuts". (2018 April 19). Federal Highway Administration (FHWA). Retrieved May 25, 2019 from <https://www.fhwa.dot.gov/utilities/utilitycuts/man01.cfm>

Section 8: Financial Analysis

Introduction

The next step of the Planning Phase was to develop pro forma data for a potential network. The data developed focused on two different network models either the Town owning and operating the network or on a core network lease model. These financial analyses were based on the recommended system-level design and related cost estimate. The financial model for the construction and operation of these proposed networks included a range of likely costs including Financing, Operations and Maintenance.

The analysis outlines operational attributes and processes including policies, staffing levels, maintenance agreements and other considerations. Particular attention was paid to back-office and other operating requirements, as well as working capital projections. A strategy for network maintenance and management based on best practices is also presented. The model includes an overall analysis of viable potential services and provides the following:

Sensitivities of Key Assumptions

- Customer segmentation
- Market penetration
- Pricing
- Tiered revenue structures
- Operating costs
- System construction
- Staffing levels
- Base, best and worst-case analysis

Pro Forma

- Operating income and cash flow
- Net present value analysis
- Subscriber revenue by service
- Subscriber revenue by customer/customer class
- Debt service analysis
- Reserve fund requirements
- Uses and sources of funds
- Operating expenses
- Operational savings
- Depreciation summary
- Projected construction costs for network, hardware, buildings and other equipment
- Return on investment (ROI)

All assumptions and price sensitivities were identified and justified. The financial models provide the Town with order-of-magnitude estimates of the overall project cost and supports the implementation roadmap by providing inputs for potential business models, financing options and partnering opportunities.

Town Owned FTTH Network Model

Although the Trustees were concerned about the complexity of a town-owned and operated FTTH model, an analysis was completed in order to provide better information for decision making. Under this model, the Town would build and operate a service business providing internet connectivity to residents, businesses and anchor institutions.

The following chart shows the results of the financial analysis for a FTTH network that would be owned and operated by the Town of Bayfield. The data points on the chart depict Total Revenue, Net Income, Cumulative Net Cash Available and Outstanding Debt. The data points are plotted over a 30-year timeline.

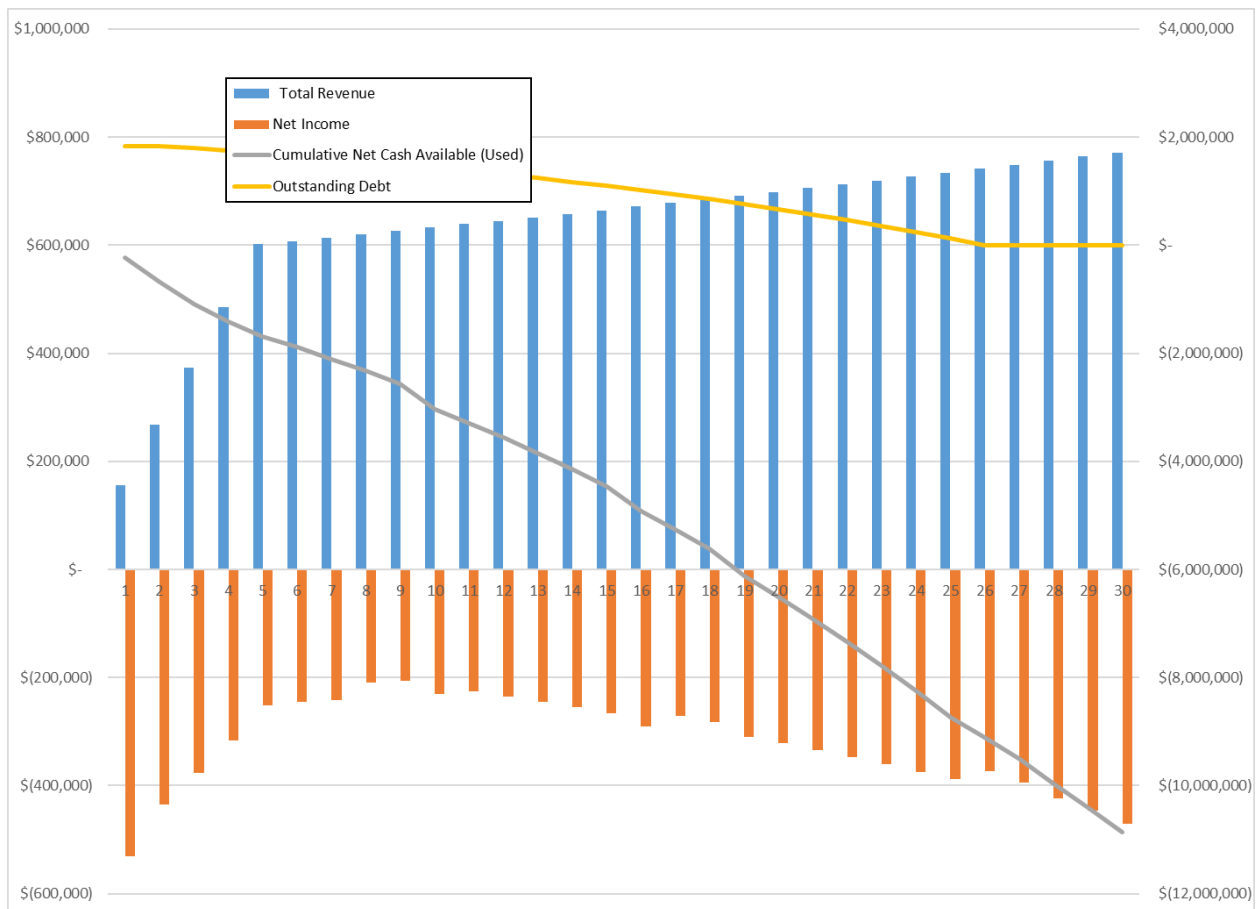


Chart of the Financial Analysis for a Town Owned FTTH Network

From the data points shown on the chart, here are the conclusions that can be reached based on the financial analysis of a Town owned and operated FTTH network:

- A Town Owned & Operated FTTH Network is NOT feasible
- The Revenue stream does not meet OPEX and CAPEX Deployment
- No Scenario creates positive cash flow.

Town Owned Core Network Lease Model

The model which drew the most support in the Vision Phase of the project is also the model defined as most feasible for Bayfield. Under the Town Owned Core Network Lease model, the Town would finance and build a core network at a CapEx cost of just under \$500,000 (after matching grant funding). This network will subsequently be leased to a private sector partner(s) who will agree to provide ubiquitous coverage to the residents, businesses and anchor institutions in Bayfield.

The following chart shows the results of the financial analysis for a Town Owned Core Network Lease Model. The data points on the chart depict Total Revenue, Net Income, Cumulative Net Cash Available and Outstanding Debt. These data points are plotted over a 30-year timeline.

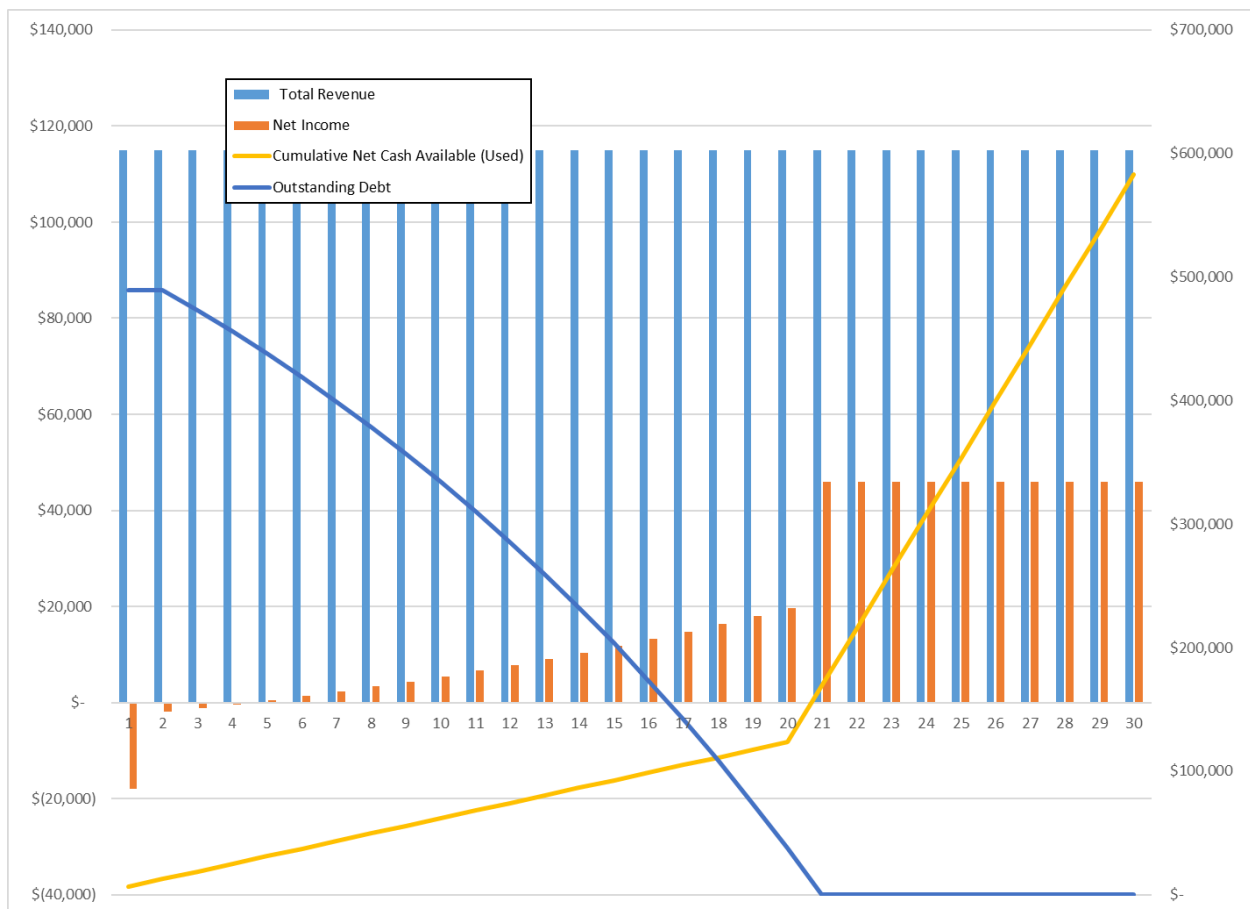


Chart of the Financial Analysis for a Core Network Lease Model

From the data points shown on the chart, here are the conclusions that can be reached based on the financial analysis of a Town Owned Core Network Lease Model:

- Total Capital Expenses of \$979,000 to fund the network will require borrowing by the Town of 50 percent and matching grants of 50 percent. Operating Expenses include hiring of an outside Network Manager and reserves/contingency funds
- Cash Flow is sufficient to cover the principal and interest of the financing vehicle and associated operating expense
- Net Income is positive in year five and remains positive throughout the 30-year model



- Grant funding is required. The model is not financially feasible without grant funding.

Complete copies of the Excel models were reviewed with, and provided to, Town of Bayfield staff.

Section 9: Funding Alternatives

Introduction

The initial analysis of Bayfield's broadband project was based on its own projected revenue versus expected costs – an examination of whether the revenue that should be generated from the infrastructure can pay for the infrastructure and operational costs that would be incurred. The evaluation will explore sources of funding that could help offset infrastructure and operational costs. These grants and other funding options can have significant positive impact on the scope, feasibility and options of a project.

This evaluation will provide a list of several federal and state grant opportunities. It should be noted that grant funding and other funding opportunities are a constantly emerging and changing target. The federal government and state legislatures across the country have recognized the need for broadband funding support. The Federal Communications Commission (FCC) and Congress have approved several channels of funding. The FCC has approved grants in several waves through the CAF II program. Congress included \$600 million specifically for rural broadband in the Omnibus Budget bill that was recently passed and signed into law, and state legislatures across the country are working on broadband funding, mostly geared towards the desire to have ubiquitous broadband, specifically in rural areas – examples are Minnesota, California, Colorado, Iowa and Indiana (and there are others).

The important positive implication of that is there are several opportunities for project external funding that can dramatically improve the financial considerations of broadband projects. The challenges of accessing these sources of funding can be:

- Being in the funding sources' specific target recipient profile
- Knowing when the money will, actually, be available
- The application process
- Determining eligibility based on the FCC broadband map – the maps can be important in determining if a project is eligible for a grant, yet there are significant concerns about the data. Respected independent community advocacy group, the Institute for Local Self-Reliance, clarified the concerns and implications of flawed map data in this article: [When You Can't Trust the Data, Flaws in the Federal Communications Commission's Broadband Forms](#)
- Having the timing correspond with the project timetable
- Meeting the intended goals of the funding agencies
- Providing the matching funds (if applicable)

It is also important to maintain awareness of other funding sources. It is not uncommon for an agency (regional, state or federal) to have targeted programs that can provide funding for broadband projects. These can range from utility related topics to community betterment to citizen specific needs to business attraction or retention, block grants, etc.

Following is a list of the most prevalent grant opportunities starting with Colorado state grants, then federal grants and rounding out the list is Public to Public Opportunities.

State of Colorado Grants

1. Colorado Department of Local Affairs (DOLA)

DOLA originally set aside \$20 million from its Energy and Mineral Impact fund to assist with the study, planning and deployment of broadband in the State of Colorado. Although that money has been used, there remains a priority on broadband deployment. Therefore, broadband projects are now being considered in the same pool with other utility projects, but with the recognition that broadband project funding is important, these projects have found favorable consideration in this process.

On their website (<https://www.colorado.gov/pacific/dola/broadband-program>) the Department describes their Broadband Program as: “DOLA supports the efforts of local governments to improve Broadband service to their constituents to achieve enhanced community and economic development.” Their stated purposes are:

- “Promotes inter-jurisdictional communication
- Supports better access to services available over Broadband, such as distance learning opportunities and telemedicine
- Provides planning and middle mile infrastructure grants.”

Broadband Program

Grants and eligibility

Broadband Planning Grants

- Regional, multi-jurisdictional approaches to Broadband planning are critical to efficient, coordinated deployment of technology and infrastructure
- Public/private partnerships, such as through Open Access Network approaches, help to leverage resources of both private providers and local governments to achieve Broadband goals

Regional Broadband Plans

- Include current available Broadband capacity, both used and unused
- Cost of realizing current unused capacity
- Prioritization of the community's Broadband needs (redundancy, reduced cost, increased speed, etc)
- Options for achieving community's desired Broadband service level (must include private and/or public/private options)

Eligibility Requirements for Planning Grants

- Regional Councils of Governments (or similar collaboration)
- Minimum local match is 25%
- Private sector providers must be invited to participate
- Eligible Projects: Needs assessments, regional plans identifying network gaps, strategies, solutions

Middle Mile Infrastructure Grants

- Connectivity from backbone to community
- Local area networks - loop of community anchor institutions (fire stations, law enforcement, schools)
- Last mile connections not eligible - require partnerships with service providers

Eligibility Requirements for Middle Mile Infrastructure Grants

- Local government partnerships
- Minimum local match is 50%
- Private sector providers must be invited to participate



Eligible Projects

- Minimum geography: county-level
- Consistent with regional plan
- Conduit, fiber, towers, etc.
- Must have operations & maintenance plan (sustainable)

Broadband Funding

- Source: Energy & Mineral Impact Assistance Fund
- Amount: \$20 million set aside

Please contact your DOLA Regional Manager for more information on the application process at:
dola.colorado.gov/regmanagers

The first category is for Broadband Planning. These grants can be used for feasibility with some component of regional coordination.

These types of funds were used by several communities to complete their study, and there are subsequent grant opportunities available under DOLA programs. As mentioned above, Bayfield's project will be in competition with other broadband projects and other utility projects, but projects similar to Bayfield's have found favorable response.

The second category of funds is for network installation (Middle Mile Infrastructure Grants). The funds are intended for projects that will enhance economic development, improve distance learning opportunities, promote inter-jurisdictional communication, improve health care delivery and enable the ability to provide the many services that are available and/or will be developed with better broadband.

