Yuma County Broadband Master Plan

Version 1.0

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Magellan ADVISORS
www.magellan-advisors.com
999 18th Street, Suite 3000, Denver, CO 8020

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- The City of Yuma
- The City of Wray
- Yuma County
- Yuma District Hospital and Clinics
- Wray Community District Hospital
- Wray School District
- Yuma School District

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1. Executive Summary

The Cities of Yuma, Wray and Yuma County (believe that affordable, high-speed broadband services are essential to support the needs of our residents, businesses and community anchor organizations across the region. Due to our rural environment, our communities don't have access to the speed and quality of broadband services found in many of Colorado's urbanized communities. This limits the ways our residents and businesses use the Internet and our access to the electronic world. Our public organizations believe that broadband is a key policy issue that should be addressed jointly to have the greatest impact in our communities.

This Broadband Master Plan is a comprehensive planning study that lays out a range of potential strategies and a recommended approach for resolving broadband issues and addressing new opportunities for Yuma's Communities. It provides an assessment of feasible options that the Cities of Wray, Yuma and Yuma County (collectively "Yuma's Communities") can use to improve broadband services, using existing public assets, investments in fiber and wireless infrastructure and partnerships with private broadband providers.

The Plan assesses specific needs and opportunities of Yuma's Communities and lays out a "broadband blueprint" for the design of fiber, wireless and facility infrastructure that would be required to enable high-speed broadband Internet connectivity to residents, businesses and community anchor organizations. It envisions the Cities of Yuma and Wray finding ways to fund the necessary fiber and wireless infrastructure through grants that are available to improve broadband. The Cities will not provide Internet directly to residents and businesses, but rather partner with private broadband providers who will provide Internet and other services over the Cities' fiber and wireless infrastructure.

This plan will enable more residents and businesses to gain access to high-speed Internet services at competitive prices. It will also allow our schools, hospitals, clinics, utilities and municipal organizations to improve their access to the Internet and reduce their costs. This will enable Yuma's Communities to maintain their rural heritage yet stay connected and have access to all of the opportunities the Internet has to offer.

Recommendations

1. **Review and adopt the Yuma Broadband Master Plan;**

2. **Identify and secure professional services that will be required to assist Yuma's Communities implement the Broadband Master Plan;**

3. **Determine an organizational model for the project;**

   a. **Maintain the Broadband Steering Committee; and,**
   b. **Evaluate consortium model, inter-governmental agreements or other structures.**

4. **Earmark existing public assets as "Broadband Ready" that can be contributed to the project;**

   a. **City electric utility poles, supply space or telecom space reservations for new fiber;**
   b. **Other City electric utility assets that may facilitate deployment of fiber;**
   c. **City and County property;**
   d. **"Network rooms" within City or County facilities; and**
   e. **City and County tower assets.**

5. **Review and revise City right of way use and pole attachment policies to support the deployment of new aerial fiber facilities on City infrastructure;**

6. **Determine funding sources for the construction of the infrastructure;**

   a. **Grant funding from the Department of Local Affairs;**
   b. **FCC and USAC funding programs;**
   c. **Local foundations; and**
   d. **Public funding.**

7. **Determine the best options to solicit private project partners, in compliance with Yuma's Communities' public procurement rules and objectives;**

   a. **Develop a solicitation and the "ask" of private operators;**
   b. **Weigh the pros and cons of an exclusive partnership versus an open access network; and**
   c. **Determine the option(s) that best meets community objectives.**

8. **Determine governance model for the partnership(s) and develop Definitive Agreements;**

   a. **Public ownership of infrastructure;**
   b. **Public and private roles and responsibilities;**
   c. **Indemnities and warranties on infrastructure;**
   d. **Capital requirements, revenue and cost sharing; and,**
   e. **Monitoring progress and success.**

2. Broadband Roadmap & Approach

2.1 Background

Yuma County covers an area of 2,370 square miles and is located on the plains of Northeastern Colorado. Bordered on the east by Kansas and Nebraska and on the west by the Front Range Denver metropolitan area, Yuma County is an accessible trade corridor within this tri-state region. Yuma is a county with an overall population of 10,151, which includes the cities of Wray, Colorado with a population of 2,390 and Yuma, Colorado with population of 3,575. The population in the unincorporated County is approximately 4,186. Collectively, this Plan refers to the these three jurisdictions as "Yuma's Communities."

Although Yuma County is a small rural community, it has a strong track record for strong economic sustainability and innovative thinking. Agriculture is at the heart of the economy, around which a diverse range of both agricultural-related and non-agricultural related industries has emerged. The revitalization of rural America depends on those who share the dream to lead the way not only in traditional Agricultural production but also in Agricultural innovation and creative community sustainability.[1] Key to community sustainability is the ability of Yuma's residents, businesses and community organizations to have access to leading edge broadband services. Yuma's Communities believe that abundant, affordable and sustainable broadband is a critical amenity that maintains their rural heritage, quality of life and self-determination.

By overturning Colorado Senate Bill 05-152 in November of 2014, the citizens of Yuma's Communities voted in favor of removing any statutory barriers to pursue any and all legal strategies to provide broadband services, directly or indirectly. After subsequent discussions with citizens, service providers, business owners and elected officials in search of ways to improve broadband in Yuma County, local public organizations began taking steps towards to find long-term solutions to address broadband issues in Yuma's Communities.

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The network has been tailored specifically to serve the needs of Yuma's stakeholders, irrespective of how the network will be financed, built and operated. The network is a "design specification" that Yuma's Communities should strive to achieve as they formulate a targeted action plan to pursue realization of the network. It lays out the critical infrastructure that will allow Yuma's Communities to gain access to high-speed broadband services. The Plan also provides an analysis of the capital and operating costs for this infrastructure to inform Yuma's communities of the capital required to build this infrastructure and lays out a range of options for funding it. It also details the most feasible strategies for the deployment,

[1] http://www.consideryumacounty.com/about_yuma_county.html

management and operation of the network, focused on achievable public-private partnership scenarios that are crucial for overall deployment. Finally, the Plan lays out a roadmap for Yuma's Communities to follow to implement the recommended approach.

2.2 Problem Statement

Yuma's Communities have embarked on this initiative to explore ways to improve broadband in their communities. Yuma's Communities believe that affordable, high-speed broadband services are essential to support the needs of residents, businesses and community anchor organizations across the region. These stakeholders are all utilizing more online applications that require more bandwidth than the current broadband infrastructure supports. In addition, emerging applications will only increase the demand for bandwidth, placing additional strain on existing broadband services and limiting the ways that Yuma's constituents are able to use and benefit from the Internet.

The key broadband issue for Yuma's Communities lies in the lack of investment being made into broadband infrastructure. The economics of Yuma's Communities make it particularly difficult for broadband providers to invest in significant upgrades to their existing copper-based broadband networks. It also creates an obstacle for new providers entering the market. The capital required for a new deployment is even higher than an upgrade of the existing broadband network. It is an economic issue whereby the investments needed to deliver the services that constituents want will not generate the return on investment that broadband providers need to warrant deployment of their capital. This is a common issue found in rural communities that suffer from inadequate broadband services.

2.3 Broadband Economics & Investment in Yuma County

Yuma's Communities can consider a range of options to improve the broadband environment for their constituents. However, it's important that public officials and constituents realize that any meaningful option to expand broadband will require capital investment. As discussed throughout this Study, the current broadband economics in Yuma County will not support these substantial investments from private broadband operators at the rates of return they need to realize today. Secondarily, broadband providers will not accept a lower return on investment unless substitute value exists; or another way to supplement these lower returns. Therefore, it's important for Yuma's Communities to realize that investment from alternative sources is a likely requirement for any significant broadband upgrade in Yuma County. Grant funding, municipal bonds, revenue bonds, foundation funding and tax increment financing are some of the most common options that local governments utilize to supplement private sector investment.

If funding is not available, Yuma's Communities could entice broadband providers to invest in upgrades and new deployments by increasing demand for broadband services. The concept of demand aggregation is important for rural communities to consider as they seek investments in upgraded broadband services from providers. By pooling demand for services from public organizations, businesses and even residents, Yuma's Communities could generate a revenue opportunity large enough for one provider to warrant making some investments necessary to deploy higher-speed broadband services. However, this process would require significant coordination between public organizations, private businesses and residents to ensure a high likelihood that a provider would secure the revenue streams needed to warrant the capital investment. Secondarily yet equally important, Yuma's Communities would likely need to provide this demand pool to a single provider in an exclusive arrangement whereby the provider would again have a high level of certainty that his revenue stream was securitized by subscriptions. The impact of doing so may limit overall competition in Yuma's Communities. "Crowdfunding" has been one strategy that

communities have utilized to aggregate demand for services, exemplified by Google Fiber's project in Kansas City.[2]

These are fundamental concepts that govern rural broadband economics. In essence, they describe the supply and demand environment in Yuma's Communities and why certain business models are recommended over others for Yuma's Communities, including the final recommended approach developed for this Report.