These grants are focused on middle mile projects - encouraging the deployment of connectivity from available backhaul to the community and local loops connecting key anchor institutions. Some specific details about these grants are:

- Last mile connectivity is not an eligible service under this program
- The funds can be used to connect anchor institutions but not end citizen or business customers
- Applicants for these funds would be required to provide 50 percent matching funds for these connections (although there could be a reduction to 25 percent match in some financial need circumstances)
- Funds are focused on projects that encompass at least county-level impacts and must be consistent with the regional broadband plans for the proposed areas. This implies that continuing to evaluate county and regional options may open up this funding stream
- The connectivity must be open access and competitively neutral
- Public safety personnel must be able to use the infrastructure for public safety purposes
- Grant recipients will need to be willing to share GIS infrastructure location information with the State
- Grant applications are due on either April 1, August 1 or December 1

The EIAF applications are evaluated by the following criteria:

CRITERIA (points per criteria)		CRITERIA DESCRIPTION
Demonstration of Need (1-20)		<ul style="list-style-type: none"> • Problem, Opportunity or Challenge is clearly identified. • Quantifiable need is well described and documented. • Urgency and Severity of Need may increase score • Health and Safety projects may increase score • Project is a mandatory priority that must be completed
Priority, Community Goal, Outcome (1-10)		<ul style="list-style-type: none"> • The project is identified in their comprehensive or other plan • Project is the local priority • Completing the project solves the problem • Identified expected outcomes
Local Effort	Pre-scored (1-5)	<ul style="list-style-type: none"> • Cash Match is worth a potential 5 points: (50% Match Required, unless financial circumstance warrants reduction) % are rounded to nearest whole number <ul style="list-style-type: none"> ▪ Less than 25% match, 1 point ▪ 25% - 35% match, 2 points ▪ 36% - 49% match, 3 points ▪ 50% - 74% match, 4 points ▪ 75% or higher match, 5 points
	Committee Scored (1-10)	<ul style="list-style-type: none"> • Cash Match is appropriate given unrestricted fund balance • In-Kind Match is appropriate leverage given the low unrestricted fund balance • Attempted/Succeeded to raise rates, fees or voter initiative to raise revenues. • Have made every effort to contribute as much to the project as possible. • Rates are higher than statewide average • Exhausted all matching partner options (when applicable) • Deferred due to lack of funding
Readiness to Go	Pre-scored (1-15)	<p>Pre-scored based on:</p> <ul style="list-style-type: none"> • Project financing secured • Preliminary engineering, plans, permits, zoning, final design etc. has been completed, is being completed, has not begun at all, etc.
Energy/Mineral Impact	Pre-Scored (1-10)	<ul style="list-style-type: none"> • Pre-scored using metrics
	Committee Scored (1-10)	<ul style="list-style-type: none"> • Project directly addresses or mitigates industry impacts (current or historic). • Project diversifies economy - post industry
		Maximum Possible Score = 80 TOTAL SCORE

More information about these grants can be found on their websites:

DOLA's Broadband Program Website:

<https://www.colorado.gov/pacific/dola/broadband-program>

DOLA's EIAF Grant Website, including application information:

<https://www.colorado.gov/pacific/dola/energymineral-impact-assistance-fund-eiaf>

It is important to communicate with Bayfield's DOLA Regional Manager. Bayfield's Regional Manager is:

Patrick Rondinelli
Fort Lewis College
1000 Rim Dr.
Durango, CO 81301
(970) 247-7311
Patrick.rondinelli@state.co.us

The Regional Manager provides insight into the process and guidance on how to best position Bayfield's project for successful funding.

2. Colorado Broadband Grants – Colorado Department of Regulatory Agencies (DORA)

The Colorado General Assembly established the Broadband Deployment Board in the Colorado Department of Regulatory Agencies in 2014. The purpose of the Broadband Deployment Boards was to increase broadband access in unserved and underserved areas of the State (where the FCC set levels of 25Mbps Down and 3Mbps Up are not available). The funds are for last mile deployments and mainly targeted to existing providers (private companies and telephone cooperatives) and non-profit electric associations. The funds can be used to pay for up to 75 percent of new infrastructure costs.

Since its establishment, the Broadband Deployment Board has awarded \$19.6 million in grant funding to private providers to deploy high-speed broadband in unserved, underserved areas of Colorado. In the most recent application period, the Board received 21 applications totaling roughly \$25 million in grant requests.

The Colorado General Assembly passed increased funding in 2018 for DORA, which was expected to be set at \$18.7 million. Reductions in High Cost Support funding were projected to reduce that amount to \$13.5 million at midyear. This program then will be very competitive.

DORA broadband grants require the participation of private sector partners. In Bayfield's preferred model, the acquisition of DORA grant funds will likely be crucial to any private sector partner seeking to complete last-mile connectivity. This can be an important aspect of a broadband strategy either in working to see if those funds could be made available to public entities or if there are discussions within a public/private partnership. More information about these grants can be found at: <https://www.colorado.gov/pacific/dora-broadband-fund>

Federal Grants and Loans

1. FCC Connect America Fund

The FCC conducted a Connect America Fund Phase II auction throughout 2018 and 2019. In their press release in August 2019, they stated:

In total, the auction last year allocated \$1.488 billion in support to expand broadband to more than 700,000 unserved rural homes and small businesses over the next 10 years. The FCC has already authorized three waves of funding in May, June and July. Today's action brings total authorized funding to over \$924 million, expanding connectivity to 342,097 homes and businesses; additional rounds will be authorized in the coming months.

There will be specific guidelines for the awarded providers. They will be required to provide annual progress reports. They will be required to offer service to 40 percent of their awarded areas by the third year. Also, they will be required to add an additional 20 percent each year, serving 100 percent of the supported locations in their accepted area by the end of year six. If carriers do not deploy infrastructure to 100 percent of the locations within a block but deploy to 95 percent of the locations for which they were awarded statewide, the carrier will be required to refund 50 percent of the support it received for the total number of unserved locations. This information (and any updates) can be found on the CAF II website:

<https://www.fcc.gov/connect-america-fund-phase-ii-auction-auction-903>.

This is particularly relevant to Bayfield for four reasons:

- Knowing if there is an award for the Bayfield area, which continues to unfold. Knowing what areas will have grant money for broadband could be important, particularly to know if that would make Bayfield ineligible for other grants (or if Southwest Colorado is not covered and, thus, could be eligible for other grants).
- The minimum service offering will be 10Mbps Up/1Mbps Down. Those may not be high enough for areas within the Town's boundaries.
- The awardee has six years to provide 10/1 service, so this may not solve many connectivity problems.
- It is unclear what will happen to funds that aren't used. Providers that were awarded these grants may not be able to provide the connectivity within the deadlines. If that happens, they lose the funding and it reverts back to the fund. Thus, there could be significant funds available as the process unfolds.

It is important to know what will be covered and what won't be. It is also important to know the minimum speeds (and if the awardee intends to provide greater service than that). In addition, it is important to know that they have six years to provide these low services. This knowledge can (and probably should) fit into the Town's strategy. It may not change Bayfield's strategy, but it is important to factor it into decisions the Town makes.

It is important to communicate with the Director of Federal Broadband Engagement, Colorado Broadband Office - OIT:

Teresa Ferguson
(303) 877-6725
teresa.ferguson@state.co.us

2. Rural Digital Opportunity Fund

This is a fairly new announcement from the FCC. In their press release, the FCC provided an overview description:

On August 1, the FCC proposed taking its biggest single step to date toward closing the rural digital divide by establishing the Rural Digital Opportunity Fund, which would direct up to \$20.4 billion to expand broadband in unserved rural areas. Providers must build out to 40 percent of the assigned homes and businesses in the areas won in a state within three years. Buildout must increase by 20 percent in each subsequent year, until complete buildout is reached at the end of the sixth year.

There are industry questions about what entities will have preference in the award process.

3. Community Connect Grants

These grants are specifically targeted to local and tribal governments for very low-income rural communities (under 20,000 residents) with completely unserved and very low-income populations. The recipients must provide at least 4 Mbps Down/1 Mbps Up with free service to all households and community institutions for two years to a community center. One key with this grant is that the service area does not have to be uniform, but any areas that will be served must be contiguous.

There are anticipated to be approximately 150 grant applications per cycle with 10 percent of those being awarded. Therefore, it is very competitive and very specific.

The evaluation criteria for these grants is based on a 50-point scale:

- Economic Characteristics (15 points) (median income, unemployment)
- Educational Challenges (15 points) (e.g., consequences of inadequate access for educational institutions and lack of distance learning)
- Health Care Needs (10 points) (based on a list of medical facilities and letters from health care professionals documenting anticipated use of the proposed network)
- Public Safety Issues (10 points) (include a listing of police, fire and rescue services who service the PFSA)
- Small Area Income and Poverty Estimates (applications with at least 20 percent of the population living in poverty will receive the maximum – 50 points – for this category)

4. Economic Development Administration

Within the United States Department of Commerce is the Economic Development Administration, which oversees Economic Development Assistant grants.

These grants have typically been based on job creation. There are different categories of grants, but they all focus on how many jobs can be created. Broadband does appear to be fundable infrastructure, although there have not been a lot of broadband projects funded. Having said that, with broadband infrastructure being eligible and some projects have been funded, it should be considered.

The key questions seem to be: how many jobs can be created and how will this project directly impact that job creation.

The EDA recommends contacting their regional representatives to discuss projects and to have them review grant applications before they are submitted. If this is a grant that could apply to the Town's strategy, that would be strongly recommended, too. Their typical timetable to submit applications is that they will receive applications at any time – although that is subject to available funds from year to year.

5. E-Rate

The Federal Communications Commission established E-Rate to provide schools, libraries and universities with discounts of 20-90 percent off of the costs of telecommunications and internet networks and ongoing expenses. E-Rate is administered through the Universal Service Administrative Company (USAC) with oversight provided by the FCC.

The specific dates that determine when schools and libraries can apply for funding can change slightly from year to year, but follows a mid-winter to spring pattern. Once the application

process ends in the spring, the funding year begins for those applications. In 2017, the application period opened February 27 and closed May 11.

There is a specific ID a school or library must get then specific forms to fill out to apply. And, there are competitive bid requirements (there must be a RFP and it must be open for 28 days) to be eligible for the funding. In addition, there are different options for how this will be paid to the institution and to the vendor. Also, there are documentation requirements that need to be understood and followed.

E-rate funding options should be considered if there are eligible schools and/or libraries. They might be an important part of funding strategies for infrastructure. Excess capacity can be added to these networks at substantially less cost than an independent build.

6. Healthcare Connect Fund

This fund was also created by the FCC and is administered by the Universal Service Administrative Company (USAC). It was created to give Health Care Providers (HCP) the ability to have broadband services that meet health care's capacity needs. It particularly encourages the formation of state and regional networks.

HCP's can apply individually or in a consortium. Funded applicants receive a 65 percent subsidy on all eligible broadband equipment and services. These dollars can be used for construction of networks. The intent of the funds is predominantly for rural healthcare providers. Urban facilities can be included as long as they are in a consortium that includes at least 51 percent rural providers.

If there are health care providers who could be part of a holistic strategy, this fund could be an important component of connectivity.

Colorado contains a large consortium, the Colorado Telehealth Network (CTN) through which most of the HCF funds are distributed. Each year, the CTN distributes RFP's on behalf of their members for the services they will need and distribute the discounts accordingly. An HCP doesn't have to go through the CTN, but that is the most common way that HCF funds are distributed in the State.

As with E-rate, excess capacity can be added to these projects at significant savings.

More information about the HCF can be found on USAC's website at:

<http://www.usac.org/rhc/healthcare-connect/default.aspx>

7. Housing and Urban Development (HUD)

HUD administers the Community Development Block Grant Program. It was established to help communities address various community development needs. Based on a national formula relying primarily on census data, CDBG provides annual grants to more than 1,200 local and state governmental entities. Although CDBG grants have been utilized very little for broadband programs, HUD has confirmed that broadband programs can be eligible for CDBG dollars.

There are two main categories of grant eligibility: Entitlement and non-entitlement. Entitlement grants are awarded to larger cities and urban counties (greater than 50,000). Non-entitlement areas are for smaller cities and administered by states. In addition, there are also Section 108 loan funds which could be available. Grants can be used as security for Section 108 loans, leveraging the grant dollars for more impact. Non-entitlement areas can also use their

grants in this way, but since they are administered by the State, the State would have to agree to leverage those funds.

8. Rural Utility Services

RUS is part of the United States Department of Agriculture and has been an important part of the development of utility infrastructure in the United States. They offer low interest loans for telecommunications based on the treasury rate, currently 2.1 percent @ 20 yrs. These rates change regularly, so it is important to check with RUS to get the most current rate. They also offer low interest loans for telecommunications used in electric utilities (of which the excess capacity can be used for other broadband services). RUS offers grants, loans and combination of the two. RUS Programs include Telecommunications Infrastructure Loan Program, Rural Broadband Access Loan and Community Connect Grants.

The Telecommunications Infrastructure Loan Program:

- A. Stated purpose: This program provides financing for the construction, maintenance, improvement and expansion of telephone service and broadband in rural areas.
- B. Entities that can apply for this grant: Most entities that provide telecommunications in qualified rural areas including:
 - State and local governmental entities
 - Federally Recognized Tribes
 - Non-profits, including Cooperatives and limited dividend or mutual associations
 - For-profit businesses (must be a corporation or limited liability company)
- C. Areas that are eligible to apply:
 - Rural areas and towns with a population of 5,000 or less
 - Areas without telecommunications facilities or areas where the applicant is the recognized telecommunications provider are eligible

The above information is available on the RUS website for this program:

<https://www.rd.usda.gov/programs-services/telecommunications-infrastructure-loans-loan-guarantees>

Rural Broadband Access Loan:

Stated purpose: The Rural Broadband Access Loan and Loan Guarantee Program (Broadband Program) furnishes loans and loan guarantees to provide funds for the costs of construction, improvement or acquisition of facilities and equipment needed to provide service at the broadband lending speed in eligible rural areas.

Entities that can apply for this grant: To be eligible for a broadband loan, an applicant may be either a non-profit or a for-profit organization and must take one of the following forms:

- Corporation
- Limited liability company (LLC)
- Cooperative or mutual organization
- A state or local unit of government
- Indian tribe or tribal organization
- Individuals and Partnerships are not Eligible

Areas that are eligible to apply:

- Proposed funded service areas must be completely contained within a rural area or composed of multiple rural areas, as defined in 7 CFR 1738.
- At least 15 percent of the households in the proposed funded service area are unserved.
- No part of the proposed funded service area has three or more “incumbent service providers.”
- No part of the proposed funded service area overlaps with the service area of current RUS borrowers or the service areas of grantees that were funded by RUS.
- Communities where USDA Rural Utilities Service has previously provided funding for construction of broadband infrastructure may not be eligible.

The above information is available on the RUS website for this program:

<https://www.rd.usda.gov/programs-services/rural-broadband-access-loan-and-loan-guarantee>

Community Connect Grants

Stated purpose: This program helps fund broadband deployment into rural communities where it is not yet economically viable for private sector providers to deliver service.

Entities that can apply for this grant:

- Most State and local governments
- Federally-recognized Tribes
- Non-profits
- For-profit corporations

Areas that are eligible to apply: Rural areas that lack any existing broadband speed of at least 10 Mbps Downstream and 1 Mbps Upstream is eligible.

The above information is available on the RUS website for this program:

<https://www.rd.usda.gov/programs-services/community-connect-grants>

Depending on the strategy that the Town pursues, if it includes building telecommunications infrastructure, RUS should be considered.

With interest rates being as low as they are currently, if broadband construction is part of the adopted strategy, there should be an analysis of available loan providers and their interest rates. If RUS rates are not at least a point lower (and possibly more than that), then the filing and ongoing requirements might not be worth the difference in rate. In addition, depending on the application requirements, RUS has typically taken 12 to 18 months to approve loans.