2.4 Changing Broadband Economics Through Public-Private Partnerships

Yuma's Communities must find ways to change the economics surrounding broadband investment in their region. The recommended approach anticipates a public-private partnership between Yuma's Communities and one or more broadband providers to co-fund broadband expansion. This approach provides a blueprint for broadband infrastructure that should be implemented jointly between Yuma County, the Cities of Yuma and Wray and interested broadband providers. It presents a recommended business model and partnership option that these organizations should consider for expanding broadband services using key strengths of the public and private partners, including:

City & County Strengths

- Access to grant funding
- Access to low-cost financing
- Available pole line infrastructure and right of way
- Available property and facilities
- Authority to expedite right of way and permitting

Broadband Provider Strengths

- Providing retail services
- Providing operations and maintenance
- Design and engineering expertise
- Existing knowledge of local markets and consumer preferences
- Existing long-haul networks, content and capacity

The community infrastructure design will interconnect all public organizations with high-capacity fiber to serve municipal, electric utility, education, healthcare and public safety needs, based on input from these organizations conducted in the Study. Using this network as a foundation, the approach recommends partnership with a primary broadband provider who will use this foundational infrastructure to build out further into the community and provide fiber-based broadband services to residents and businesses. In addition, this new infrastructure will support the deployment of more wireless assets that can be used to serve rural residents throughout the County.

The approach anticipates that the community infrastructure will be financed through a combination of grant funding, local public funding, foundation funding and capital from broadband providers. Yuma County and the Cities of Wray and Yuma should strive to own the community infrastructure itself, as it will become a long-term asset of Yuma's Communities that can be used for a variety of communications and technology programs in the future. Ownership will enable Yuma's Communities to maintain an asset that

[2] http://www.nlc.org/find-city-solutions/city-solutions-and-applied-research/infrastructure/gig-city-usa-bringing-google-fiber-to-kansas-city

allows them to support these needs for the next 10 to 20 years.

Yuma's Communities should develop a partnership with one or more broadband providers who will deliver services over the community-owned infrastructure and provide all necessary operations, retail services, management and customer service. Some examples of these partnerships include:

- The City of Huntsville, AL and Google Fiber
  - https://fiber.google.com/cities/huntsville/

- The City of College Station, TX and Wirestar Networks
  - http://www.cstx.gov/index.aspx?recordid=9831&page=3089

This partnership should be based on leveraging the capital investments made in the community infrastructure to incentivize broadband providers to deliver retail services over it. By reducing the investment required to expand broadband services, Yuma's Communities may change the economics that prevent broadband providers from making investments to upgrade services. Since the community infrastructure is a significant portion of the overall cost of deploying broadband services, Yuma's Communities can lower the barrier to investment that exists today.

2.5 Recommended Strategy

The rural, low-density environment in Yuma's Communities creates a challenging environment to attract broadband investment from traditional carriers and broadband providers. Although incumbents have made some incremental investments over time and have gestured that some of their federal grant funding dollars may be earmarked for Yuma's Communities, a number of issues remain for Yuma's Communities that are an obstacle for achieving significant broadband improvement:

1. Available funding pools from the Connect America Fund II ("CAF II")[3] remain limited for census tracts within Yuma's Communities;
2. There is a lack of clarity on whether CAF II funding will be deployed locally;
3. There is no clear timeline that indicates when enhanced services would be available; and
4. CAF II funding (and other broadband subsidies) deployed by current incumbents are unlikely to deliver long-term solutions to meet the broadband bandwidth, quality and reliability needs

Further, relying on any private sector providers to enact significant broadband improvements in the timeframes that Yuma's Communities' require is unlikely to occur. Rather, these improvements will be made on an "opportunity basis" in instances when providers can reasonably ensure that capital deployed will yield their required return on investment. Investments will likely be made unevenly within the communities whereby some residents and businesses may have improved access to broadband while others do not. This is particularly likely in Yuma's rural communities. These rural areas present a challenging business case for any provider deploying private capital and seeking a reasonable return on the investment. In summary, incremental upgrades will improve the local environment; however, there is no guarantee when, where and how it will happen.

The key obstacle to improving broadband in Yuma's Communities is the cost of constructing new fiber and wireless infrastructure. To improve the broadband environment on a countywide basis, a master plan for

[3] https://www.fcc.gov/general/connect-america-fund-caf

fiber and wireless infrastructure investment is required. Yuma's Communities must play an active role in determining who will pay for the infrastructure and how private operators can make use of this infrastructure to deliver leading edge broadband services to residents, businesses and community organizations.

This Plan does not recommend that either of the Cities or the County provide retail services directly, rather it recommends that they collectively own certain portions of the fiber and wireless infrastructure and partner with private operators to use it to deploy enhanced broadband services. Ownership of the infrastructure allows Yuma's Communities to maintain control of a key infrastructure asset, support their future municipal and utility needs and incentivize private operators to deploy enhanced broadband services to residents and businesses by reducing the capital investment barriers to entry.

Funding will most likely be required from the public organizations, sourced directly or via grants. This funding would be used to build the required fiber and wireless infrastructure needed to form the "backbone" of the network, connect public facilities and interconnect with private operators. If Yuma's Communities commit to building (and owning) the infrastructure, an opportunity exists for local broadband providers to partner with Yuma's Communities to use this infrastructure and deliver enhanced broadband services on a widespread basis. Public-private partnerships ("P3s") leverage the low-cost financing, grant funding and infrastructure management capabilities of local governments coupled with the operational experience of private broadband providers. Building the infrastructure will eliminate the key barrier to entry that limits private operators from deploying enhanced broadband services into Yuma's Communities. Therefore, the recommended broadband strategy for Yuma's Communities is to develop a plan to fund the required infrastructure and forge one or more partnerships with private operators to deliver enhanced broadband to Yuma's Communities.

2.6 Benefits to Yuma's Communities

Ownership of fiber infrastructure will enable Yuma's Communities to possess a technology and communications asset that will serve public needs for the next 10-20 years. The community infrastructure will become a strategic resource that Yuma's Communities leverage to support municipal, utility, educational, healthcare and broadband needs. The fiber network will help protect community anchors from future bandwidth constraints and increases in telecommunications costs. In partnership with broadband providers, it can also deliver the fastest and most reliable Internet services to residents and businesses in Yuma's Communities. A summary of the benefits includes:

Municipal Operations

- Provide high-speed connectivity between City facilities and consolidate government IT functions;
- Enable better electronic collaboration between the Cities and County;
- Reduce connectivity issues between sites that lead to operational inefficiencies;
- Support public safety needs for additional connectivity and
- Support technology sharing programs to reduce cost across the three public jurisdictions; and,
- Enable greater security for City data and operations

Utility Operations

- Support future advanced metering to manage electric demand more efficiently and reduce costs;
- Enable grid automation that enables more efficient demand response and reduces outages;

- Support future development of "behind the meter" applications such as smart home and potentially drive new revenue opportunities; and,
- Provide greater security to support SCADA telemetry data and protect the grid.

Economic Development

- Provide a true differentiator to businesses looking to maintain a rural presence yet have access to high-speed broadband connectivity;
- Support the technology needs of Yuma's Communities' agri-businesses by deploying fiber and wireless infrastructure to support smart farming and precision agriculture;
- Stabilize and reduce the cost of doing business in Yuma's Communities by making affordable high-speed broadband available to current businesses; and,
- Use broadband as an incentive in conjunction with other economic development programs to attract new businesses to the County.

Education

- Provide a redundant source of high-speed connectivity that will complement current EAGLE-Net connections that serve the Yuma and Wray school districts;
- Support both school districts' take home technology programs by supporting a path to better broadband connectivity in the home;
- Enable redundant connectivity for Morgan Community College to support online programs;
- Enable local connectivity between school districts and other community organizations that may facilitate more collaboration and reduce technology costs.

Healthcare

- Support the telehealth and telemedicine programs being implemented by Yuma's Communities healthcare providers and clinics, improving patient care and reducing travel time for healthcare professionals and citizens;
- Support video transmission for remote facilities to support real-time access to healthcare information; and,
- Provide infrastructure needed to enable hospitals with redundant fiber connectivity to the Internet and Colorado Telehealth Network.

Quality of Life

- Provide infrastructure that delivers state-of-the-art amenities to residents and businesses while preserving Yuma's rural heritage;
- Allow residents and businesses to access all of the opportunities that the Internet has to offer;
- Support more stable connectivity for telecommuters and home-based businesses;
- Support local self-reliance by owning and controlling essential communications infrastructure; and,
- Enable residents and businesses to flourish in the rural environment yet stay connected to the rest of the world.

2.7 Partnership Design & Roles

The goal of the broadband partnership is to use the strengths of each entity to add value to the partnership itself. The following table illustrates the ideal roles of each party in a proposed broadband public-private partnership. The ideal partnership would allow Yuma's Communities to remain "passive owners" of infrastructure, provide the funding vehicle for the construction of the backbone network. The

private partner(s) would assume operations and maintenance functions by taking over all management functions of the community infrastructure and alleviating Yuma's Communities of these responsibilities. The specific roles and responsibilities should be conveyed in a definitive agreement that memorializes the duties of the parties within the partnership.