If it is deemed that as part of Bayfield’s strategy RUS should be considered, it is important to discuss with them the areas that would request loans. Because they are funding rural utilities, the municipal population must be less than 20,000 and not adjacent to a City of over 50,000. Moreover, there are other considerations about other federal funding, 15 percent must be unserved and there cannot be three or more current providers.

9. USDA Community Facilities Loans and Grants

For infrastructure - telecommunications is a listed eligible use. The community has to be under 20,000 population. Eligibility is based on income, population and need.

For USDA (and RUS) grants and loans, there are State Directors. For Colorado:

Sallie Clark
Denver Federal Center
PO Box 25426
Denver, CO 80225
Phone: (720) 544-2903
<https://www.rd.usda.gov/co>

Public-to-Public Opportunities

Colorado Department of Transportation Fiber

There is a significant discussion occurring today at the state level regarding the use of unused or dark fiber in the state's transportation and other agency systems.

If there are CDOT fibers in the Bayfield area, CDOT has executed intergovernmental fiber optic agreements with other agencies. One example is Summit County. There, the county has gained access to about a dozen strands of fiber optic cables from Breckenridge to I-70, then along the corridor into a point of presence (POP) in the Denver area. This is valuable long-term asset for Summit County, which, if leveraged correctly, could result in 70 percent to 90+ percent savings over the cost of purchasing commercially available backhaul.

Pursuing this would include meeting with CDOT's senior fiber optic program managers. The questions needing to be answered would be what CDOT fiber might be available in the area, if there was funding for a CDOT-owned fiber optic cable through the area and if not, what priority is there for fiber in the Bayfield area. Depending on what is already available and what funding is available, the question to be answered is what timetable could there be to fill in any high priority segments that could be mutually beneficial (if needed).

It is also important to consider that, if available (or could become available), internal to a number of branches of the state government, there is not a clear, common approach to allowing the use of dedicated state-owned fiber optics for carrying "commercial telecommunications traffic." Under a best-case scenario, unused CDOT fibers can be granted to municipalities to provide commercial traffic; worst case may be that municipalities would have to lease capacity on existing highly limited "single string" (not-redundant) commercial fiber optic cables.

It is recommended that Bayfield evaluate several possibilities to capitalize on these types of programs:

- Develop Intergovernmental Agreements: If nearby municipal entities have excess to backhaul fibers, it may be possible to negotiate an arrangement with them for a number of their unused strands or wavelengths on existing strands.
- CDOT Service Swaps: If CDOT brings fiber to the Town, Bayfield could develop swap exchanges for free fiber. From our discussions with CDOT officials, if this is an option, it might be possible to offer to operate some of CDOT's infrastructure (e.g., CDOT traffic signals) in exchange for free fiber. Alternatives like this can have a side benefit of giving

the local municipal entity control over local CDOT signals to better manage peak-hour traffic (if applicable), especially during special times and events.

- CDOT Leases: Depending on if the Town or entities within the Town decide on broadband operational models and what fiber is available, it could be possible to leverage a lease agreement to reduce traffic costs.

Regional Opportunities

Other area municipal entities, Councils of Governments, regional planning districts, etc. might also have fiber resources and/or financial resources. Working with them to understand their plans, resources and needs can be a very valuable, mutually beneficial effort. Dark fiber, redundancy, operational support, financial contributions, grant possibilities (grants available to them or that they know about), potential customers, etc. are all possibilities of collaboration.

Public Policy

There are several options that can be utilized to generate revenue for possible projects that might fit into a larger broadband strategy:

- Revenue generating policies
- Franchise agreements
- Local Improvement Districts – Ammon, Idaho provided a new concept in fiber project financing. Ammon determined where the network would be, and anyone within that area who wanted to connect were given the opportunity to pay for connecting to the network in advance and having that be attached to their property and paid for over twenty years. For those who chose not to connect, they will be given the option of paying at the time of connection the full fee of \$3,000 - \$5,000 onetime payment

Participant

Depending on who might want to be connected and the degree to which they need the connection, there are some potential customers who may be willing to pay a significant portion (or even the entire amount of the cost to reach them) to have fiber connection. Many private networks operate with this ROI model. Depending on what strategy is chosen, if there is a potential for a fiber build, it is worth contacting the list of end users to see if they are willing to consider paying for all or part of what is needed to get the fiber to them.

Section 10: Potential Partners

Introduction

Based on the current, fluid nature of La Plata Electric and FastTrack, there is a very real opportunity to create Public-Private Partnership alternatives that reach the Town's goals for improved service while protecting scarce community resources. The approach used to engage with potential partners included building a list of potential partners and other interested parties, developing a request for expressions of interest (EOI), sending the EOI to the list of potential partners, processing responses to the EOI and selecting potential partners based on the level of interest. This approach created a faster-moving cycle in which partners were identified and brought to the table more quickly and with a higher likelihood of successful progress.

Identifying Potential Partners

The list of current internet service providers (ISP) for the Town of Bayfield, which was developed during the *Market Assessment* for this Study, was used as a starting point for identifying potential partners for the potential buildout of the Town's core fiber ring network. Here is the list of ISPs who were identified as potential partners (in alphabetic order):

- Aligntec
- Cedar Networks
- CenturyLink
- FastTrack
- Forethought/Brainstorm
- Highspeed4U
- Mammoth Networks / Visionary Broadband
- USA Communications / Zito Media

This is the list that the Request for Expressions of Interest was sent to.

Request for Expressions of Interest

After researching a variety of methods for determining which of the potential partners would be the best fit for the Town of Bayfield, including request for expressions of interest (EOI), request for interest (RFI), request for qualifications (RFQ) and request for proposal (RFP), the decision was made to develop an EOI. The EOI can be found in **Appendix C** of this report.

On January 3, 2020, the EOI was sent to the list of potential partners. They had until January 15, 2020, to submit questions about the EOI, and their responses were due on February 11, 2020.

EOI Responses

There were four responders to the EOI. The following table list the responders and their responses to the questions included in the EOI.

Responders	Period of Exclusivity	DORA Experience?	Timeline	Requirements	Service Options	Internet Pricing
AlignTec	YES	2018 request - failed due to budget issues	Build hybrid wireless-fiber network until fiber ring placement	Town cover all costs associated to planning, designing and construction as well as maintenance of the "Town Fiber Ring Network". Provide fiber lease flexibility	Internet - YES Voice - Pending Video - Pending	Residential 50M - \$39.95 1000M - \$149.99
Brainstorm	YES	Won 6 DORA Grants	Pre-registration Goals Met First	Help offsetting capital expenditures will increase the chance of success. Reduced, or eliminating permitting fees, offsetting lease fees for a period of time or subsidizing our capital expenditure towards construction to homes are all ideas we would be willing to discuss.	Internet - YES Voice - YES Video - YES	Residential 100M - \$50 1000M - \$70
CenturyLink	No, Open Access	Won 2 DORA Grants	Does not require significant amount of time after the network is built to begin connecting customers	Open Access or will likely challenge the funding	Internet - YES Voice - YES Video - No	Not Provided
Visionary Broadband	Prefers 18-36 months	Won 2019 DORA Grant	Phase Approach 2-3 years	Clear and open partnership in planning the fiber ring and fiber to the premises services	Internet - YES Voice - UNK Video - UNK	Residential 100M - \$50 1000M - \$80

Section 11: Strategic Direction

Introduction

The final step in the completion of this study was the exploration of findings with the Board of Trustees and the creation of a plan for implementation of approved recommendations. The Strategic Plan outlined below incorporates the overall findings of this study into a plan that creates the greatest opportunity and value to implement a network that is capable of meeting current and long-term community needs.

Broadband Feasibility Study Workshop

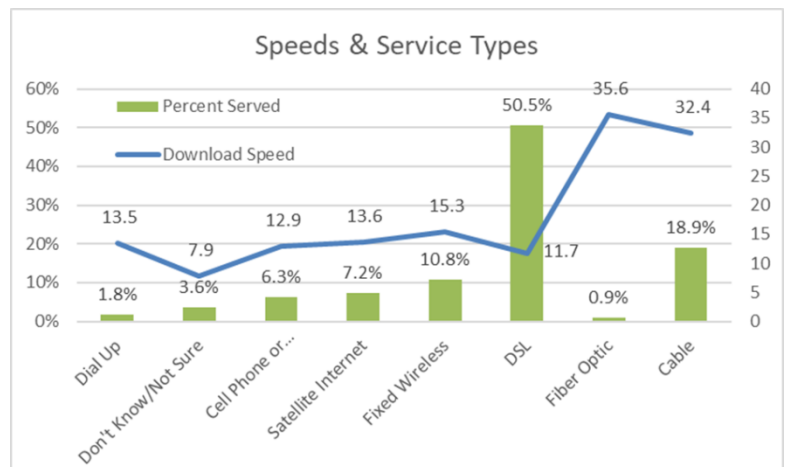
This broadband feasibility study was the primary topic at a Board of Trustee workshop held on Thursday, February 18, 2020. During the workshop, the Trustees participated in a presentation and discussion of the Study findings to date and developed guidance for Town staff regarding next steps for the potential project.

Findings

FINDING #1: BAYFIELD RESIDENTS ARE UNDERSERVED AND WANT TOWN INVOLVMENT

Across more than 114 completed surveys of residents and business owners, there were widespread reports of residents reporting speeds below the FCC definition of broadband, a high level of dissatisfaction with current options and a higher-than anticipated level of service outages.

Beyond service levels, residents also feel it is important for the Town to be involved in finding a solution. Eighty-three percent said they feel internet is an essential utility, while 85 percent indicated they would be very or somewhat likely to purchase services from Bayfield or one of its partners. Beyond services, survey respondents were philosophically aligned to the concept of government sponsored services with 87 percent saying they feel it is appropriate for Bayfield or a partner to compete with the private sector.



FINDING #2: REGIONAL OPPORTUNITIES AND PARTNERSHIPS ARE AVAILABLE

There are 11 providers currently serving the Bayfield market, ranging from the incumbent CenturyLink to Wireless Internet Service Providers (WISPs) to Fiber-based providers. HR Green staff executed a Request for Expression of Interest (EOI) that provided potential partners with a map of the proposed network, an overview of the potential business model options under consideration and asked them to respond with detailed options and alternatives to partner with the Town.

Four providers responded to the EOI indicating their interest in a potential partnership with the Town to extend broadband ubiquitously throughout the Town. Further details surrounding the EOI process and interested partners can be found in Section 10 of this report.

FINDING #3: BROADBAND SERVICE EXPANSION IS FINANCIALLY FEASIBLE IN BAYFIELD

A study of the financial feasibility of the project was conducted to determine if a system could be built and operated that meets the Board's goals for ubiquity, speed and service, while remaining financially self-funding. Three models were created, and two models demonstrated financial viability across 20- and 30-year lifecycles. A publicly-owned and operated model was NOT feasible given the low potential subscriber counts and the need to build and establish staff and infrastructure.

Both models deemed feasible were based on the creation of dark fiber networks and subsequent leasing of dark fibers to provider(s) who would extend service to individual homes and businesses.

The Core Network Lease Model, which was designated as the preferred alternative, was based on a preliminary network design created by HR Green staff featuring the use of current conduit assets and the extension of new fiber and conduit to form a distribution backbone. The model assumes that a private-sector partner will construct and finance individual connections to homes and businesses and will pay lease fees to the city for the use of the distribution backbone.

Utilizing current area lease rates, the models reflect that a ubiquitous Core and Distribution network could be designed and constructed for \$979,000. After stabilization, operating expenses of \$69,000 were estimated to reflect ongoing (non-capital) expenses as a cost of network maintenance.

The Bayfield Leased Network Model is feasible assuming the acquisition of state grant money through the Department of Local Affairs (DOLA) broadband grant funding at 50 percent of the total cost of capital expenditure. Without state funding assistance, the build would not be economically feasible in the future. The model assumes that the Town would create a 20-year financing vehicle to cover initial CapEx and ongoing operating expenses totaling \$490,000 to \$500,000.

Assuming grant assistance is available, the models reflect a turn to positive net income in year five of the project. Overall cash flow fully covers the principal and interest on the financing vehicle and ongoing operations costs and make the overall implementation achievable with the assumptions provided.

FINDING #4: TRUSTEES AND STAFF FULLY SUPPORT IMPROVED BROADBAND SERVICE

Trustees and staff believe that broadband services need to be improved in the Town. Bayfield, unlike some rural Colorado communities, has a meaningful number of rival providers who are making incremental strides to improve service beyond that available over DSL from CenturyLink. These efforts have been focused on newer residential developments, anchor institutions and businesses who offer higher returns on investment for the ISPs. Unfortunately, while this has improved broadband in certain pockets of town, it has left large pockets of unserved or underserved residential and business locations throughout the Town.

At a July 3, 2019 working session, Town Trustees discussed a number of competing values that must be considered in establishing the direction for a municipal broadband project. As a result of this meeting, and as subsequently discussed at a working session February XX, 2020, the Trustees are interested in exploring grant funding and moving forward with initial design of an open access network, creation of a formal RFP process to select a provider (or providers).

Recommendations

HR Green staff presented several recommendations, which were agreed to by the Board in concept. In order to fully realize the benefits of improved broadband service, a number of recommendations must be executed concurrently, primarily due to the need for state funding as a mechanism to drive project deployment and the complicated nature of the potential Public Private Partnership.

RECOMMENDATION #1: COMPLETE FORMAL REQUEST FOR PROPOSAL (RFP) TO IDENTIFY PARTNER(S)

The EOI process conducted as part of this study was useful to determine interested parties but does not provide the Town with enough details to fully determine a proposed partner nor the form of the partnership. It is recommended that the Town of Bayfield conduct a formal RFP to identify and select its partner(s) for the potential buildout.

RECOMMENDATION #2: PURSUE PHASED GRANT FUNDING

As identified throughout this report, the project cannot move forward without identified and committed grant funding. There are three grant application periods through DOLA, which can be used, for both engineering and final construction expenses. A formal grant application should be submitted as soon as practical to cover final engineering design of the proposed city-owned network.

A subsequent grant request can be submitted following completion of the final engineering design to fund the network construction.

It is also recommended that the selection of a private partner be timed to allow for coordination of private-sector grant requests to assist with paying for last-mile connectivity. Ideally, a coordinated approach would assure both the private sector and the Town of availability of state funds to complete both the city-owned distribution network and the last-mile connections due to the interdependence of both funding sources for completion of the two-phase project.

Next Steps

The Trustees expressed strong support for the ongoing exploration of the recommendations outlined above. Due to the need for Town match funds, it is likely that work will be dependent on the completion of the 2021 FY budget and identification of funding sources for the matching portion of the project.

- Trustees directed the interim City Manager to proceed with a plan to identify funding and pursue the grant funding necessary to implement the recommendations outlined above. While precise timing was not stated, the general consensus was to pursue grant funding in either the August or December DOLA funding cycles.

Appendix A: Public Sector Needs Interviews

Summary of Anchor Institution Feedback

Bayfield Chamber of Commerce

Date: June 5, 2019

Time: 5:00 pm

Attendees:

- Brenna Morlan, Chamber President

Chamber Overview:

The Bayfield Chamber of Commerce does not have a physical location. This interview was held over the telephone.

In addition to being the Chamber President, Brenna is a member of the Town Board of Trustees.

Chamber Feedback:

- Internet plays a major role in economic development for the Town.
- The Chamber has more home-based business members than brick and mortar business members.
- Their home-based businesses are concerned about poor Internet service. They have trouble with their connections dropping. They use their Internet for credit card processing and when it is slow or goes down then they lose business.
- Internet in Bayfield is not reliable or adequate.
- Businesses open up in Bayfield and then go out of business due in part to poor Internet service availability and reliability.
- A lot of businesses that would relocate to Bayfield do not because Bayfield does not have sufficient Internet service.
- Not enough Internet service providers (ISP) in Bayfield. Need to create a more competitive ISP marketplace.
- Would like to attract technology jobs to Bayfield. Poor Internet holds Bayfield back from acquiring these types of jobs.
- It is a broadband infrastructure problem not an ISP problem.
- The most viable alternative is for the Town to create a public/private partnership to jointly provide service. The Town should be the “custodian” of the Town’s broadband infrastructure and partner with someone to provide services over the Town’s infrastructure.