Yuma's Communities will likely be responsible for funding the backbone fiber, equipment to interconnect their facilities and any City or County property needed to deploy the network, collectively the "backbone network." The backbone network is envisioned as a publicly owned community infrastructure that facilitates the needs of the Cities and County to support municipal and community anchor connectivity. However, the backbone network will also become an asset that the partner(s) will use to deliver retail broadband services to residents and businesses. The backbone network, funded by Yuma's Communities will reduce the overall cost of deployment for the partner; however, the partner(s) will still be responsible for funding the distribution fiber, drops, wireless distribution and any equipment needed to provide retail broadband services to residents and businesses.

Function	Partner	Yuma's Communities	Owner's Representative
Funding	• Distribution Fiber • Drops • Home Equipment • Wireless Distribution	• Backbone Fiber • Equipment to Connect Community Sites • Facilities & Data Rooms	
Project Management	X	X	X
Permitting & ROW	X	X	
Design/Engineering	X		
QA/QC on Design/Engineering	X		X
Warranties on Design/Engineering	X		
Construction	X		
QA/QC on Construction	X		X
Warranties on Construction	X		
Outside Plant O&M	X		
Outside Plant Repairs	X		
Network Operations & Upgrades	X		
Customer Service	X		
Billing & Provisioning	X		

** The fourth column labeled "Owner's Representative" is an independent third party agent working on behalf of Yuma's Communities to ensure that their interests are represented in the construction of the network.*

2.8 Open Access Considerations

An important consideration for Yuma's Communities is whether to pursue open access or an exclusive broadband public-private partnership. Open access enables multiple broadband providers to deliver services to businesses and residents over a single network that is owned independently of these providers. In this case, Yuma's Communities would be the owners. Open access is compelling because it enables consumers to choose from multiple broadband providers and improves both price and service competition among the providers operating on the network.

However, open access development in the US has been primarily an "academic" endeavor that has gained growing attention in the community broadband arena. In reality, very few "true" open access networks that serve residential and business subscribers exist today. Many existing networks have features of open-access; however, they generally only provide services to businesses, community organizations and wholesale operators.

Several examples of "true" open access networks that have been successful at attracting multiple providers to serve business and residential customers include:

- The City of Palm Coast, FiberNET
  https://www.palmcoastgov.com/fibernet

- Chelan County, WA
  https://www.chelanpud.org/my-pud-services/residential-services/fiber-optics

Open access networks often face key factors that many times challenge their financial sustainability. A summary of challenges facing residential open access networks includes:

- Residential open access generally requires a large market size to support multiple providers
- Residential open access rates can be difficult to sustain to participating broadband providers
- Broadband providers are sometimes hesitant to use a network they don't own and control

Yuma's Communities shouldn't rule out an open access option for the proposed network; however, there is a high likelihood that due to the small market size, it will be challenging to incentivize multiple broadband providers to compete with one another over such a network. As mentioned in the previous section, demand aggregation is critical to spur new investment and partnerships with Yuma's Communities. If that demand is partitioned among multiple providers, it will reduce the incentives for each broadband provider to invest and/or partner with Yuma's Communities.

Yuma's Communities must weigh the tradeoffs carefully between an exclusive partnership and an open access network. An exclusive partnership is likely to be more successful given the small market size; however, Yuma's Communities must be willing to accept that a single provider is likely to dominate the market and competition will be limited. Conversely, open access may be a challenge to realize entirely without Yuma's Communities making nearly all capital investments required to build and operate the network.

3. Proposed Network Overview, Operations & Management

3.1 Network Overview

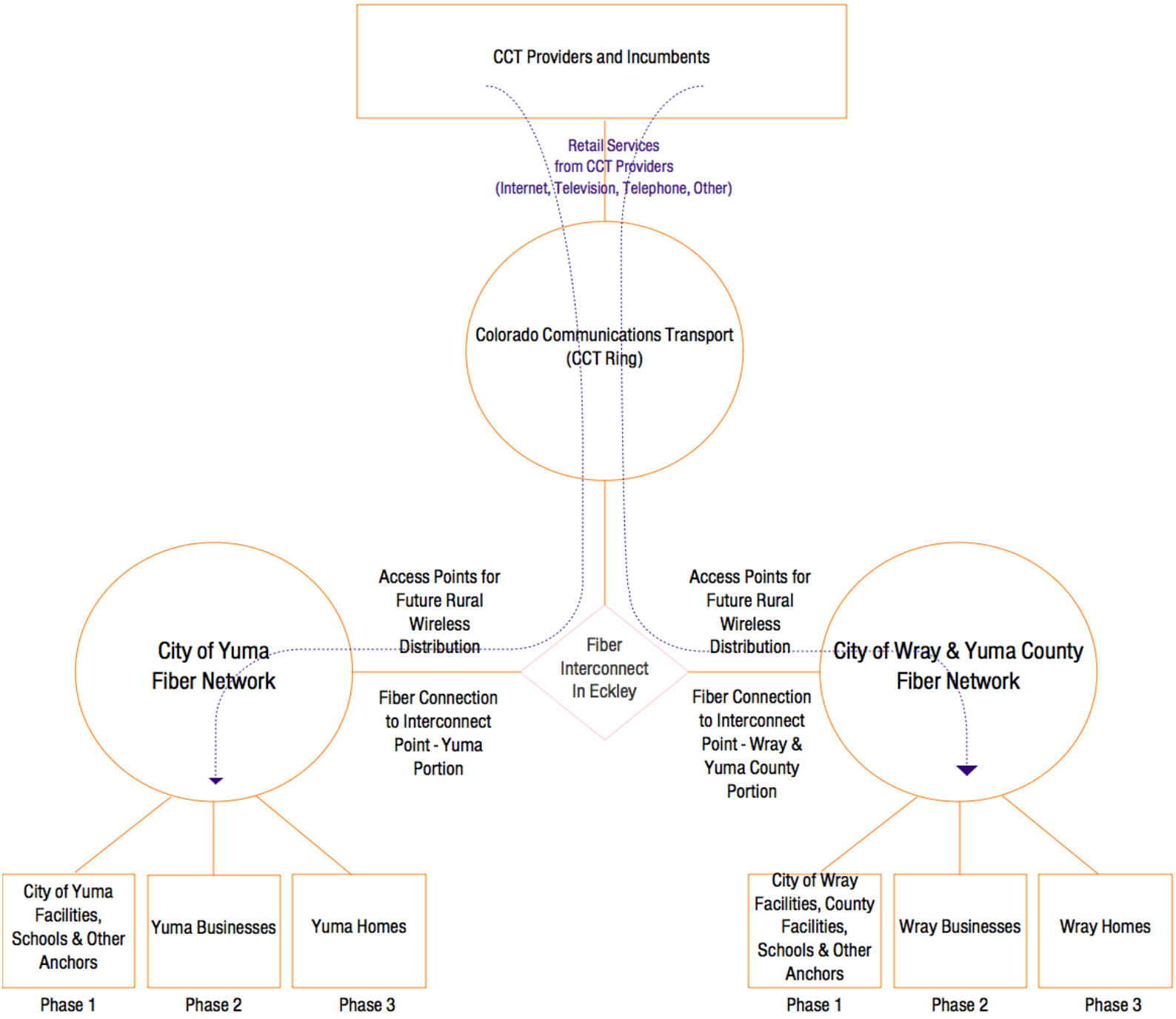
Fiber is the gold standard for municipal communications, broadband services, and Internet access. Over 2,000 cities in the US own some form of municipal fiber networks and have used them for decades to support their operations. These networks are becoming increasingly important to cope with the rapid growth in connected devices, from utility assets, to street lights, to traffic signals, to surveillance cameras. Cities that maintain fiber networks are able to accommodate these "smart city" technologies that make them more efficient, reduce cost and increase the value they deliver to their constituents.

The Cities of Yuma and Wray will be equipped with high-capacity fiber backbones that run throughout the major thoroughfares within each City. The network should be value engineered at the lowest cost possible, yet maintain high performance and reliability metrics. Each City should consider using its existing utility poles for new installation of aerial fiber. Using these resources allows for significantly lower construction costs versus the alternative of underground fiber installation. The Cities should also consider how their current electric utility resources, line crews and equipment may be used to reduce overall operational costs for construction and maintenance of the network.

The primary fiber backbone will interconnect key City and County sites, providing high-capacity, redundant fiber for their internal operations and to support future utility needs. The backbone will be constructed of 288-count fiber, which may be installed using ADSS (All-Dielectric Self Supporting) cable on existing utility poles or as stranded fiber lashed to existing cable or strength members. Specific materials and installation techniques should be determined through a full engineering design and analysis in conjunction with each City's electric utility.

The backbone will be built with distribution points at key locations throughout the network. This will enable broadband providers and/or exclusive partners to use the backbone network as a "jumping off point" to extend their networks deeper into the community to serve business and residential customers. Yuma's Communities can share excess capacity in the backbone network with providers that they will use to deliver broadband services, the terms of which should be defined in the definitive agreement with the partner(s).