Bayfield School District

Date: June 5, 2019

Time: 1:30 pm

Attendees:

- Bill Bishop, Director of Technology
- Roger Dodd, Data Services Coordinator

District Overview:

The Bayfield School District is composed of one administration building and four schools – one high school (grades 9 – 12), one middle school (grades 6 – 8), one intermediate school (grades 3 – 5) and one primary school (grades K – 2). All the schools, as well as the administration building, are located within the town limits of Bayfield.

District Feedback:

- The District has a 300 Mbps symmetrical fiber-based connection to the Internet via FastTrack. The District's IT team monitors the District's utilization of the Internet connection. Currently the District is utilizing about 200 Mbps of the 300 Mbps on an average school day.
- The District has recently installed a second FastTrack Internet connect at the Intermediate school. This is a redundant connection in case the primary connection goes down.
- All District buildings are interconnected via leased dark-fiber connections from FastTrack. The District runs 10Gbps connectivity between buildings and 1Gbps connectivity within buildings.
- The District pays approximately \$1,200 a month, which includes their e-rate discount, for all the fiber connectivity and services (Internet and phone) provided by FastTrack.
- The District has approximately 1400 students, 300 teachers and a number of administrative personnel.
- The District supports 1,700 chrome books, 300 laptops and 200 desktops. Students start using the chrome books in the 6th grade. Students start taking the chrome books home at night in the 9th grade. They are using a one-to-one program, which means there is one chrome book for each student.
- The District utilizes Google. Teachers use Google a lot as part of their curriculum.
- Most of their applications are cloud-based.
- Due to Google usage as well dependency on cloud-based services, network cannot be down.
- FastTrack has been extremely reliable. The District is very happy with FastTrack. They have no complaints about the service they receive from FastTrack.
- FastTrack has had only one outage in the last year due to a router failure in Durango. The Internet connection was down for 24-hours. Not a good situation.
- Concerned about redundancy. There is only one FastTrack fiber connection between Bayfield and Durango. This is a single point of failure. The District's Internet connection including the second Internet connection to the Intermediate school will go down if that connection is cut.
- Due to the reliability of FastTrack, they have had very little need to call Fast Track for help.

- The District says that their most critical issue regarding connectivity for the District is support and customer service. When they have a problem, they want the issue resolved on the initial phone call. They do not want to be put on hold or to leave a message for someone to call them back. They expect that their provider's support team will be accessible, consistent, knowledgeable, understandable and quick to resolve problems.
- The District is encouraged by the Town taking the initiative to explore a broadband infrastructure with Bayfield. Private sector providers only put infrastructure in place when it looks like it will be profitable.
- The District supports both the "Provide incentives to existing providers" and the "Create a public/private partnership to jointly provide service" alternatives.
- The District is 100 percent supportive of the Bayfield Broadband project. They are willing to be included in the conversation and would also be willing to attend meeting, etc. The Town should feel free to reach out to them anytime.
- Interesting side note, Pueblo Community College is building a remote campus in Bayfield. They will be using the statewide network provided by CenturyLink.

Pine River Irrigation District

Date: June 6, 2019

Time: 1:00 pm

Attendees:

- Ken Beck, Superintendent

District Overview:

The mission of the Pine River Irrigation District (PRID) is focused on the operation of Vallecito Reservoir to provide supplemental irrigation water to 45,000 acres of land and water for domestic users. PRID provides fresh water to the residents of the Town of Bayfield. Their office is north of Bayfield and is outside of the town limits.

PRID Feedback:

- Their Internet services are provided by CenturyLink. They have a DSL connection that provides up to 40 Mbps Down and up to 5 Mbps Up.
- They pay \$105 per month for the CenturyLink Internet services.
- As of January of 2019, CenturyLink completed a project to run fiber (FTTN) around the entire Vallecito Reservoir.
- CenturyLink ran fiber to the pedestal (node) outside of the PRID office and then used the existing copper line from the pedestal to the office to provide both phone and Internet services.
- If you did not subscribe to the updated CenturyLink services as soon as they completed the fiber project, then you were placed on a waiting list. You had to wait for someone to drop their CenturyLink service before CenturyLink would add you to their service.
- PRID experiences outages every other month, so up to six times a year.

- Even though they pay for 40 Mbps, sometimes it seems more like 5 Mbps. It seems that the more people in the area that are using CenturyLink Internet services the slower the District's connection seems to be.
- The Bayfield, Forest Lakes and Vallecito area seems to be growing in population, and as the area grows, there is added demand on ISPs, which causes a further decline in reliability.
- PRID definitely sees a need for improved service in the area going forward. They see their needs increasing in the future, so 100 Mbps services could be in their future.
- PRID has experienced the "headaches" of a public-private partnership (P3). While they understand that the success of a P3 greatly depends about who your partner is, they believe there are far fewer "headaches" if you own a utility out right. Therefore, PRID supports the viable alternative for Bayfield to "Create a municipal utility to operate a broadband system."
- PRID is supportive of and willing to participate with Bayfield in creating a broadband network. PRID is willing to help to move this initiative forward.

Pine River Library District

Date: June 5, 2019

Time: 3:00 pm

Attendees:

- Shelley Walchak, Library Director
- Tim Lovejoy, Computer and Network Specialist

District Overview:

The library is located in the expanded business district on the north side of Highway 160. An addition to the 2004 building was added in 2012 to add a large community room and expanded space for the public. The Library's 12,000 square foot building is home to almost 40,000 items. The Library includes more than 80 public computers; two smaller meeting rooms; a children's imagination room; comfortable chairs for reading; a large selection of books, magazines, audio and video materials; online databases and downloadable media including audio, video, music and e-books. A 17,000 square-foot Community Garden serves the community by providing space for garden beds, teaching classes and serving the food needs of the community. Current staff level is the equivalent of 10 full-time employees who serve a community of over 9,000.

District Feedback:

- The library has a 100 Mbps symmetrical fiber connection from FastTrack. They moved to 100 Mbps in July of 2018 when they renewed their contract with FastTrack.
- The library pays an e-rate discounted monthly cost of \$240 for their connection. Their contract with FastTrack expires on July 1, 2021.
- FastTrack has a fiber hub in the Library that they need occasional access to.
- They are very happy with FastTrack. It is very reliable. It is rare, but they do experience occasional outages. They have only had two or three problems over the last five years.
- They are able to continuously monitor their bandwidth usage. They predict that when their contract expires with FastTrack that they will probably need to increase their bandwidth to 250 Mbps.

- They are part of the Marmot library consortium. Marmot is headquartered in Grand Junction. The library uses the cloud-based Integrated Library System (ILS) hosted by the consortium. By using Marmot's ILS, the library has access to over 1.2 million items.
- The library provides: 39 desktops for public access, 14 laptops for gaming/lab use/class use, 5 laptops for check out, 5 chrome books for check out, 10 chrome books for after school use, 3 Macs for public use and 4 Xboxes for gaming.
- Home schoolers use the Internet resources at the Library. Students from the public schools use the library's Internet and technology resources primarily for gaming.
- The library offers a variety of technology programs, including open gaming once a week and a coding program twice a week.
- Travelers staying at a nearby RV park, come to the library to make use of its Internet resources.
- Sometimes people come to the library's parking lot after hours to use the library's Wi-Fi.
- The library's 2018 statistics showed: an average of 88 public computer uses each day, an average of 200 public Wi-Fi logins each day and an average of 67 e-materials downloaded each day.
- The library would like to expand their facility so they can create an incubator space for business startups.
- They are "all in" with whatever the Town decides to do regarding community broadband. They are supportive and willing to help in any way they can.

Road Runner Transit

Date: June 5, 2019

Time: 8:30 am

Attendees:

- Matt Nesbitt, Transportation Director

Program Overview:

Road Runner Transit is a program division of Southern Colorado Community Action Agency, Inc. The Southern Colorado Community Action Agency, Inc. (SoCoCAA) was formed in 1966 and received its non-profit corporate status in 1967. SoCoCAA has been in continuous service since then (formerly as the Southern Ute Community Action Programs).

The Road Runner Transit program's mission statement is: "With major support from La Plata County, from the Towns of Ignacio, Bayfield, the City of Durango and a federal grant managed by the Colorado Department of Transportation, Road Runner Transit increases mobility among seniors and persons without cars or licenses as well as assisting commuters in saving money."

Program Feedback:

- Road Runner Transit is the public transportation provider from Ignacio and Bayfield to Durango.
- Road Runner Transit also provides intercity bus service between Durango and Grand Junction, CO.

- The program uses a lot of manual processes. For example, drivers use a clipboard to keep track of the number of riders.
- Currently not using an Internet provider.
- As their ridership increases and they add more busses and routes, they will need to get more tech savvy. They will need to add technologies such as GPS/AVL, tablets for drivers, automated rider counters and route tracking.
- Major bus stops in Bayfield are at Town Hall and the library.
- They are the only transportation provider to the hospital in Durango as well as to the Durango tech center.
- The communities they serve provide matching funds to match CDOT funds.
- They are supportive of Bayfield's broadband efforts and are willing to help anyway they can.

Upper Pine River Fire Protection District

Date: June 6, 2019

Time: 2:30 pm

Attendees:

- Roy Vreeland, Deputy Chief
- Lisa Eckert, Business Manager

District Overview:

The Upper Pine River Fire Protection District (UPRFPD) provides all-risk fire, rescue and emergency medical services to 265 square miles of eastern La Plata County and a small portion of Western Archuleta County in southwest Colorado. The District serves a permanent population of approximately 15,000 residents.

The District includes the Town of Bayfield, Gem Village and the communities of Forest Lakes, Vallecito Lake and Lemon Reservoir. The District is mostly an urban interface fire protection district and works closely through mutual aid with the Forest Service and surrounding fire districts.

District Feedback:

- The District maintains eight fire stations, three of which are staffed 24 hours in Bayfield, Forest Lakes and Lake Vallecito. Station 1 and the District's administrative office building are located in the Town of Bayfield. The District has total of 48 FTE employees.
- The District has a 100 Mbps symmetrical fiber connection from FastTrack at the Administration building. The connection is used for Internet and VoIP services.
- They pay approximately \$200 a month for this connection. There was no installation cost for the connection.
- The District has a USA Communications (Zito) connection to Station 1. It is used for Internet, telephone and cable TV services.
- CenturyLink DSL connections are installed to the rest of their stations. The personnel at the staffed stations complain about the slowness of the Internet at these stations.

- When a station with CenturyLink service has an outage, it takes a while for CenturyLink to resolve the problem. CenturyLink does not make public safety a priority. Also, CenturyLink seems to have only one technician in the area.
- All of the District's data and application services are cloud-based.
- Poor communications, particularly cellular, throughout the District impact the use of technology on the fire apparatus. For example, using laptops in the field or patient side is not possible.
- Fire personnel use iPads in the field for reporting, but cannot upload the report until they get back to their stations where they can access the Internet.
- FirstNet not going over well in the County. AT&T seems to have the worse service in the County.
- County's secondary Emergency Operations Center (EOC) is in Bayfield. The County's primary EOC is in Durango. Connectivity between the two EOCs is over fiber, so they can video conference between the two EOCs.
- The District is teaching some online video conferencing-based EMT classes from the EOC in the admin building. The class attendees either work for the District or surrounding departments. This is a revenue stream for the District.
- Going forward the District wants higher speed and more reliable Internet to all stations.
- It would like to use the Internet connections to all their stations for video conferencing-based training classes. This will save time and money because fire station personnel can stay in District.
- District supports viable alternative to "Provide incentives to existing providers."
- District concerned about whether the Town has the capacity to manage the infrastructure or the services of a broadband utility. Also concerned about who will pay for it.
- District is very involved in the Town and would like to be involved in the broadband process going forward.

Summary of Department Director Feedback

Marshal

Date: June 6, 2019

Time: 4:00 pm

Attendees:

- Joseph McIntyre, Chief Marshal

Marshal Overview:

The Bayfield Marshal's Office is staffed by eight Deputies including the Marshal, a School Resource Officer, a Deputy with the South West Drug Task Force Team and an administrative assistant. The Bayfield Marshal's Office provides 24/7 law enforcement, code enforcement & animal control services to its 2,600 residents. They also assist other agencies in the area in providing law enforcement services to the 7,700 residents in the greater Bayfield Community.

Marshal Feedback:

- Since 2010, La Plata County is the fastest growing county in this state, and Bayfield is the fastest growing community in the County.
- The community is not very well served with broadband services, whether the services are from the private sector or public sector.
- As the department's technology advances, they need Internet Services to come along with them; otherwise, they cannot take full advantage of the technology.
- They have MDT's in every vehicle. Currently AT&T is providing services for their MDT's; however, they are moving away from AT&T to Verizon. They are moving to Verizon due to better coverage.
- The department wants to be in control of their MDTs. Currently the county is providing IT services for the MDTs in the vehicles.
- Their RMS system is in the cloud. The department is having to rely on different people to support their different technology. The department's desktop computers are supported by the town's IT contract services.
- Currently the town does not use video arraignment; however, they may need it in the future.
- It would be great to have Wi-Fi hotspots along with better cellular services throughout the community. With hotspots, officers would not have to come back to the office. They could stay in the field to continue to provide services.
- Current services seem to be reliable. However, they do get kicked off every so often, particularly after hours and on weekends. FastTrack is located in Durango so they may not realize when there is a problem.
- Redundancy is a problem. The department is pretty much done if the Internet connection goes down.
- Of the four viable alternatives for service delivery, the middle two would be preferred. One of those would be to provide incentives to existing providers, and the other role would be to create a public private partnership to jointly provide service.
- Staffing and cost concerns if the town decided to provide broadband services in competition with local or incumbent private providers. Currently, the town has enough staff to support current services. If the town were to start delivering broadband services, then the town does not have enough staff to run that service.
- Cortez got into the broadband business and; unfortunately, it cost more than what they brought in. Providing broadband services needs to be cost neutral. The community needs to stay even. Not sure about the underlying issues in Cortez.



Parks and Recreation Department

Date: June 5, 2019

Time: 11:30 am

Attendees:

- Becky Eisenbraun, Director

Department Overview:

The Bayfield Parks and Recreation Department provides a variety of programs, facilities and services to meet citizens' recreational needs. Throughout the year, the department offers a variety of youth and adult programs, yoga classes and special events that serve all ages. The Department oversees 33+ acres of parks lands, open space and trails within the town limits of Bayfield. There are eight town parks with walking trails, picnic areas, athletic fields and playgrounds. Eagle Park has a pavilion that can be rented for parties or special events. Each year, staff members plan and organize several community events such as the 4th of July Celebration, Spring Festival and Old-Fashioned Christmas. Bayfield Parks and Recreation also work with a variety of community organizations and groups to provide Town-wide special events such as Downtown Block Parties and Heritage Days.

Department Feedback:

- No broadband problems at town hall. Sometimes the phones are not connecting. Fastrack provides both Internet and VoIP. Happy with broadband at the office.
- Bayfield is underserved. Slow to no service, problems connecting and slow service.
- Town has 8 parks. Eagle Park has a pavilion which they rent out. This is a source of revenue.
- Three fulltime staff and three seasonal employees during the summer plus several high school kids that help with refereeing games after hours and on the weekends.
- Currently using a lot of manual processes. Schedule created through Microsoft excel. Trying to find a parks and rec Software System. Everything by hand until they can find a software company.
- With a software package, people can use their phones to register. Software should be equipped with a mobile app. People can also access software on their mobile phones to check field schedules.
- Currently, people have to come into the front desk to schedule leagues. They can turn in their rosters and registration forms. They have to come in house or they can mail it. Registration cannot be done on the Town's web site. The recreation software will allow someone to register online.
- The vendors and sponsors for Town events all of have to come into the town hall, nothing can be done online.
- They have to pay cash or check or they can call the town hall and pay with a credit card over the phone. The payment process can be automated and that is something that the park and rec department is looking forward to doing with their new software.
- Broadband issues might have contributed to all the manual processes that the Department is using.