The exact terms of a partnership or open access network will define the buildout plan for the network; however, this approach anticipates that broadband providers will be responsible for funding the fiber distribution and drop network components to individual homes and businesses. They will also be responsible for any wireless distribution points that are deployed off of the backbone network. A full list of the sites and interconnection points for the network is included in Section 3.2, followed by conceptual network design maps and breakdown of the total costs for the network.


CCT Providers and Incumbents
Retail Services
from CCT Providers
(Internet, Television, Telephone, Other)
Colorado Communications Transport
(CCT Ring)
Access Points for
Future Rural
Wireless
Distribution
Access Points for
Future Rural
Wireless
Distribution
City of Yuma
Fiber Network
Fiber
Interconnect
In Eckley
City of Wray & Yuma County
Fiber Network
Fiber Connection
to Interconnect
Point - Yuma
Portion
Fiber Connection
to Interconnect
Point - Wray &
Yuma County
Portion
City of Yuma
Facilities,
Schools & Other
Anchors
Yuma Businesses
Yuma Homes
City of Wray
Facilities, County
Facilities,
Schools & Other
Anchors
Wray Businesses
Wray Homes
Phase 1
Phase 2
Phase 3
Phase 1
Phase 2
Phase 3

3.2 Sites to Connect & Interconnection Points

City of Yuma

Site Name	Street Address
Yuma School District Office	418 S Main St, Yuma, CO 80759
Yuma High School	1000 S Albany St, Yuma, CO 80759
Yuma Middle School	500 S Elm St, Yuma, CO 80759
Kenneth P Morris Elementary School	416 S Elm St, Yuma, CO 80759
Yuma City Hall	910 S Main St, Yuma, CO 80759
Yuma Public Library	910 S Main St, Yuma, CO 80759
Yuma District Hospital	1000 W 8th Ave, Yuma, CO 80759
Yuma Police Station	216 E 3rd Ave, Yuma, CO 80759
Yuma Fire Station	200 S Buffalo St, Yuma, CO 80759
Yuma Ambulance Barn	302 E 2nd Ave, Yuma, CO 80759
Yuma Community Center	421 E 2nd Ave, Yuma, CO 80759
Yuma Public Works	215 W Railroad Ave, Yuma, CO 80759
Yuma Swimming pool	101 S Elm St, Yuma, CO 80759
Yuma Wastewater Plant	County Road G & Highway 34

City of Wray & Yuma County

Wray School District Office	30222 County Rd 35, Wray, CO 80758
High School	30074 County Rd 35, Wray, CO 80758
Middle School	620 W 7th St, Wray, CO 80758
Elementary School	30204 County Rd 35, Wray, CO 80758
Town Hall	245 W 4th St, Wray, CO 80758
Wray Community District Hospital	1017 W 7th St, Wray, CO 80758
Wray Police Station	326 W 4th St, Wray, CO 80758
Wray Fire Station	145 Main St, Wray, CO 80758
Wray Ambulatory	304 W 3rd St, Wray, CO 80758
Wray Public Works	150 Ash St, Wray, CO 80758
Wray Public Library	621 Blake St, Wray, CO 80758
Morgan State Community College	32415 US-34, Wray, CO 80758
Wray Municipal Airport	Hadley Rd, Wray, CO 80758
Yuma County, Sheriff's Office & Courts	310 Ash St # L, Wray, CO 80758
Yuma County Roads & Bridges Office	1310 Blake Street, Wray, CO 80758
Hillcrest Care Center	360 Canyon Ct, Wray, CO 80758
Wray Water Tank	Near Hillcrest Care Center

Interconnection Points with Broadband Providers

Eckley Interconnection Option 1	Intersection of State Road 34 and SE Main St, Eckley, CO
Eckley Interconnection Option 2	Intersection of State Road 34 and County Road T-5

Yuma Interconnection Point	EagleNET/Zayo – Yuma City Hall
Wray Interconnection Point	EagleNET/Zayo – Wray Public Library

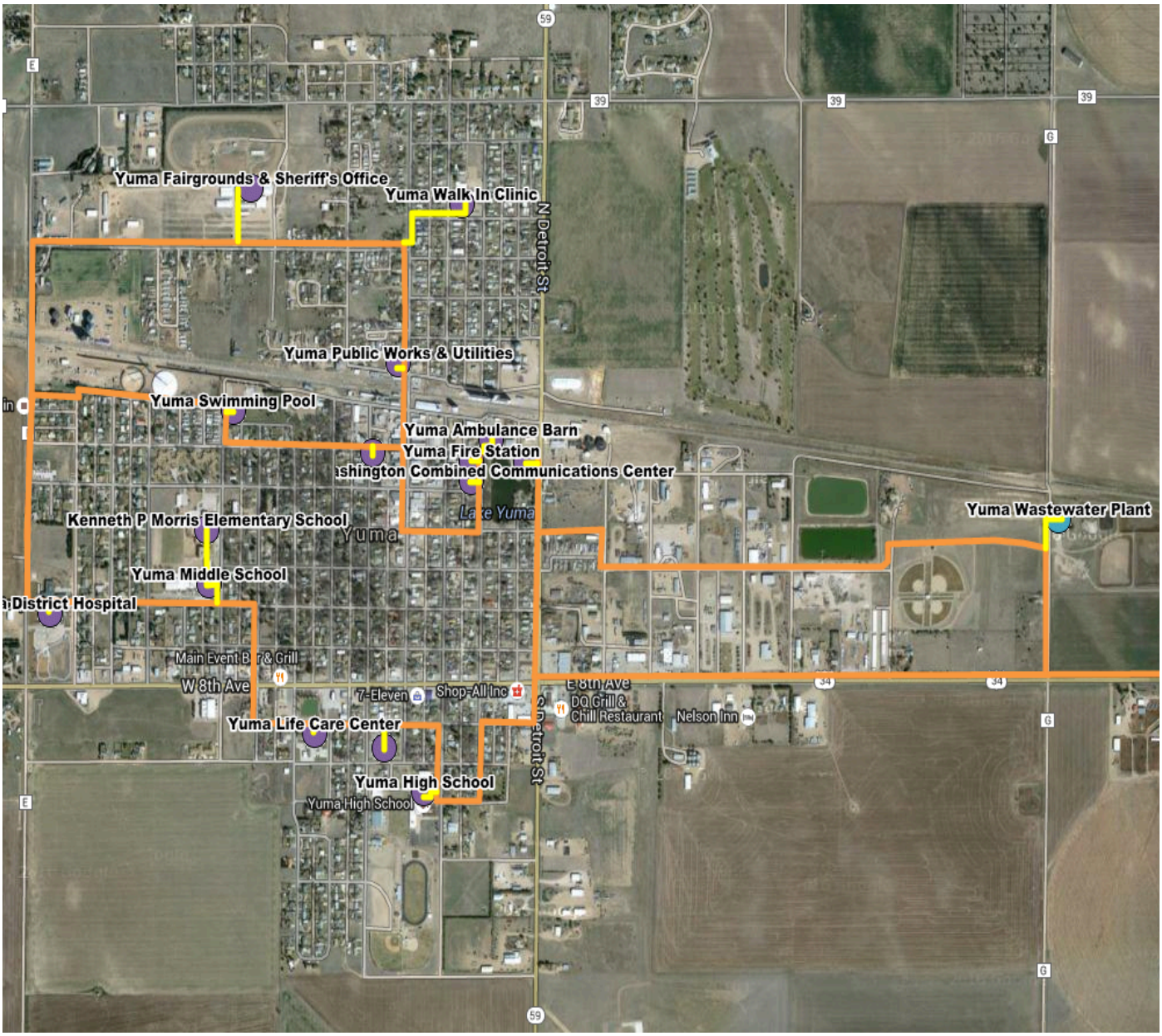
Fiber Access Points for Future Rural Wireless Broadband Distribution

Yuma Community Network	State Road 34 Fiber Route From Yuma to Eckley
Wray Community Network	State Road 34 Fiber Route From Wray to Eckley