- One of the things that they struggle with, is people turning in registration forms late. This could be solved if the Department had the ability for people to register online. Their numbers will increase and people will be on time with their payments with an online system.
- Having the application is great but also having it sit on a fast response and broadband network is an added bonus.

Pine River Senior Center

Date: June 6, 2019

Time: 8:00 am

Attendees:

- Brenda Jones, Senior Center Coordinator

Center Overview:

The center is a resource for local senior citizens. Some of the features of the center include a dining area, a lounge with a flat panel TV, free internet use, a pool table, conference room, commercial and warming kitchens and a large outdoor deck that faces the Pine River with views of the mountains. The center is one of the facilities provided by the Bayfield Parks and Recreation Department. It is usually staffed by one member of the Town's staff and a couple of times a week someone from the County's senior center. The center has volunteers that help with the front desk and volunteers that help serve meals. The Center was built in 2009.

Center Feedback:

- It is a recreation center that is open Tuesday, Wednesday and Friday.
- The Senior center is hooked to FastTrack. The center's Wi-Fi is connected to the center's FastTrack connection.
- Staff has no problems with the broadband access at the senior center.
- The center's security cameras runoff of the center's Wi-Fi.
- The center has a brand-new laptop computer available to the seniors, but they get frustrated with it because it is sometimes slower than they like. They can use it for E-mail and other online activities. It connects using the center's Wi-Fi. The center also has a printer available for the seniors to use.
- Maybe half of the seniors have connectivity at home, but it is so slow.
- Seniors are using the Internet to stay in touch with grandchildren. They access grandkids pictures, Facebook, etc. They like to use their phones as well because then they can visually see each other as well as speak to each other (FaceTime).
- Most of the seniors bring their own tablets to the center or their iPhones. They can use the senior center Wi-Fi with their own devices.
- Seniors can use the laptop to go to the Medicare web site in order to fill out forms and to sign up for it.
- Sometimes seniors come and sit in the parking lot at the senior center to use the center's Wi-Fi after hours, or they sit on the front porch of the senior center and access it that way.

- The ideal broadband program needs to include faster service. Something that would be beneficial for everybody. It needs to not be so expensive. Seniors are on a fixed income so it needs to be faster and cheaper.
- The Town should help improve the availability of services, but it should not be up to the town to provide services. It is great that the town wants to help get people services; however, the provider companies should step up and make the services available. The town should not have to pay incentives or do other things to help the providers come to Town.
- Having a franchise agreement with the provider(s) that could provide incentives to the provider(s) would be a good thing.

Public Works Department

Date: June 6, 2019

Time: 9:30 am

Attendees:

- Jeremy Schulz, Director

Department Overview:

The Public Works Department is responsible for maintaining/developing the roads, which includes snow removal, street signs, street line painting, street sweeping and general road maintenance. The Department also handles the day-to-day maintenance of the Water & Wastewater Systems. There are 6 Public Works Employees who are charged with Public Works and Water & Wastewater duties.

Department Feedback:

- Broadband is a focus of the Town board. Fiber to the home is the ultimate goal. Need broadband to attract residents and businesses.
- Good fiber-based service right now for businesses.
- Lacking fiber services to residential areas. Largest provider is CenturyLink, and it uses DSL. Speed is not optimum. There are other providers in town, so residents have options.
- Do not see Bayfield being a provider. There is infrastructure in town, and they are trying to figure out how to utilize the infrastructure to minimize disturbance as far as excavation and then possibly leasing some of the space to private providers for them to light the fiber.
- Town would not necessarily have the staffing issues or the overhead costs that would come into play if the Town were a provider. However, the Town still would be able to generate modest revenue from allowing different providers to utilize some of Bayfield's infrastructure to provide those services.
- Bayfield is not in the position to provide broadband as a utility at this time. It might be possible in the future, but the Town would need to experience a little more growth. Not there yet population wise or staff wise.
- There are a lot of cord cutters. Too many people on a home Internet connection, and it starts slowing down.
- Dig once would be optimum.

- The town is looking at installing some conduit to the new subdivision for broadband as the development is going in and then offering those to potential providers. At this point in time, it looks like Cedar Networks is also looking to put in conduit. This is a dig once opportunity for Cedar to put in their conduit alongside the town conduit.
- The Town is being very proactive in anything that is opened up there trying to put conduit in.
- Any waterline projects that are coming up, the Town will look to put conduit in as well. It will be a shared trench.
- Trying to find a way not to disturb the soil and put pressure on providers so they will use existing conduit to minimize disturbance.
- There are potentially lower cost for providers to use existing underground conduits rather than going aerial. Town could review pole leases for aerial connectivity and then copy and modify the language. Present them to the private providers, and it might generate some interest.
- Ninety percent of the current right of way permit requests are for fiber. Ten percent are for gas companies who are replacing their antiquated lines.
- Dig once makes good sense. It is a few dollars of initial investment. Town has been very proactive and trying to get some conduit in the ground whenever anyone is digging stuff up. It is not going to eliminate all excavation but it will minimize it. Do not have to dig up the roads any more than you have to.
- Pueblo Community College is running fiber to their building. Attaching to the statewide network provided by CenturyLink.
- At this time, it is probably not possible for the town to be able to pull the trigger on becoming a service provider. The Town could start by creating an incentive program, then move to a P3, eventually ending up providing broadband as a utility.
- The Public Works Department is currently not in a position to leverage existing systems, programs and staff to help provide broadband services.
- The Department operates SCADA Systems for the wastewater and freshwater plants. It is using ESRI for GIS mapping. They have a rough fiber map but it is not all-inclusive, so it still needs some work. They have maps for water and sewer but they are finding that there are some corrections that need to be made.
- In the next 5 to 10 years, the Departments is pursuing better utilization of the infrastructure and increased staffing. The department would like to market the infrastructure a little bit better and better coordination between providers. No one really knows that it is out there and available.

Summary of Community Influencer Feedback

Town Mayor

Date: June 6, 2019

Time: 11:00 am

Attendees:

- Matt Salka, Town Mayor

Mayor Overview:

In addition to being the Town's Mayor, Matt Salka is an IT services professional with Data Safe. The Town of Bayfield contracts with Data Safe for IT support services.

Mayor Feedback:

- Town hall has a 100 Mbps symmetrical fiber connection from FastTrack.
- Town uses cloud-based services.
- Redundancy is an issue. CDOT ran fiber over the top of Wolfcreek Pass. It seems that they did not engage with other public entities or providers to put in additional conduit while they were installing their conduit.
- CenturyLink seems to be the ISP for all the other providers. What happens if CenturyLink goes down?
- The Town is not well served with broadband services. Not enough rooftops to encourage investment from providers.
- Town residents and businesses need and want better broadband.
- Supports the trend of "cutting the cord" when it comes to TV services. Sees most homes using video streaming services over the Internet.
- FastTrack and Cedar Networks seem to be making the rounds trying to connect all of Bayfield using fiber. FastTrack is connecting some businesses and Cedar is connecting some residences.
- There are other options for Internet services in Bayfield, such as fixed wireless. However, speeds are very slow. Latency is the concern with satellite Internet providers.
- Improving broadband should focus on businesses first and then trickle out to residents. This is slowly happening - wishes it could happen faster.
- Need more and better broadband inside of town limits because there are a lot of home-based businesses in Bayfield.
- Better broadband would attract more residents and then that would attract more businesses, such as restaurants and hotels.
- FTTP is the goal. This is expensive but could share the costs by making deals with providers.
- Big supporter of "Dig Once" policies. Need to stop tearing up the roads every time there is a need to put in more conduit and fiber. Dig once is what Bayfield tries to do.
- On a scale of 1-10 (1 is Most Important... 10 Least Important), how important are each of the following benefits to you as a byproduct of bringing high speed broadband to the town?
 - a. Home Internet Service - 5
 - b. Economic Development - 1
 - c. Education Services - 2
 - d. Health Services/Telemedicine - 1
 - e. Updated Public Infrastructure - 1
 - f. Tourism Benefits – 8
- Would like to see Town and private providers work together to solve the broadband problem.

- Would have cost concerns as well as staffing concerns if the Town went into the broadband utility business.
- Ideal broadband program would be to create a public/private partnership to jointly provide service and share costs. Town could build and maintain the infrastructure and a provider could lease fibers from the town and then provide services over the leased fiber.

Town Trustee

Date: June 5, 2019

Time: 5:00 pm

Attendees:

- Brenna Morlan, Member, Town Board of Trustees

Trustee Overview:

This interview was held over the telephone.

In addition to being a member of the Town Board of Trustees, Brenna is the President of the Bayfield Chamber of Commerce.

Trustee Feedback:

- Town needs a fiber broadband infrastructure to continue to grow – to stay in “business”. It is a broadband infrastructure problem and not an ISP problem.
- Town does not have enough Internet service providers (ISP). A couple of ISPs recently started to deliver services to the Town, and they seem to be a little better. More providers promote better competition and improved levels of service.
- The most viable alternative is for the Town to create a public/private partnership to jointly provide service. The Town should be the “custodian” of the Town’s broadband infrastructure and partner with someone to provide services over the Town’s infrastructure.
- The Town knows how to maintain the broadband infrastructure and has the staff to maintain it. The Town is less knowledgeable when it comes to delivering services of the broadband infrastructure and does not have the staff to support the delivery of services.
- Having FastTrack come to Town was awesome. Great partnership with the Town for fiber connectivity to Town and businesses.
- Recently signed a fiber lease agreement with a provider. It is a 75/25 split in revenues from the lease, with the Town receiving the 25 percent share. Town is using the revenues to maintain roads and other municipal infrastructure needs.
- On a scale of 1-10 (1 is Most Important... 10 Least Important), how important are each of the following benefits as a byproduct of bringing high speed broadband to the town?
 - a. Home Internet Service: 2 to 3
 - b. Economic Development: 1
 - c. Education Services: 3
 - d. Health Services/Telemedicine: 3
 - e. Updated Public Infrastructure: 3
 - f. Tourism Benefits: 5

- Town collects some payments online. It is clunky but probably not related to Internet issues.

Summary of Potential Providers/Partners Feedback

City of Durango

Date: June 4, 2019

Time: 11:00 am

Attendees:

- Eric Pierson, IS Manager
- Charlie Powell, Network and Security Manager

Durango Overview:

This interview involved staff from the City of Durango Information Services Division. This Division is part of Durango's Finance Department. The Information Services Division is responsible for providing and managing the computer hardware and software environment for all City departments and citizen-facing systems like online payments, maps and service requests.

Durango Feedback:

- The Bayfield Marshal office has a handful of PCs that connect to the City of Durango's CAD system in the City's 911-dispatch center. The 911-dispatch center is a City department. They do a charge back to each of the public safety offices that use the City's dispatch center.
- At one time, SCAN was used between all the cities and counties in the Region 9 area. Which is about a dozen organizations.
- SCAN used routers at Cortez and Durango. The smaller communities, like Bayfield, were connected into those routers. The town hall in Bayfield and some of the county facilities in Bayfield were connected to SCAN. Support for SCAN has dwindled over the years.
- SCAN was an offshoot of a DOLA grant that the city and county got back in the mid-1990s. SCAN is a middle mile fiber network. The county is still using SCAN for its connectivity. SCAN is still there, but it is underutilized at this point. SCAN had five nines of uptime.
- Durango's network manager along with the network manager from Cortez and La Plata County were the main people maintaining the SCAN network.
- The Town of Bayfield recently pulled out of SCAN and found cheaper access through FastTrack. When Bayfield pulled out of SCAN then the county had to reconfigure what they were doing. So, now the Bayfield connection to the dispatch center comes through the County.
- Currently, Durango has a 500 MB fiber circuit from Skywerx (Mammoth/Visionary). For the Skywerx connection, they are paying \$1,134 per month. The city has a one-year agreement with Skywerx.
- FastTrack owns the City's IP addresses; therefore, they must maintain a minimum amount of connectivity via FastTrack. The City has 50 MB of bandwidth with FastTrack. The connection costs \$250 per month. The contract is for one year. The City does not use any of the FastTrack bandwidth.
- SWCCOG (SCAN) provided and quote for the city through forethought, and the city reviewed it. However, they could not get redundancy through the COG. The COG (SCAN) is a competitor provider in the current environment. The COG acts as broker.

- Durango does not have a fiber to the home or fiber to the business initiative. They have exempted themselves from SB 152. Durango does lease dark fiber to ISPs.
- Cedar networks floated the idea of trying to get some fiber to the home, but they needed to use LPEA electric poles. LPEA prefers to use FastTrack, so FastTrack has first priority on LPEA poles. If there is space on the poles, LPEA will let other ISPs use it.
- FastTrack owns all of the fiber that interconnects LPEA substations. They have not made any of that available.
- Spectrum is a cable TV provider in Durango. Spectrum provides both cable TV and Internet. Durango has a franchise agreement with Spectrum. Cable TV providers can typically provide higher speeds.
- CDOT is a major player when it comes to fiber up over Wolfcreek Pass.
- The City has no interest in expanding a program that would create a new countywide or region broadband network.
- The City does still see a need for shared services among the government entities in the Southwest part of the state.
- The ideal broadband program for the region might be a P3 with Forethought or with Cedar Networks.

Colorado Department of Transportation – Region 5

Date: June 7, 2019

Time: 1:00 pm

Attendees:

- Julie Constan, PE, Traffic and Safety Program Engineer

CDOT Overview:

The Colorado Department of Transportation (CDOT) exists to ensure that Colorado has a safe and efficient highway system by building and maintaining interstates, U.S. highways and state highways.

CDOT Feedback:

- CDOT does not have anything through Bayfield right now.
- There is a group that has been meeting to discuss fiber. This group includes CDOT, Bayfield, SWCCOG, FastTrack, LPEA and San Luis Valley Rural Electric Cooperative.
- Region 5 is the least funded area of the state. Five percent of the state's population lives in this part of the state, and they have 25 percent of the state's lane miles. However, they get about 10 percent to 15 percent of the state funding. Therefore, they rely upon partnerships to make projects happen and to make the money stretch further.
- CDOT has been working on public private partnerships (P3) to expand their fiber network. They have been involved in scenarios where they build the fiber network and then they lease fiber to partners, and the scenario where partners build the fiber network and they lease fiber from them. CDOT's ITS department has been working on these scenarios and partnerships.
- CDOT has fiber that goes from Walsenburg and I-25 all the way up to the summit of Wolf Creek

Pass. However, there is a limited amount of fiber capacity.

- Region 5 has been awarded an Advanced Technology Deployment for Congestion Mitigation grant from the Federal Highway Association. With the grant, they are planning to bring fiber from the top of Wolf Creek Pass to the east side of Pagosa Springs.
- Some of the fiber is for their own needs. They need to bring CDOT fiber further west so they can communicate with their road signs and traffic signals. Right now, the connectivity between signs and signals is through cellular modems.
- They are looking at installing 244 strands of fiber. They are planning to have conversations between the ITS group and potential partners regarding the fiber strands.
- They have two partners on the project at this point. These partners want to give money to the project. They want to get over the pass to I-25. This will help to complete their networks.
- This project will help to provide redundancy potentially to Bayfield. It will help address the problem concerning what happens if Bayfield's fiber between the Town and Durango goes down.
- Depending upon how much money the partners bring to the table, this might be an opportunity to bring CDOT fiber even further west. They might be able to get the fiber as far as Highway 160 and 151. They are working on P3 arrangements right now.
- The project from the top of Wolf Creek Pass to Pagosa Springs will probably be a \$12,000,000 project.
- If all goes well, the project to run fiber from the top of Wolf Creek Pass to Pagosa Springs could get underway in the summer of 2020. It could be a two-season job. It all depends upon how quickly winter decides to set in on the pass.
- CDOT has a microwave tower at the top of Wolf Creek Pass as a backup.
- The state received a Build grant to install fiber in a number of places. They are focusing on the I-25 and I-70 corridors. Once they get those areas taken care of, they might focus on the 160 area to try to get the fiber further west. No timeline is in place for that part of the build out.
- There is a piece of legislation that allows entities through P3s to utilize some of CDOT's right of way.
- CDOT is not aware of any connectivity between Bayfield and Pagosa Springs. CDOT is planning to have conversations with FastTrack and others about trying to get fiber connectivity from Pagosa Springs to the west.
- CDOT and the SWCCOG meet often so they can talk about what each other is working on. CDOT is trying to fill in the gaps where nobody has anything as far as fiber is concerned. They are also looking at potentially partnering with people to fill in gaps where other people might have fiber and they do not.