List of Potential Providers to Interconnect

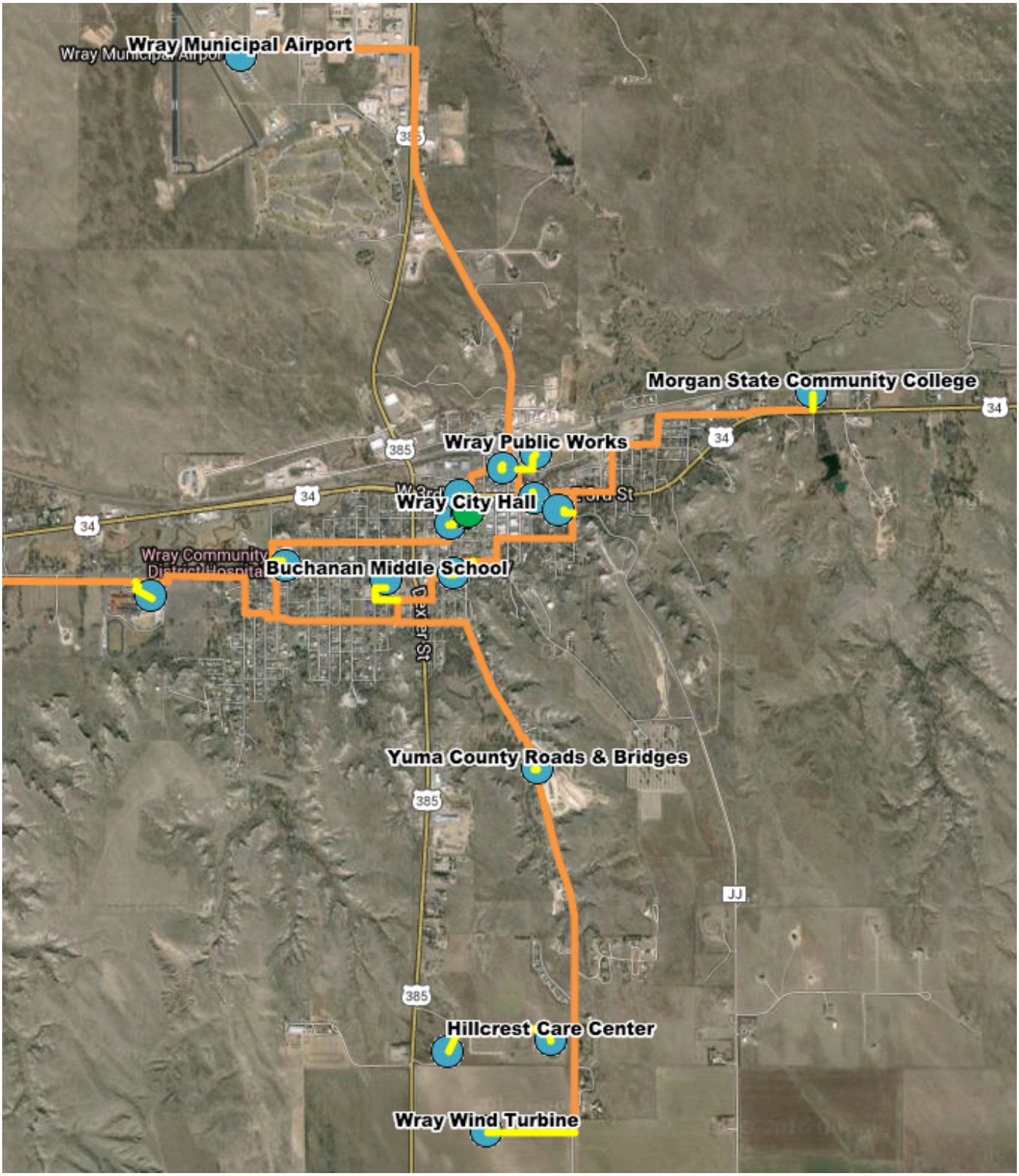
Agate Mutual Telephone	www.prairenetwork.net
Eastern Slope Rural Telephone Association, Inc.	www.esrta.coop
Nunn Telephone Company	www.nunntel.com
PC Telcom - my.pctelcom.coop	www.mypctelecom.coop
Peetz Cooperative Telephone Company	www.peetzplace.com
Plains Cooperative Telephone Company	www.plainstel.com
Roggen Telephone Cooperative Company -	www.rtebb.net
Stoneham Cooperative Telephone Corporation	not available
Wiggins Telephone Association - www.wigginstel.com	www.wigginstel.com
Willard Telephone Company	not available
Zayo Group – www.zayo.com	www.zayo.com
CenturyLink	www.centurylink.com

3.3 Yuma Backbone Fiber Infrastructure Design & Costs



CAPITAL COSTS						
Network Segment	**Feet**	**Total Footage**	**Aerial %**	**Underground %**	**Aerial Cost**	**Underground Cost**
Backbone Ring North	11,344	14,747	70%	30%	$98,069	$84,059
Eckley Extension	64,500	83,850	0%	100%		$545,025
Backbone Ring South	14,993	19,491	70%	30%	$129,614	$111,098
Backbone Ring East	5,890	7,657	70%	30%	$35,644	$15,276
	96,727	**125,745**			**Backbone Ring Total Capital**	**$1,018,785**
Sheriff's Office Lateral	476	619	50%	50%	$2,939	$5,879
Walk In Clinic Lateral	990	1287	50%	50%	$6,113	$12,227
Public Works Lateral	260	338	50%	50%	$1,606	$3,211
Centennial Mental Health Lateral	365	475	50%	50%	$2,254	$4,508
Yuma Public Library Lateral	160	208	50%	50%	$988	$1,976
Police Department & CCC Lateral	234	304	50%	50%	$1,445	$2,890
Yuma Fire Station Lateral	201	261	50%	50%	$1,241	$2,482
Yuma Community Center Lateral	301	391	50%	50%	$1,859	$3,717
Yuma City Hall Lateral	425	552	50%	50%	$2,624	$5,249
Yuma Middle School Lateral	268	34	50%	50%	$1,655	$3,310
Yuma Ambulance Barn Lateral	213	276	50%	50%	$1,315	$2,631
Yuma District Hospital Lateral	235	305	50%	50%	$1,451	$2,902
Yuma Life Care Center Lateral	145	188	50%	50%	$895	$1,791
Yuma High School Lateral	219	284	50%	50%	$1,352	$2,705
Yuma Swimming Pool Lateral	125	163	50%	50%	$772	$1,544
Yuma Wastewater Plant	150	195	50%	50%	$1,622	$4,63
	4,767	**5,880**			**Lateral Total Capital**	**$87,153**
					Yuma Network Total Capital	**$1,105,938**

3.4 City of Wray & Yuma County Backbone Fiber Infrastructure Design & Costs



CAPITAL COSTS						
	Feet	Total Footage	Aerial %	Underground %	Aerial Cost	Underground Cost
Backbone Route1	3,226	4,193	70%	30%	$27,889	$23,905
Backbone Route2	4,152	5,398	70%	30%	$35,894	$30,766
Backbone Route3	4,812	6,256	70%	30%	$41,600	$35,657
Backbone Route4	2,054	2,670	70%	30%	$17,757	$15,220
Backbone Route5	2,342	3,045	70%	30%	$20,247	$17,354
Eckley Extension	71,655	93,152		100%		$605,485
Backbone Route 6	7,358	9,566	70%	30%	$63,610	$54,523
Backbone Route 7	10,205	13,267	70%	30%	$88,220	$75,618
	105,804	**137,547**			**Backbone Ring Total Capital**	**$1,153,745**
Centennial Mental Health Lateral	162	211	50%	50%	$1,000	$2,001
Yuma County & Sheriff's Lateral	204	265	50%	50%	$1,260	$2,519
Wray City Hall Lateral	192	250	50%	50%	$1,186	$2,371
Wray Ambulance Service Lateral	401	521	50%	50%	$2,476	$4,952
Wray Fire Department Lateral	180	234	50%	50%	$1,112	$2,223
Wray Police Department Lateral	254	330	50%	50%	$1,568	$3,137
Wray Public Library	195	254	50%	50%	$1,204	$2,408
Wray Community Hospital Lateral	359	467	50%	50%	$2,217	$4,434
Buchanan Middle School	413	537	50%	50%	$2,550	$5,101
Hillcrest, Tank & Turbine Laterals	2010	2,613	80%	20%	$19,859	$9,929
	2360	**3,068**			**Lateral Total Capital**	**$73,507**
					Wray & Yuma County Network Total	**$1,227,252**

3.5 Summary of Total Costs

Capital Costs	City of Yuma	City of Wray & Yuma County
Backbone Fiber	$473,760	$548,260
Lateral Fiber Extensions to Community Sites	$87,153	$73,507
Eckley Extension to Reach CCT Ring*	$545,025	$605,485
Required Equipment	$52,500	$35,000
Optional Equipment (If Open Access Option is Selected))	$100,000	$100,000
Optional Management Systems (If Open Access Option is Selected)	$70,000	$70,000
Total Capital Costs	**$1,328,438**	**$1,432,252**
Annual Operating Costs	**City of Yuma**	**City of Wray & Yuma County**
Fiber Operations & Maintenance	$15,000	$15,000
Equipment & Software Maintenance (Enterprise Equipment Only for Community Anchors, Not Broadband)	$25,000	$25,000
Staffing Required (2 FTEs to Manage Both Networks, Network Engineering)	$150,000	$150,000
Total Annual Operating Costs	**$190,000**	**$190,000**

**Eckley extension to reach CCT ring is a significant cost in the overall project. Yuma and Wray should discuss a joint build with one or more of the CCT providers to reduce the total cost to the Cities and County.*

4. Broadband Expansion to Residents & Businesses

4.1 Deployment Phases

Deployment of the network will be subject to a number of factors that include:

1. Total funding available;
2. Timing of funds;
3. Allocation of funds among Yuma's Communities and partner(s); and,
4. Deployment schedule for partner(s).

Community broadband projects generally follow a phased deployment whereby the network backbone is built first, followed by an expansion to connect to businesses, followed by an expansion to reach residents. This approach is employed to:

1. Allocate capital where the greatest need exists;
2. Connect the largest customers first; and,
3. Connect the customers that generate the greatest revenues to sustain the network.

For Yuma's Communities, this approach should be used as more of a guideline than a specific plan for deployment. Since Yuma's Communities are relatively small, it's likely that multiple phases could be deployed simultaneously.

4.2 Community Anchor Network

Yuma's Communities should strive to connect the community organizations to the backbone as a first step in deploying the overall network. This will provide the foundation through which subsequent buildouts to reach businesses and residents will occur. The backbone will provide a redundant network that connects community organizations listed in Section 3.2. 12-24 count lateral fibers will be spliced from the backbone to each location and a terminating fiber panel installed in an equipment room within each site. From the panel, each site will have 6-12 fiber ports to connect to local Ethernet switches, through which each site will connect to one another. This Study has budgeted for new Ethernet switches at each site to terminate fibers.

Although existing equipment may already be available, these switches will provide a demarcation point at each location for the backbone ring and separate equipment that may be managed and monitored by broadband partner(s). This Plan anticipates that a third-party will manage the community anchor network

on behalf of Yuma's Communities to minimize any operational or staffing increases that the network may place on the Cities or County. Installing Ethernet switches at each site will allow partner(s) to more easily manage the community anchor network to support the organizations connected to it.

4.3 Expansion to Businesses & Residents

This Plan envisions the partner(s) using the community infrastructure as a "jumping off point" to deploy last-mile infrastructure to reach businesses and residents. It is envisioned that the partner(s) will negotiate a long-term lease or IRU ("Indefeasible Rights of Use[4]") with Yuma's Communities for use of the backbone network to provide continuity that will serve businesses and residents. Negotiating the terms of this agreement may be complex and Yuma's Communities should seek subject matter expertise in the telecommunications industry that have negotiated these on behalf of public organizations. This work would fall into the "Owner's Representative" function described in Section 2.4, Partnership Design & Roles.

The community backbone should be constructed with high-count fibers of at least 288 strands to allow sufficient capacity to support feeder/distribution network deployment and reach premises across both Cities. It should also be equipped with access and splice points at key locations running along the backbone, allowing partner(s) to tap into the backbone at many points to support fiber extensions to premises. This also holds true for wireless assets that providers may wish to deploy deeper into rural communities to provide fixed wireless broadband services.

This plan anticipates that the partner(s) will utilize a GPON or Active Ethernet based deployment for business and residential services. The preferred option is GPON, which will allow the partner(s) to conserve dark fibers on the backbone network and employ higher density fiber in the last-mile. However, the specific architecture should be determined in the pre-deployment plan and the negotiations with the potential partner(s). If the partner(s) plans to deploy Active Ethernet to businesses and residents, upsizing the backbone fiber may be required to allow the partner to provide capacity back to the interconnection point in Eckley or another location. If the partner(s) plan to deploy Ethernet electronics in the field within each City, upsizing the backbone fiber cable may not be necessary. This case holds true with GPON deployment as well. The specific design will depend on the partner(s) selected for the project and should be agreed on subsequent to this Study in the negotiations with such partner(s).

The partner(s) will likely provide the funding for the expansion to residents and businesses, unless Yuma's Communities determine that it is in their best interest to own the last mile and can obtain funding to do so. Yuma's Communities may desire to negotiate a joint build of the last-mile fiber and possible contribution of funding that would warrant some ownership in the last-mile network. This would allow Yuma's Communities to own some fiber assets down to each individual home and business, which could provide value for future smart grid automation and other municipal and utility functions.

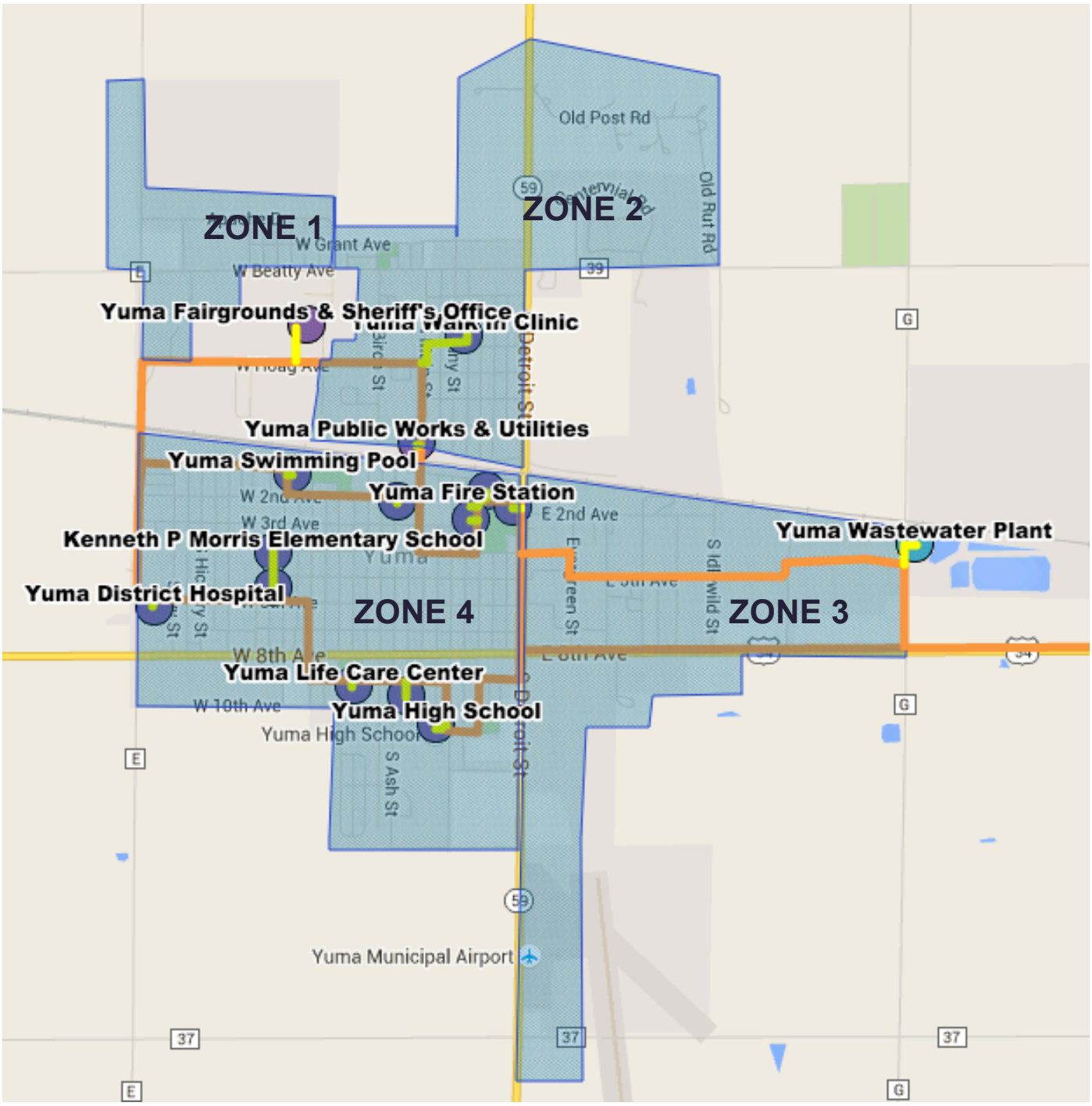
The partner(s) will be expected to own fiber distribution hubs, cabinets, splitters and equipment to provide broadband services on the network. The partner(s) will be responsible for sourcing and providing all retail content and services over the network, as described in Section 2.4, Partnership Design & Roles. Yuma's Communities should also strive to shift operations and management responsibilities for the network in