La Plata County

Date: June 7, 2019

Time: 9:30 am

Attendees:

- James Torres, IT Operations Manager

County Overview:

This interview involved staff from the La Plata County Information Technology Department. The purpose of the Information Technology Department is to provide hardware, software, data and web-based services to residents, agencies, businesses and La Plata County Staff so they can make informed decisions and conduct business in an efficient manner.

County Feedback:

- The County has two offices in Bayfield. In the town hall, they have an office where a couple of people provide DMV services and they have a road and bridge shop in Bayfield. Internet traffic from those offices comes across a fiber connection at town hall back to the County facilities in Durango.
- The County and the Bayfield Marshal office were all on the SCAN network because the Marshall office needs access to the County's CAD system. However, there are a lot of changes regarding how that traffic is handled. A discussion with the county is under way regarding this situation.
- A potential fiber link in Bayfield is an important link to the County. Right now, the County's connection to the DA's office in Pagosa Springs is via a wireless Skywerx (Mammoth) connection. They would prefer to have that connection via fiber so that is why the link between the County and Bayfield is important.
- Redundancy is something that everyone has had a concern about. The County as big, as it is, does not have a redundant circuit. The County has been in discussion with the SWCCOG about a redundant connection.
- The County hosts the colocation point for the entire region. Tri-State, Durango School District, City of Durango, Forethought, FastTrack and Cedar Networks all pass through the County's colocation point.
- The County understands that with the growth that Bayfield is experiencing there needs to be at least "two sources of water into the town." Bayfield has a spider web that is not acting like a mash.
- Just like the City of Cortez, Bayfield may need to set itself up as a broadband utility in order to ensure that its businesses and residents get the bandwidth that they need.
- Finding a path for Bayfield to become its own utility seems to be the only viable option for residents and businesses. To increase high-speed connectivity to the residential areas which is equal to economic growth. The growth in home-based businesses in Bayfield make that connection even more critical.
- The County has always wanted to be a partner. In the last few years, the county has had conversations with Bayfield about providing Bayfield with services. This would cut Bayfield's costs and bring in a little revenue to the County.

- The County is all about helping to provide whatever services they can.
- The County does not have a fiber pipe that they own between Bayfield and the County offices.
- The County could be viewed as a provider but they can also be viewed as a user. If Bayfield builds a circuit between the Town and the County, then the County could pay Bayfield for the use of that circuit. The County could use that circuit to provide services to the DMV Office and the road and bridge shop.

La Plata Electric Association

Date: June 7, 2019

Time: 8:00 am

Attendees:

- Dan Harms, Manager of Rate, Technology and Energy Policy

LPEA Overview:

La Plata Electric Association, Inc., a Touchstone Energy Cooperative, is Colorado's fifth largest electric distribution cooperative, serving more than 33,000 individual, family and business members in La Plata and Archuleta, with segments of Hinsdale, Mineral and San Juan counties.

LPEA Feedback:

- There are three different fiber lines that go to Bayfield - FastTrack has one, LPEA has one and Tri-State also has a line.
- LPEA does have redundancy to Bayfield. LPEA is using the Tri-State line for their operational needs. LPEA also has fiber on the FastTrack line.
- LPEA thinks that the electrical substation on Bayfield Parkway would be a hub for the expansion of its fiber network. LPEA, Tri-State and FastTrack all come into Bayfield at the substation. They would envision going up 501 to Vallecito someday.
- LPEA has fiber going all the way back to the county line from the Bayfield substation. However, it is not connected to anything. LPEA would be interested in using it to get to Pagosa Springs.
- Fast track and LPEA operate as separate entities. FastTrack is a subsidiary of LPEA and Empire Electric. LPEA owns 75 percent of FastTrack. Most of FastTrack's trunk lines originate at the LPEA offices. The LPEA offices are one of the major stops between Albuquerque and Denver.
- With the passing of Senate Bill 19-107, there may be some changes. It will change the landscape of what LPEA is doing. However, the Senate Bill will not impact Tri-State.
- LPEA is trying to figure out if it makes sense for LPEA to lay its own fiber for their operational needs.
- The Senate Bill could provide LPEA with additional opportunities and cost justification to put in large strand counts of fiber so they could possibly lease out some dark fiber to whoever needs it. They would prefer to keep the fiber network an open access network.
- They could work directly with the Town of Bayfield or any broadband provider to get additional broadband into the area. Although that is not their primary objective with what they are trying to do, it is a strong secondary motive.

- LPEA is not interested in trying to get fiber to the home. LPEA does not want to be a retail player. They do want to facilitate the expansion of broadband throughout the area for all the retailers.
- LPEA will most likely not be doing residential. They will provide the dark fiber to someone that needs to do residential. There seem to be plenty of players out there; however, if there were not enough players out there, than LPEA would consider getting into the residential market.
- FastTrack is a middle mile provider. FastTrack will probably pair quite well with what LPEA is trying to do. LPEA is not going to work exclusively with FastTrack. They will try to keep what they are doing a little more open. FastTrack is doing more of a lit fiber model than a dark fiber model.
- FastTrack has considered doing residential; however, their modeling indicates that it would not be cost effective.
- LPEA might be able to take the fiber that is on their transmission lines and open it up commercially. The Senate Bill seems to make it possible to perfect LPEA fiber for telecommunications purposes.
- LPEA is very interested in finding a fiber path east out of Bayfield. This would include a connection over to Pagosa Springs and then connecting to CDOT to go over Wolf Creek Pass. The question is whether CDOT is putting in enough fiber and whether they would be willing to lease that fiber.
- LPEA's goal would be to make it a no brainer for people to lease dark fiber from LPEA. LPEA wants to be a facilitator. They want to provide low-cost fiber in the area, so broadband can keep expanding.
- FastTrack would be interested in doing P3 with the Town of Bayfield. LPEA would be interested in talking about becoming a partner because they really want to see broadband work in the communities. That is one of their strategic goals.
- LPEA has a substation up near Vallecito that they would like to get fiber to. It would be great if they could open that up to commercial use, then there would be a drop point to Forest Lakes and Vallecito.

Region 9 Economic Development District of Southwest Colorado

Date: June 7, 2019

Time: 11:00 am

Attendees:

- Heather Otter, Project Manager

Region 9 Overview:

Region 9 Economic Development District of SW Colorado, Inc., promotes and coordinates economic development efforts throughout Southwest Colorado. Region 9 is led by a board of directors comprised of representatives from 17 local governmental jurisdictions and 9 from the private sector.

Region 9 serves the counties of Archuleta, Dolores, La Plata, Montezuma and San Juan and the cities and towns within those regions, as well as the Southern Ute and the Ute Mountain Ute Indian Tribes.

Region 9 Feedback:

- Region 9 covers the five counties in the southwest part of Colorado, and La Plata County is one of those.
- Region 9 helps develop a comprehensive economic development strategy for the region. The strategy is updated every five years.
- Within the strategy's five-year timeframe, there is a two-year cycle when Region 9 puts together a Community Development Action Plan (CDAP). This is the tactical piece to the larger economic development strategy. In the CDAP there are high, medium and low priority projects. Broadband and services are big on the list.
- Bayfield has some projects on the CDAP, including broadband projects that are under the telecommunications and public infrastructure categories.
- Every two years, Region 9 goes in and updates the progress on the high priority projects. High priority means that they require collaboration between multiple organizations. That the community as a whole sees these projects as important to the economic development and vibrancy of the community.
- The high priority projects typically require funding of some kind. That could be state or maybe Federal funding, including grants. Region 9 plays a part in the documentation and the facilitation of those discussions to make sure everything is updated. Then they have to post those publicly and then they need to help guide people to those documents.
- Often times the Region 9 is invited to high-level meetings such as the meeting that will be taking place with the Bayfield Town Council on July 2. They are invited to these types of meetings just so that they are in the loop. The community typically comes back to Region 9 to ask questions about synergies, funding and to help source grant funding.
- Region 9 is a potential provider of information resources and potentially grants. Not that Region 9 is the grantor, but they are a source to find grants. Region 9 is a hub between the local communities and the state and Federal level.
- Region 9 works very closely with the people at the state's Office of Economic Development and International Trade (OEDIT).
- The role that Region 9 could play for Bayfield is looking at grants and other funding mechanisms or layering. If there are incentives, then Region 9 can play a big part in that. There could be ways to incentivize certain businesses to operate in certain areas.
- Region 9 could also look at enterprise zones that provide state tax credits for certain things. This is more of a down the road thing. If there is broadband that can provide the right services for people to come and operate their businesses. That plays a part and then there are other incentives through the state that they may want to layer with local incentives as a means for building infrastructure.
- Region 9 does a lot of support for small businesses including home-based businesses.
- Region 9 is keenly interested in businesses that are going to create jobs.
- Region 9 has a loan and business-financing arm, so they do offer loans to small businesses.
- In the southwest area, there is an ecosystem of entrepreneurs. There have been several very successful businesses spin off from that.

- Region 9 has seen quite a number of co-worker spaces created. Many of the small towns, including Bayfield, are looking at developing co-working spaces as another way to promote and support small businesses and entrepreneurs. There are lots of incentives and things that Region 9 does to support that environment.
- Region 9 has been doing a lot of work with Opportunity Zones. This could be a part of a P3. This is about matching private investment with communities that are in designated areas.
- Region 9 has working relationships with the people in the towns and the counties within their area, so they are a source for making connections. Region 9 helps other communities not reinvent the wheel. Many of the communities have similar issues around the area.

Southwestern Colorado Council of Governments

Date: June 4, 2019

Time: 1:30 am

Attendees:

- Miriam Gillow-Wiles, Executive Director

SWCCOG Overview:

The Southwest Colorado Council of Governments (SWCCOG) officially formed in December 2009. The SWCCOG promotes regional cooperation and coordination among local governments and between levels of government for the geographic area comprising the Counties of Archuleta, Dolores, La Plata, Montezuma and San Juan. The need for a SWCCOG is based on the recognition that the people of the Region form a single community and are bound together not only physically but economically and socially. It is the purpose of the SWCCOG through its participating membership, staff and programs, to provide local public officials with the means of responding more effectively to the local and regional problems of this regional community.

SWCCOG Feedback:

- Bayfield is a member jurisdiction of the COG.
- The COG's goals are: aging, environment, housing, telecommunications, transportation and tourism. They work on a variety of projects and programs under each of those goals.
- Telecommunications is the one that COG has focused on the most because and this is the area where there is the most need. The COG began by developing the SCAN fiber network.
- SCAN was the first project of regional broadband development in the entire state, so there were a lot of lessons to be learned.
- SCAN was initially used for anchor institutions because of the Senate Bill 152. Since then, the communities have opted out of the Senate Bill 152, and they are using the fiber for dark fiber leases.
- The COG is not an ISP and they are never going to be an ISP.
- The current goal of the COG is to build infrastructure between communities to create a middle mile backbone infrastructure where it does not exist or in areas where there is not usable or available fiber.
- The COG's board has asked the COG staff to put together an agreement for the aggregation of

services so that the members could purchase connectivity together and, therefore, reduce the total cost per Meg. It's purchasing connectivity in bulk.

- The COG has a contract with one ISP (Forethought); however, they would like more than one ISP. Forethought can also provide VoIP Services.
- Bayfield currently does not use SCAN; they are using FastTrack.
- SCAN put in a 48-count fiber into Bayfield. The fiber still exists. Some of it is leased, and the town uses some it for its own assets like a water tower or a sewer treatment plant. The leased fiber serves as a revenue source for the Town.
- Redundancy is an issue across the entire region. There is a severe lack of redundancy. If a fiber gets cut between Bayfield and Durango, then Bayfield is up a creek. There are only two lines out of Durango to Albuquerque and the Grand Junction. Nothing currently to the east to the top of Wolf Creek Pass.
- One of the goals of the COG is to build along 160 to meet CDOTs fiber on the top of Wolf Creek Pass.
- Because this part of the state is so rural, it is hard to make an ROI for any business, which is where local government has to come in to help develop that infrastructure to make that ROI more palatable.
- Trying to figure out what Senate Bill 19-107 means for LPEA. There are some things that need to be worked out with 107 before it can be implemented. They have two months to figure it out. Governor signed on Monday, June 3 in Salida.
- Bayfield did a fiber swap with FastTrack, so they have a fiber loop that runs across the top of the town. There is some SCAN fiber in Bayfield and because Bayfield was forward thinking and put in some conduit when they did some roadwork and they did a fiber swap for dark fiber.
- The COG is focusing on the middle-mile infrastructure trying to build from Utah to the top of Wolf Creek Pass and from New Mexico to Silverton and all parts in between.
- The COG is looking at utilizing the CDOT right of way because they are trying to build infrastructure as well for the future of transportation. The COG could build out the fiber network, and CDOT could piggy back on it.
- The COG will be looking at creating public-public partnerships and some public-private partnerships to build the middle-mile infrastructure.
- Broadband is becoming a critical infrastructure particularly for public safety, so it needs to be part of a holistic asset management system. Communities need to budget for support of it. Fiber does not wear out but equipment on either end does.
- There is never going to be an ROI on middle-mile broadband in southwest Colorado or in a lot of the Rocky Mountain west. This is where the COG is trying to make a difference.

Appendix B: Public Policies

Pavement Degradation Policy

Specifics about the Pavement Degradation Policy are included in section 6.0 *Pavement Restoration* of the Bayfield's *Right-of-Way Regulations* manual. The section states the following:

6.0 PAVEMENT RESTORATION

6.1 Fee

Pavement restoration fees, as set forth in Appendix A, are charged in order to offset a portion of cost directly incurred by the Town due to the Permit Holder electing not to construct a two (2) inch mill and overlay for the length of the cut and full width of the lane, as required by these Regulations. Excavations result in the need to reconstruct the surface and/or subsurface structure of the street earlier than would be required if the excavation or disturbance did not occur. A portion of the Permit fee relates to restoration costs. The cost to substantially restore the pavement to its original condition shall be calculated as the cost to construct a two (2) inch mill and overlay for the length of the cut and the full width of the lane and the PCI of the pavement as set forth below and in Appendix A.

6.2 Fee Determination

The cost of restoration shall be based on the cost to construct a two (2) inch mill and overlay for the length of the cut and the full width of the lane. The unit prices for the Permit fee relating to restoration costs shall be reviewed annually and revised to reflect significant increases or decreases, which will be based on the bid tabulation from the Town's annual Capital Improvement Program ("CIP") overlay project. The unit prices shall be determined by averaging the milling and overlay bid prices and also include a proportionate share of the traffic control and mobilization bid prices and a ten percent (10%) administrative fee. Revised fees shall be approved in accordance with the Bayfield Municipal Code.

6.3 Fee Schedule

Pavement restoration fees, as set forth in Appendix A, will be assessed based on the PCI of the existing pavement surface. PCI information for a specific street segment can be requested through the Designated Representative.

6.3.1 In order to promote coordination and reduce unnecessary expense, a pavement restoration fee will not be assessed for streets included on the current CIP schedule for overlay and reconstruction. A copy of the Town's current CIP schedule may be requested through the Designated Representative. The Town's CIP schedule is subject to change without notice and ultimately depends on budgeting constraints of the Town.