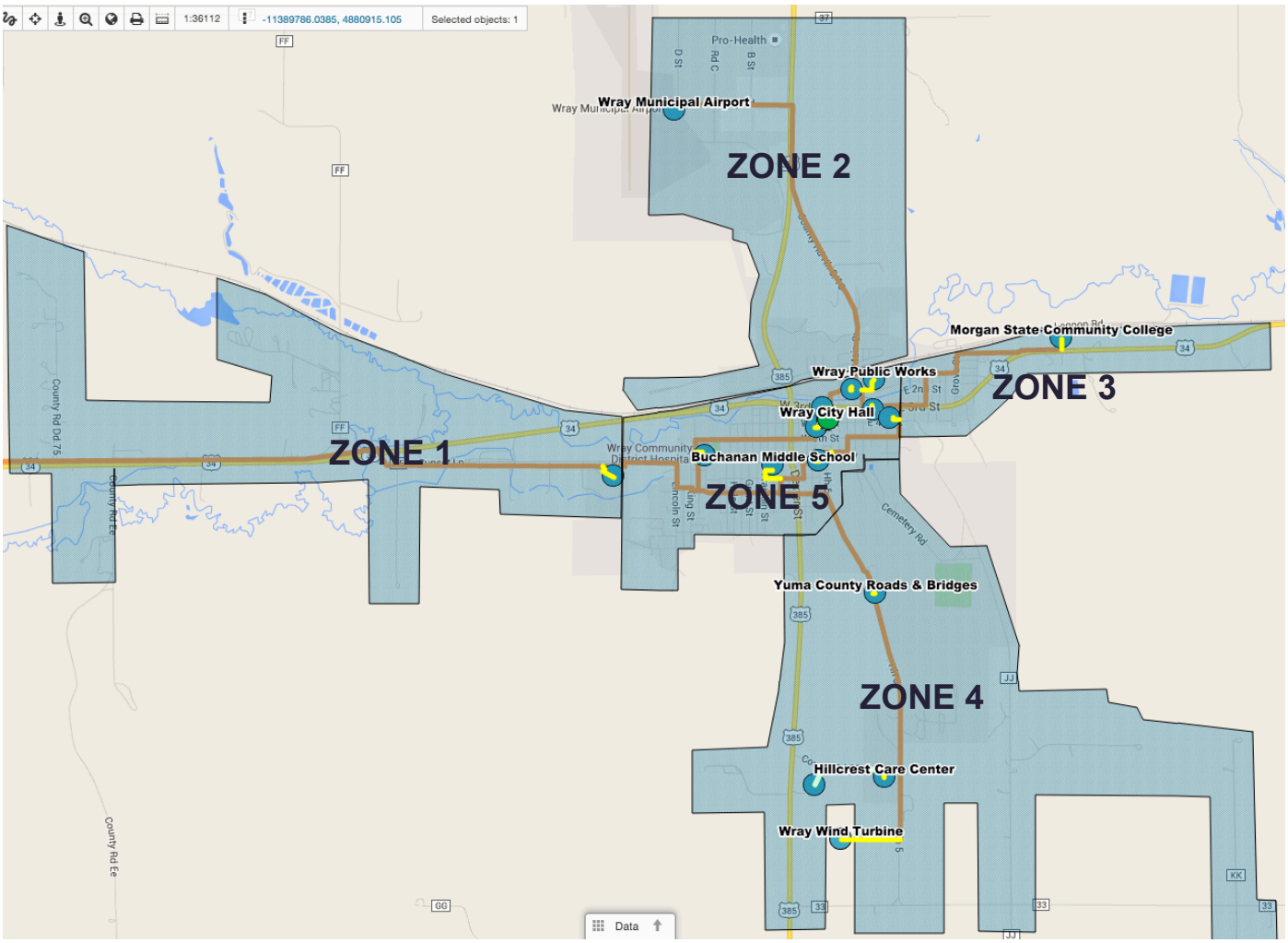
[4] **Indefeasible right of use** (IRU) is a permanent contractual agreement that cannot be undone, between the owners of a communications system and a customer of that system. The word "indefeasible" means "not capable of being annulled, or voided, or undone." The customer purchases the right to use a certain amount of the capacity of the system, for a specified number of years. IRU contracts are almost always long term, commonly lasting 10 to 30 years.

whole to the partner(s), including outside plant maintenance, network operations, provisioning, billing and customer service. The goal is to minimize operational load falling on Yuma's Communities and shift these functions to a partner(s) that has the economies of scale to absorb them more easily.

4.4 FTTP Design for the Cities of Yuma and Wray

Service zones for residential and commercial fiber to the premise connectivity have been conceptually designed in the map below, providing about 98% coverage to all homes and businesses within each City. Each City's pole line infrastructure was utilized to provide routing for distribution fiber to minimize cost of construction and improve the overall momentum of deployment. The maps below lay out the zones to be equipped with fiber distribution hubs ("FDHs") and distribution to pedestals. A full engineering analysis will determine whether aerial or underground drops should be run to homes and businesses. Leveraging each City's pole line infrastructure should reduce the cost of aerial drops to each home; however, this analysis should be conducted with each City's utility engineers and fiber engineering design contractor.


ZONE 1
ZONE 2
ZONE 3
ZONE 4
Yuma Fairgrounds & Sheriff's Office
Yuma Walk-in Clinic
Yuma Public Works & Utilities
Yuma Swimming Pool
Yuma Fire Station
Kenneth P Morris Elementary School
Yuma Wastewater Plant
Yuma District Hospital
Yuma Life Care Center
Yuma High School
Old Post Rd
Old Rut Rd
W Grant Ave
W Beatty Ave
W Hoag Ave
W 2nd Ave
W 3rd Ave
E 2nd Ave
W 8th Ave
E 8th Ave
W 10th Ave
Yuma High School
Detroit St
S Ash St
S Idlewild St
Yuma Municipal Airport



Total households counted in the design were 1279 in the City of Yuma and 896 in the City of Wray. Based on these small overall house counts, the electronics to serve both Cities can be consolidated, minimizing overall deployment costs for the provider. The FTTP design anticipates only one GPON optical line terminals ("OLT") is required to serve each City, minimizing the cost of electronics for deployment.

Zones have varied number of households and businesses. FDH cabinets for each zone should be sized appropriately to accommodate connections to homes and businesses and based on total market demand. FDH sizing should be determined by the partner(s), based on the overall deployment plan for the network. The specific layout and boundary for each zone should also be value engineered in the full engineering design to determine any potential cost savings. The following section lays out the estimated costs required to deploy FTTP services into the two communities by the private partner(s).

4.5 FTTP Cost Estimates in the Cities of Yuma and Wray

Item	Assumption	Variable	City of Yuma	City of Wray
Households	House counts from city boundaries and aerial survey of each City		1,279	896
Estimated Homes Subscribing	Assumes average uptake of 50% based on similar municipal broadband projects across rural and suburban communities.	50%	640	448
Businesses	Estimated business counts based on aerial survey, additional refinement may be required.		194	129
Estimated Businesses Subscribing	Assumes average uptake of 50% based on similar municipal broadband projects across rural and suburban communities.	50%	97	65
Total Premises Passed	Total residential and commercial parcels		1,473	1,025
Total Estimated Subscribers	50% of total residential and commercial parcels		737	513
Feeder/Distribution Costs	Average feeder/distribution cost would be $795 without the backbone fiber build. With the build, feeder/distribution drops to $350 per premise. Includes 70% aerial, 30% underground installation, FDHs and pedestals. Labor & materials.	$350	$515,550	$358,750
Fiber Drop Costs	2 fiber aerial drop from pedestal to the home. Transitions off poles. Splicing at the pedestal. Labor & materials.	$375	$276,188	$192,188
Optical Network Terminals	Gigabit ONT with 2 onboard GE ports, 1 ATA RJ-11, 1 HPNA	$305	$224,633	$156,313
Optical Line Terminals	7 slot GPON chassis equipped with 2 8-port GPON line cards, SFPs, AC power, installation & commissioning, spares	$46,000	$46,000	$46,000
In-Home Wiring	Variable costs - 50% of premises requiring new inside wiring, CAT5, labor & materials.	$100	$36,825	$25,625
Total FTTP Capital Costs			**$1,099,195**	**$778,875**

4.6 Expansion to Rural Areas of Yuma County

Expansion of the backbone network will supply excess fiber that could be used to expand wireless deployments to rural residents in Yuma's Communities. The economics of rural Yuma County challenge the business case for widespread deployment of fixed wireless today. In some areas of the County, additional tower infrastructure or leasing would be required to serve rural residents on a widespread basis. There is a marginally sufficient business case to deploy additional towers and wireless assets for the sole purpose of providing residential broadband services. Magellan evaluated the business cases for (1) new deployment of towers and (2) new leases on existing commercial towers to provide expanded wireless coverage to residents in rural Yuma County. In most cases, we could not forecast a positive return on investment in these locations and the ones that did establish a positive return did not generate this return until after 20 years of operations.

In conjunction with the community infrastructure deployment, excess capacity in the fiber backbone can be easily utilized to provide fiber connection points for vertical assets along these routes. Instead of deploying large towers, smaller, less costly monopoles and fixed wireless or wimax technologies could be deployed to reduce the overall cost of providing the service to residents along these routes. This would be particularly useful along Route 34 connecting Wray and Yuma to Eckley as well as surrounding each City boundary.

Fixed wireless along these routes could achieve speeds of 15-30 megabits per second using an unlicensed spectrum in a 2-3 mile range on either side of Route 34 and at the boundaries of the fiber plant, including the backbone and distribution network. This would improve current residential speeds in some rural portions of central Yuma County. Higher speeds are always available utilizing licensed microwave connections; however the costs of the equipment, licensing and management may be considerably higher and reduce the business case opportunity for providers to serve these residents at prices they can afford.

Serving rural residents should be incorporated into the public-private partnership as a potential requirement of Yuma's Communities assuming a partial business case exists to do so. In an RFP to solicit a private partner, Yuma's Communities should clearly lay out the need to serve the rural portions of the County and seek partners that have wireless experience providing these services in rural communities.

Existing wireless assets should be utilized wherever possible to reduce overall costs. The cost model that follows provides guidance to planning wireless deployments where little or no coverage exists today. Conservative estimates on new wireless sites equipped with monopoles, fixed wireless unlicensed sector antennas, power, cabinets and fiber connectivity are estimated at $60,500 each; however, these costs may depend on the specific locations for installation, line of sight requirements, tree cover and other factors.