6.3.2 A pavement restoration fee will not be assessed when the Permit Holder or contractor elects to mill and overlay for the length of the cut and the full width of the lane. See Section 6.4.

6.4 Mill and Overlay Instead of Pavement Restoration Fee

The Permit Holder or contractor may elect to mill and overlay for the length of the cut and the full width of the lane to a depth of two (2) inches instead of paying the restoration fee. The following

guidelines shall be used to determine the milling area for the overlay:

6.4.1 Streets with No Lane Striping or Centerline Striping Only

- a. A strip of pavement over the street cut shall be milled to a two (2) inch depth and a width of 12 feet, plus any additional width for the requirement to mill one (1) foot beyond the edges of the pavement cut.*
- b. If the location of the milled strip will result in an edge less than four (4) feet from the street centerline or gutter lip line, the width shall be extended to the street centerline or gutter lip line.*
- c. If the location of the milled strip will result in an edge less than one (1) foot from an existing pavement joint, the width shall be extended to the joint.*
- d. If the location of the milled strip is over the street centerline, the minimum milled width along a centerline shall be four (4) feet.*

6.4.2 Streets with Lane Striping

- a. A strip of pavement over the street cut shall be milled to a two (2) inch depth and a width of one (1) lane, plus any additional width for the requirement to mill one (1) foot beyond the edges of the pavement cut.*
- b. The edges of the milled strip shall be at the lane stripes or centered in a lane.*
- c. If the location of the milled strip will result in an edge less than two (2) feet from an existing pavement joint, the width shall be extended to the joint.*
- d. Increased milling greater than one (1) lane width shall be made in 1/2 lane width increments.*

6.5 Intergovernmental Cooperation

The Designated Representative shall have the authority to waive any of the right-of-way use fees set forth in the Fee Schedule for any Construction Activities or Rehabilitation and Repair Activities associated with a Permit issued to another governmental entity, which may include municipalities, towns, water and sanitation districts, metropolitan districts and intergovernmental authorities. The Designated Representative shall not have any authority to waive the pavement restoration fees as set forth in the Fee Schedule. No waiver of pavement restoration fees shall occur unless a written waiver is obtained from the Designated Representative.



Street Cut Fee Policy

The Street Cut Fee Policy is mentioned several times throughout the *Right-of-Way Regulations* manual. The Street Cut Fee is included in *Appendix A* of the manual, which is the Right-of-Way Fee Schedule.

APPENDIX A					
BAYFIELD RIGHT-OF-WAY PERMIT FEES					
Permit #:			# of Work Days:	App. Date:	
Contractor:					
Project Location or Address:					
Work Description:					
	Unit	Unit Cost	Min. Cost	Quantity	Fee
Administrative Fees (Non-Refundable)					
Construction/Rehabilitation and Repair Activities BASE FEE (required for each permit)	EA	\$ 25.00			\$
Street closure/detour plan review	EA	\$ 175.00			\$
Project and/or plan review					
Arterial/Major Col.	EA	\$ 100.00			\$
Residential/Minor Col.	EA	\$ 40.00			\$
Total Administrative Fees					\$
ROW Activity Fees					
Rehabilitation and Repair activity-1 to 3 locations	EA	\$ 20.00			\$
Rehabilitation and Repair activity-annual fee	EA	\$ 335.00			\$
Excavation-backfill/compaction	SF	\$ 0.05	\$ 75.00		\$
Pavement-cut/subgrade/pave/patch	SF	\$ 0.05	\$ 150.00		\$
Pothole-cut/subgrade/pave/patch	EA	\$ 25.00	\$ 75.00		\$
Concrete-curb/gutter/sidewalk/crosspan	LF	\$ 1.00	\$ 75.00		\$
Traffic control-lane closure/detour	WK	\$ 100.00			\$
Traffic control-sidewalk or trail closure	WK	\$ 100.00			\$
Total ROW Activity Fees					\$
Pavement Restoration Fee					
2-inch mill and overlay for the full lane width in-lieu of restoration fee				Check <input type="checkbox"/>	No Fee
Streets that are on the CIP schedule for rehabilitation-no restoration fee				Check <input type="checkbox"/>	No Fee
Restoration fee-schedule of fees (LF-longest cut dimension in feet)					
PCI	Unit	Unit Cost	Quantity	Fee	
100-90	LF	\$ 16.00		\$	
90-80	LF	\$ 13.60		\$	
80-70	LF	\$ 11.20		\$	
70-60	LF	\$ 8.80		\$	
60-50	LF	\$ 6.40		\$	
50-40	LF	\$ 4.80		\$	
40-30	LF	\$ 3.20		\$	
30-0	LF	\$ 1.60		\$	
Total Payment Restoration Fee					\$
Other Fees					
Technician controlled signal	HR	\$ 75.00	\$ 150.00		\$
After-hours inspection or signal control	HR	\$ 90.00	\$ 180.00		\$
Total Other Fees					\$
Notice of Violation					
Arterial/Major Col.	<input type="checkbox"/> 1-\$500 <input type="checkbox"/> 2-\$1,000 <input type="checkbox"/> 3-\$2,000 <input type="checkbox"/> 4-\$4,000 <input type="checkbox"/> 5 & subsequent-\$8,000				
Residential/Minor Col.	<input type="checkbox"/> 1-\$200 <input type="checkbox"/> 2-\$400 <input type="checkbox"/> 3-\$800 <input type="checkbox"/> 4-\$1,600 <input type="checkbox"/> 5-\$3,200 <input type="checkbox"/> 6 & subsequent-\$6,400				
Total Permit Fee					\$

The specific Street Cut Fee is mentioned on the *Pavement-cut/subgrade/pave/patch* line in the *ROW Activity Fees* section on the Fee Schedule.

Traffic Control Policy

The Traffic Control Policy is included in section 5.3 *Traffic Control* of Bayfield's *Right-of-Way Regulations* manual. The section states the following:

5.3 Traffic Control

5.3.1 General

Construction Activities or Rehabilitation and Repair Activities that involve vehicles, materials or equipment that interfere with the movement of vehicular or pedestrian traffic on any public street must have appropriate traffic control during the activity. Traffic control devices and standards shall be in accordance with the most recent version of the MUTCD. Traffic control plans shall be provided when applying for a Right-of-Way Permit for Construction Activities. Traffic control for Rehabilitation and Repair Activities shall be provided in accordance with the requirements of this section. When required by the Designated Representative, the contractor shall modify the traffic control plan in the field in order to improve traffic flow or safety. Improper installation of traffic control may be cause for a Notice of Violation. All excavations shall be protected and surrounded with safety orange fence and type one barriers with reflective lights.

5.3.2 Traffic Control for Rehabilitation and Repair Activities

- a. Traffic control for Rehabilitation and Repair activities is generally considered to be "short-term stationary," "short-duration" or "mobile," as defined by the MUTCD Chapter 6G. Permit requirements are as follows:*
 - 1. For short-term stationary (daytime work at one (1) location for more than one (1) hour and completed within one (1) day and short-duration work (work in one location for up to one hour), vehicle(s) shall have a rotating beacon/strobe light. An arrow board or arrow stick can be substituted for a rotating beacon/strobe light. A vehicle shall be augmented with arrow panels when working on arterial streets. A minimum of five (5) cones beginning at the back of the vehicle will be spaced at distances equal to the speed limit in feet for each adjacent Traffic Lane.*
 - 2. For mobile work (continuously moving operation with short- duration stops), TA-35 for streets with more than two (2) lanes and TA-17 for two (2) lane streets must be followed. Shadow vehicles must be equipped with arrow panels and proper signs. Cones and attenuators are not required.*
- b. Vehicles and equipment shall not block sidewalks if pedestrians cannot safely pass around them and shall be moved from sidewalks to accommodate disabled people if necessary.*

5.3.3 Minor Traffic Control for Construction Activities

- a. Typical application (TA) plans provided in the MUTCD, Section 6H.01, may be copied and submitted as traffic control plans when work does not involve conditions listed under Section 5.3.4 for major traffic control, such as work within an intersection or a traffic control zone that passes through an intersection.*
- b. The following TA plans are typically used for Right-of-Way Permits: 1, 3, 4, 6,*

15, 16, 17, 18 and 21 through 29. Where the TA plans do not apply, a separate traffic control plan will be required. Applicants are required to comply with the TA plan that is submitted.

- c. Traffic control plans for sidewalk closures are required.*

5.3.4 Major Traffic Control for Construction Activities

A traffic control plan, including any sidewalk closures, shall be prepared by an ATSSA Certified Traffic Control Supervisor and submitted with the Permit application when one (1) or more of the following conditions occur:

- a. The length of the traffic control zone passes through an intersection*
- b. Work occurs within an intersection*
- c. Full street closures are proposed*
- d. Detours are proposed*
- e. When required by the Town Engineer*

5.3.5 Variable Message Boards and Neighborhood Information

- a. Variable Message Boards should be considered and may be required by the Town Engineer for Construction Activities on arterial streets. When proposed or required, message boards will be provided a minimum of 48 hours in advance of the start of construction.*
- b. Neighborhood notification by door hangers or flyers may be required by the Designated Representative when Construction Activities will significantly impact neighborhood traffic. When required, door hangers or flyers will be distributed within an area designated by the Designated Representative a minimum of 48 hours in advance of the start of construction.*
- c. The Designated Representative may require Permit Holders or contractors to provide news release information in significantly affected neighborhoods and meet with homeowner associations in advance of the work to obtain their input and minimize the noise, congestion and inconvenience that will occur.*

5.3.6 Taper Lengths

The minimum taper lengths (L) required for Traffic Lane shall meet the requirements of the MUTCD, Section 6C.08. Where conditions warrant, the Designated Representative reserves the right to require adjustments in taper lengths to conform to the project site requirements and/or limitations.

5.3.7 After-Hours Traffic Controls

Barricades, cones, signs and all other vehicular or pedestrian traffic controls shall be taken out of service after designated working hours unless their use and application are required to ensure the safety of the traveling public. Controls shall be noted on the traffic control plan.

5.3.8 Loop Detectors

Any damage to traffic signal poles, lines and loop detectors shall be immediately reported to the Town at (970) 884-9544.

Conduit/Fiber Colocation Policy

The Conduit/Fiber Colocation Policy can be found in *Subsection 4.2.1 Colocation of Town Infrastructure with Permit Holder's Infrastructure* of *Section 4.2 Terms and Conditions* of Bayfield's *Right-of-Way Regulations Manual*. The section states the following:

4.2.1 Colocation of Town Infrastructure with Permit Holder's Infrastructure

- a. The Town recognizes that it is within its police power to preserve the physical integrity of its streets and highways, control the orderly flow of vehicles and pedestrians and efficiently manage the gas, electric, water, cable, broadband, telephone and other facilities that crisscross its streets and public rights-of-way. It is the Town's policy to efficiently use public rights-of-way for a variety of infrastructure and utilities in order to provide public services; advance the Town's goal of increasing opportunities for access to traffic control, communication and broadband services; limit the frequency of street closures and cutting of public streets and reduce road degradation caused by repeated boring and trenching of public rights-of-way. To this end, the Town requires all Permit Holders proposing Construction Activities that involve directional boring or open trenching within a public right-of-way that extend for more than 1000 feet in length to collocate and install Town conduit simultaneously with the permit Holder's Construction Activity. The Town shall not be restricted in its use of Town conduit installed through a colocation pursuant to this Section 4.2.1. The Town will review all permit applications in a competitively neutral manner and make all permit decisions based on substantial evidence. The Town may, upon initial review of the permit application, determine that the Permit Holder's proposed Construction Activity does not demonstrate a need for colocation of Town infrastructure.*
- b. For any Construction Activity that requires colocation of Town conduit, the Town shall, as a condition of the issuance of the Permit or continued validity of a Permit, require the Entity/Permit Holder to install Town conduit with tracer wire and associated infrastructure, as identified by the Town, concurrent with the installation of the Permit Holder's infrastructure. The requirement for the Entity/Permit Holder to install Town conduit with tracer wire and the associated infrastructure shall be completed after the Town has reviewed and approved all estimated costs associated with the co-location of the Town conduit.*

The Permit Holder shall install the Town conduit with tracer wire adjacent to the Permit Holder's infrastructure and within the same bore or trench alignment.

The Town will bear all costs associated with the colocation, including the Town conduit, pull boxes and all other materials and infrastructure to be installed, including the incremental labor and equipment cost incurred by the Permit Holder (or its contractor or subcontractor) that are reasonably and directly attributable to the required colocation of Town conduit, materials and infrastructure.

Pursuant to Section 3.12 of these Regulations, a completion inspection with the Designated Representative is required. When a colocation of Town conduit is required, this completion inspection shall include physical verification of the installed Town conduit. Upon the Town's request, the Permit Holder shall submit to the Town

signed as-built documentation of the Town's conduit and provide the Town with a Town-approved bill-of-sale or similar document evidencing Town conduit ownership following the colocation. The as-built documentation should also be delivered in the form of 3D GIS data, to within a few inches' accuracy that can be imported into the Town's GIS system.

The Designated Representative may waive Permit fees set forth in the Fee Schedule for any Construction Activities associated with a Town colocation project. All applicable pavement restoration fees, as set forth in the Fee Schedule, shall apply unless and until a written waiver is obtained from the Designated Representative. A Permit Holder may appeal a colocation condition imposed by the Town in accordance with the appeals procedure set forth in Section 7.0 of these Regulations.

Conduit/Fiber Construction Specifications

Section 16 Fiber Optic Cable and Interconnect, of Bayfield's Construction Specifications manual includes conduit/fiber construction specifications. After a thorough review of this section, an update was required to bring this section up to current industry standards. The updated subsection of the Section 16 states the following:

2.2 PERFORMANCE REQUIREMENTS

- A. **Operating Temperature.** *Ensure that the shipping and the operating temperature range of fiber optic cable meets or exceeds -40°C to +75°C (-40° to +167° F) as defined in the environmental requirements section of the NEMA TC 2 standard. Ensure that the installation temperature range of fiber optic cable meets or exceeds -30°C to +60°C (-22° to +140° F), per Telcordia/ Bellcore GR-1221. The operating temperature range of the cable as defined by Telcordia/ Bellcore GR-1221 shall be; -40°C to +70°C (-40°F to 158°F).*
- B. **Bend radius.** *Ensure that the fiber optic cable is capable of withstanding a minimum unloaded bend radius of 10 times the cable diameter (when the long term tension load is less than 800 N or 200 lbs.) and a minimum loaded bend radius of 20 times the cable diameter when loaded to pulling tension of 2700 N (600 lbs.). Test the cable as required in the FOTP- 33A standard. Ensure that bending the fiber optic cable up to the minimum bend radius does not affect the optical characteristics of the fiber.*
- C. **Cable Strength.** *Ensure that the fiber optic cable is capable of withstanding a pulling tension of 2700 N (600 lbs.) during installation without increasing the fiber attenuation more than 0.8 decibel per mile and without changing other optical fiber characteristics after the tensile load is removed. Ensure that optical fiber is proof-tested by the fiber manufacturer at a minimum of 690 Megapascals, MPa (100 kilo pounds per square inch, ksi). Ensure that the cable will withstand 25 impact cycles and the change in attenuation does not exceed 0.2 decibel at 1,550 nanometers when tested according to the requirements as detailed in the FOTP-25B standard. Ensure that the fiber optic cable can withstand a minimum compression load of 860 kilopascals, kPa (125 pounds per square inch, psi) when applied uniformly over the length of the sample at the rate of 0.15 to 0.8 inch per minute and maintained for 10 minutes as defined in the FOTP-41A standard. Ensure that the change in attenuation will not exceed 0.15 decibel during loading at 1,550 nanometers, and that no fiber displays a measurable change in attenuation after load removal.*
- D. **Water Penetration.** *Ensure that the fiber optic cable is capable of withstanding the tests for water penetration defined in the FOTP- 82 standard. Ensure that a one-meter length of cable is*

able to withstand a one-meter static head of water applied at one end for 24 hours without water leaking through the other open cable end.