These numbers should be used as a guide to assess the financial feasibility of serving rural areas. Wireless service could be provided within 1-3 miles of each wireless site, depending again on the terrain and topographical factors of the particular location. Yuma's Communities in conjunction with potential partner(s) should identify key areas for these sites and make a determination whether the economics will allow deployments to rural residents. It's also possible for Yuma's Communities to successfully fund these wireless sites through various broadband grant program, in which case, they should be included as part of the grant to build the backbone fiber network. A follow-up task to this Report should include the determination of how wireless sites may be deployed in the project.

Item	Assumption	City of Wray
Monopole Structure	50" monopole, pad, foundation and cabinet, labor and materials, permitting, civil work	$45,000
4-Sector Antenna	Equipment, Engineering, Line & Antenna Work, Cabling, Power, labor and materials	$12,000
Fiber Interconnection	Underground conduit, vault installation, enclosures, splicing and termination	$3,500
Total Costs Per Wireless Site		$60,500

5. Funding Resources

The following sections lay out potential funding sources and strategies that Yuma's Communities should consider for the deployment of the backbone network. A number of broadband grant and loan programs exist at state and federal levels; however, Yuma's Communities should identify the most reasonable programs for which they qualify and focus their efforts on pursuing the ones that will have the highest chance of being funded. Only broadband funding programs that have direct applicability to Yuma's Communities are included in this section to ensure they pursue only the most relevant programs.

5.1 Colorado Department of Local Affairs Broadband Program

The Colorado Department of Local Affairs ("DOLA") Broadband Program provides grant funding to local government organizations to build key middle-mile fiber and wireless infrastructure. It requires a sustainable plan to operate and maintain the infrastructure, which can be achieved in conjunction with broadband providers or other organizations through public-private partnerships. Many Colorado local governments have applied for funds for broadband planning; however, a few have also applied for funds to build infrastructure, including Rio Blanco County, Region 10 and the Town of Estes Park.

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% *(Yuma's Communities will need to identify how the other 50% will be funded for the program)*
- 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)

Funding Amounts

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

Funding to Date as of December 2015

- Awarded – About $12,000,000
- Pending – About $6,000,000
- Available – About $2,000,000 *(Time is of the essence to apply)*

5.2 USDA RUS Community Connect Grant Program 2016

The Community Connect Grant Program helps fund broadband deployment into rural communities where it is not yet economically viable for private sector providers to deliver service. Eligible applications include state and local governments, federally-recognized Tribes, non-profit organizations and for-profit corporations. Eligible areas include those rural areas that lack at least 3Mbp download plus upload speeds. Although many of Yuma's Communities already have this level of access, some very rural residents may not have access to even basic broadband services, for which this grant could apply. In these cases, it is expected that a wireless solution would be provided to rural residents, which is covered under the Community Connect program.

Use of Funding

- The construction, acquisition, or leasing of facilities, spectrum, land or buildings used to deploy broadband service for:
    - all residential and business customers located within the Proposed Funded Service Area (PFSA)
    - all participating critical community facilities (such as public schools, fire stations, and public libraries)
- The cost of providing broadband service free of charge to the critical community facilities for 2 years
- Less than 10% of the grant amount or up to $150,000 may be used for the improvement, expansion, construction or acquisition of a community center that provides online access to the public.

Other Requirements

- Buildings constructed with grant funds must be located on property owned by the awardee
- Leasing expenses are covered through advance of funds period included in the award documents
- Grantees must have legal authority to provide, construct, operate and maintain the network
- Partnerships with other federal, state, local, private and non-profit entities are encouraged

- For additional detail see Code of Federal Regulations 7 CFR, Part 1739.

Funding Amounts

- Source: Rural Utilities Service Telecommunications Fund
- Amount: $20.4 million set aside

Funding to Date

- Awaiting notice of funding availability

5.3 EDA Public Works Fund Grants and Loans

Under the Economic Development Assistance programs (EDAP) Federal Funding Opportunity (FFO) announcement, EDA will make construction, non-construction, and revolving loan fund investments under the Public Works and Economic Adjustment Assistance (EAA) Programs[5]. The funding number for this program is EDAP2016. Grants made under these programs will leverage regional assets to support the implementation of regional economic development strategies designed to create jobs, leverage private capital, encourage economic development, and strengthen America's ability to compete in the global marketplace.

To date, the EDA has only made several broadband-related grants under this program, focused primarily on funding facilities that support broadband connectivity and data centers. This funding program should be evaluated if EDA funding could support the buildout of Yuma's Communities interconnection facilities that would provide buildings or interior space for fiber termination, equipment and other broadband-related uses.

Eligible Entities

- Nonprofits having a 501(c)(3) status with the IRS, other than institutions of higher education
- Private institutions of higher education
- Native American tribal organizations (other than Federally recognized tribal governments)
- Nonprofits that do not have a 501(c)(3) status with the IRS, other than institutions of higher education
- Special district governments
- City or township governments
- Others (see text field entitled "Additional Information on Eligibility" for clarification)
- County governments
- State governments
- Native American tribal governments (Federally recognized)
- Public and State controlled institutions of higher education

Funding Amounts

- Source: EDA Public Works Fund
- Amount: $99 million, Public Works Program

[5] https://www.eda.gov/funding-opportunities/

- Amount: $35 million, Economic Adjustment Assistance Program

5.4 USDA RUS Broadband Loan Program

On April 8 2016, the Department of Agriculture's (USDA) Rural Utilities Service (RUS) published a Notice of Solicitation of Applications (NOSA) in the Federal Register for the Rural Broadband Access Loan and Loan Guarantee Program (the Broadband Program) for Fiscal year 2016. Applications will be accepted from April 8, 2016 through July 7, 2016. The Broadband Program provides loans for the construction, improvement and acquisition of facilities and equipment.

Eligible Entities

- Corporations
- Limited Liability Companies
- Cooperatives
- State or Local governments
- Indian Tribes or Tribal organizations

Other Requirements

- The Broadband Lending Speed is the new broadband service offered by the applicant, which must meet a minimum of 10 MB downstream and 1 MB upstream for both fixed and mobile services to the customer.
- RUS defines a rural area as one which is not located within (i) A city, town, or incorporated area that has a population of greater than 20,000 inhabitants; or (ii) An urbanized area contiguous and adjacent to a city or town that has a population of greater than 50,000 inhabitants.

Funding Amounts

- Source: Rural Utilities Service Broadband Loan Program
- Amount: $100,000 to $10 million

Funding to Date

- Not available

5.5 Colorado Telehealth Network ("CTN") & Healthcare Connect

CTN is the federally designated provider for Colorado's health care broadband infrastructure. CTN works in partnership with health information technology entities in the state. CTN became fully operational in the first quarter of 2012, one of the first in the nation to achieve this distinction. No other state receiving such FCC support has used their funds to create such a far-reaching, all-inclusive network. CTN advances policy goals and health outcomes to rural and underserved communities through promotion of:

Presently CTN provides subsidized broadband connectivity to 200 behavioral and physical health care sites in Colorado. CTN has also launched a statewide image exchange service, the Colorado Image Exchange, providing a vender-neutral archive for storage and retrieval of clinical and diagnostic images. With the effort proposed here, CTN's goal is to further maximize access to health care services through the

statewide adoption of telehealth services as an integral component of the Colorado health care delivery system.

For Yuma's Communities, CTN can assist local healthcare organizations apply for and receive subsidies for broadband connectivity to support their healthcare needs. CTN provides assistance in rural communities to help them receive high-speed connectivity to support growing need. For the Yuma and Wray District Hospitals and clinics in the area, this would allow for upgraded connectivity beyond what these organizations are able to receive today, at subsidized rates.

5.6 Colorado Broadband Fund

The Broadband Deployment Board (Board) established through HB14-1328 provides grants from the Broadband Fund (Fund) to deploy broadband service in unserved areas of the state. Unserved areas lie outside of municipal boundaries or in a city with a population of fewer than 5,000 inhabitants and consist of one of more contiguous census blocks in which a majority of households lack access to at least one provider of a broadband network that uses satellite technology and, at least, one provider that uses non-satellite technology.

Unserved areas are also any portion of a state or interstate highway corridor that lacks access to a provider of a broadband network. For the purposes of the Broadband Fund broadband networks are defined as those that provide internet service at measurable speeds of at least 25 megabits per second downstream and at least 3 megabits per second upstream with sufficiently low latency to allow for real-time communications and have either no usage limits or usage limits that are reasonably comparable to those found in urban areas for the same technology.

Grants from the Fund can provide up to 75 percent of infrastructure project costs. Grants may only be awarded to for-profit entities; except that a nonprofit telephone cooperative or a nonprofit rural electric association that existed on May 10, 2014, is also eligible. The Board awards money from the Broadband Fund per statutory requirements and Board policy.

Although the Cities and County may not qualify for this funding directly as public organizations, there are a number of other entities that could potentially apply for funds, including local rural electric associations such as the Y-W Electric Association, current telephone coops or potentially through the formation of a new coop with members from existing independent operators and/or broadband providers.