- E. **Splicing Materials.** *Ensure that all splice enclosures, organizers, cable end preparation tools and procedures are compatible with the fiber optic cable and are approved by the Engineer.*

Splice Enclosures. *Contain all optical fiber splices within a splice enclosure. Ensure that the enclosures provide storage for fiber splices, non-spliced fiber and buffer tubes. The splice closure shall be a stand-alone closure that does not require an outer closure and shall meet the following minimum requirements:*

- 1. The closure shall seal, anchor and protect fiber optic cable splices.*
- 2. The closure shall provide for a minimum of two (2) additional spare entries in addition to the required number of cables being spliced up to a maximum of six (6) total cable entries.*
- 3. The closure shall be suitable for underground applications and shall be water and airtight.*
- 4. The closure shall be of clamshell design or dome type.*

Ensure that the splice enclosure restores the mechanical and environmental integrity of the fiber optic cable, encases the sheath opening in the cable and organizes and stores optical fiber. Ensure all hinges and latching devices are stainless steel. Ensure that the enclosure is airtight and prevents water intrusion. Ensure that the splice enclosure can accommodate pressurization and has the ability to be reentered without requiring specialized tools or equipment. Ensure that the enclosure provides fiber and splice organizers including splice trays and strain relief. Ensure that splice enclosures allow re-entry and are hermetically sealed to protect internal components from environmental hazards such as moisture, insects, and UV light.

Fiber optic splice enclosures shall also comply with the Telcordia/Bellcore GR-771-CORE standard and all applicable NEC requirements. Provide space for future expansion equal to 100 percent of the initial utilization. Provide fiber optic cable penetration end caps to accommodate a minimum installation of two trunk fiber optic cables and two fiber optic drop cables. Ensure that the enclosure end caps are factory-drilled to the proper diameter to accept and seal the fiber optic cable entries. Ensure that the cable entry locations can accommodate an assortment of cables with ODs ranging from 0.45 to 0.55 inch, +10 percent, without jeopardizing the waterproof characteristics of the enclosure. Provide fiber optic splice enclosures meeting the following requirements:

Mechanical
Resist compression deformation to a maximum of 400 pounds.
Withstand an impact energy to a maximum of 40 foot-pounds at 0° F.
Axial Tension: 100 pounds for 30 minutes.
Cable Torsion: ten 90-degree rotations.
Cable Flexing: ten 90-degree bends.
Environmental
Hydrostatic Pressure Head: Up to 20 foot-pounds (-9 pounds per square inch).
Withstand 40 freeze/thaw temperature cycles.
Ultraviolet resistant during a maximum 30-day exposure in compliance with the requirements detailed in the ASTM B117 standard.
Chemical
Withstand a 90-day exposure to solutions of 3% sulfuric acid, 0.2 normal of sodium hydroxide, 10% Igepal®, kerosene, and be fungus resistant as required in the ASTM G21 standard.

- F. **Splice Trays.** Ensure that the splice trays are securely attached and accessible and provide adequate storage for the fiber cable. Ensure the splice trays provide access to individual fibers without disrupting other fibers in the tray. Ensure that the splice trays hold the buffer tubes rigidly in place and provide protection for fusion splices. Ensure that the raceway accommodates the minimum bend radius of the fiber. Ensure that splice trays allow visible inspection of the fiber. Ensure that the splice tray includes a cover with a locking mechanism to hold it in place.
- G. **Cable Terminations.** Use Type ST, SC, LC, or FC connectors only, as specified in the plans or by the Engineer. Ensure that all Type ST, SC, LC, or FC fiber optic connectors, whether factory pre-terminated or field-installed, are ultra-physical contact or angled physical contact, depending upon the type of application, with pre-radiused tips. Ensure that ST and FC connectors include a ceramic ferrule and a metallic body and provide a strain relief mechanism when installed on a single fiber cable that contains strength elements.
- Ensure that Type ST, SC, LC, or FC connectors provides minimum 50-pound pullout strength. Ensure that the optical fiber within the body of all connectors is mechanically isolated from cable tension, bending and twisting.
- Ensure that all connectors are compliant with the TIA/EIA-568-A and TIA/EIA-604 standards, as applicable, and are tested according to the Telcordia/Bellcore GR-326-CORE standard. When tested according to the TIA and EIA's FOTP-171, ensure that the connectors test to an average insertion loss of ≤ 0.4 decibel and a maximum loss of ≤ 0.75 decibel. Test the connectors as detailed in FOTP-107 to reflectance values of ≤ -50 decibels.
- H. **Pre-terminated Connector Assemblies (pigtails).** Ensure that pre-terminated connector assemblies are used for fiber termination. Ensure that the pre-terminated cable assemblies consist of fiber optic cables with factory-installed Type ST, SC, LC or FC connectors on one end of the cable and an un-terminated optical fiber on the other, depending upon the application. Ensure that the pre-terminated connector assemblies are installed with fusion splices. Ensure

that all buffer tubes and fibers are protected once the attachment of pre-terminated connector assemblies is complete.

- I. **Buffer Tube Fan-out Kits.** *Ensure that a buffer tube fan-out kit is installed when fiber optic cables are terminated. Use a kit compatible with the fiber optic cable being terminated and that is color-coded to match the optical fiber color scheme. Ensure that the buffer tube fan-out kit supports 12 fiber strands. Ensure that output tubing and the fiber strands contained therein are of sufficient length for routing and attachment of fiber optic cable to connected electronics or as directed by the Engineer. Ensure that the kit and the connectors are supplied by the same manufacturer.*
- J. **Patch Panels.** *Ensure that the patch panel is compatible with the fiber optic cable being terminated and color-coded to match the optical fiber color scheme. Ensure that the patch panel has a minimum of twelve Type ST, SC, LC or FC panel connectors, depending upon the application. Ensure that the patch panel does not exceed a 14 inches' length by 6 inches' width by 4-inch depth and is suitable for mounting within an approved cabinet at the field device location.*
- K. **Pre-terminated Patch Panels.** *Ensure that the pre-terminated patch panel is a termination panel that includes a factory installed all-dielectric SMF cable stub. Ensure that the panel includes factory-installed and terminated Type ST, SC, LC or FC panel connectors, depending upon the application. Ensure that the cable stub is of adequate length to splice the stub and provide a fiber connection between the panel and the backbone fiber cable or as directed by the Engineer.*
- L. **Field Assembled and Terminated Patch Panels.** *Ensure that the field-assembled patch panel is a termination panel that includes a connector panel and the hardware required to mount the patch panel within an approved cabinet at the field device location and connect the panel to the backbone fiber cable.*
- M. **Connector Panel.** *Ensure that the connector panel provides twelve Type ST, SC, LC or FC, bulkhead-mount coupling connectors, depending upon the application. Ensure that each coupling connector allows connection of a cable terminated on one side of the panel to a cable on the opposite side. Ensure that each bulkhead-mount coupling connector includes a locknut for mounting the connector in predrilled or punched holes in the connector panel.*

Appendix C: Request for Expressions of Interest

Request for Expressions of Interest

Town of Bayfield Broadband Partnership

Release Date: January 3, 2020

Responses Due: February 11, 2020: 5:00 p.m. Mountain

Introduction

The Town of Bayfield, Colorado is situated in the eastern part of La Plata County in southwestern Colorado. It is located about 18 miles east of Durango and 50 miles west of Pagosa Springs on US Highway 160.

Bayfield is a safe, livable community, with a small-town feel striving to become a multigenerational, diverse community that maintains its values while progressively pursuing ongoing sustainability of economic resources, natural resource stewardship and livability. Bayfield is committed to the promotion of a vibrant business community balanced by recreational and educational opportunities in order to foster a unique and complete community for future generations.

The Town of Bayfield was incorporated August 18, 1906, in La Plata County, Colorado. The Town's population is approximately 2,500 residents with 1,039 residential and 90 business rooftops currently being served by Town Utilities.

Bayfield is considering the development and deployment of a fiber to the home network in partnership with potential private sector partners. The partnership envisions the City leveraging state funding to construct a municipal fiber to the curb network (ring design) and identifying a partner willing to leverage DORA funding to assist in creating ubiquitous fiber to the home connectivity throughout Bayfield. In this model, the partner would be responsible for completing the drop construction to each demand location as part of providing the services, and ongoing operations.

Please refer to Appendix A for a map of the proposed fiber ring network.

This Request for Expressions of Interest (EOI) has been initiated to enable the Town to identify one or more partners who would be interested in providing network services to end-users within the Town limits using Town-built fiber infrastructure. The Town seeks input from interested potential partners regarding the terms and conditions under which partners would operate and manage Internet and other network services to homes and businesses over Town-owned fiber.

Bayfield is particularly interested in providers who will use the fiber to provide ultra-high-speed network access. Bayfield defines ultra-high-speed as being in the multiple-hundred megabit to gigabit-per-second range.

One of Bayfield's primary goals of this network is economic development. Broadband enables communities otherwise at a disadvantage to participate on a more equal footing in the emerging global economy. With the Internet as a driving vehicle, many businesses can locate

anywhere—as long as there is enough bandwidth at affordable prices. High tech firms and other companies that rely on high-speed connections will go where they can flourish. Responses to this EOI should state how the respondent’s approach will further the Town’s goals of attracting businesses and residents and encouraging economic retention in the Town.

Bayfield seeks to make the Town a more desirable place for firms and residents—who see the quality of life benefits of broadband both directly through home connections and through enhanced services provided to the business community.

Because this network is an important part of the Town, Bayfield seeks a wired service provider or multiple providers who are interested in providing services to the residents and businesses in the community.

Wired services include the provision of one or more of the following services to end customers in the community: Voice, video and data/broadband content, but services proposed must include at a minimum a fiber to the home broadband connection. Wired services may include other ancillary services typically provided by broadband or cable providers.

Requested Information

There are several central goals to the Town’s municipal fiber to the curb network (ring design) undertaking. Respondents to this EOI and any possible subsequent RFP should indicate whether and how their proposal serves these goals:

- 1. Offer service to any customer connected to or any customer that could be connected to the Town fiber network; serving only limited areas of the Town or specific types of customers is less desirable.*
- 2. Offer unique services and speeds and network performance better than that provided by the incumbent networks in the Town. For example, providing hundreds of megabits or gigabit speeds, providing symmetrical services, providing services that continue operating when commercial power fails, providing service level agreements and providing direct connectivity between locations on the Town fiber.*
- 3. Propose connectivity services to the Town’s business park and other locations where a provider can cost-effectively and competitively connect to commodity Internet and secure cloud services.*
- 4. The Town will likely seek DOLA funding, which will require that the core network be open access. However, the Town is willing to provide a period of exclusivity to a partner. Such exclusivity should be identified, if necessary, by providers responding to this EOI.*
- 5. Respond to the needs of health care providers and patients.*
- 6. Respond to the needs of the large and small businesses connected to the Town fiber.*
- 7. Provide cost-effective services for price-sensitive customers and flexible pricing plans.*

The Town seeks an uninhibited network, where Service Providers may offer a range of services, and network operators are neutral with respect to Service Providers, applications, websites, type of use and type of connection device.

The Town seeks Service Providers who would be interested in offering lit broadband services and partners who would be interested in handling maintenance and operations of the network. The Town also seeks partners who will be interested in extending the Town fiber, if expansion is needed.

For the network to have the intended economic and quality of life impacts, Bayfield considers both cost and availability of service to be important. The Town encourages responses from interested partners that address both to maximize adoption of service.

Response Requirements

Interested parties shall respond to the EOI within 21 business days of release (according to the schedule below) and shall provide the following:

- 1. Affirm that you are interested in this partnership.*
- 2. Provide a statement of experience discussing past performance, capabilities and qualifications. Identify other networks your firm has designed, built, maintained or operated; include the levels of broadband speed, availability and adoption among different categories of end-users and unique capabilities or attributes. Discuss other partnerships with other service providers, government or non-profit entities you have undertaken, particularly any involving dark fiber leasing. Describe the nature of the projects and your firm's role. Explain how your firm is a suitable partner for this project.*
- 3. At a very high level, summarize the technological and operational approach you would use for this project. How would you use technology to meet the Town's goals? What approach would you use to interconnect with the Internet and other public networks? How would you perform network management? Under what scenarios would you require route diversity or other special features in the Town fiber? At what sort of facility (or facilities) would you place network electronics? Would you require direct, dedicated fiber connectivity to all premises or would a passive optical network be suitable in some cases?*
- 4. Summarize the business approach you would use for the project. How would your business plan help meet the Town's goals? What are the key assumptions? What are your main areas of risk and how can the Town help reduce the risks?*
- 5. Describe your previous experience/successes with projects funded from sources such as the Department of Regulatory Affairs (DORA).*
- 6. What is your proposed schedule for implementing service? Offer a timeline with key milestones. Would you be able to begin service before the entire Town was constructed? Are there areas of the Town you would recommend be constructed first?*

7. *What are your requirements for the Town to meet in order for you to partner with the Town on this project? What, if any, are the financial requirements you have of the Town in order to enter into a partnership? If you do not address this question as to financial requirements, it will be assumed that you are interested in the partnership but have no financial requirements whatsoever of the Town.*
8. *What service options would you plan to offer over this network (for example, data only, voice and data, a triple play of voice, data and cable television, etc.)? What download/upload or symmetrical speeds would you offer and guarantee to end-users? How will your residential and business offerings differ? Please propose planned pricing for 100 Mbps, 500 Mbps and 1 Gbps service for residential and business customers.*
9. *Provide a statement of how your proposed participation would help the Town's economic development goals. Describe your interests and plans to hire local contractors and providers in Bayfield and how your participation would help local job creation. Describe your relationships with local businesses in Bayfield as well as your interest and plans to engage them in this project. Describe your relationships with socially and economically disadvantaged small businesses in Bayfield as well as your interest and plans to engage them in this project.*
10. *Provide three (3) references, including contact information, from previous contracts or partnerships.*

Timeline and Process for this EOI

1. *Interested Parties to this EOI should send an email expressing their interest in the project to John Monday, Project Manager for this EOI process. This email should be titled: "The Town of Bayfield Fiber Ring Network EOI" and should be emailed to Mr. Monday at [Email address removed]. Please include a company contact and the contacts name and email address in the body of the expression of interest.*
2. *January 15, 2020: 5:00 p.m. Mountain - Questions on the EOI are due to Mr. Monday.*
3. *January 22, 2020: 5:00 p.m. Mountain - Answers to questions sent to all interested respondents.*
4. *February 11, 2020: EOI responses due by 5:00 p.m Mountain. Responses should be emailed to Mr. Monday at [Email address removed]. Late submissions may not be opened and an email will be sent to those who missed the deadline.*

Questions

Questions may be addressed to John Monday at [Email address removed] and can be submitted via email until January 15, 2020 at 5 p.m. Mountain Time. Questions and responses will be emailed to all interest respondents. You may also call John Monday at [Telephone number removed].

Rights and Disclaimer

HR Green, as the authorized representative of the Town of Bayfield, reserves the right to reject any and all proposals from interested parties, to waive any informalities and/or irregularities in the proposals, to re-advertise, to negotiate with any party for the identified services, to put identified or other services out to bid or to otherwise proceed to provide any identified or other service in the best interest of the Town of Bayfield in its sole discretion.

Any proposal received as a result of this EOI is prepared at the Proposer's expense and becomes the property of the Town of Bayfield. Proposals and all ideas contained therein shall not be deemed proprietary with respect to the Town of Bayfield (unless specifically otherwise stated) and may be used by the Town of Bayfield in any manner deemed in its best interest.

The Town of Bayfield may, at its sole discretion, modify or amend any and all provisions herein. The Town of Bayfield will not pay for any information herein requested or provided in response hereto, nor is it liable for any costs incurred by any responses hereto. The Town of Bayfield reserves the right to extend the Request for Expressions of Interest dates. All changes or clarifications will be emailed to the interested Respondents.

APPENDIX A – Proposed Town Fiber Ring Network Map (Subject to Change)

